Managing the business case development in inter-organizational IT projects:

A methodology and its application

Silja Mareike Eckartz

MANAGING THE BUSINESS CASE DEVELOPMENT IN INTER-ORGANIZATIONAL IT PROJECTS: A METHODOLOGY AND ITS APPLICATION

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MANAGING THE BUSINESS CASE DEVELOPMENT IN INTER-ORGANIZATIONAL IT PROJECTS: A METHODOLOGY AND ITS APPLICATION

DISSERTATION

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Prof.dr. H. Brinksma,
on account of the decision of the graduation committee,
to be publicly defended
on Friday the 31st of August 2012 at 16.45

by

Silja Mareike Eckartz

born on 31 July 1985
in Wipperfürth, Germany

This PhD dissertation has been approved by:

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"Show a little faith, there is magic in the night!" (Thunder Road, Bruce Springsteen)

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Silja Mareike Eckartz
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Abstract

The business case (BC) is an artifact that is used to justify an investment in terms of its expected costs, benefits and risks. In the field of IT it is commonly used to justify an investment into an IT project in order to get the investment approval from upper management. Decision makers also may use the business case to compare different projects within a portfolio and decide into which they want to invest money. While the general role of business cases in single organizations is rather clear and subject to most BC research, its role and importance in an inter-organizational setting are less articulated and researched. The inter-organizational setting in this PhD research refers to multiple profit and loss responsible units that are working together in a project to jointly implement an IT system. Such profit and loss responsible units can either be different business units within one multinational or different companies within a business network.

The fact that the role of the BC is rather clear in single organizations, however, does not mean that everything goes as planned and the expected benefits are achieved in time and within budget. Uncertainties related to both the cost and the benefit estimations included in the BC, may interfere greatly with the realization of the BC itself. While the estimation of the costs is a well-understood problem in a mature research domain, the specification of the benefits is often more challenging and less well understood and researched. In line with previous research we find that current knowledge and practices on benefits estimation are not satisfactory and many projects fail to realize their anticipated benefits.

In this thesis we provide a better understanding of the problem of BC development in general, and in inter-organizational settings in particular. The research yields the following outputs/deliverables:

Based on literature we develop a conceptual model that helps to identify and understand the mechanisms in place in such a setting.

Following design science as main research paradigm we develop our business case for inter-organizational projects (BC4IOP) methodology specifically for this problem domain. Our methodology supports stakeholders in inter-organizational projects with the assessment and management of the benefits as well as the distribution of costs of a joint investment. It provides participants with a platform and process that initiates and supports discussion. The methodology consists of the following three independent but complementary components:

- BM4IOP: a comprehensive benefits management method;
- VM4IOP: a method that explores how a network creates value and what the impact is on business case development;
- SID4IOP: a method that supports stakeholders to achieve agreement on the cost distribution of a shared project, by structurally disclosing more information.

We follow a multi-method research approach where we use a variety of techniques, such as interviews, surveys, iterative design cycles and focus groups with experts to design the components underlying the BC4IOP methodology and the methodology itself. We validate our methodology by conducting (i) five case

studies in different multinationals and (ii) four experiments with experts from academy and industry.

Our empirical results confirm that developing a shared BC in an inter-organizational setting is more complex than in intra-organizational settings. The BC4IOP methodology is found to be feasible and useful in inter-organizational settings. It helps to overcome challenges typically found during the BCD process when stakeholders have different goals and no centralized decision-making power.

The methodology is able to overcome these challenges by, among others, providing structure and a way to handle sensitive stakeholder information and encouraging in-depth discussion among project participants.

We conclude that it is the combination of: the *identification and specification* of costs and benefits for an *individual BC* and the *decision* about the cost and benefit distribution in a *shared BC*, that make BC4IOP a strong and unique methodology.

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List of Abbreviations

AHP	Analytical hierarchy process
ASAP	AcceleratedSAP
BC	Business case
BC4IOP	Business case for inter-organizational projects
BCD	Business case development
BDN	Benefit dependency network
BM	Benefits management
BM4IOP	Benefits management for inter-organizational projects
BO	Barge operator
BU	Business unit
COCOMO	Constructive cost model
COSYSMO	Constructive systems engineering cost model
COTS	Commercial off-the-shelf
CRM	Customer relationship management
CSF	Critical success factor
DCF	Discounted cash flow
DYA	Dynamic architecture
ERP	Enterprise resource planning
ES	Enterprise system
EU	European union
FPA	Function point analysis
GDSS	Group decision support system
IOS	Inter-organizational system
IOP	Inter-organizational project
IS	Information system
IT	Information technology
KPI	Key performance indicator
LCC	Life cycle costing
MC	Multiple choice
MCDM	Multi criteria decision making
MSP	Managing successful projects
NPV	Net present value
P3O	Portfolio, program and project offices
PAR	Participatory action research
PAT	Planning apart together
ROI	Return on investment
PPM	Project portfolio management
RQ	Research question
SAAS	Software as a service
SID	Structured information disclosure
SID4IOP	Structured information disclosure for inter-organizational projects
SLIM	Software lifecycle management
SLR	Systematic literature review
SMART	Specific, measurable, attainable, relevant, time-bound

SME	Small and medium enterprises
SSC	Shared service center
STOF	Service, technology, organization, finance
SWOT	Strengths, weaknesses, opportunities & threats
TCO	Total cost of ownership
TO	Terminal operator
UDC	Unit of data collection
VM	Value model
VM4IOP	Value model for inter-organizational projects

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1

Introduction & Motivation

"Es geht nicht um ein Stück vom Kuchen es geht um die ganze Bäckerei"
(Brücke in Berlin)

1.1 Research motivation

Large IT implementations, such as implementations of Enterprise Systems (ES) often have an impact on the entire organization or even on a network of several organizations. In order to ensure that this impact is in line with the business goals and that the implementation is indeed valuable for the entire organization, the project needs to be carefully evaluated. A business case (BC) can help in making a well-argued decision about whether to implement an IT system by thoroughly investigating and describing the main rationale behind the IT investment project. It helps the project participants to analyze, discuss and specify the value for the IT adopting organization, the costs of the entire implementation process and the benefits that can be achieved by using the system. The business case can help project managers to compare different investment options, including vendor and package selection and is also valuable on a portfolio management level. Portfolio managers can compare the BC of different investment options when deciding about their project portfolio.

Cost-benefit analysis forms the basis behind every BC and describes the systematic process for calculating the costs and benefits of a project. The estimation and management of costs and benefits management (BM) are essential topics to discuss when researching the business case development (BCD) process. Cost estimation involves the prediction of both the person-effort and elapsed time required for the successful completion of the project (Boehm et al., 2000). *Benefits management is an approach to identify, estimate, plan and manage the delivery of benefits.* Clear benefits identification, or a detailed plan on how expected benefits will be realized, are essential at the inception of a project. Such a plan is used to manage the project execution and to review progress and achievement both during the project and its completion (Peppard et al., 2007). Although both costs and benefits are equally important for a successful BC, literature pays more attention to cost estimation than to benefits management. Years of research in the field of software engineering made cost estimation a well-discussed and well-covered topic. Compared to such an established research field, the study of BM in the field of IS is still in its beginning.

We further observe that there is limited research on the general BC and its deployment process. The scholars in the IS field mainly investigate problems related to the content of the BC, its deployment and its methods. The basic idea behind a BC is based in literature on the IT productivity paradox, IT economics, basic cost-benefit analysis and general IS evaluation (Irani and Love, 2001, Willcocks, 1994, Parker et al., 1989). This literature describes the business case as an artifact, be it a tool, a process or a document, that is developed once in the beginning of a project to obtain funding for a significant financial investment (Ward and Daniel, 2006). In their description it primarily includes quantitative aspects of a cost-benefit analysis.

The increasing complexity in the IS context challenges these traditional BC approaches we refer to above. Already more than ten years ago Remenyi (1999) and others have called for a "new approach to develop a business case for IT investments" that builds upon the quantitative views of current IS evaluation methods. Such an approach should:

- Emphasize the importance of realizing business benefits from IS implementations.
- Take a broader view than just a quantitative cost-benefit analysis.
- Support the organization in successfully planning and managing the implementation project (Ward and Daniel, 2006).
- Acknowledge the organizational context and its uncertainties in which the IS evaluation takes place (Serafeimidis and Smithson, 2003).

Recent research is following this request by developing conceptual descriptions for business case development, cost estimation and especially benefits management. However, so far, their deployment process is often only limited described in literature.

Inter-organizational projects:

One can observe a trend both in literature and practice moving away from one organization as the predominant focus towards networks of organizations (Jones, 2012). The inter-organizational setting in this PhD research refers to multiple profit and loss responsible units that are working together in a project to jointly implement an IT system. Such profit and loss responsible units can either be different business units within one multinational or different companies within a business network.

The development of BCs for inter-organizational projects has its very own challenges and is not extensively researched yet (Eckartz et al., 2012a). The potential of successfully managing the network is well recognized by practitioners, who expect benefits with respect to the efficiency, flexibility and quality of their relations with customers, suppliers and competitors (Jongkind, 2009). However, many projects are struggling with the identification of the benefits and the distribution of the costs of the IT investment in the network.

One example is the Vos Logistics hub project, where information sharing in a logistics chain in the Netherlands was studied (Van Hillegersberg et al., 2003). One of the findings of the project was that while the potential of implementing the hub

was great, the participating parties experienced difficulties through misaligned goals and the need to share private information. Following, during the time of the project the participants did not agree upon a method to identify benefits and distribute the costs of the hub over the supply chain parties.

The importance of the BC and the need for continuous research on this topic is also expressed by practitioners; IT professionals from both market research institutes as well as ES vendors report in white papers on the ever increasing importance of having a well defined BC (Panorama, 2010, Dosch and Hopf, 2006). These reports confirm that an unclear, unconvincing BC is an important reason of why IT projects often fail to be completed in time, in budget and also often do not meet the system requirements. Research indicates that having a weak or no BC is among the most common reasons for IT projects to fail (Whittaker, 1999, Kappelman et al., 2006). These findings are supported by practical insights from the project management domain, which shows that most project management methods require the use of a BC for important projects. Research by the Panorama Group (2010) further shows that there is high demand for improved benefits management as 41% of the investigated companies fail to realize at least half of the business benefits they expect from their IT solutions.

Other research shows that most organizations focus on costs or cost management, while not paying attention to the potential of benefits management. Consequently only 30% of the IT projects actually deliver their expected benefits (Nelson, 2007) and many organizations exaggerate their benefits. We see that successful realization of benefits from IS/IT investments has often been reported as one of the major organizational challenges. An analysis of the ERP reports published by the Panorama Group (2010, 2011) shows that the average implementation costs declined in 2009 and 2010 compared to prior years, which is a positive development. However, a deeper analysis of the data shows that although costs were declining, projects were still running over budget. One can see that the economic situation and following tight budgets force companies to cut implementation costs which results in lower project success rates and a higher business risk. At the same time in 2010 more companies were actually using a BC compared to 2009. One can further observe that an increasing number of projects are realizing more than 50% of their expected business benefits. Experts claim that there is a relation between the usage of the BC and benefit realization (Panorama, 2011).

Based on these developments and the evidence from literature we conclude that BCD is an important topic that should especially cover the unresolved challenges of benefits management. Research in cost estimation is matured and perceived as a well-understood problem. However, BM exceeds mere cost estimation. BM is a rather complicated subject as the correct identification, quantification and realization of the benefits requires in-depth understanding of the business processes that are impacted by the project. Therefore, the primary contribution of this thesis is the development of a business case development methodology for managing IS/IT implementations in inter-organizational settings.

1.2 Problem statement

We address the challenge of BM in this thesis by taking a different approach to BC deployment. We propose to take a wider focus than cost/savings, package selection and system -or package functionalities. We claim that in-depth understanding of the benefits and underlying business processes will lead to more successful IT project implementations. Figure 1.1 shows in which areas we expect challenges when developing the BC, with respect to (i) the different elements of the BC, being costs and benefits and (ii) for both intra- and inter-organizational projects. The upper right corner is left blank as no major challenges are expected with respect to reporting on the costs when developing a BC.

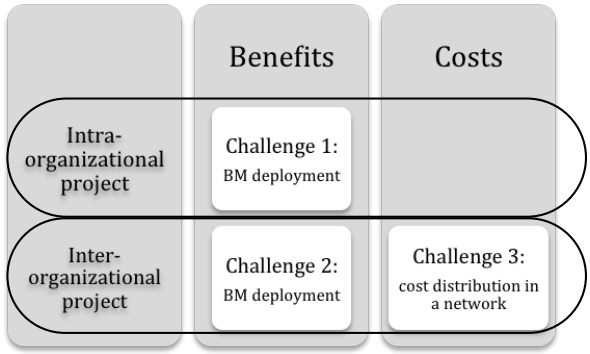


Figure 1.1 Expected challenges in BCD with respect to benefits and costs

- **Challenge 1:** Based on evidence from practice and literature we conclude that the limitations of current BM methods are major reasons preventing BM from becoming a widely practiced standard, such as cost estimation methods are already. Although BM is described in literature, the actual deployment of BM is still a challenge, as current methods are not easy enough to use. Current BM methods further do not deliver sufficient added value and do not make a strong connection to the changes in business processes through which most benefits can be realized (Schubert and William, 2009, Shang and Seddon, 2002). We aim to improve the understanding and support for benefits management.
- **Challenge 2:** If an IS implementation involves not only one organization but happens in an inter-organizational network, developing the BC will involve some more challenges (Daneva and Wieringa, 2006, Eckartz et al., 2012a). Factors as competition, power and differences in semantics between actors influence the stakeholders' willingness to share the information that is necessary for the development and deployment of a shared BC. The challenge we encounter is that current BM methods

provide insufficient support for the complexity of inter-organizational projects.

- **Challenge 3:** While the thorough discussion of IS costs in software engineering literature is sufficient for intra-organizational projects, it does not provide enough understanding for the challenges that play a role in inter-organizational projects. Daneva et al. (2008) report on the shortcomings of current cost estimation models for inter-organizational implementation projects. They conclude that for inter-organizational projects there is a shortage of both relevant metrics and historical project datasets, and an absence of proper methodologies. We further expect that especially the issue of cost distribution between multiple stakeholders in a network stays largely unaddressed.

In this dissertation we will review current BC concepts and methods and propose a BC methodology that is not only applicable in intra-organizational projects but also in inter-organizational IS implementation projects. We refer to a methodology as a set of methods, procedures and techniques often supported by tools (Avison and Fitzgerald, 2006). We structure our research around the following two design goals. With respect to addressing the BM Challenges 1 and 2 we set out to:

Design a benefits management method for IS implementation projects, that is feasible, effective and efficient.

In order to address the inter-organizational aspects of Challenges 2 and 3 we set out to:

Design a business case development methodology for inter-organizational IS implementations, that builds upon best practices from practitioners and evidence from literature, and that is feasible, effective and efficient.

1.2.1 Research questions

We will use three top-level research questions to structure our research. In order to discuss our research questions, we use the distinction between knowledge questions and design problems (Wieringa, 2009). Practical design problems are labeled with a "D" and describe the difference between the way the world is experienced by stakeholders and the way they would like it to be. Knowledge questions, "K", emerge when there is a difference between what we know about the world and what we would like to know about the world. Knowledge questions are either empirical or conceptual questions that will be answered with research. Table 1.1 shows how the three top-level research questions can be decomposed into sub-questions that form our research plan and guide our research. In section 1.5 we present which research questions are addressed in each of the chapters.

We start our research with a knowledge question that we use to investigate how current business case development methods, and especially benefits management methods, are used in practice and described in literature.

1: What are advantages and shortcomings of current business case development methods and practices in the IS domain, according to both scientific literature and practitioners? (K)

The purpose of our first research question is to identify advantages and shortcomings of current business case development methods in order to define improvement goals/solution requirements and reusable knowledge. Based on these insights we propose a solution that addresses our two design goals listed above. The solution design is covered in our second research question.

2: Design a methodology to improve the development and use of BCs to support investment decisions of inter-organizational information system implementations. (D)

In order to answer our second research question we need to find a systematic approach to integrate the solution requirements identified before into a coherent business case methodology. Finally, we will evaluate the methodology answering the next knowledge question:

3: What is the contribution of our proposed methodology? (K)

Table 1.1 Research plan with research questions

RQ 1: K: What are advantages and shortcomings of current business case development methods and practices in the IS domain, according to both scientific literature and practitioners?

- RQ 1.1. K: Which benefit models are described in literature and are relevant for our research?
- RQ 1.2. K: Which cost models are described in literature and are relevant for our research?
- RQ 1.3. K: What are the problems with these approaches in i9nter-organizational projects?
- RQ 1.4. K: Which specific characteristics can be recognized in inter-organizational projects and show to have an influence on the BC development and deployment process?
- RQ 1.5. K: Identify design specifications for a BC method that can be successfully applied in inter-organizational projects.

RQ 2: D: Design a methodology to improve the development and use of BCs to support investment decisions of inter-organizational information system implementations.

- RQ2.1 D: Design a comprehensive benefit model.
  - RQ2.1.1 K: Compare, integrate, improve and customize existing models to an inter-organizational setting.
- RQ 2.2 D: Design a way to analyze the network structure in inter-organizational projects.
  - RQ2.2.1 K: How do business partners agree on a shared value network?
- RQ2.3 D: Design a method to allocate costs and benefits to partners in a network.
  - RQ2.3.1 K: How are costs and benefits allocated among business partners?
  - RQ2.3.2 K: Which techniques are used for cost and benefit allocation?
  - RQ2.3.3 D: Develop a distribution model based on the insights from the questions above.

RQ 3: K: What is the contribution of our proposed methodology?

- RQ3.1. K: Validate the benefit model on usefulness.
- RQ3.2. K: Validate the value distribution model on usefulness.
- RQ3.3. K: Validate the cost and benefit distribution model on usefulness.

Our research questions show that we will follow an elaborate research approach to create a methodology for BCD in inter-organizational projects. We do not intend to provide just another extensive review of IS evaluation techniques, as we believe that this topic is covered by current research sufficiently. Instead we want to analyze the interaction between the different elements of a business case and show how a BC can be developed in an inter-organizational project. We first provide better understanding and an improved method for IS projects within one single organization. Afterwards, we will widen our scope and analyze how such a method can be extended and applied in inter-organizational projects.

1.3 Methodology at a glance

This thesis follows a design research approach (Peffers et al., 2006, van Aken, 2004, Hevner et al., 2004). Design research is defined as interdisciplinary and it includes elements from both conceptual as well as empirical research. Researchers have proposed several methods to structure the design research process into several steps and phases. In this dissertation we use the structure of Wieringa (2009, 2012), which proposes the following, three phases: problem investigation, solution design and solution validation. We follow a multi-method approach to get diverse insights into the problem investigation and solution design of a BC methodology for inter-organizational projects. Using a multi-method approach helps us to effectively deal with the richness of the real world as it uses different paradigms each focusing attention on different situational aspects (Mingers, 2001). Figure 1.2 presents a high-level overview of our research design.

1) Problem investigation:
In order to learn about current business case development practices and to identify their advantages and shortcomings we start with a literature review and exploratory interviews with experts. Based on these insights we conclude that there is a need for an improved BC development method *and* deployment process and confirm our research objective.

In order to build a solid foundation for our solution design, we conduct an extensive literature review (Chapter 3) (Webster and Watson, 2002) covering scientific publications in the areas of "IS BC development", "benefits management", "cost estimation", "ES implementation" and "inter-organizational cooperation/setting/project". Our literature study results in a conceptual framework (Chapter 4), attempting to understand the impact of inter-organizational settings on the BCD process. We also consolidate a list of requirements from literature for an improved BC method.

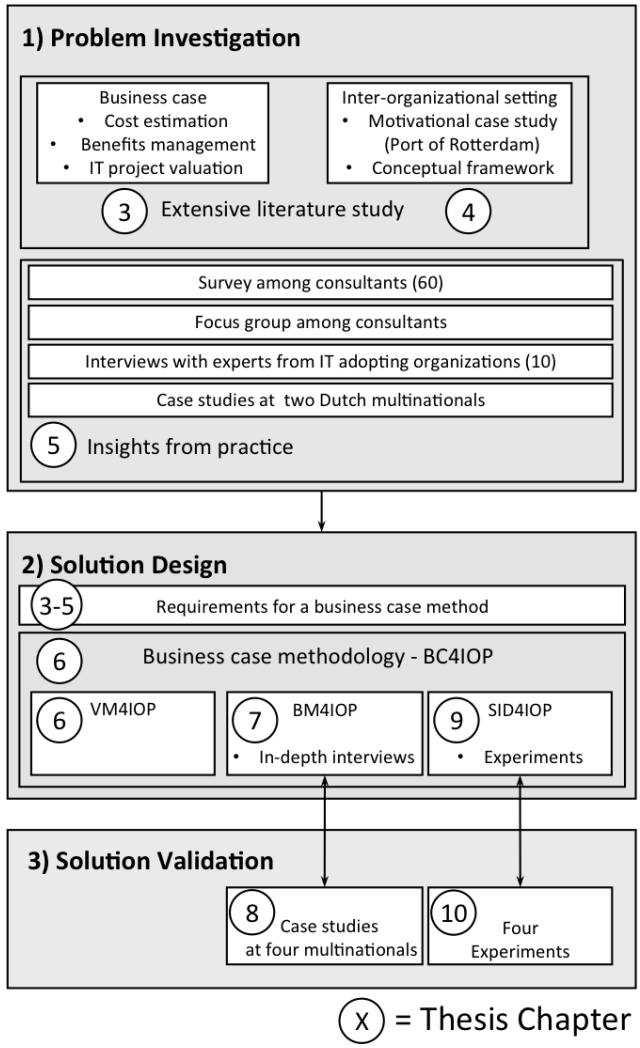


Figure 1.2 Research methodology

Building upon this initial problem investigation, we set out to gain detailed insights from practice (Chapter 5). The research activities performed in this stage include elements from both problem investigation as well as solution design. In order to identify best BC practices we conduct several interviews with BC experts from IT adopting organizations in the Netherlands and Germany. We further

survey 60 experts mostly from advisory organizations to learn about current BC deployment patterns, challenges that experts encounter and their demands for an improved BC method. In addition we perform six in-depth interviews and several case studies to get detailed understanding of the advantages and shortcomings of BC- and benefits management processes that are currently in place. We compile our empirical insights in a list of design specifications for an improved BC method.

2) Solution design:

Based on the problem investigation we iteratively design our BC methodology, consisting out of three elements (Chapter 6):

- **VM4IOP**: a method that extends current value modeling logic to the area of inter-organizational BCD.
- **BM4IOP**: a comprehensive benefits identification, evaluation and specification method.
- **SID4IOP**: a method that, helps actors to achieve agreement on the cost distribution in a shared project.

For each method different solution design activities are performed that will be elaborated on later in this thesis. The design of the benefits management method (BM4IOP) will be discussed in Chapter 7. The element of our BC methodology, addressing the challenge of an inter-organizational BC, is presented in Chapter 9. Our solution design process builds upon the conceptual framework, the requirements identified from literature and practice and our own logical reasoning.

3) Solution validation:

Finally, we validate the different elements of our improved BC methodology by applying them in several case settings (Chapter 8) and experiments (Chapter 10).

Table 1.2 Overview of research methods

Design cycle phase	Research question	Research method
Problem investigation	RQ1: What are advantages and shortcomings of current business case development methods and practices in the IS domain, according to both scientific literature and practitioners?	Literature review, survey and focus group with 60 experts, 10 interviews, 1 exploratory case study
Solution design	RQ2: Design a methodology to improve the development and use of BCs to support investment decisions of inter-organizational information system implementations.	Survey and focus group with 60 experts, 10 interviews, iterative participatory method design with 6 experts, 2 case studies
Solution validation	RQ3: What is the contribution of our proposed method?	Iterative participatory method design with 6 experts, 4 case studies, 4 experiments

1.4 Contribution

The primary contribution of this thesis is the development and validation of a business case development methodology for managing IS/IT implementations in inter-organizational settings. This methodology is described in Chapter 6. The contributions of this thesis can be specified with respect to the different elements and context factors of our methodology. More specifically Figure 1.3 shows that our research mainly contributes to the benefits domain and the challenges experienced in inter-organizational projects. Some elements contribute to both aspects.

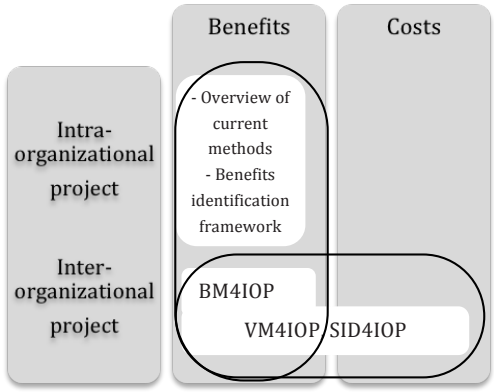


Figure 1.3 Overview of contributions

With respect to benefits:

- We provide an overview of current benefits management methods.
- We present a framework with different benefit classification axes to support the process of benefits identification.
- We propose and validate a benefits management method that helps practitioners to get new insights into their benefits and supports them with achieving those benefits.

With respect to the inter-organizational setting:

- We specify the linkage between costs and benefits.
- We develop a conceptual framework that shows how project constellation influences the BCD process.
- We propose to extend business case development methods with value modeling logic to be better applicable in inter-organizational projects.
- We demonstrate how group decision support systems (GDSS) can support the BC development and deployment process in inter-organizational projects.
- We develop a method to support the distribution of costs in an inter-organizational project.

1.5 Outline of the dissertation

This dissertation is organized into four parts shown in Table 1.3.

Part I presents in Chapter 1 the introduction and motivation for this thesis. Chapter 2 describes the methodology that we follow when conducting this research. Chapter 3 provides the conceptual frame and the basic definitions used throughout the research. Chapter 4 focuses on developing a conceptual framework for inter-organizational BCD, based on literature. Further, Chapter 5 presents insights from practice collected during several interviews, case studies and a survey.

Part II presents the iterative solution development process, which builds upon Part I. Chapter 6 introduces our BC4IOP methodology for developing and deploying business cases in inter-organizational projects. Chapter 7 and Chapter 9 describe and discuss the different methodology components (BM4IOP, VM4IOP and SID4IOP) in more detail.

Part III of this dissertation presents our empirical research that we conducted to validate the different elements of our BCD methodology. Chapter 8 discusses the validation of the BM4IOP and VM4IOP method in several case studies. Chapter 10 describes the results of four experiments that validate the usage of the SID4IOP method in the process of BCD.

Finally, *Part IV (*Chapter 11) discusses the main contribution of this dissertation and presents an outlook on future research.

Table 1.3 Outline of this dissertation

	I. Problem analysis (RQ 1)		**II. Solution design (RQ 2)**	**III. Solution validation (RQ 3)**
	Literature	**Practice**		
Chapter 1	Introduction			
Chapter 2	Research methodology			
Chapter 3	General concepts		Design specifications	
Chapter 4	Inter-organizational setting	Case study	Design specifications	
Chapter 5		Interviews & focus group	Design specifications	
Chapter 6			BC4IOP	
Chapter 7			BM4IOP & VM4IOP	
Chapter 8				Four case studies
Chapter 9			SID4IOP	
Chapter 10				Four experiments
Chapter 11	**IV.** Conclusions & Recommendations			

2

Methodology

"Planning is bringing the future into the present so that you can do something about it now." (Alan Lakein)

This chapter provides background information on the research approach taken and the research methods used in conducting this research. We motivate why we selected the research methods that we used. We further specify the data collection techniques used. The details about the application of each research method can be found in the respective chapters. For example the response rate to our survey will be described in Chapter 5.

2.1 Research approach

As already indicated in Chapter 1, this PhD research is interdisciplinary and it includes elements from both design science and empirical research (Easterbrook et al., 2008). It can be structured in three phases, according to Wieringa's design cycle (Wieringa, 2009): problem investigation, solution design and solution validation. A detailed description of the different phases is provided in Chapter 1, Figure 1.2. During the problem investigation phase we use the framework by Avison and Fitzgerald (2006) to structure the comparison of existing methods. During the solution design phase we borrow concepts from method engineering (Aydin, 2006, Brinkkemper, 1996) and extend them with Avison et al. to design our own methodology.

During each phase of the design cycle multiple research methods were used to increase the credibility and validity of our results. Using a multi-method approach helps us to effectively deal with the richness of the real world as each method uses different paradigms each focusing on different aspects of the situation (Mingers, 2001).

We used interpretation (Boland, 1985, Walsham, 1995) in our research to understand the context of business case development (BCD) projects. We applied an interpretive approach to analyze (i) the articles found in the literature review, (ii) the data collected during the survey and (iii), the data collected during our case studies. This seemed appropriate as e.g. the experts we interviewed based their answers on their own interpretation of the question. The researcher in turn again used their own interpretations to make sense of the answers. The degree of subjectivity in this sense making activity needs to be taken into account when interpreting the data.

Generalization is less important in interpretive studies than in positivistic studies and thus smaller sample sizes are sufficient (Klein and Myers, 1999). An ideal research project, would combine positivistic and interpretative views and gain insights from a large sample of in-depth case studies, however, this is hardly possible in practice.

We are building upon the concepts of Pawson and Tilley (Pawson and Tilley, 1997) in our research when analyzing our data. In particular we are trying to identify mechanisms for what we learn in our survey and interviews and observe in our case studies. Further, taking Pawson et al's constructive critique on traditional experiments into account we apply the realistic evaluation approach to our experiment. There we try to validate a mechanism (M) (e.g. a theory we have knowledge about) by putting it into use in a self-produced context (C), which is believed to sustain the ideal conditions to bring the mechanism (M) into action and result in a certain outcome (O).

2.2 Research methods

A variety of research methods can be applied to any research problem, and often a combination of several methods is needed to fully understand the problem (Easterbrook et al., 2008). Table 2.1 shows the research methods and measurement instruments that we applied to answer our research questions. Table 2.2 gives some methodological details for each research method. As one can see in the table we use seven different research methods. Most of them are field research methods. Intrusion and subject involvement vary in all possible ways, which increases the overall robustness of our results.

Table 2.1 Overview of research methods and measurement instruments used

Research question	Research method	Measurement instrument
Problem investigation, RQ1: What according to both scientific literature and practitioners are current business case development methods and practices?	• Literature review • Survey • Focus group	• Questionnaires • Interviews
Solution design, RQ2: How to improve the development and use of BCs to support investment decisions of inter-organizational IS implementations?	• Literature review • Survey • Participatory method design • Experiments • Exploratory case study	• Questionnaires • Interviews • Direct observations
Solution validation, RQ3: What is the empirical contribution of our proposed method?	• Participatory action research • Survey to evaluate the case study outcomes • Experiments	• Questionnaires • Interviews • Direct observations • Experiment

Table 2.2 provides a cross-reference to the section in this chapter where more details can be found about each research method. In the remainder of this chapter we discuss each research method (this section) and measurement instrument (Section 2.3) in more detail.

Table 2.2 Details for each research method

Research method	Unit of data collection (UDC)	Environment of data collection	Control of UDC	Control of environ-ment	Intrusion when collecting data	Subject involve-ment
Literature review (Section 2.2.1)	Scientific literature	Lab	No	Yes	None	None
Survey (Section 2.2.2)	Sample	Field	No	No	Low	Low
Focus group (Section 2.2.3)	Sample	Field	No	No	High	High
Participatory method design (Section 2.2.4)	Sample	Field	No	No	High	High
Experiment (Section 2.2.5)	Sample or model	Lab or field	Yes	Yes	Any	Low
Case study (Section 2.2.6)	Small sample	Field	No	No	Low	Any
Participatory action research (Section 2.2.7)	Unit of study	Field	Yes	No	High	High

2.2.1 Literature review

A literature review is an essential part of every research project. It is one of the most important methods used to support evidence-based research (Brereton et al., 2007). Evidence is defined as a synthesis of best quality scientific studies on a specific topic. A systematic literature review (SLR) provides a rigorous review of previous research and is therefore seen as the main method of synthesis (Kitchenham et al., 2009). In this research we conducted a semi-systematic literature review following the guidelines of Webster et al. (Webster and Watson, 2002) and Kitchenham et al. (Kitchenham et al., 2002) to (i) establish the context of our topic to previous work and (ii) identify, analyze and synthesize relevant literature (Blumberg et al., 2005). Our literature review covers scientific publications on the following topics. Additional search terms used are given in parenthesis: (i) ES implementation ("enterprise system", "enterprise resource planning", "ES", "ERP"), (ii) IS benefits ("benefits management", "benefits realization", "value management", "value engineering") (iii) general IT investment

valuation ("cost-benefit analysis", "costs"), (iv) inter-organizational IS implementations ("cross-organizational", "ERPII"), (v) business case development ("business case"), (vi) value modeling ("business model"), (vi) group decision support systems and (viii) collaboration ("network").

In order to identify, evaluate and interpret relevant scientific research in these areas we consulted several electronic indexing services by conducting different searches using the individual search strings identified above (e.g. Google, Google Scholar, Science Direct, Scopus, ACM Digital Library). We include sources from scientific literature as well as white papers. We used backward and forward citation tracking to accumulate a relatively complete census of literature (Webster and Watson, 2002). We admit that our research might be subject to omission and inclusion errors as we include only materials in English language. This is explained by the fact that our main databases have English publications only. We applied the following inclusion criteria:

(1) The paper covers one of the topics we are interested in.
(2) The paper is credible, i.e. the method described is meaningful and intuitive to follow.
(3) The paper provides enough detail on the context.
(4) It is an original paper. If a paper reports on extension of earlier work we traced back the original publication.

The decision to include an article in our research was made after the inclusion criteria were applied on the basis of a review of the abstract and conclusion of each article.

Our literature review was conducted during the problem investigation phase and extended during the solution design phase when we defined our method foundation based on existing literature sources.

2.2.2 Survey

Survey research is an ideal method to systematically identify information about a broad population of individuals. They provide an efficient way to collect data from a large number of respondents (Babbie, 2010). The biggest challenge with survey research is the selection of a representative sample from a well-defined population. Controlling for sampling bias is very important to later on be able to generalize the results to the target population. Low response rates increase the risk of bias (Easterbrook et al., 2008). Later in this section when discussing the data collection techniques we will discuss how we accounted for these challenges. Questionnaires are the most often used data collection instruments, however, structured interviews or other data collection methods can also be used. In our research we conducted the following surveys:

1. A survey that was conducted at the beginning of our research, during the problem investigation phase, to learn about BC practices from experts in the consulting industry. The survey was mainly of quantitative nature and consisted of a questionnaire that was distributed during a workshop.
2. A survey that was conducted at the end of the problem investigation/beginning of the solution design phase to get insights

into best BC practice from adopting organizations. This survey was mainly qualitative and based on interviews.

3. A survey that was conducted during the solution validation phase to evaluate the case study process and outcomes. During this survey respondents were asked to answer a set of closed questions. These questions were complemented by an open question interview.

2.2.3 Focus group

Focus group research is a form of qualitative research that involves a group of people in an active discussion to generate feedback on a topic. A moderator is used to support the group in the process of exchanging ideas, feelings, perceptions and experiences on a specific topic. Questions are asked in an interactive group setting where participants are free to talk with other group members (Blumberg et al., 2005). This is the strength of a focus group study as group discussion produces data and insights that would otherwise be less accessible (Lindlof and Taylor, 2002). The focus group does not attempt to reach consensus between the participants (Okoli and Pawlowski, 2004). Focus groups can be used as self-contained research methods and as techniques to be used in conjunction with another method, for example a survey (Morgan, 1997). We used the focus group method during our problem investigation phase to validate the findings we got from our expert survey.

A second focus group was used during the problem analysis phase to reflect on critical issues and success factors for benefits management. A group of experts from the advisory industry was asked to assess the importance of a set of characteristics identified by a survey among 60 experts.

2.2.4 Participatory method design

In our participatory method design we involved stakeholders in the solution design process to ensure that the final method meets the demands of the stakeholders and is usable. Our participatory method design process is an adaption of traditional participatory product design that has its roots in Scandinavia, where it was named cooperative design (Bødker, 1996). Participatory design is used as an approach in a variety of fields, such as software design and can be seen as a move of the end-users into the world of researchers and developers. A similar phenomenon can be observed in our research method, where end-users (in this case BC experts/consultants) participated during the design of the improved BC method.

After we developed a first version of an improved benefits management method based on literature, we iteratively involved several experts in the proceeding design process. We conducted several design iterations until a temporary saturation point was reached. During each iteration the method was evaluated and improved by a new expert. A saturation point (as in grounded theory, Glaser and Strauss, 1967), is the point where one reaches diminishing returns, and additional interviews add nothing to what one already knows about the topic. The assumption of grounded theory is that future interviews will not add extra information. Thus, no new data results from additional data collection: “One

keeps on collecting data until one receives only already known statements" (Seldén, 2005).

2.2.5 Experiment

Experiments are studies that involve the intervention by a researcher beyond that required for measurement (Blumberg et al., 2005). A treatment is systematically applied to subjects to observe how they respond. The treatment is applied for knowledge gathering only. An experiment can be categorized as a causal research method, as it helps to understand why events occur under some conditions and not under others. There is at least one independent variable and one dependent variable in a causal relationship. The advantages of experiments are that one is able to manipulate an independent variable, while a control group is used as comparison to assess the potency of the manipulation and control for effects of other extraneous variables. The disadvantages of experiments are that laboratories tend to be artificial, that the number of variables that can be included is limited. Further, the generalizability from non-probability sample might be a problem.

In our research we developed two kinds of experiments:

- During the solution design phase when developing our methodology, we used experiments to (i) test the functionality of our tools and (ii) pilot the validation experiment.
- During the solution validation phase we conducted several experiments to analyze the mechanisms of our SID4IOP method.

2.2.6 Case study

Case study research is the most common research method used in IS research (Orlikowski and Baroudi, 1991). It is particular useful for IS research as it allows the study of information systems in organizations, focusing not only on the technical but the organizational issues (Benbasat et al., 1987). A case study can be defined as "an empirical inquiry that investigates a contemporary phenomenon within its real life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (Yin, 2003) p.23. Case studies help to analyze phenomena that are inseparable from their real life context, and thus, difficult tor replicate in a laboratory environment, as they study subjects in their natural environment without applying a treatment. "Case studies typically combine data collection methods such as archives, interviews, questionnaires, and observations. The evidence may be qualitative (e.g., words), quantitative (e.g., numbers), or both" (Eisenhardt, 1989) p.534.

Case study research can be distinguished into at least two kinds of research: observational case studies and action case studies. In this dissertation both have been used. Case studies are suitable for exploratory, explanatory and descriptive research. In the beginning of our research we used exploratory observational case studies to discover deeper insights into the studied phenomena. Later on we conducted several confirmatory action case studies (see next section) to validate different elements of our BC method.

2.2.7 Participatory action research (PAR)

Action research is on form of case study research and has its origins in the social sciences. It is the application of a treatment to subjects in their natural environment to improve their situation and analyze how they are responding (Baskerville, 1997). PAR aims at involving an action component that causes positive change and that requires the collaborative involvement of the 'community of research interest' (Walter, 2009).

The treatment is designed and should have an architecture with mechanisms intended to cause an effect. However, the application of the treatment in a specific context will create emergent effects not designed by the treatment designer. The analysis (evaluation and explanation) of these effects is part of action research.

Advantages of PAR are:

- the practical outcomes and positive change resulting from the problem solving focus,
- the research objective which aids in producing practical outcomes that are workable, and
- the commitment of the community of interest which enables access to community understanding and knowledge.

The main criticism of action research is that the produced findings are just anecdotal evidence and therefore difficult to generalize to other contexts. Other shortcomings of PAR are the amount of time it takes and that there are always variables that one cannot control, e.g. participants might come with their own ideas or methods that they want to see applied in a case study. Another disadvantage is the research bias that is imposed by the researcher.

In our research we use participatory action research during the solution design phase when deploying our BM4IOP method in real life case studies.

2.3 Measurement instruments used

In the previous section we have described the different research methods used to conduct this design science research and finally develop our BC method. We have discussed some of the advantages and disadvantages of the different methods and the rational for choosing these methods over others. In this section we will discuss the measurement instruments used when conducting our research. The following measurement instruments will be discussed: questionnaires, interviews and observations.

2.3.1 Questionnaires

The questionnaire is a research instrument that consists of a series of questions prompting to gather information from respondents. They are often designed for statistical quantitative analysis of the responses, however, this is not always the case as they can also be used to collect qualitative information.

We used questionnaires during our survey to collect information about the current way of developing and deploying BCs. They further helped us to identify some of the challenges faced by the respondents. Their main advantage over other survey methods, such as personal interviews, is that they can be standardized and are quite cheap to be conducted, as they do not require much intervention of the

researcher. However, this makes the question construction and wording extremely important. Furthermore, low involvement with the research might result in low survey response. We tried to overcome this shortcoming by distributing the survey during a workshop where experts gathered to learn about new developments in BC development. A specific time-slot at the beginning of the workshop was reserved for our questionnaire. This resulted in a response rate of nearly 100%. Another shortcoming of questionnaires is the fact that respondents cannot clarify their argumentation behind their answer. We circumvented this shortcoming to have a negative impact on our research by presenting the results of the survey to the participants at the end of the workshop and allowing for an extensive discussion in the form of a focus group. This allowed us to gain more detailed insights into the outcomes of the questionnaire.

2.3.2 Interviews

In our research we used mainly semi-structured interviews. Such interviews lie in between fully unstructured and structured interviews and are often used during surveys and case studies. In fact they are the most widely employed data gathering technique in research that integrates qualitative and quantitative research elements (Bryman, 2006). An interview guide is used to ensure that the most relevant topics are covered during the interview and that the questions are asked in a similar way in all interviews. In contrast with structured interviews the semi-structured interview is more flexible as it allows the researcher, depending on the course of the conversation, to ask follow-up questions.

We used semi-structured interviews to gather information, in several phases of the research, about current BC development and deployment in practice. We further used this data gathering technique to identify design specifications for an improved method design. Semi-structured interviews were used to gather data during (i) our focus group discussion, (ii) the survey among experts in IS adopting organizations, (iii) our participatory method design process and (iv) four case studies at IS adopting organizations.

2.3.3 Observations

Observation is a method that is used to study and understand people in their natural environment. Sometimes it is the only method available for collecting certain types of information (Blumberg et al., 2005). It is often used during case studies but can be found in almost all research studies, especially during the exploratory phase. A distinction can be made between behavioral and non-behavioral observations. Behavioral observations can be classified into four categories of analysis: non-verbal behavior (e.g., body movement), linguistics behavior (e.g., use of words, such as 'ah'), extra linguistic behavior (e.g., loudness of the voice, rate of speaking) and spatial relationships (e.g., how a person relates physically to others). Non-behavioral observations can be classified into three forms: record analysis, physical condition analysis (e.g., analysis of financial statements) and process analysis (e.g., analysis of paperwork flows in an office) (Blumberg et al., 2005). Several researchers have described the role of researchers in observational studies. Gold (1958), identified the following four roles: complete

observer, observer-as-participant, participant-as-observer and complete participation. Others adapted and extended this list slightly with variations of roles (Baker, 2006).

We used observations during our exploratory and participatory case studies. In our case study we mainly played the role of 'observer-as-participant' (Gold, 1958) as our role included more observation than participation. This role has the advantage that insiders might find it easier to talk to an "attentive stranger" than to somebody they are more familiar with. However, the role also includes a serious weakness, as we as researchers were limited to get an understanding of the total situation. This might lead to misunderstandings or misconceptions (Gold, 1958).

2.4 Validity threats to the research results

The last section of this chapter will discuss the soundness of our research design and methodology. All the methodological choices described before impact the validity of our research. We will discuss the four types of validity threats shown in Figure 2.1 and describe how we addressed them (Babbie, 2010).

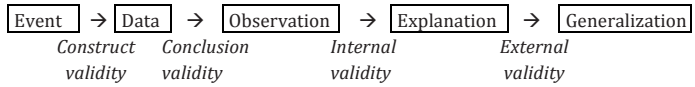


Figure 2.1 Types of validity

2.4.1 Construct validity

Construct validity discusses the quality of the operationalization of the concepts (constructs) used in the research. It will be investigated if the operationalization of a construct actually measures (produces the data) it says it would do. Thus, construct validity further investigates if evidence found in a study matches its theoretical definition. As such it emphasizes the link between events and data and theory.

We accounted for construct validity threats by carrying out an extensive literature review that resulted in, among others, definitions for our research foundations.

2.4.2 Conclusion validity

Conclusion validity is the degree to which the conclusions one draws about relationships between two or more variables in our data are reasonable. It is especially important when interpreting the results of our experiments. Originally, conclusion validity was only concerned about statistical relationships between variables, however, nowadays it is used to assess the credibility of any conclusion drawn from a dataset, quantitative as well as qualitative. Whenever one investigates the relationship between two different variables there are two possibilities, either one concludes based on the data that there is a relationship between the variables or that there is none. No matter which conclusion one draws, this conclusion could be wrong. Reliable measurement instruments and

good implementation of interventions or treatments help to improve conclusion validity.

2.4.3 Internal validity

Internal validity starts from the point where there is a relationship between two variable and investigates if this relationship is a causal one. Thus, it will be investigated whether any correlation found between the variables can be accounted for by a third variable. This is especially relevant for experiments. Qualitative studies might not always be about cause and effect issues, thus, internal validity of qualitative studies relates to the quality and trustworthiness (Stenbacka, 2001) of data. Internal validity further investigates if the results of the research are really caused by a certain phenomena and not by any other influences. We will address internal validity by deploying several research methods and data collection techniques. Such a method- and data-triangulation approach provides extensive insights and increases the internal validity.

2.4.4 External validity

There are two ways to interrogate the generalizability of empirical insights. In the sample model, external validity describes the extent to which findings from a sample can be generalized back to the population the sample was drawn from. In the proximity similarity model external validity describes the extent to which the results of a study can be generalized to other persons, places, times etc. beyond the unit of data collection (Babbie, 2010). In this dissertation we develop mechanisms to argue why our findings are generalizability to a population or specific context.

Each of the experts that participated in our surveys, interviews, case studies or experiments represents experiences with particular types of organizations. The background of the involved subjects needs to be taken into account when making statements about the generalizability of our findings.

For example for our iterative participatory method design we reached a saturation point after having in-depth discussions with six experts. However, this saturation point might have been reached earlier or later with a different set of experts. We also expect that the resulting improved method might have been different with a different set of participants.

2.5 Summary

This chapter described the research approach we followed when conducting our research. Our research can be classified as design science, and is comprised out of three research phases: problem investigation, solution design and solution validation. In this chapter we argue why we used certain research methods and measurement instruments to collect our data in these three phases. Detailed information about the steps followed, research methods used and the data collected during the three phases will be provided in the subsequent chapters of this book. Finally, we discussed possible threats to the validity of our research and how these can be overcome. Considering these validity threats is already a manner to improve the validity of our research.

3

Literature Review – The Business Case and its Elements

"A goal without a plan is just a wish." (Antoine de Saint-Exupery)

Academic research on the development and deployment of business cases (BCs) during IS implementations is limited, especially with respect to defining characteristics of successful BCs. However, the few publications are unanimous that the deployment of the BC during the ES implementation follows a generic pattern (Nah et al., 2001, Ross and Beath, 2002, Ward et al., 2008). Several reviews on ES benefits (Esteves and Borhorquez, 2007, Staehr, 2007) show that current benefit frameworks pay limited attention to contextual and temporal variations, socio-technical and business changes, and levels of benefit realization (Schubert and William, 2009). Further, current studies provide limited insights into how the variations in motivations to undertake an IS project influence the expected and realized benefits. Following this analysis, we conclude that the limited scope of existing frameworks asks for a more holistic and detailed analysis of IS benefits, embedded in benefits management.

In this and the next chapter we will discuss the theoretical base of this research. As described in Chapter 2, we performed an extensive literature review to get in-depth knowledge about the topics listed in Table 3.1.

Table 3.1 Structure of literature background in Chapter 3 and Chapter 4

Chapter 3	3.1. Business case development for IS implementations 3.2. Costs of IS implementations 3.3. Benefits of IS implementations 3.4. IT project valuation methods
Chapter 4	4.2 Characteristics of enterprise systems 4.3 Characteristics of inter-organizational information systems 4.7 Literature background on group decision-making

The theoretical insights gained from the first four topics will be discussed, in the same order as mentioned in Table 3.1, in the remainder of this chapter. This chapter describes each of the BC elements (except the risks) in the context of an IS

implementation in a single organization (Section 3.2-3.4). The last three topics will be discussed in Chapter 4.

As this dissertation research focuses on the evaluation of ES implementation in an inter-organizational setting, Chapter 4 will discuss how the main elements of a BC change if the implementation span crosses the boundaries of one single organization. We will end Chapter 3 with the consolidation of design specifications for an improved business case development (BCD) methodology. Therein we list a variety of critical issues that based on the literature study presented in this chapter, influence the success of a BCD method.

3.1 Business case development for IS implementations

A BC rationalizes about the costs and benefits of an IS project implementation. A business case can help in making a decision about whether and how to implement an IS, by thoroughly investigating and describing the main rational behind the investment project. It helps the project participants to specify, analyze and discuss the value for the IT adopting organization, the costs of the entire implementation process and the benefits that possibly can be achieved (Schmidt, 2003b). For example, project managers can compare different investment options, including vendor and package selection. The BC is in most instances the outcome of a negotiated agreement between business managers and IT managers.

There are several views on business cases used by researchers and practitioners. In this work we distinguish between three main views on the business case. Each perspective emphasizes a specific function of the BC.

A. The BC as an instrument to get investment approval for a single project.
B. The BC as an instrument to evaluate multiple projects and compose a project portfolio (Jeffery and Leliveld, 2004).
C. The BC as a project management instrument that can, next to the project evaluation, be used to actually manage the implementation process (Remenyi, 1999).

Perspective A describes the business case as an instrument to justify why management should invest into the IT project. Its main purpose is to get investment approval from top management. The function of the BC is to *evaluate a single project* against the null option and assess its absolute value. Most current literature focuses on this viewpoint.

Perspective B is closely related to the first view, but on a portfolio level (B), namely as an instrument that can be used to evaluate several IT implementation options (projects), based on their costs and benefits. As such, portfolio managers can compare the BC of different investment options when deciding about their *project portfolio*. The function of the BC is the evaluation of alternative investment options including the null option to assess the relative value of each option. With regard to portfolio management some research has been done on the deployment of business cases. This will shortly be discussed in Section 3.1.1.

Perspective C includes the logic from the other two perspectives but additionally describes the business case as a *project management instrument*. The BC can be used to actually manage the implementation process, ensuring that the

project is finished in time and budget realizing the planned benefits. This viewpoint is less visible in the current literature. However, it can bring an organization the most added value. This view goes beyond the initial justification of a project towards using the BC as a management instrument to actually realizing the benefits and managing the costs and the risks.

In this thesis we therefore attempt to broaden the potential of BCs by developing a business case methodology that can be used as a *project management instrument* for single as well as multiple projects.

The three views have the following design elements in common, that are related to the content of the BC: An estimation (mostly quantitative) and description of the *costs*, a discussion of the expected *benefits* (taking quantitative as well as qualitative effects into account), an analysis of the expected *risks* and an *evaluation* of the investment based on the estimated costs, benefits and risks.

Given the complex nature of business case development, we decided to focus this thesis on the benefits of an IS implementation. We will therefore give a short introduction into current cost (Section 3.2) and IT project valuation (Section 3.4) literature, and do not provide an extensive analysis as we do for the benefits. The issue of cost distribution in an inter-organizational network will be discussed in Chapter 9 and 10. The risks of an IS implementation project are an important issue to consider they are out of the scope of this dissertation. This does, however, not mean that the risks are less important to consider during an IS implementation.

3.1.1 Portfolio management

IT project portfolio management is a systematic management approach to large groups of IT projects. In order to support funding decisions and to generate the largest return on all investments, project proposals can be classified into different categories. The categorization of projects depends on the driver behind each project. Both academics as well as practitioners have proposed several sets of categories (Ross and Beath, 2002, Weill and Aral, 2006, Hunter et al., 2008, Muntslag, 2001, Markus and Tanis, 2000). A categorization that is often recognized and easy to understand is the one by Gartner (Hunter et al.), which distinguishes between "run the business", "grow the business" and "transform the business". We will use these three drivers as illustrative examples throughout our research.

Literature shows that the IT investment decision-making process differs per category. Following, we expect that the BCD process differs for projects in different categories. Decision-makers are expected to make better decisions about e.g. the distribution of the budget if they know into which investment category the projects they are evaluating fall. Comparing a portfolio of projects from different categories is possible as long as the comparison criteria are clear and agreed upon by all participants. The categorization provides a guideline but is not sufficient to successfully support the decision-making process. Specific evaluation criteria, for various investment categories, are useful in order to advice decision-makers in the BCD process. In Table 3.2 we give an example on how the project categories of Gartner (Hunter et al.), are expected to influence the following three main elements of the BC: benefits, costs and risks. This means that the funding decisions for a mandatory project (falling into the "run the business category") should focus

on aspects of the business case different from decisions about innovation projects ("transform the business"). Later on in this thesis we will address the topic of portfolio management again.

Table 3.2 Linking the different IT investment project categories to BC elements

		Project Category		
		Run the Business	**Grow the Business**	**Transform the Business**
Business Case Elements	**Benefits**	Bottom line, financial benefits	Financial and non-financial benefits	Non-financial/ qualitative benefits
	Costs	Focus on cost reduction (efficiency)	Focus is uncertain, but costs should not exceed the benefits	Focus on effectiveness
	Risks	Low/medium	Medium/high	High

3.1.2 Difference between business case and business model

There is some confusion about the difference of a business case to a business model. We shortly position our work in this context.

A business model is a framework for creating economic, social, and/or other forms of value. The term business model is used for a broad range of informal and formal descriptions to represent core aspects of a business, including purpose, offerings, strategies, infrastructure, organizational structures, trading practices, and operational processes and policies. A business model is the method of doing business by which a company can sustain itself by generating revenue. The business model describes how a company makes money by specifying where it is positioned in the value chain. It describes the exchange of value in a network on a high aggregation level.

The business case focuses on why an investment in a project is valuable. Whereas the business model describes the network or company as a whole, a business case always focuses on one investment decision only. In most cases it describes one project where a change in a situation is demanded and thus concrete action is required.

3.2 Costs of IS implementations

The success of any project depends largely on adequate understanding and estimation of costs at the early stages of the project. Cost estimation involves the prediction of both the person-effort and elapsed time required for the successful completion of a specific project (Boehm, 1981). Methods that have been employed to estimate costs of software projects include algorithmic techniques such as COCOMO, SLIM, COSYSMO, among others; expert judgment; and estimation by analogy or case-based reasoning approach. Other methods include fuzzy logic modeling, linear programming, classification and regression trees, neural networks, and lexical analysis of requirements (Jorgensen and Shepperd, 2007).

The success of networked IS implementations depends on adequate cost estimation. Previous research has found that "traditional software cost estimation methods do not yield accurate results in the [ES] context because they rely on a predefined set of factors that only partially describe this context, and they let each of the network partners incorporate their own biases and intuition into the estimate" (Daneva, 2006). Furthermore, the assumptions which one usually makes when estimating project cost do not hold in the ES context (Stensrud, 2001, Stensrud and Myrtveit, 2003, Davenport, 2000).

Complex inter-organizational IS implementation projects have a shortage of both relevant metrics and historical project datasets. Further, there exists an absence of proper methodologies to evaluate size, effort, productivity, and other cost factors for such complex settings (Daneva and Wieringa, 2008).

3.2.1 Life cycle costing

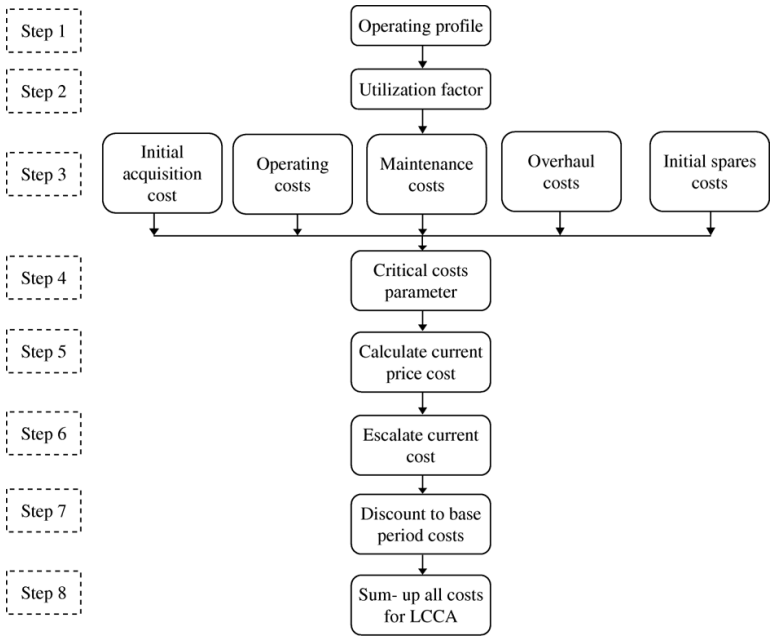
Life cycle costs (LCC) are cradle to grave costs, which are essentially the total costs of machinery and equipment over its entire life cycle. This includes the cost of acquisition, operation, maintenance, conversion, and/or decommission of the artifact (Barringer, 2003). Thus, the life cycle cost of an artifact is essentially the sum of all funds expended in support of the item from its conception and development through its operation to the end of its useful life. Life cycle costing, therefore, is a technique for determining the Total Cost of Ownership (TCO) of an item (Office of Government Commerce, 2005, Woodward, 1997) and has been used as a tool to provide economic justifications of projects (Asiedu and Gu, 1998).

LCC is based on the assumption that, in order to arrive at meaningful decisions all available options have to be taken into account. This means that all potential significant resources expenditure must be addressed. For every option, explicit consideration must be given to all relevant costs right from the initial conception of the idea, to the purchase of the artifact, and its disposal. The degree of sophistication of LCC varies according to the complexity of the goods or services to be procured. The cost of collecting necessary data can be very high. Thus, in cases where the same items are acquired frequently, a cost database might be very useful.

A general procedure for determining LCC has been proposed by Harvey (1976). It consists out of the following steps (Figure 3.1):

- Define the cost elements of interest: The costs of elements of interest refer to all cash flows or sources of cost that occur in the life of the asset.
- Define the cost structure to be used: The cost structure is aimed at grouping costs to ensure consideration of all relevant cost elements, identify trade-offs and avoid duplications to ensure an optimum LCC result. In this respect, a number of structures can be identified. For example, White and Ostwald (1976) divided costs into the three categories of: engineering and development; production and implementation; and operation. Alternatively, Barringer (2003) divided costs into acquisition (or one-off) costs and sustaining (or recurring) costs.
- Establish the cost estimating relationship: A cost estimating relationship is a mathematical expression that describes, for estimating purposes, the cost of an item or activity as a function of one or more independent variables.

- Establish the method of LCC formulation: The method of LCC formulation involves choosing an appropriate methodology to evaluate the LCC. According to the Woodward (1997), a formidable method is the one by Kaufman (1970) shown schematically in Figure 3.1.



Source: Adapted from Kaufman (1970)

Figure 3.1 Kaufman's life cycle costing formulation

The concepts of cost breakdown structure, cost estimating, discounting and inflation are fundamental to all applications of LCC. The LCC approach identifies all future costs and benefits and reduces them to their present value. It does so by using discounting techniques through which the economic worth of a project or series of project options can be assessed.

LCC is a technique very well suited to estimate the costs in a BC for the entire life cycle of an IS implementation. It might be a valuable addition to BCD methodologies. However, as the LCC approach is extensively discussed in literature and cost estimation is not the main focus of this thesis, we will not elaborate on this topic further.

3.3 Benefits of IS implementations

In this section the concepts of "benefits" will be discussed in depth. In section 3.3.1 17 different benefits management methods will be reviewed. Benefits explicate the advantages that each solution scenario of a BC is expected to deliver in detail. A business benefit can be defined as "an advantage on behalf of a particular stakeholder or group of stakeholders" (Ward and Daniel, 2006). Benefits management in the IT implementation domain is "*the process of organizing and managing such that the potential benefits arising from the use of IS/IT are actually realized*" (Ward and Daniel, 2006). The decision of the management to evaluate IT investments before and after they occur is one of the factors that separates successful from less successful companies in their IT deployment. This shows the potential impact of benefits management for companies who do not evaluate their IT investments in such an extensive way.

A structured literature review by Schubert and William (2009) on various IS investment benefits showed that current benefit frameworks pay limited attention to contextual and temporal variations, business changes, and levels of benefit realization. Further, current studies provide limited insights into how the variations in motivations for undertaking a project influence the expected and realized benefits.

Our literature review shows that recent literature on benefits does not provide a complete view on identifying, realizing and assessing IS benefits. Some authors identify benefits according to their characteristics, but they do not give guidelines for benefit realization and assessment (Shang and Seddon, 2002). Those who discuss benefit realization and assessment, do not discuss the identification of benefits (Al-Mashari et al., 2006, Davenport, 2000). Shang et al. (2002) provide the most complete benefits list of all benefit categorizations (Eckartz et al., 2009b). In each benefit categorization a distinction can be made between tangible and intangible benefits (Murphy and Simon, 2002). Tangible benefits often are measured by the use of Key Performance Indicators (KPI). Measuring and quantifying intangible benefits is often phrased as substantially more difficult and this issue still needs to be solved.

Following this analysis, we conclude that the limited scope of existing benefits frameworks asks for a more holistic and detailed analysis of IS benefits. Such an analysis should be dependant on the characteristics of the benefits. The analysis should be embedded in benefits management (Ward and Daniel, 2006). This is to help organizations in understanding when and where in the IT investment process benefits are currently realized and where and how they could potentially gain more benefits. In order to realize the expected benefits it is important to specify them early in the process and also explicate the necessary business and organizational changes during the IT investment (Peppard et al., 2007). These changes are based on the motivations or drivers behind the IT investment. Classification of these drivers may help to further tailor and specify the BC development process including the necessary methods or tools.

The term 'disbenefit' is used in many benefits management approaches and it is interpreted in a number of ways: a disadvantage, something objectionable,

something that makes a situation unfavorable, or undesirable effects of an investment. Ward, Taylor and Bond (1996) highlight that potential disbenefits of an investment should always be considered and they define those as the adverse impact on a business or an organization. Bannister (2008) makes the distinction between anticipated and unanticipated disbenefits. Anticipated disbenefits can be costs or risks and they should be managed; they should be part of a business case. Unanticipated benefits have to be managed in a reactive manner since they arise (i) as unexpected or unintended side-effects, (ii) from unforeseen use of technology, or (iii) as creation of new risks (e.g. new forms of fraud).

3.3.1 Review of benefits management methods

Researchers as well as practitioners have developed a variety of benefits management methods based on the early work by Ward et al. (1996). In this section we present a comparison of 17 benefits management methods identified in literature, of which eleven from scientific literature and six developed in practice. The identification of the methods is the result of an extensive literature search performed in 2010. We show how the framework of Avison et al. (2006), developed specifically for the comparison of methodologies, can be applied to the domain of benefits management. This framework distinguishes seven characteristics: philosophy (paradigm, objectives, domain and target), model, techniques and tools, scope, outputs, practice (background, user base, players) and product. Table 3.3 shortly explains how we deployed the characteristics in our comparison of methods and how they can be mapped to the categories by Avison and Fitzgerald (2006). Afterwards Table 3.4 uses the categories to compare the 17 benefits management methods.

Table 3.3 Mapping of concepts used for comparison to categories by Avison and Fitzgerald.

Avison category	**Concept used in our comparison**
Philosophy	Principles that underlie the method. Split into paradigm and target in our comparison (see Table 3.4)
Model	The constructs (abstraction) used to model the real world such as verbal, mathematical or schematic models.
Technique and tools	Techniques and tools provided to support the user of a method, e.g. tools for Project Management.
Scope	Covered phases of the benefits management life cycle (benefit identification, realization and assessment). Ability to quantify benefits.
Outputs	Deliverables produced by the method, such as requirements specification and working implementations.
Practice	Background of the method (commercial, academic) and players supposedly involved with the use of the methodology.
Product	Product(s) provided to support the use of the method, such as software tools, written documentation and training.

Table 3.4 Benefits management method comparison

Method (main reference)	**Paradigm**[1]	**Target**	**Model**	**Techniques and Tools**	**Scope: Identify**[2]	**Scope: Realize**	**Scope: Assess**	**Scope: Quantify**	**Outputs**	**Practice**[3]	**Products**
1.1 Ward et al. (1996)	B	IT	Process model, verbal guidelines	Conceptual model, tools for PM	✓	✓	✓	✓	Documentation for PM, reports	A	Book, academic papers, software tool
1.2 Shang & Seddon (2002)	H	ES	Verbal classification	Classification techniques, graphs	✓	✓	✓	✓	Classified benefits, benefits graphs	A	Academic papers
1.3 Chand et al. (2005)	H	ERP	Verbal classification	Classification techniques, BSC	✓	×	×	✓	Classified benefits, BSC	A	Academic paper
1.4 Remenyi & Sherwood-Smith (1998)	B	IS	Process model, financial model, verbal guidelines	Organizational techniques, tools for PM, financial tools	✓	✓	✓	✓	Documentation for PM, quantified benefits	A	Book, academic papers
1.5 Gunasekaran et al. (2001)	S	IT	Analytical model	-	✓	×	~	✓	Verbal benefits documentation	A	Academic papers
1.6 Andresen et al. (2000)	H	IT in construction	Process model, verbal guidelines	Measurement technique	✓	✓	✓	✓	Quantified benefits, evaluated benefits	A	Academic paper

[1] H = science paradigm ("hard" thinking); S = systems paradigm ("soft" thinking); B = both paradigms

[2] ✓= subject is discussed; ~ = subject is briefly discussed; × = subject is not discussed

[3] A = Academic, C = Commercial

1.7 Giaglis et al. (1999)	S	IS	Process model, verbal guidelines	BPM (Modeling), BPS (Simulation)	✓	×	×	✓	As-is model, to-be model	A	Academic paper
2.1 Changchit et al. (1998)	S	IS	Descriptive process model	-	✓	×	×	×	-	A	Academic paper
2.2 Ashurst et al. (2008)	S	IT	Process model, verbal guidelines	Many referenced from literature	✓	✓	✓	✓	-	A	Academic papers
2.3 Schubert & William (2009)	S	ES	Verbal classification	Taxonomy of benefits	✓	×	×	×	Classified benefits	A	Academic paper
2.4 Yates et al. (2009)	B	IT in health	Process model	PM software tool	✓	✓	✓	×	-	A	Software tool, academic paper, guide
3.1 Thorp (2003)	S	IT	Verbal (process) guidelines	Conceptual models, tools for PM	✓	✓	~	~	Documentation for PM	C	Book, training
3.2 OGC (2009)	S	Any project	Verbal process guidelines	Tools for PM	✓	~	✓	~	Documentation for PM, reports	C	Book, training, certification
3.3 OGC (2007)	B	Any project	Process model, verbal guidelines	Conceptual models, tools for PM	✓	✓	✓	✓	Plan or report after each phase, quantified benefits	C	Book, training, certification
3.4 Bradley (2010)	B	Any project	Process model, verbal guidelines	Conceptual model, tools for PM, measurement and organizational techniques	✓	✓	✓	✓	Plan after each phase, quantified benefits, documentation for PM, reports	C	Book, training, software tool
3.5 Melton et al. (2008)	B	IT	Process model, verbal guidelines	Conceptual model, many tools for PM	✓	✓	✓	✓	Documentation for PM, reports	C	Book
3.6 IT Governance Institute (2008)	H	IT	Process model, verbal guidelines	Tools for PM	✓	✓	✓	×	Documentation for PM	C	Book

The comparison of the 17 benefits management methods shows that among others:

- 11 methods are developed in research, 6 in practice.
- Only 6 methods provide a conceptual model that guides the benefits thinking and reflection during the practical application.
- 13 methods discuss the quantification of benefits, of which 2 only briefly discuss the topic.
- 9 methods encourage the user to assign roles and responsibilities for the identification, measurement and realization of benefits.
- 5 methods support the integration of the method with existing business processes and KPIs by delivering a plan or report as output.

We use insights from theory and practice to identify characteristics that successful BM methods for IS implementations should include. In our literature search we identified a variety of critical issues influencing the success of a BM method. We complement this list of characteristics by collecting input from experts: We asked experts from IS adopting organizations, in a focus group setting, to reflect on critical issues and success factors for BM. We further conducted a survey among 60 experts from the advisory industry to learn about their demands on a successful BM method. Besides the collection of critical issues the experts were asked to assess the importance of each of the characteristics.

The four characteristics that were considered to be most important for the success of a BM method are:

- Ability to correctly quantify benefits.
- The method must not be too abstract and include practical tools.
- Ability to clearly assign responsibilities for benefit identification, measurement and realization.
- Ability to integrate the method with exiting business processes and key performance indicators (KPIs).

We used the four characteristics to compare the 17 BM methods. Two researchers independently scored the methods on actual support for the stated factors. Our analysis shows four methods significantly distinguish itself from the total of 17 methods in completeness: Cranfield Process Model of Benefits Management (Ward and Daniel, 2006), Managing Successful Programmes - Benefits Realization Management (Office of Government Commerce, 2007), Benefit Realization Management (Bradley, 2010), Project Benefits Management (Melton et al., 2008).

To select the final foundation for our improved BM method design cycle we performed a multi-criteria analysis of these four methods including a detailed discussion with the focus group, mentioned above. The method by Ward and Daniel (2006) was unanimously selected as the most complete as it fulfills most of the criteria identified from literature and by practitioners. So this will be used later on in this research as basis for our design activities described in section 7.1.3.

The Cranfield process model of benefits management method (Ward and Daniel, 2006) got validated in real life IT implementations and therefore serves as a solid basis for an inter-organizational IS BM method. Its basic activities are:

- Identify company goals, critical success factors and KPIs
- Structure benefits and goals by building a benefit dependency network
- Identify benefits, measures, and benefit owners
- Structure the benefits on type of business change
- Structure the benefits on degree of explicitness

Evaluating the method using the characteristics identified above and discussing it with the experts of our focus group we found that the method still has some flaws and does not address all issues that our literature search pointed out to be important. The most important shortcomings identified are:

- Experts perceive the benefit dependency network as complex. A more straightforward connection between the benefits, goals and drivers of the project is desirable.
- The method pays limited attention to contextual and temporal variations. This is relevant as changes in the project duration are often present in complex projects (Schubert and William, 2009).
- Although the method provides guidance on the classification of benefits, there is hardly any guidance on the initial identification of benefits. For example possible areas where benefits can be expected that support actors in the initial brainstorming are missing. This is important, as without it the whole method will be based on an incomplete set of benefits.

We will address these issues in our design cycle described in section 7.1.3 when developing an improved benefits management method based on the method of Ward and Daniel (2006).

3.4 IT project valuation methods

The following classes of models are the result of a synthesis of the works reported in the literature on IT project valuation. We would like to state that these classes are not mutually exclusive nor collectively exhaustive. After listing the different model classes we will provide a description of each class, including a critical evaluation of the strong and weak points of each method, and especially in which context, the valuation method is expected to be the most useful. The classes of models are:

1. Financial and economic models
2. Constrained optimization models
3. Checklists & scoring models
4. Multi-criteria decision making models
5. Models based on analytic hierarchy process
6. Group techniques

We will discuss the financial and economic models in detail, as they are the basis for our research. Group techniques are another important foundation for our research. We will discuss their literature background at the end of Chapter 4. All other classes will be described at a higher level of abstraction.

3.4.1 Financial and economic models

Financial and economic models are also referred to as index models and were extensively used for project selection in the 1950's and 1960's notably in the chemical and pharmaceutical industries and in the field of R&D project selection. Index models are presented as a relationship between the expected outcome and the estimated costs, taking the general form:

$$\text{index} = \frac{\text{anticipated outcome}}{\text{estimated costs}} \text{ . risk factor}$$

Some techniques were developed for the particular case of IT project appraisal based on 'information economics'. Information Economics was developed by Parker & Benson (1987) to evaluate IT projects. Information Economics is a technique, which tries to appraise intangible benefits and uncertainties of IT projects. The information economics model is an extension of the traditional financial cost/benefit model to include intangible benefits. To assess the Return on Investment (ROI) a proposed project is assessed by using an extended form of ROI as:

Traditional Cost/Benefit Analysis	+	Value Linking	+	Value Accelerating	+	Value Restructuring	+	Innovation Valuation

Value linking and value acceleration analysis are techniques to assess costs that enable benefits to be achieved in departments most often outside of IS. Value restructuring addresses the value gained from the restructuring of a process and its resulting organizational change. Innovation valuation considers the value of new innovative IT applications by accounting for both: the benefits, costs and risks of being first and for the costs and risks of failure (Parker and Benson, 1987).

Other financial models which have been used for IT/IS evaluation include: return on investment, accounting rate of return, net present value, internal rate of return and profitability index (Ballantine and Stray, 1999, Rosacker and Olson, 2008). Although index models are not a substitute for judgment, it can be argued that they can play a positive role in the process of IT project selection. Their main strength is a reduction of emotional aspects when screening IT projects because they require accurate quantitative data expressed in economic terms. This strength can also be a shortcoming because quantitative estimates of most factors related with an IT project are difficult to gauge at the outset and difficult to express in economic terms. Therefore, the project proposers may be tempted to simplify the inputs (costs) and outputs (outcome). Another problem associated with index models for IT project selection is that they consider only one project at a time and hence project interdependencies and resources constraints are ignored. Project interdependencies can have a significant effect on the value associated with a portfolio of IT projects. We will address these problems later on in this thesis when discussing the development of our BC methodology.

3.4.2 Constrained optimization models

Constrained optimization models try to optimize an objective function, usually profit, with respect to a set of constraints such as resources. These constraints could reflect financial, technological, marketing or organizational considerations. Mathematical programming is often used to solve optimization problems. It basically aims to improve the quality of decision making by providing managers with a better understanding of the consequences of their decisions. In other words, constrained optimization models approach the IT project valuation problem as a set of projects competing for limited resources and try to plan the best possible allocation of scarce resources. There are several examples of the application of constrained optimization to IT project selection (Badri and Davis, 2001, Wu, 2008). A general problem with constrained optimization models is their dependence on quantitative estimates as model input.

3.4.3 Checklists and scoring models

Checklists are simple tools used to support project selection decisions. Checklists consist of a list of factors that are judged on their relevancy for the success of the project by a decision maker. The project is evaluated either by using yes or no responses or by a detailed description.

An important step in the design and use of checklists is the formulation of a complete list of all the relevant factors or categories against which the projects have to be analyzed. However, this list should also not be too long to still be usable. Finding a balance between length and completeness might be a challenge. When a suitable list has been made and agreed upon, then the decision makers can define a scale for each item in the checklist against which the degree of contribution of each project to a particular factor can be measured. Moreover, a weighting system can be introduced to reflect the decision makers' preference regarding the relative importance of a factor. Such a checklist is referred to as a scoring model. Common criteria for such checklists are the following: Promise of success, time to completion, cost of the project, strategic need, market gain and risks.

Scoring models allow decision makers to consider conflicting goals. They incorporate non-economic criteria and they are adaptable to input data, and can cope with qualitative as well as quantitative data.

Christiansen (2008) and Sen (2009) have presented several applications of checklists and scoring models for IT valuation.

3.4.4 Multi-criteria decision making models

In multi-criteria decision making (MCDM) decisions are made in a situation where multiple objectives, usually conflicting and incommensurate, are present. The purpose of MCDM is not to determine the best decision, but to help the decision makers arrive at a preferred decision, as there is no universally accepted best solution when decision makers consider multiple objectives simultaneously (Haimes and Li, 1988). Typically no unique optimal solution exists for problems that include multiple criteria. This might be experienced as a drawback. Some MCDM examples for IT portfolio selection are provided by Chen and Cheng (2009), Zandi and Tavana (2010) and Yeh et al. (2009).

Multi-attribute value functions are used to rank solution alternatives. One of the more recent research findings suggests the combined use of an evidential reasoning approach based on the Dempster–Shafer theory (Shafer, 1976) of belief functions with real options analysis (Hilhorst et al., 2008).

3.4.5 Models based on analytic hierarchy process

Analytic Hierarchy Process (AHP) is a framework suggested by Saaty (1980). AHP is a method of pairwise comparison. AHP divides the selection problem into a number of levels and deals with one level at a time. Pairwise comparisons are carried out in a way so that the ratio scale of the judgments is maintained. The result is a pairwise comparison matrix. This matrix is useful in detecting errors of judgment and inconsistencies, which is a good feature of AHP. However, one disadvantage of AHP is that the number of comparison tables might become very large if one uses a lot of comparison attributes. This can lead to a tendency to exclude valid comparison attributes in order to keep the number of calculations manageable. Recent examples of the use of AHP for IT project selection can be found in Lee and Kim (2000) and Liang and Li (2008).

3.4.6 Group techniques

A few techniques have been proposed in the literature whose aim is on helping a group of individuals to make a decision (DeSanctis and Gallupe, 1987). These group techniques try to avoid the spurious effects, which usually occur in a group environment such as influence of dominant individuals, pressure for conformity and formation of cliques. At the end of Chapter 4 we will provide more insights into group decision support methods.

Comparing the six project valuation techniques we conclude that financial and economic models (3.4.1) can best be used as basis for our research. Depending on the project other IT valuation methods might be a useful addition during the BCD process. Given the inter-organizational nature of this thesis, group techniques (3.4.6) build a second important foundation for our research.

3.5 Design specifications for an improved BCD method

Based on the literature insights, discussed in this chapter, we identified a variety of critical issues to be influential on the success of a BCD method. We refer to these as design specifications; one might, however, also refer to them as requirements. We used the framework developed by Avison and Fitzgerald (2006), presented above, to structure these elements. Table 3.5 presents the final results of a clustering activity performed independently by the author of this thesis and another researcher. During this clustering an iterative approach of discussion, comparison and inspection of the original categories by Avison and Fitzgerald was followed.

The design specifications were used as input for our method design process, described in this dissertation from Chapter 6 onwards. When collecting the design specifications we had to make a tradeoff between completeness and complexity. We arrived at a set of design specifications that will actively be addressed in this thesis when describing our method design. We will do so by using the reference

code listed in the second column and check which of the criteria our new defined methodology fulfills.

Analyzing the design specifications in Table 3.5 one can see that most design specifications from literature are about requirements for a benefits management method. Only a few are about the BCD process in general.

Table 3.5 Design specifications for an enhanced BCD approach, informed by literature study

Avison category	Ref code	Critical issues/success factors
Philosophy	P1	• Focus should be on organizational change, not only IT change (Ashurst et al., 2008).
	P2	• Benefit determination should be an iterative process (Ashurst et al., 2008).
	P3	• Process should be open for (business) change (Schubert and William, 2009) .
	P4	• Steps in the method should be loosely coupled (Ashurst et al., 2008).
Model	M1	• Models that allow organizations to practice benefits management in their own common way (Ashurst et al., 2008).
Technique and tools (Steps to be included in the method)	T1	• Include overall/high-level intention behind the project (Remenyi and Sherwood-Smith, 1998, Peppard et al., 2007).
	T2	• Identify interdependencies between benefits.
	T3	• Provide clear labels and terms including a clear explanation of benefits.
	T4	• Address operational, managerial, strategic, IT-infrastructure, organizational benefits (Shang and Seddon, 2002).
	T5	• Make benefits specific, measurable and quantifiable (Remenyi and Sherwood-Smith, 1998, Peppard et al., 2007, Ashurst et al., 2008).
	T6	• Differentiate between tangible and intangible benefits (Schubert and William, 2009).
	T7	• Take time and immediacy of benefits into account. Move away from one point in time to a process of benefits measurement over time. Have a long term focus, as many benefits are only realized after the system went live (Chou and Chang, 2008).
Scope	S1	• Focus on business benefits.
	S2	• Start a BCD project at the business context.
Outputs	O1	• Translate academic methods into effective working practices (House of Commons, 2006, Chou and Chang, 2008).
Practice	Pra1	• Identify persons essential to the project (Shang and Seddon, 2002, Peppard et al., 2007).
	Pra2	• Identify an owner for each benefit who takes responsibility for the realization (Ward and Daniel, 2006).

Table 3.5 (continued) Design specifications for an enhanced BCD approach, informed by literature study

Avison category	Ref code	Critical issues/success factors
Product	Pro1 Pro2	• Methods and best practices that apply to the organization and its processes (Chou and Chang, 2008). • Introduce guidelines, training, workshops that help using the method.

3.6 Summary

This chapter presented the first part of our theoretical basis of this dissertation. We introduced the topic of business case development in more depth and positioned it against business modeling. We provided some high-level introduction into IS implementation cost estimation. We conclude that life cycle costing is a valuable approach when estimating the costs of an IS implementation, both for intra- as well as inter-organizational projects. Afterwards, we thoroughly discussed the topic of benefits and benefits management, including a comparison of 17 benefits management method. This comparison resulted in the selection of one preferred method, which we will use as a basis in our method development process in Chapter 7. The comparison clearly showed that current literature is not addressing business case development and benefits management in inter-organizational settings. We will elaborate on this gap in Chapter 4 and make an attempt to close this gap with this dissertation.

Following, we presented six different kinds of project valuation methods. We selected financial and economic models, such as cost-benefit analysis, to be the focus of this dissertation. Based on the insights from the literature review we finalize this chapter by presenting a set of design specifications that an enhanced BCD method should address.

4

Discussing the Context of Business Case Development[4]

"For me context is the key - from that comes the understanding of everything."
(Kenneth Noland)

After having introduced the theoretical background behind business case development in Chapter 3, this chapter will focus on the context in which our research is situated: inter-organizational networks. This research is conducted having a general IS project implementation evaluation perspective in mind. During our research we investigated one special kind of IS in particular: Enterprise system (ES) implementations in an inter-organizational context. In this chapter we will describe the characteristics of ESs (Section 4.2) and analyze how they influence the business case (BC) elements and the business case development (BCD) process.

At the beginning of this research project we participated in a case study at the Port of Rotterdam, where we were asked to develop the business case for the implementation of a multi-agent system. A case study that was characterized by its inter-organizational nature. During the case study we quickly had to acknowledge that the BC method we were using (based on literature) did not provide sufficient support to arrive at a shared BC. At the end of the project we were able to describe the problem situation and to present a high-level qualitative BC but the quantitative shared BC was missing. This experience showed us that creating and negotiating an inter-organizational BC for multiple-stakeholder ISs is a major challenge, which is not comparable to the BCD for single company implementations. Based on this experience we were motivated to analyze inter-organizational networks and identify those characteristics that make the BCD challenging. One of the factors that plays a major role is the stakeholders' willingness to share information necessary for the BCD.

In this chapter we identify characteristics present in inter-organizational projects (Section 4.3) and following develop a conceptual framework (Section 4.4)

[4] This chapter is based on the following publication:
Eckartz, S., Katsma, C.P. and Daneva, M. (2012). *Exploring the Business Case Development Process in Inter-Organizational Enterprise System Implementations.* Information Resources Management Journal (IRMJ) 25(2), 85-102

that explains the effect that a network project constellation has on the development of a shared BC. We identify several factors, such as goal consensus, cultural and semantic similarities and willingness to share information, that mitigate this effect (Section 4.5).

Subsequently, we apply the framework in the Port of Rotterdam case study to see if it helps us explaining the network situation with its challenges (Section 4.6). The application of the framework confirms our earlier finding that current BCD methods need to be re-stated and complemented by new tools and interventions to support stakeholders in inter-organizational specific settings. One promising intervention is the extension of current BCD methods with group decision support systems. We finalize our chapter with section 4.7, where we provide a literature background on group decision making. The theoretical basis of this chapter will be referred back to when developing the BC4IOP methodology, especially the group decision-making aspect (SID4IOP) in Chapter 6, 9 and 10.

4.1 Research method

We first conducted an extensive literature review using the guidelines of Webster and Watson (2002). We included publications covering BCD (Ward and Daniel, 2006, Ward et al., 2008), coordination mechanisms (Crowston, 1997, Malone and Crowston, 1994, Kishore et al., 2004), inter-organizational IS implementation (Davenport et al., 2004, Ferrario and Montagna, 2004) and group decision making (Section 4.7) in our literature review. This review resulted in relevant findings on the development and deployment of the BC during an inter-organizational IS implementation (Section 4.3 and 4.5). From this literature we identify four factors that influence the quality of the BCD process (Section 4.4.2) (Rowley and Slack, 2007). We evaluate these findings from the perspective of project constellations in inter-organizational collaborations and derive a conceptual framework. The objective of our framework is to specify the increased complexity of the BCD process during the early stages of an inter-organizational IS implementation.

Next, we deploy our framework in a case study at the port of Rotterdam (Section 4.6). The port of Rotterdam is a large business network in the transportation sector in the Netherlands. We deployed participative observation techniques in workshops within six consecutive months. We also conducted interviews, observed negotiation between actors, and, in a few occasions, guided the attempt to develop a shared BC for the network. We used a diary approach to record incidents. Also, we reflected on the relevant events with different interviewees in informal unstructured interviews. We participated in the following sessions:

- Six individual interview meetings with different actors to get an understanding of the situation at hand and of the important concerns of each actor. Unstructured interviews were conducted to collect mostly qualitative data.
- Five brainstorming meetings with different stakeholders (several barge operators, the Transportation ministry, and an official from the port of Rotterdam).

- Three collaborative workshops with most involved stakeholders present except for the terminal operators.

We coded and clustered the information that was collected by means of our interviews and the other empirical materials using our conceptual framework. Based on the analysis of the case study results we are able to identify four challenges that companies are expected to encounter during the BCD process.

Before discussing the inter-organizational context in more detail we will introduce the special case of enterprise systems.

4.2 Characteristics of enterprise systems

Enterprise systems (ES) evolved over the last 50 years from inventory control systems in the 1950s and manufacturing resource planning systems in the 1970s towards enterprise resource planning (ERP) systems in the early 1990s (Moller, 2005). Nowadays the trend goes towards a loose-coupled and network oriented perspective (Christopher, 1998) on supply chain integration. This idea is reflected in the core of extended ERP, also know as ERPII (Moller, 2005) or inter-organizational ERP.

Based on a structured literature review (Eckartz et al., 2009a) and two annotated bibliographies on ES publications published between 1997 and 2005 (Esteves and Pastor, 2001, Esteves and Borhorquez, 2007) we have developed a concept matrix (Webster and Watson, 2002) showing the characteristics identified in literature. This concept matrix is shown in Table 3.2. We will only list the first key articles who give a definition/characteristics of ES, as our review shows that afterwards the characteristics mentioned were not much different. Following the concept matrix we will provide our own definition of an enterprise system.

Table 4.1 Concept matrix of enterprise system characteristics

Article/literature: Concept:	**O'Leary (2000)**	**Davenport (1998)**	**Markus (2000)**	**Pozzebon (2000)**	**Parr (2000)**
Packaged software	X	X	X	X	X
Cross-functional Integration of BP	X	X	X	X	X
Large Size		X	X		
Complexity		X	X	X	X
Process large majority of transactions	X	X			
Central Enterprise-wide database, each data piece is stored once	X	X	X		
Real time data access	X	X			X

Table 4.1 (continued) Concept matrix of enterprise system characteristics

Article/literature: Concept:	**O'Leary (2000)**	**Davenport (1998)**	**Markus (2000)**	**Pozzebon (2000)**	**Parr (2000)**
Support for multiple currencies & languages	X		X		
Support for specific industries	X	X	X		X
Ability to customize without programming (modularity)	X	X			X
More than just infrastructure			X		
High degree of interdependencies				X	

As one can see in the concept matrix most definitions of ESs have been written around the year 2000, when most people looked at ESs from a packaged software perspective. Although the general line of reasoning behind ESs still holds today, this dissertation focuses on the implementation of general business applications (not only packaged systems) in an inter-organizational context. Current technology for business applications has moved from monolithic packaged ES software towards modular services that are easier to combine and mash-up. For our BCD method it does not matter whether the system to be implemented is a commercial off-the-shelf (COTS) product or a custom build system. To give an example, the implementation of a shared e-procurement system might lead to other costs and benefits than a company-wide SAP implementation, however, the process of benefits management and cost estimation and distribution is the same for both kind of systems.

Analyzing the concept matrix further, we find a second characteristic of an ES that all authors agree on: An ES crosses functional boundaries and integrates business process within and across an organization. The BC for a system that only influences one business process is supposed to be much easier to develop and agree on than a BC for a complex cross-functional IS implementation. This shows it is very important to emphasize this aspect in this dissertation, as it influences the BCD process substantially.

We define enterprise systems as software that enables the integration and coordination of data and business processes within and across complex organizations. They support the connection and management of information flows within and across functional areas in an organization, allowing managers to make more accurate decisions. ES provide a single system that is central to the organization and ensure that information can be shared, across all functional levels and management hierarchies.

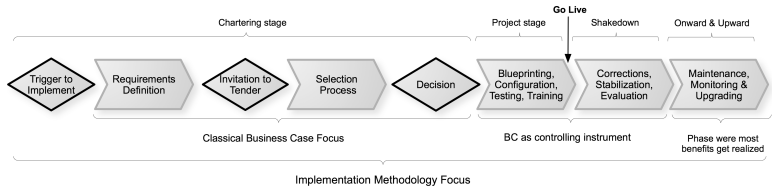


Figure 4.1 BC development during ES implementation life cycle

Figure 4.1 shows the ES implementation life cycle and shows how BC deployment is focused on the chartering stage, whereas extensive implementation research shows the project stage to be of substantial importance too (Katsma, 2008). Currently the BC deployment is often used to obtain funding approval for the huge up-front financial investment and not to actively manage the project throughout the entire life cycle. A BC exists to ensure that, whenever resources are consumed, these support one or more business objectives. This implies that a BC should be reviewed at various stages during the IT life cycle as a controlling instrument. Another important issue to consider is that only during the onward and upward phase when the ES system is in operation most benefits get actually realized.

In the remainder of this thesis we will regularly refer to ES implementations as example. Although our methodology is designed for systems that are complex and that cross functional borders we do not intend to develop a methodology that is applicable to ES implementations only. Thus, characteristics like being a packaged system and having a central database do not influence the design decision we take throughout our research.

4.3 Characteristics of inter-organizational information systems

In the field of IS research, scholars take different perspectives upon this relatively young research domain of inter-organizational collaboration (Klein et al., 2004, Schulz and Orlowska, 2004). Our research builds upon the work of Kishore et al. (2004) that includes coordination theory to exemplify the extra complexity due to the number of involved actors. We extend their line of reasoning by investigating the impact of the project constellation among the involved actors when the BC is initiated during the early stages of an inter-organizational IS implementation.

The network of actors should deliver diverse inputs to build a BC for an inter-organizational IS implementation, which complicates the BCD process (Schmidt, 2003b). Although the actors are aware of the need to share information, they might lack a shared understanding of the terminology used, hesitate to release sensitive information or disagree on how costs and benefits are distributed in a network. The involved actors might further have different drivers for participating in an inter-organizational cooperation, such as acquire resources, reduce uncertainty, enhance legitimacy or, in the best case, attaining collective goals

(Oliver, 1990). Differences in these drivers among actors can make the BCD process challenging and complex. Such a context calls for a structured BCD approach.

4.3.1 Context assumptions

Inter-organizational relations can be classified based on the type of relationship between partners and their coordination structure. A distinction can be made between markets and non-markets (Heide, 1994). Markets are characterized by discrete interactions and limited personal involvement (Powel, 1990), while non-market interactions are usually based on some form of relationship between the partners. The latter can be classified as being either of hierarchical or of a network nature. Figure 4.2 shows the three structures.

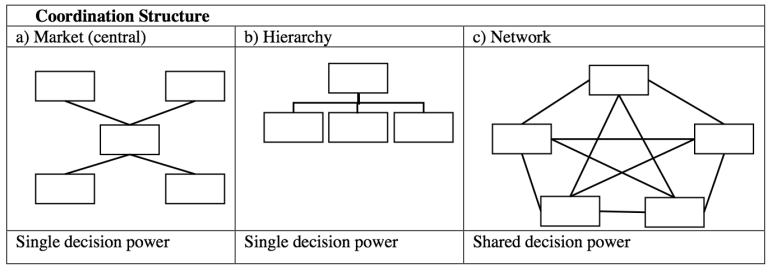


Figure 4.2 Different coordination structures and their power relation (adapted from (van Alstyne, 1997))

Inter-organizational relations organized in a market structure (Figure 4.2, a), often have a short-term focus and are mainly based on the price mechanisms. Markets are characterized by transactional contracts. Hierarchical partnership structures (Figure 4.2, b), e.g. franchise or outsourcing contracts, rest on unilateral interaction and an authority relationship. The network (Figure 4.2, c) as a coordination structure is characterized by cooperation, collaboration, and the sharing of information (Jaffee, 2001). Thus, it is different from a pure market structure; in fact, it is a hybrid of hierarchy and market, which is based on bilateral, often long-term interaction between partners.

For our research we assume that the implementation of inter-organizational ISs involves multiple actors that are cooperating in a network. All involved actors need to first develop their own individual BC, and, next to that, jointly agree on a shared BC. This is in contrast to existing literature, which often assumes a single actor taking ownership for the network and therefore exercising power in the decision-making process. Such single decision power can often be found in coordination structures that have a hierarchical or central market structure. Networks are characterized by relational contracts and decentralized decision power of the actors. Agreements are based on trust on the other actors.

This research focuses on situations where the BC is developed for rather complex IS implementations, such as ES or multi agent systems, that are organized

in a network structure. IS with rather obvious costs and benefits for all stakeholders at the early stage of the project are not considered for our research objective. We also do not take bi-lateral agreements into account.

4.4 A conceptual framework for inter-organizational BCD

In earlier research we presented an exploratory framework that investigates the impact of coordination structure and project scope on six different coordination properties (Eckartz et al., 2010).

Now we focus on one application of our previous framework, namely the situation in which a BC is developed for an inter-organizational IS in a network setting with a shared power distribution amongst the actors to make decisions. Our main line of reasoning is depicted in Figure 4.3, from left to right. In an inter-organizational setting we distinguish different project constellations (box ❶ in Figure 4.3). These project constellations influence (arrow ❹ and ❺) the BCD process (box ❸) significantly, via four mediating factors (box ❷). The BCD process is defined in terms of its quality and structure.

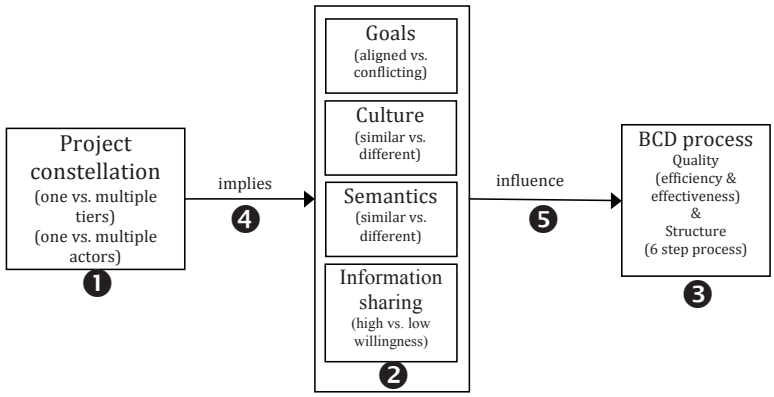


Figure 4.3 Conceptual framework: Impact of Project constellation on the BCD process

In the following sections we first explain the three boxes and their relationships respectively. We then conclude the section with a discussion on how specific project constellations result in challenges for the BCD process.

4.4.1 Project constellation

In this section we will elaborate on the constellation that is present in an implementation project, as shown in Figure 4.3, box ❶ where the goal is to integrate decision processes across tiers, in e.g. a supply chain. We define an actor as a decision-making unit. When referring to a single actor, we mean one organization that may consist of several individuals but each single actor does not have the mere decision making power over the other actors. In this research, we

exclusively focus on projects with multiple actors, because we analyze the context of inter-organizational systems.

Before the start of a joint project, every single actor is involved in his own business network with multiple other actors, such as suppliers, customers or competitors. Several drivers can initiate a joint project like new legislation, innovations or the insight in a shared business opportunity between a set of actors. The connection between firms in the network is referred to as role linkage by Hong (2002).

Based on Hong's conceptualization of role linkages we discern three different patterns how multiple actors can be involved in such a project (A, B and C, Figure 4.4). We define the pattern of the number of partners and tiers involved in a project as the *project constellation*. The project complexity increases from column (A) to (C). In short these project constellations can be explained as follows:

Pattern A) A project can be established by actors within one tier. The implementation of the Dutch payment system IDEAL by several banks is an example of this project constellation (Figure 4.4, A),

Pattern B) Single actors from different tiers may be involved in a project, but in pattern B we distinguish exclusively one actor from each tier. Nowadays, these single supplier "pipes" are more exotic as vendors try to balance their risk by multiple supplier partnerships. Still there are substantial situations where component or partner uniqueness often dictates single supplier relationships (Figure 4.4, B)

Pattern C) A set of multiple actors from multiple tiers are involved in the project. There are plenty of examples for this project constellation, e.g. in the automotive industry, where multiple suppliers and customers are connected through an IOS with the car manufacturer. (We depicted one possible pattern in Figure 4.4, C).

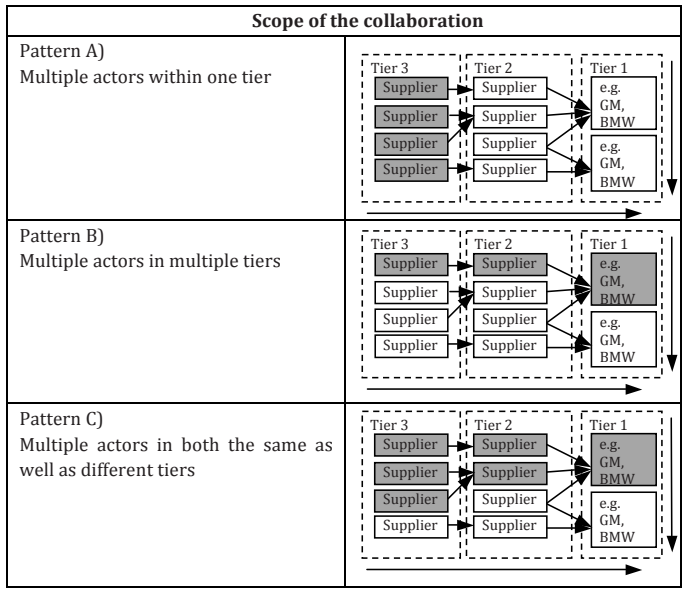


Figure 4.4 Three forms of scope of the collaboration

4.4.2 Four factors influencing the inter-organizational BCD process

Based on a literature review (Xu and Beamon, 2006, Park, 1996, Daneva and Wieringa, 2006) and case research we identify several important factors (Figure 4.3, box ❷) that are expected to influence the BCD process when evaluating the investment in an IOS. We follow a similar clustering and classification approach like Rowley & Slack (2007) and derive four main factors that influence the BCD process (Table 4.2). We phrase the factors as discrepancy variables. We make the note that our list of factors that *directly* influence the BCD process is not exhaustive. Other factors, like trust, power and competition *indirectly* influence the BCD process and will be mentioned when discussing the conceptual framework.

Table 4.2 Four factors influencing the BCD process

Factor	Explanation	Sources
Goals (aligned vs. conflicting)	Alignment of the individual goals of each actor for the project. (We distinguish between aligned versus conflicting goals)	(Daneva and Wieringa, 2006, Provan and Kenis, 2007, Davenport, 1998, Davenport, 2000)
Culture (similar vs. different)	Similarities in the way the actors interact with each other (we distinguish between similar versus different national and organizational cultures)	(Kendra and Taplin, 2004, Hofstede, 1983, Schein, 2004)
Semantics (similar vs. different)	Similarities in the use of language and knowledge exchange between the actors (we distinguish between similar versus different semantics)	(Daneva and Wieringa, 2006, Davenport, 2000)
Information sharing (high vs. low willingness)	Willingness to share sensitive information with the other actors in the project (we distinguish between high versus low willingness to share information)	(Thorelli, 1986, Park, 1996)

Goals

This factor implies that if the individual goals of the actors are conflicting it is more difficult to get an agreement on the BC than if the goals of the separate actors are aligned. The goals of the individual actors are specific for a project as they describe the individual objectives that each actor wants to achieve with the project. Individual goals can be similar or different among the actors and can even change throughout the project. If the goals are different, they can either be aligned or they could be in conflict with the goals of the other actors. Consensus between the actors on the majority of the goals would be ideal for the BCD process. However, reaching consensus is not always desirable or possible. Explicating the individual goals and defining a joint goal are important when steering the BCD process.

Consensus is typically a project-related factor as it includes the project goals and the different perspectives of each single actor. The other three factors, semantics, culture and willingness to share information, are typical characteristics that are independent of the project. These three characteristics are typical actor-dependent characteristics.

Culture

This factor states that efficient collaboration requires the awareness of different cultural backgrounds (Hofstede, 1983) and if necessary the application of interventions to create an open and effective group culture (Kendra and Taplin, 2004). Each of the involved actors has its own national and organizational culture (Schein, 2004) and the differences between these cultures influence the BCD

process. It is expected that during the BCD process sub cultures will evolve in which the collection of actors shape their temporary group culture.

Semantics
This factor refers to the meanings that actors attach to the information entities and each actors' existing body of knowledge that they would share by using a common IOS. The actors in the network might for example speak a different language or use different terminology. Consequently, this could have an impact on the progress or speed of the BCD process and eventually on how agreement on the terms used in the BC is accomplished (Daneva and Wieringa, 2006, Davenport, 2000).

Information sharing
Information sharing describes the willingness of actors to share their sensitive cost- and benefit information, and their ability to actually supply financial numbers for the BC. It is closely linked to competition between the actors and one of the most important aspects in the BCD process (Thorelli, 1986). Information sharing is easier when actors speak the same language and is more difficult in case of competing actors (Park, 1996).

4.4.3 The BCD process specified: Quality criteria and structure

This section will describe the last element of our conceptual framework, the BCD process (Figure 4.3, box ❸). We analyze the nature of the BCD process based on quality criteria *and* structure.

Quality criteria
The quality criteria we use are derived from project management (like scope, time and resources) and software development processes (Fenton and Pfleeger, 1996, McCall et al., 1977) (efficiency, quality of the output). We specify the quality criteria for the BCD process based on efficiency and effectiveness in Table 4.3.

Table 4.3 BCD process: Quality criteria

Quality criteria	**BCD process specification**
Efficiency of the BCD process	Completion of the BC within the projected amount of time, against the proposed resources
Effectiveness of the BCD process	Realization of a qualitative BC that includes the proposed scope, benefits, cost, risks for the several involved actors. Resolution of possible conflicts between actors during the process

We further define a set of evaluation criteria (Table 4.4) that can be used to evaluate if a BCD method can support the BC development and deployment process.

Table 4.4 BCD process: Evaluation criteria

Evaluation Criteria	Measurement: Does the method…
Accessible and effective knowledge sharing	… provide support in transforming tacit into explicit knowledge? … facilitate an increase in mutual insights and shared understanding?
Trustful information exchange	… provide mechanisms for trust building? … provide mechanisms to separate private and public information, for trustful information sharing?
Decision making and negotiation support	… provide mechanisms to explicate conflicting and mutual interests and possibly come to a mutually agreed upon decision?

Structure
Several authors have derived different stepwise approaches to define the BCD process (Remenyi, 1999, Schmidt, 2003a). One of the most commonly used set of guidelines are the ones by Ward et al. (2008), who propose the following six steps for BCD:

1. Define business drivers and investment objectives
2. Identify benefits measures and objectives
3. Structure the benefits
4. Identify organizational changes to achieve benefits
5. Determine the explicit value of each benefit
6. Identify costs and risks.

In the next section we will further elaborate on how the BCD process quality attributes and steps are impacted by the different factors that we specified in the prior sections.

4.5 The inter-organizational BC

After having introduced our conceptual framework in this section we will explore how inter-organizational characteristics influence the different elements of the BC development and deployment process.

4.5.1 Influence of project constellation on the BCD process

Based on literature and experience we referred to earlier, we conclude that possible impacts of the factors on the BCD process can be traced back to different project constellations (Figure 4.3, arrows ❹). For each project constellation pattern we will now specify which of the factors, identified in Table 4.2, are likely to positively or negatively influence the BCD process. Table 4.5 depicts the relationship between the three project constellations (specified in Figure 4.4) and the four mediating factors that influence the BCD process (specified in Table 4.2).

Table 4.5 Value of factors in different project constellations (Figure 4.3 arrow ❹)

Project Constellation	**Goals** (aligned vs. conflicting)	**Culture** (similar vs. different)	**Semantics** (similar vs. different)	**Information sharing** (low vs. high)
Pattern A) multiple actors within the same tier	aligned	similar	similar	low
Pattern B) multiple actors from different tiers (one actor per tier)	conflicting	different	different	high
Pattern C) multiple actors from the same as well as multiple tiers	conflicting	different	different	low

Table 4.5 displays the extreme instances of these four factors for each pattern. We focus on situations in which the factors negatively influence the BCD process as project managers perceive these as being the most critical. When the influence of the factor on the BCD process is likely to be negative it is shaded in grey. We conclude that the following factors are critical: (i) conflicting goals, (ii) different cultures, (iii) different semantics, and (iv) low willingness to share information.

The second part of our analysis covers the impact of these "shaded critical factors" on the BCD process (Figure 4.3, arrows ❺), and we display them in Table 4.6. We specify if the effect applies to the whole BCD process, or to a specific step only.

Table 4.6 Impact of factors on the BCD process steps (Figure 4.3, arrow ❺)

Critical Factors	**Negative impact on BCD process steps by Ward et al.** (2008)
Conflicting goals	whole process
Different culture	whole process
Different semantics	step 3
Low willingness to share information	step 1,2,6

Beside the impact on the BCD process steps we expect all four critical factors mentioned in Table 4.6 to also have a negative effect on the two BCD process quality criteria: efficiency and effectiveness. We will explain our line of reasoning for each of the patterns below, referring to Table 4.5 and Table 4.6.

Pattern A

Within pattern *A*, all actors are from within the same tier. As their distance in the supply chain is rather small we assume that they often have similar motives to participate in a project and are therefore more likely to have similar, non-conflicting goals (goals=aligned). We further assume that actors from the same tier

use similar language (semantics= similar), thus semantically confusion is limited. In the case that the actors operate in the same sector, their organizational culture is expected to be similar, thus actors show comparable behaviors in how they interact with each other (culture= similar). In the case that the actors are competitors their willingness to share (sensitive) information with other actors is low (willingness= low). Low willingness to share information is expected to hinder the BCD process as it impedes the collection of important financial information for the BC from the actors in the project. It will especially impact those steps of the BCD process that rely on the collection of a rather large amount of information, such as it is the case in step 1, 2 and 6, where the drivers, objectives, benefit measures, costs and risks for a project are identified. If insufficient information is collected the BCD process will be less efficient and will require more time to be finished (quality criteria, efficiency= low).

Group techniques, such as GDSS, might help in overcoming the low willingness to share information, e.g. by supporting anonymous information sharing.

Pattern B

In pattern *B*, all actors are from different tiers and the problem of low willingness to share information is hardly present as there is, often, no significant competition between the different actors. However, the larger the distance between the different tiers the more likely it is that the actors "speak a different language" and are more likely to have different organizational cultures when interacting with each other. This effect on semantics and culture is enlarged when the tiers are from different sectors. Whether or not the semantics of the different actors are similar will determine if the actors can easily obtain a shared understanding of the benefits and consequences of a project. This, in turn, is expected to affect step 3 of the BCD process. In this step multiple actors need to structure the benefits, and thus need to really understand what is meant by the different benefits identified by the multiple actors. Differences in semantics and culture will decrease the efficiency and effectiveness of the BCD process. Further, actors from different tiers are assumed to have different interests in the project, which is reflected in their individual goals. Whether the goals are aligned or conflicting will impact the efficiency of all steps in the BCD process. It further impacts the likelihood of conflict between the actors (effectiveness= low).

GDSS extended with group culture interventions, might offer possibilities to overcome some of these challenges.

Pattern C

The challenges identified in type *A* and *B* are amplified if the actors in a network are from both the same as well as different tiers. In this situation it is likely that the actors have different goals, semantics and culture. A set of actors also is less likely to share information with the other actors in the network, because competition between them plays a role. Different mitigation strategies should be combined in order to come to a successful BC in this latter situation.

Concluding our analysis we see that the three patterns have different influences on the BCD process. We now can cluster these influences into what we call *challenges* for the BCD process.

- *Challenge 1*: Explicate conflicting goals and objectives of multiple actors in a shared BC. Resolve conflicting goals or compensate actors with a negative BC, given that the overall BC is still positive.
- *Challenge 2*: Overcome barriers that hinder the BCD and agreement process due to differences in organizational culture between the actors.
- *Challenge 3*: Overcome barriers that hinder the BCD and agreement process due to differences in semantics between the actors.
- *Challenge 4*: Find ways to increase the willingness of the actors to share (sensitive) information with other actors and to quantify (put numbers in) the BC.

Our aim of this cluster exercise is to propose intervention mechanisms that are specifically applicable in each of the three patterns. Table 4.7 shows the four grouped challenges for each of the three patterns. It shows that projects with multiple actors within the same tier and the same sector (type A) are expected to have the least challenges to overcome when developing a BC. Whereas project constellations with pattern *C* are confronted with the most challenging project situation with respect to the BCD process. Table 4.7 further provides a first solution proposal for each project constellation that is based on which of the four challenges is present in each pattern.

Table 4.7 Challenges present in different project constellations & solution proposal

Project Constellation	**Impact on Factors**	**Challenge**	**Solution proposals**
Pattern A) multiple actors within the same tier	Low willingness to share information	Challenge 4: Share information	Group techniques, such as GDSS, that allow for anonymous information sharing
Pattern B) multiple actors from different tiers (one actor per tier)	Conflicting goals Different culture Different semantics	Challenge 1: Aligning goals Challenge 2: Bridging culture Challenge 3: Bridging semantics	Create awareness of the other's position, culture, process and goals. Group techniques, such as GDSS
Pattern C) multiple actors from the same as well as multiple tiers	Conflicting goals Different culture Different semantics Low willingness to share information	Challenge 1: Aligning goals Challenge 2: Bridging culture Challenge 3: Bridging semantics Challenge 4: Share information	Create awareness of the other's position, culture, process and goals. Group techniques, such as GDSS, that allow for anonymous information sharing

4.5.2 Influence of BCD process on BC outcome

Once the inter-organizational BCD process is understood, one can go one step further and analyze the effect of the BCD process on the actual BC outcome. It is expected that the quality of the BCD process influences the quality of the final outcome, namely the BC itself. The quality of the BC outcome can be measured using evaluation criteria. We defined a set of evaluation criteria and present them in Table 4.8. A BC has high quality if, among others, it represents the true costs and benefits of the IS perceived by the different stakeholders and results in a decision including a payment distribution. The thorough investigation of the influence of the BCD process on the BC outcome is subject to further research.

Table 4.8 BC outcome evaluation criteria

Evaluation Criteria	Measurement: Does the method…
Agreed value specification	… result in a clear definition and distribution of "value" that is agreed upon by (multiple) stakeholders? E.g. SMART5, or value which can be defined as either observable, measurable, quantifiable or financial? … result in an agreed upon distribution of costs in a network?
BC documentation	… help to capture value, control risk, and leverage opportunities? … result in structured (e.g. metrics, templates), complete and correct BC documentation?
Evaluation and selection of alternatives	… provide alternatives that are comparable & compatible? … provide a clear and logical analysis of tangible and intangible factors? … support stakeholders to identify and compare options and select one?

4.6 Application of the framework in a case study

In order to analyze if our framework helps to explain the BCD process in a real life project we applied it in the same case study that motivated our focus on inter-organizational networks, described at the beginning of this chapter. The case study setting involves multiple actors in a network that are engaged in the process of making a joint decision on an IT investment. More specifically, barge operators (BO), terminal operators (TO) and the harbor authority discussed how a multi-agent system could support logistic planning in the port of Rotterdam. Our case study was part of a bigger research effort: Transumo (www.transumo.nl). A platform, started in 2004, where 150 parties from industry, government and academia jointly develop knowledge about sustainable mobility. We were involved

[5] SMART = Specific, Measurable, Attainable, Relevant, Time-bound

in a business case work package of a larger project (Douma et al., 2010) that aimed at the design and implementation of a multi-agent system for the port of Rotterdam. Our role in this case study was investigatory as well as advisory. In total, three researchers were involved alternately during our 7-month long participation in the case study. We took both expert-based as well as participant-observation-based approaches and conducted various unstructured qualitative interviews to gather information about the BC development and deployment process. While collecting and analyzing the observations and the interviews, we focused on findings related to the BC development process as well as its outcomes.

In order to assist the actors in evaluating the different implementation options, we supported and helped the participants in workshop settings to develop individual BCs. The idea was to use these individual BCs as a basis for arriving at a shared BC. Below we explain the impact of project constellation on the shared BCD process by applying our conceptual framework to the case situation.

4.6.1 Case background

The coordination structure shown in Figure 4.5 presents the relations between the actors in our case setting. Barges are used to transport containers from the port of Rotterdam to the hinterland and vice versa. Whenever a barge visits the port, it has to call on several terminals to load and unload containers. To guarantee short

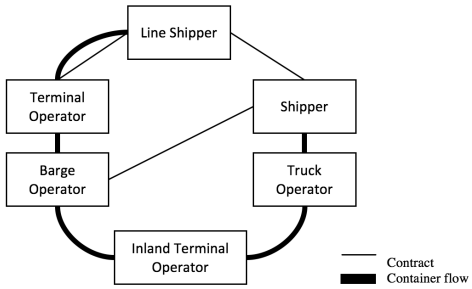


Figure 4.5 Network coordination structure of the case study setting

sojourn times in the port, the barge operator schedules convenient arrival times at the concerning terminals. The terminal operators on the other hand want to operate efficiently and have to decide when a barge can be processed, taking into account all kinds of restrictions, e.g. specific times at which containers need to be at the terminal. Based on our knowledge about the project we conclude that the actors in the port are organized in a network structure with shared decision power. This implies that the actors in the network need to get to an agreement when making decisions. In this case they need to come to an agreement about their shared BC.

The project constellation, is described for the case at hand in Figure 4.6. One can see that the network involves actors from multiple tiers, in particular several barge operators (Tier 1) and several terminal operators (Tier 2) (Pattern C in Figure 4.4). These business characteristics complicate the project scope, e.g.,

parties want to stay autonomous, have no contractual relationships, and are reluctant to share information that possibly undermine their competitive position.

Douma (2008) shows that an integrated ES, enhanced by multi agent algorithms and controls, can support the alignment of barge rotations and terminal quay capacity, taking into account the business characteristics. We were involved in the BCD process to evaluate if an investment into such an integrated ES would be profitable

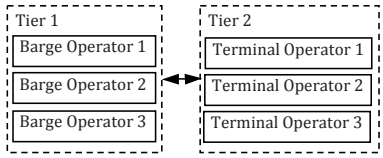


Figure 4.6 Project Constellation

4.6.2 Application of the conceptual framework to case study

Creating a shared BC using the BC guidelines developed earlier, but without having an advanced methodology and/or group support turned out to be hardly possible, as participating actors did not share sensitive cost and benefit information. In order to better understand the challenges present in the project at hand we applied our conceptual framework introduced in Figure 4.3 to our case. The results are shown in Figure 4.7 and explained afterwards.

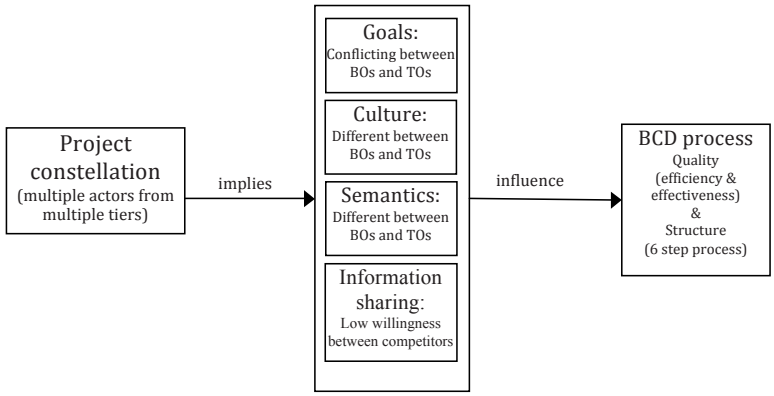


Figure 4.7 Conceptual framework as applied to the case study

Starting from the left, one can see that the harbor case is a multi-tier network, as it is illustrated in Figure 4.5. Following from the network structure, the BCD process results in a shared BC, which is developed and decided on jointly by all actors in the network as they have shared decision power.

The proposition that actors within the same tier and from the same sector experience increased competition compared to actors from different tiers and sectors is supported by our case study where we observed high competition especially between the different BOs. This directly impacts the willingness to share sensitive cost and benefit information, which is needed for a shared BC. We found it particularly hard to quantify the expected benefits and costs mentioned vaguely by the different actors. However, without concrete numbers it is very difficult to arrive at a trusted BC, no matter which guidelines one uses. The willingness to share information was further negatively impacted as the barge and terminal operators had different mental models with respect to the BC (semantics). This rendered the discussions ineffective as actors had to spend much time on clarifying the meanings of the different terms used in the BC to describe the costs and benefits. For example, actors had different understandings of what it means to achieve cost reduction or an improvement in planning.

Analyzing the goals of the actors in our case study, we found that they were conflicting. The main goal of the BOs is to keep sojourn times short in the port and thus waiting times short at the terminal. However, the main goal of the TOs is to have a queue in front of their terminals, so that they always have work for their cranes and employees to do. As Figure 4.5 indicates, in the current situation, there is no contractual relationship between the BOs and TOs; so, no fines will be paid when barges arrive too late at the terminal or when terminals do not handle barges in the agreed time slot. This makes it very difficult to get agreement between BOs and TOs on how a solution could look like. It also makes the BCD very challenging, as the actors did not agree on the costs and benefits. The TOs actually did not recognize the problem as urgent, as they currently achieve their goal of having queues, and therefore also had no incentives in investing into an improved planning system.

4.7 Literature background on group decision making

The development of the conceptual framework and the analysis of the port of Rotterdam case study have shown that the nature of inter-organizational networks makes the BCD process very challenging. One potential solution is the extension of current BCD methods with group decision support system logic. In this section we will discuss the theoretical background of such systems.

Decades of academic and professional literature have covered the topic of group decision making quite extensively. In this thesis we will use insights from the areas of: information systems, organizational science, economics and, social psychology, to build our knowledge base on group decision making.

Group decision making, also referred to as collaborative decision making, is a situation where individuals are brought together in a group to solve one or several problems. Most strategic decision processes, such as the development of a BC,

concern decisions with uncertain outcomes and actors with conflicting views (Eisenhardt and Bourgeois III, 1988). Both uncertainty (Mathiassen and Stage, 1992) and conflict (Robey et al., 1993) have for years been regarded as key issues to deal with when managing IT projects. Research shows, that management teams that engage in cognitive conflicts generally make higher quality decisions than teams that do not engage in conflict (Schweiger et al., 1989). However, conflict might also have a negative impact on reaching consensus (Amason, 1996). In what follows we present an aggregated view of some of the most important findings with respect to group decision making. In section 4.7.4 we elaborate on GDSS in inter-organizational projects.

4.7.1 The rationale behind group decision making

Early work by Black (1948) discusses the rational of group decision making, and, consequently, develops a theory that can be applied to decision making on any kind of topic by means of voting. Voting-based methods are, together with consensus decision making, the two most dominate formal group decision making systems. When a group needs to make a decision between two implementation options, using the voting system the option with the highest number of votes is chosen. The consensus based system tries to avoid "winners" and "losers". It requires that the majority approves a decision, e.g. for one implementation option, however, it also requires that the minority agrees to go along with the course of action. This implicates that the course of action needs to be modified to get the agreement of the minority. Given the context of our research we will focus on consensus based decision making in this thesis.

4.7.2 Decision making models and practices

Plenty decision making models and practices exist that can support business when making decisions. Among others: Game theory, corporate finance and decision-making software.

Game theory is the branch of mathematics that models decision strategies for rational agents under conditions of competition, conflict and cooperation (Gibbons, 1992). Game theory can be used to explain situations in which the payoff (and thus the respective payoff table) of all stakeholders is known. However, in the situation of inter-organizational projects, as described in Chapter 4, the payoff table is often not known or stakeholders hide their knowledge about their expected payoff. In networks where this is the case, game theory does not qualify as practice that can be used to support the decision-making process.

In this thesis we propose to combine cost-benefit analysis (as discussed in Chapter 7) with group decision support software.

4.7.3 Group decision support systems

Empirical research has shown that Group Decision Support Systems (GDSSs) are perfectly fitting for highly complex problems with a lack of structure (DeSanctis and Gallupe, 1987). Their deployment is found to improve the decision quality and time efficiency in negotiations (DeSanctis et al., 2008). "A GDSS is a computer-based technology designed to help project teams and other small groups with

activities such as problem identification and analysis, decision making, planning, creativity, conflict management, negotiation, and meeting management" (DeSanctis et al., 2008). GDSSs can support group interaction on three levels, providing (i) communication support, (ii) group decision support and (iii) machine-induced group communication. The following advantages of GDSSs can be identified (DeSanctis et al., Lam and Schaubroeck, 2000):

- Parallelism, as actors can enter information at the same time.
- Anonymity, resulting in better pooling of the information within a group. Further people feel fewer barriers to speak as other people less influence them.
- Group memory system, as the system can store information.
- Asynchronous communication, actors can process information at individual pace and do not have to remember their arguments but are able to directly fill in their argument into the system.
- Prevention of unfunded discussions.
- Focus on content.
- Provide structured tools.

A GDSS provides structure to unstructured meetings that involve a large group of people. It is shown that the effect of a GDSS improves positively as the size of the group increases. Research shows that people tend to share more conflicting information and unique information in GDSS settings than in face-to-face settings (Lam and Schaubroeck, 2000). The sharing of extra information is expected to increase the decision quality.

Decision quality can be measured using objective and subjective measurements. The objective measurement requires the case scenario to have a point system build in. With this point system an objective measurement of the decision quality can be made (Barkhi and Kao, 2010). With a subjective measure a panel or a person evaluates the quality and satisfaction of the decision. Research shows that the decision satisfaction is dependent on whether a person did have the feeling he had his share in the meeting. Another factor that is often evaluated is time efficiency. GDSS generally improve the time efficiency as the communication is more structured which makes time management easier (Lam and Schaubroeck, 2000).

Drawbacks of GDSS include increased costs through costly infrastructure (hardware, software, network, room), the risk of technical failure and that the lack of verbal communication might lead to misinterpretation.

4.7.4 GDSS for inter-organizational projects

In the past years most GDSS research was focused on intra-organizational use (Hartono et al., 2010). Issues like the sensitivity of information that play a major role in inter-organizational projects are less important when information is only shared within one organization. In inter-organizational projects, where competition plays a role, the sharing of strategic information is very risky as competitors might abuse this information. However, the sharing of unique knowledge, such as strategic information is essential for determining the decision that would be beneficial for all (Wittenbaum et al., 2004).

Organizations are only sharing information if it has a positive influence for them and they expect that the other organization is sharing information back. Observing the amount of information, which organizations share, there seems to be a balance between greediness and fairness. A better balance will be reached when all parties have thought about the concerns of the other parties before. However, some information will always be hidden by each party (Güth et al., 1996).

The process of reaching a stable decision outcome with a group always takes time. Research by Mason and Phillips (1997) shows that the time needed to come to a joint decision is longer when the stakeholders do not share any information and can be accelerated by sharing. Another study reveals that if only one of the actors in a group decision process shares his information with the others, then the average total costs are higher as if all actors would have shared their information (Kelle and Akbulut, 2005).

Trust

Assuming that all actors are positive about the BC for an investment, it might still be challenging to reach consensus about the details and financing of the project. Trust and opportunism play a crucial role in any information sharing process (Zaheer et al., 1998). Trust can decrease the negotiation costs and lower the risks of conflict. Trust, in any form, does not suddenly exist, but needs to be built up; especially in a complex settings trust needs time to grow (Edelenbos and Klijn, 2007). The creation of trust can generally be fostered through teambuilding activities; however, this is rather difficult for collaborative BC development teams. An alternative can be the smart staffing of the teams. If people know each other from previous projects trust is probably already on a higher and deeper level, resulting in improved project outcomes (Maurer, 2010).

Hidden profile

The lack of trust can be the origin of a hidden profile, but there are more reasons why participants want to hide information from other participants. A hidden profile stands for the unknown information distribution among the stakeholders in a project (Wittenbaum et al., 2004). Hidden profiles are common in inter-organizational projects. In such a setting it is unrealistic that all information is shared. Research on the effect of communication technology, such as a GDSS, on the information exchange has shown mixed results (Wittenbaum et al.). Recent studies show that, as users get more familiar with communication technology, the effect of GDSS become more positive than before.

4.8 Summary

This chapter describes theoretically, in the form of a conceptual framework, how the BCD process is influenced by the project constellation. We focus on the context of an inter-organizational network project constellation and present which factors play a role in such complex settings. We present the application of the framework in a case study at the port of Rotterdam. Finally, we analyze how group-decision support systems can help to address the challenges experienced in inter-

organizational BCD projects. GDSS support the participants in a decision making process by enabling asynchronous and anonymous information exchange. These are two important characteristics that are essential when developing the BC for an inter-organizational business application implementation that involves multiple actors with decision power.

This chapter can be positioned as providing a thorough discussion of the context in which our methodology is supposed to be applied. The group decision support system aspect will be build upon later in this thesis (Chapter 6, 9 and 10) when describing the method design process.

5

Insights from practice

"If we knew what it was we were doing, it would not be called research, would it?"
(Albert Einstein)

5.1 Introduction

After having discussed the theoretical foundation for this dissertation in Chapter 3 and 4, this chapter will cover the empirical side of our problem analysis. In particular we will describe and analyze the data and insights that we collected from practitioners on the topic of business case development (BCD). We use a multi-method approach to get a thorough overview of current best business case (BC) practices deployed by IT consultants and IT adopters during IS implementations. Hereby we focus in particular on the drivers behind a project, the content and process of BCD and the satisfaction with BCD practices. While presenting the results we will investigate the role of portfolio and benefits management for BCD.

Our analysis of the data in this chapter will among others elaborate on similarities and differences between IT consultants and IT adopters with respect to their current BCD practices.

We further used the interaction with the practitioners to collect requirements for the design of an improved BCD method. We will use the categorization provided by Avison to present these design specifications (requirements) at the end of this chapter.

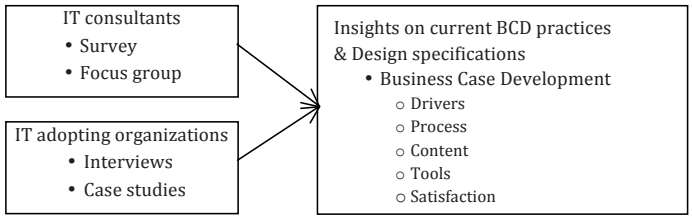


Figure 5.1 Data sources used to get insights on current BCD practices

We present our results in five categories.

- The drivers, section 5.3: Discussing the main drivers behind (i) initiating an IS project and (ii) developing a BC for an IS project.
- The process, section 5.4: How the dynamics and timing of the BCD process is shaped and managed.
- The content, section 5.5: Describing the elements typically discussed in a BC.
- The tools, section 5.6: Discussing the methods and tools used by experts to support the BCD process.
- Satisfaction, section 5.7: We investigate how the satisfaction with benefits management and cost estimation influences the satisfaction with the BCD process.

For each category we provide insights from both IT consultants as well as adopting organizations.

5.2 Research approach

Our approach used four different research methods to collect our empirical data. A survey and a focus group discussion were used to get insights from IT consultants. Both were hosted at our university in combination with a workshop on BCD.

Interviews and case studies were used to collect data from BC experts in IT adopting organizations. These were conducted at the location of the experts or via telephone. More details on the data collection are provided below.

5.2.1 Survey among consultants

We carried out a survey among IT consultants that are experienced with BCD. We used the survey to collect detailed evidence on how practitioners deploy the BC or perform BCD during IT investments and what instrumentation they use. The survey included 30 questions (4 open questions, 15 multiple choice questions, and 11 rating questions (5 point Likert scale)). The survey was implemented online and is available upon request. The estimated total time for answering the questionnaire was 20 minutes. We piloted our survey with six practitioners. They provided a detailed list of constructive comments that mostly found their way into the survey. The pilot improved our survey design in terms of changing the order of questions and partially re-phrasing them. However, we must note that no significant changes were identified in the overall survey research process.

We launched the survey at a workshop on business case development that we hosted in our university, in summer 2008, and to which we invited approximately 75 practitioners that represent the Dutch IT service industry. The practitioners were identified by contacting four Dutch professional associations (NOREA, www.norea.nl; NESMA, www.nesma.nl; Computable, www.computable.nl; Automatiseringgids, www.automatiseringgids.nl). For attendees to participate in the workshop, they first had to complete the survey questions in a specific timeslot that preceded the start of the workshop. Our research questions did not require the sample to be representative of the population regarding gender or age, but they did require them to be representative regarding experience with business case development for information systems (see Table 5.1). Representativeness

was needed to give support to a generalization from observations about the sample to the population. The survey was completed by 60 respondents of which 20% had completed up to 3 business cases, 50% between 3-10 and 30% had completed more than 20 business cases. The survey findings serve as inputs to the next stage of our research process, namely, the focus group discussion and the in-depth interviews.

Table 5.1. Demographics

Background	**%**
Consultants	62%
Academics	12%
Customers/ES adopters	16%
ES vendors	6%

Experience in no of BC	**%**
1-2	16%
3-10	49%
11-25	15%
>25	15%

5.2.2 Focus group

The goal of this stage was to validate the findings of the survey. The focus group took place immediately after the workshop and used the data collected during the survey as input for discussion. During the workshop presentations, the results were processed and preliminary summaries of the data were available to practitioners to review and start a discussion on them.

We make the note that the focus group members do not gather to vote or to reach consensus (Morgan, 1997). The intent was to promote self-disclosure and that is what we were after in this study. During the discussion we checked and probed upon our findings, dig into depth on the line of reasoning behind perception and actions of practitioners. We gained more insights on open affairs that our survey either left unanswered or actually generated new, but more specific questions.

Ten experts participated in the focus group. The focus group participants were selected based on their company's interest in our study and their willingness to contribute to a collaboration with the university in a research project. The focus group members represented a variety of industry sectors (e.g. banking, manufacturing, telecommunications, among others). However, all of them were experienced professionals in the field of implementing corporate-wide IT solutions.

The focus group was moderated by the author of this thesis, who was assisted by other researchers who kept notes of the discussion and transcribed parts of it when necessary. The panel members worked in two stages, dealing with the cost topics and, then, with the benefits-related topics in each stage. This was done to ensure that the group members were not overwhelmed with a long list of inquiries at the start of the process. Audio transcriptions were recorded during the focus group discussion and later on used as complementary material.

5.2.3 Interviews with experts from adopting organizations

In order to get more detailed insights into current BCD by adopting organizations we conducted 10 in-depth interviews with experts from adopting organizations. We asked project managers, information managers or IT investment decision makers about their experiences with portfolio management, BCD and benefits management. These organizations were located in the Netherlands and Germany (Western Europe) and were from different sectors. Wherever possible the interviews were held face-to-face, otherwise the interviews were conducted over the telephone. Each interview lasted for approximately 60 minutes. Table 5.2 gives an overview of the characteristics of the organizations. The interview protocol is provided in Appendix A.

Table 5.2: IT adopting organizations – characteristics

Organization	Size (Employees)	Industry	Interview type
1	> 10.000	Financial Services	Face-to-face
2	> 1000	Financial Services	Telephone
3	> 1000	Construction	Face-to-face
4	> 100.000	Electronics	Face-to-face
5	> 10.000	Human Resources	Telephone
6	> 100.000	Energy	Telephone
7	> 100.000	Car manufacturing	Telephone
8	> 10.000	Pharmaceuticals	Face-to-face
9	> 10.000	Financial Services	Face-to-face
10	> 100.000	Financial Services	Face-to-face

5.2.4 Case studies at two Dutch multinationals

We conducted two case studies at two Dutch multinationals to learn more about the use and instrumentation of BCD methods and to collect design specifications from an IS adopter perspective. Especially, we focused on identifying requirements for benefits management. In total 40 people from the finance and IT department were interviewed either individually or in-group interview settings. We also investigated their BCD documentation. The results from this document inspection and the interviews were used to finalize our insights from practice and the resulting set of design specifications. Our questions were organized around the following themes:

- What are critical success factors for a successful deployment of benefits management?
- How can you ensure that benefits management really delivers increased benefits instead of only demanding a lot of extra administrative paperwork?
- What are your requirements for a benefits management method with regard to your role in your organization?

In the remainder of this chapter we will refer to the two case studies as Organization A and Organization B.

5.3 Business case development – The drivers

In this part we will describe how drivers behind a project influence the funding decision-making process and the BCD process. We will take the results from consultants as well as adopting companies into account.

5.3.1 Insights from IT consultants

The interviewed consultants were aware of the different variations in drivers (project categories) behind the IT investment, but also stated that the link between drivers and BCD process often is not considered and thus one type of BC is prepared for all projects. The majority of the experts pled for a different approach that would include portfolio or driver dependent BCD (Table 5.3). On the other hand a large portion of the consultants, though not the majority, feared that such an approach would require more effort when developing the BC as one would need to go more into detail.

Table 5.3 Experts opinion on project categories

Actual BCD Process	Ideal BCD Process
Project categories are often not considered and thus one type of BC is prepared for all projects, e.g. the difference between a BC to purely get investment approval and a BC to track benefits is not made	Different project categories drive different BCD processes.

We also surveyed our experts for the drivers behind developing a BC for a project; the results are shown in Table 5.4.

Table 5.4 IT consultants – Reasons to develop a BC (multiple answers possible)

Analyzed concept	Result
Reason to start the BC	To get investment approval by client's top management: 77.8% To provide client with a detailed overview of expected costs, benefits and risks of the program: 59.3% As a component to win the contract: 42.6%

5.3.2 Results from IT adopting organizations

Table 5.5 shows the condensed results for the 10 advisory organizations on the drivers of projects. Some cells are left blank as occasionally an interviewee could not answer some specific question or some organizations did not provide detailed information on all topics.

Table 5.5 Adopting organizations – Drivers and influence on BCD process

	Investment categories *(drivers)*	**Influence on BCD process**
Org. 1	Innovation/New/Repetitive	
Org. 2	A,B, C project classification	Defined per category
Org. 3		
Org. 4	Strategic/Top line/Bottom line/Mandatory	Extend of BC process depends on budget
Org. 5	Strategic/Efficiency/Handling	
Org. 6	IT projects are often cost reduction projects	
Org. 7	Run the business/Legal/Business Value	
Org. 8	Business project/IT project/Development project	
Org. 9	Cost reduction/Revenue/Innovation	Different BC focus per category
Org. 10	Run the business/Grow the business/Transform the business	

The decision makers confirmed that different investment categories were used to support portfolio management. However, they often did not know the exact categories, which indicates that the usage of categories is still limited. We observed another issue, namely the misclassification of projects. Our research findings show that reasons for this misclassification vary: guidelines are missing to select a category; or practitioners intentionally misclassify a project to increase its chance of being selected. Based on the literature and the fact that most interviewed organizations are in industries where external regulations are highly present (financial services, energy) we expected that a category of "mandatory" or "external obligation" projects could be clearly identified. However, this was not the case, as such a category was only mentioned by one organization. In this case the external obligation was used to make the project sound more urgent.

Most interviewees stated they deploy categorization differently as they categorize investments based on the benefits they will bring. An often-stated distinction was the separation of top -and bottom-line benefits. The interviewees unanimously expected that top-line benefits (strategic) are more difficult to predict than bottom-line benefits (operational), as they are based on many assumptions.

5.3.3 Comparative analysis

We found that consultants often prepare one type of BC for all projects and do not make a difference between e.g. a mandatory project and an innovation project. However, the experts agree that for different project categories different evaluation criteria should be used and also a different BCD process should be deployed. The decision makers from the adopting organizations seem to be a step further in addressing this issue. They claim to distinguish between different

investment categories, however, they are also still in the beginning of formulating evaluation criteria for each investment category, the latter is observed in 3 out of 10 organizations. This phenomenon seems logical as the adopting organizations often have a collection of projects and need to make decisions on their entire project portfolio. Advisory organizations apparently still act opportunistic and see *"their"* project singularly and also drive the BCD process from that perspective. Adopting and consulting organizations in each new project should drive the BC on a mutually agreed portfolio of projects that is relevant to the project at hand.

5.4 Business case development – The deployment process

In this section we will analyze how the dynamics and timing of the BCD process is shaped and managed. We will take the results from consultants as well as adopting companies into account.

5.4.1 Insights from IT consultants

During our survey we asked IT consulting experts to indicate at which point in time the BC is initiated and updated. We further asked them to specify the activities that are performed during the BCD process and the final result of the BC, in terms of realized benefits. Our descriptive results are presented in Table 5.6.

Table 5.6. IT consultants – BC deployment process

Analyzed concept	Result
Point in time when BC is initiated	81.5% start their BC before the start of the project 16.7% start their BC during the project
Update and consult the BC	37.3% claim to consult the BC on a regular basis during the implementation to check if it is still on track 17.6% claim to update the BC throughout the implementation cycle
Activities during BCD and IT investment process *(multiple answers possible)*	75% take investment horizon into account 60% assign an owner for benefits 69% take interdependencies between benefits into account
Planned benefits actually realized	64.4% did not know how many percent of their planned benefits are actually realized at the end of the project 24.4% claim to realize more than 40 percent of the planned benefits

During the focus group the experts described their actual BCD process and compared it with their ideal BCD process. These qualitative results are presented in Table 5.7.

Table 5.7. Experts opinion on BCD process

Actual BCD Process	Ideal BCD Process
• BCs provide support in identifying the possible benefits of the IT investment. This way portfolio managers can make informed decisions about which projects to start/continue and which projects should be stopped, as they do not deliver enough benefits. • BCs are not consulted during the implementation process to see if the project is still on track.	• BC should be dynamic, calculations should be made for smaller parts of the project, not one size fits all. • BC should be adopted throughout the process. • An agile BCD, allows to adapt the goals, requirements and benefits during the process by not planning everything in advance, the project objectives gradually become more specific. • Shift of focus in BC from pure cost focus towards more people and benefits oriented BC. In order to convince controllers and top management a financial cost focus is preferred, however, in order for a project to be successful it needs to meet goals in all of the following areas: planet, profit, people, and pleasure.

Most respondents initiate their BC before the start of the project with the reason of getting investment approval by client's top management. During the panel discussion it was often stated that the BC was a "marketing" instrument for the project. This is of course *one* of the contributions of the BC, but apparently consultants and their customers still leave out a lot of other beneficial features of BCD. This is confirmed by the notable result that only 37.3% of the respondents consult the BC on a regular basis during the IT investment and even less (17.6%) update the BC based on new insights during the implementation. These findings are also confirmed in our focus group.

We also observed that most respondents (64.4 %) did not know what percentage of their planned benefits actually is realized. We expect that this is mainly due to: (i) a lack of proper benefits management tools that allow for good estimates and evaluations, (ii) a lack of time and (iii) pressure to frequently start new projects. Without proper benefits management tools and procedures, the specification of benefits is rather difficult and makes an ex post evaluation of the benefits very difficult.

Thus an evaluation of the investment is completely neglected. The same conclusions can be drawn from the focus group meetings where participants, discussing the crucial BC elements, mainly came up with elements such as baseline assessment, a roadmap describing where the project is going and how benefits can be achieved and project predictions.

5.4.2 Results from IT adopting organizations

During our interviews we asked the experts from IT adopting organizations about the extent that they updated, monitored and evaluated the BC during and after the project. We further investigated the deployment of benefits management,

especially focusing on the long-term usage. A summary of the answers is provided in Table 5.8.

Table 5.8. Insights from adopting organizations on the BCD process

	BC Deployment Process			
	BC updated during a project	**BC monitored during a project**	**BC evaluation (directly) after a project**	**Benefits Management in the long-term**
Org. 1	Cost only	Yes	No	Yes, on program level
Org. 2	No	No	No	No
Org. 3	Cost only	Costs only	Only Costs	If benefits are measurable
Org. 4	Should be, not always done	More on costs than benefits	No not necessary (benefits occur later)	Bottom line benefits only
Org. 5	Yes, in case of Exception Report	No	No	Yes
Org. 6	No	Costs only	No	No
Org. 7	Yes	Yes	Not directly	Measurable benefits
Org. 8	No	Yes	Yes	Yes
Org. 9	No, is desired	No	Yes	Yes
Org. 10	Should be, not always done	No	Yes	Bottom line benefits only

Most organizations structure their BCD process using life cycle phases provided by the project management method Prince 2. When asked whether the business case was updated during a project and used to monitor benefits realization during a project, only companies that really depend on IT confirmed this. In companies that use IT only for support purposes the BC was often not updated at all or only the project costs were actualized and monitored as the project manager believed that investments into IT cannot go wrong and are always beneficial: "*all investments in IT will deliver good results*". Another reason not to use the BC as a management instrument during the project mentioned was that "*the project will not be stopped anyway*". Further analysis of this organization showed that it had enough financial resources to overcome project failures.

The last important finding from our interviews shows that decision makers or IT managers currently do not manage the projects benefits. This means no one is responsible for determining whether the proposed benefits in the BC are actually achieved. A majority of our interviewees suggest handing over the BC to the line organization after completion of the project to make sure the benefits are being realized.

Organization A at first introduced project portfolio management (PPM) to manage the release functionality changes in their ES. There is a strong link between their project portfolio management (PPM) and their BCD; PPM is used to determine which projects to abandon and which projects to support from a portfolio of projects. Currently, Organization A manages all ICT projects according to PPM and benefits management is used to specify the benefits as input for decision making. Thus benefits management is used in all IT projects and serves as a foundation for PPM.

Our results in organization B show that the BC is developed in cooperation between one or more of the business departments and the IT department. However, a BC is not developed for all projects. Business departments decide themselves if they develop a BC for a specific project. In the case that a BC is developed for a project, exception reports will be created when costs, risks or functionality of the project change significantly. However, during project execution limited attention is paid to benefit realization. Contrary to what we saw in Organization A, the BC is not used as a guide for project portfolio management in Organization B.

5.4.3 Cross study analysis

The findings on the BC process, and benefits management in particular, correspond for both investigated groups and confirm most findings from our literature review. Recurrent deployment of BCD is only present in one third of the investigated cases and mostly BCD is a one-time affair in the beginning of the process. Both the advisory as well as the adopting organizations do not really include portfolio management into the process of BCD. The maturity level on this aspect is rather low as often the BC is not updated or managed, let alone that project categories or changes in the entire project landscape are taken into account during the BCD process. Especially the adopting organizations see the necessity to improve this.

We found an increasing awareness of the importance of benefits management between both groups of experts. The biggest challenges are (i) making intangible benefits measurable or quantifiable and (ii) establishing ownership to benefits in either the project -or line organization. Only 20% of the consultants are satisfied with the used benefits identification or management approaches. Both groups express that a solution to this problem would be important for them.

During the two case studies we observed a difference in the approach of linking BCD to PPM. Organization A uses benefits as input for PPM, whereas Organization B does not use BCD as guideline for PPM, although PPM is deployed for managing projects. Both organizations acknowledge the relevance of benefits management and see the urgency to improve BCD methods.

5.5 Business case development – The content

In our next category, the content, we are analyzing which elements are usually addressed in a BC. Are both qualitative as well as quantitative elements discussed? We will take the results from consultants as well as adopting companies into account.

5.5.1 Insights from IT consultants

Table 5.9 presents the descriptive statistic results from our survey among consultants. The results are discussed below the table.

Table 5.9. IT consultants – Elements of a BC (multiple answers possible)

BC element	Result
Costs (quantitative)	84.7%
Costs (qualitative)	62.7%
Benefits (quantitative)	76.3%
Benefits (qualitative)	67.8%
Objectives	74.6%
Internal drivers	71.2%
External drivers	61%
ROI models	66.1%

Our results show that the respondents mostly choose quantitative costs as BC element (84.7%). An explanation for the cost focus of the BC provided in our focus group included "costs can be quantified easier". There seems to be consensus on what the cost estimation problems are, as most companies store some historical data, although not in a standardized way, which can be used for cost estimation. This information is complemented with expert judgments, which provide input for the BC of an IT project. Consultants state that especially the measurement of intangible and soft benefits is an important but challenging task. In that perspective our respondents do not completely confirm the findings of Ward et al. (2008) that benefits often are forgotten or left out. They put it subtler as the estimation of benefits seems to be more difficult compared to cost, and the investment problem itself during the BCD sometimes is unclear or only partially understood.

According to one respondent, one solution might be to "*put relative numbers, percentages or benchmarks to the benefits instead of absolute numbers which is often not possible*". This way one can analyze e.g. *"what can you earn, what do you lose when you do not do this"*. Another option mentioned was that "*If one cannot measure benefits in numbers, one should express it as something else, namely qualitative argumentation that one made the best decision in that situation."*

5.5.2 Results from IT adopting organizations

The answers of the experts from IT adopting organizations are shown in Table 5.10. Not all interviewed experts could provide us with information about both the costs as well as the benefit types described in their average BC.

Table 5.10 IT adopting organizations – Content of the BC

	Content of the BC	
	Benefits (types)	**Costs (types)**
Org. 1	No benefits on project level	Internal/External/Investment/Baseline
Org. 2	Financial (ROI)	No information provided
Org. 3	No information provided	Implementation/Software/Hardware
Org. 4	Qualitative/Quantitative	Hardware/Software/FTE
Org. 5	No information provided	Based on Shared Service Center invoice
Org. 6	Cost reductions/Infrastructure/ Standardization	Based on common sense/Assumptions
Org. 7	ROI/Non-financial	Function Point Analysis used
Org. 8	Quantitative	Development/Resource costs
Org. 9	FTE Reductions/Customer profitability/Qualitative	Communication/Investment costs/No FTE costs
Org. 10	Top line/Bottom line/Non – financial	No information provided

Eight of the nine interviewees considered financial consequences the most important in a business case. However, formal methods were hardly used to determine the financial consequences of an investment. Often common sense was used for this judgment. Only one organization used Function Point Analysis (FPA) as a method to determine the costs of a project. Most organizations admitted that they sometimes exaggerate benefits to let the business case look better. "*Financial benefits are often stated too positive in order to be able to compete against other projects and present the project in the best possible way.*"

Experts distinguish typically financial (quantitative) vs. non-financial (qualitative) benefits, where quantitative benefits can be either top line (increased revenue) or bottom line (cost reductions), and qualitative benefits are focused on strategic goals. Qualitative and top line benefits are considered most difficult to define and measure. Other types of benefits identified were FTE reductions, standardization and customer profitability. Cost reductions based on FTE are not always considered as benefits, as not all organizations can lay off their employees, and following realize the connected cost reduction benefits.

Overall our interviewees mostly mention bottom line benefits such as FTE reductions. A reason for this is given by one organization, as top line benefits are not often found in the IT departments, as they are cost centers. Non-financial benefits are often perceived as having limited value for the business case and are sometimes only considered when two investments are "equal" in all other financial aspects. However, experts agree that having methods to make non-financial benefits measurable would improve the value of those benefits in the decision making process (see next section).

Remarkably, we found that in the cases we studied the BC is not used in practice to stop a project during its implementation (e.g. as costs get too high, or the benefits too little).

Our first case study organization (Organization A) had a rather mature level of ICT BCD, which includes cost specification as well as benefits management.

Organization B was less mature in their BCD in the beginning of our case study, but started a benefits management initiative and pilot project that covers our entire case study. Currently, their average BC contains a detailed indication of costs and deliverables, but no concrete indication of benefits that are to be realized with the project.

5.5.3 Cross study analysis

There is a large resemblance between the results from consultants and IT adopters. Both groups mostly refer to the cost as most important part of the BC. Identifying and specifying benefits also is phrased by both groups, but significantly less. We expect that this is closely related to the fact that most organizations do not know how they should account for intangible benefits, as their investment evaluation methods are often based on financial/quantifiable input only.

From our data we conclude that the root cause behind this phenomenon is a lack of a holistic focus on benefits. In the next section we will show that present methods and tools are not the main cause, as these are able to support identifying different project categories for portfolio management and also include real benefits elicitation tools.

Based on the results from the interviews with experts at the two adopting organizations we learn that the two organizations differ in their BC maturity level. Organization A focuses on both cost and benefits management, while Organization B only focuses on costs only.

5.6 Business case development – The tools

In this section we will describe and discuss the methods and tools used by experts to develop the BC. We will take the results from consultants as well as adopting companies into account.

5.6.1 Insights from IT consultants

Table 5.11 shows how many percent of the consulting experts use a certain method for BCD and benefits management. Multiple responses were possible when answering our survey.

Table 5.11 Insights from IT consultants – Tools used during the BCD process (multiple answers possible)

Analyzed concept	Result	
BC instruments & methods used in %	Own, company specific tool	26.3%
	MS Excel	23.4%
	Prince 2	18.4%
	Non Specific (no specific tool), Net Present Value	7.9%
	Balanced Score Card, MSP (managing successful programs), Discounted Cash Flow (DCF), STOF, Internal Architecture Framework (e.g. DYA)	5.3%
	MS Word, Information Economics, Gartner TCO, Pay Out Time, Activity Based Costing, ROI, Cost-Benefit Analysis, Sensitivity Analysis, Risk Analysis, Process Analysis, Value Network Analysis, Method based on Remenyi (1999), Interviews (qualitative), Creative techniques (visioning, brain storming, idea generation), Marketing techniques (SWOT, competitive forces, market analysis)	Each 2.6%
Benefits management instruments & methods used in %	Program management packages (MSP, P3O etc)	34.8%
	None	30.4%
	Financial metrics	30.4%
	MS Excel or other spreadsheets	17.4%

With respect to the instruments and methods used for BCD we observed that a) most respondents (26.3%) were using their own company specific automated tool and b) many of the other specified tools were not explicitly tools for BCD but generic project management tools. This confirms our literature finding that organizations do not have a clear understanding of what a BC actually is. 23.4% of the respondents used MS Excel to specify the quantifiable cost and benefits. 18.4% used Prince 2, a project management tool that includes BCD as one step in the project initiation process. However, with respect to benefits management both tools have their limitations. The remaining respondents identified a variety of tools (Table 4), however, none of them are specific for BCD and certainly not adjusted for IT investments. Based on the insights we got from the focus group we can conclude that project management tools, such as Prince 2, can support the BC monitoring throughout the life cycle, however, they are less likely to be used as instruments during the BCD or benefits management process.

The majority of our respondents (34.8%) used program, portfolio or project management packages such as MSP or P3O to manage their benefits. This shows that benefits management tools are available and known by one third of the respondents, but apparently this does not mean that they are more satisfied with their benefits management. The second largest group (30.4%) perceived benefits

management tools from a mere cost reduction perspective (financial metrics perspective), in our opinion this is a remarkable result as this is a rather narrow conception of benefits.

5.6.2 Results from IT adopting organizations

The instruments used by experts in IT adopting organizations to develop a BC are presented in Table 5.12. Not all experts provided information on this question.

Table 5.12 IT adopting organizations – Tools used during the BCD

	Tool Support
Org. 1	No information provided
Org. 2	Templates/Guidelines to improve consistency
Org. 3	Templates/Standardized tools
Org. 4	Evaluated business case both during and after project
Org. 5	Making benefits measurable
Org. 6	No information provided
Org. 7	Methods for defining benefits
Org. 8	Business case should be more flexible
Org. 9	Method for defining benefits
Org. 10	Making non-financial benefits measurable

When analyzing the results on the tools the experts used, we found an interesting distinction between companies that are highly dependent on IT and those companies that use IT only for support purposes.

Hardly any tools or formal methods were used to determine the financial consequences of an investment. Often common sense was used for this judgment.

Most experts indicated that they use the project management tool Prince 2 to structure their BCD process. Most organizations have some tools and methods in place to estimate the costs of an investment (e.g. FPA). However, only few organizations have (recently) started to systematically approach the challenge of benefits management with e.g. deploying benefit-tracking tools. *"Having tools available does not mean that they are actually used to e.g. track benefits".* Our interviews, however, showed that adopting organizations have a high demand for standardized tools and templates that (i) guide the BC deployment process and (ii) especially help to better define and realize (intangible) benefits. Such tools should not be too strict, but provide a rather flexible method/guide that shows how the BC can be deployed during the implementation process and finally results in an improved consistency of BCs.

Organization A used (i) Value Management Office, based on the Value management framework develop by SAP, (ii) templates developed by IBM and (iii) various corroborative practical experiences to support their benefits management initiative. Organization B used a project management methodology based on Prince 2 (instrumentation).

5.6.3 Cross study analysis

We observe a discrepancy between consulting organizations and adopters with respect to the used tools. Most used methods are not BCD or BM specific tools, but more generic Excel, NPV, or Project Management templates. Nevertheless, the deployment between both groups differs. It is interesting to see that the adopting organizations are more precise in formulating their desires for the appropriate tooling, whereas the advisory organizations show a more reactive attitude.

5.7 Business case development – Satisfaction

We investigated how satisfied the experts were with their current BCD practices and which factors are having an effect on this satisfaction. We will take the results from consultants as well as adopting companies into account.

5.7.1 Insights from IT consultants

Table 5.13 reports on the satisfaction of the experts with their current BCD practices, including benefits management and cost estimation. Figure 5.2 shows the results of a regression analysis that depicts the antecedents and relations between the different kinds of satisfaction.

Table 5.13. IT consultants – BC satisfaction

Analyzed concept	Result
Satisfaction with current BCD practices	30%
Satisfaction with current benefits management	20%
Satisfaction with current cost estimation practices	40%

Analyzed relationship	Result
Relation between quality of BC and ES program success	70.6% agree that there is a relation between the quality of the BC and the ES program success 6% disagree with this statement

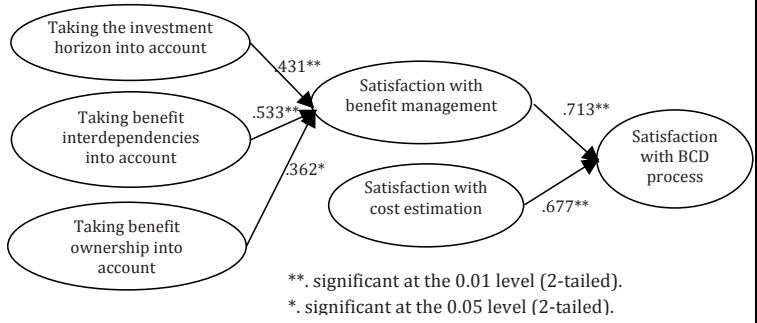


Figure 5.2 Relation between different elements and satisfaction

Our survey results show that 30% of the respondents were satisfied with their current BC practice. This satisfaction is positively influenced by satisfaction with both benefits management as well as cost estimation. This means that respondents who are satisfied with their current benefit and/or cost estimation practices tend to be more likely to be satisfied with the overall BCD. The survey respondents agreed with our literature finding that a good BC is a precondition for a successful ES program.

The results show further that only 20% of the respondents were satisfied with their current benefit identification, this is quite little compared to 40% who were satisfied with their cost estimation practices. Analyzing the regression analysis shown in Figure 5.2 one can see that this satisfaction rises when respondents take the investment horizon of the benefits into account (i.e. the deliberate separation and discussion on long term versus short term investments and benefits, executed by 75% of the respondents); assign an owner for each benefit (executed by 60%); or explicitly address interdependencies between benefits (executed by 69%). The majority reports to be more satisfied with benefits management when these aspects are really taken into account ("it is important to make someone accountable for the process and the achievements of benefits"). These findings are consistent with benefits management literature that highlights the importance of the three factors, but also does not give clear applicable guidelines on how to e.g. assign ownership for benefits in order to increase the number of realized benefits.

5.7.2 Results from IT adopting organizations

Our interviews at Organization A show that the users are satisfied with their current BC deployment and rate the importance of benefits management very high (benefits realization is indicated as their most important key performance indicator). However, they also experience difficulties in their way of working, as e.g. the issue of benefits ownership is not always completely clear. For example somebody who is responsible for the benefits realization might not see the value of the project, whereas somebody else, who might not be responsible for the benefit, will see and benefit from the value of the project. The interviewees further report, that IT employees still have difficulties with the "benefits mindset", as 70% fall back on focusing only on time and budget management instead of including benefits management as well.

In the current situation at Organization B, business people complain about loosely coupled projects, as it is not clear what the ICT implementations will contribute towards the higher business goals. Another problem is the lack of responsibility for benefit realization. There is a strong request from business unit managers and controllers to improve benefits specification and realization as well as assessment during and after the IT implementation project. The majority of our interviewees from the business departments report that a mature BCD approach and especially benefits management can help to specify the added value of a project. Finally, the complete group of interviewees from both the IT as well as business departments express the relevance to analyze possibilities of BCD in detail.

5.8 The role of benefits management during BCD

Based on Ward et al. (2008), we plead a BC approach should take a holistic perspective both in process and content. It should extend the focus from merely cost/savings towards benefits management. Following the line of reasoning in our discussion it becomes clear that an improved BC approach should go beyond explaining the reasoning for initiating a project towards being a management approach. Such a management approach can be used during the entire implementation cycle, possibly integrated in the implementation method. One element of such an extended BC method could be a benefit identification framework (Shang and Seddon, 2002).

5.9 The role of portfolio management during BCD

The project selection and funding decision-making process can be seen as a communication and learning process (Berghout and Renkema, 2005), that is dependent on reliable evaluation criteria and quality indicators. It is known that evaluation criteria can support a rational decision making process, but practice shows that decisions are often not made on merely rational grounds. The danger is that if no indicators are present, a project can be conceived in many different ways. Thus, the better the quality of the indicators, the better the quality and rationality of the decision making process.

Our research and the reviewed literature show that different parts of the BC are expected to be more or less relevant depending on different project categories (see 3.1.1). In the majority of our investigated organizations the current BCD and evaluation practices do not make this "category distinction". We recommend decision makers that are evaluating *strategic/transform the business* projects, to focus especially on the non-financial benefits and risks of the investment. For projects that are categorized as *bottom line/run the business* we recommend to focus primarily on cost management and the achievement of financial benefits.

Not all organizations developed a business case for mandatory investments. Based on the literature and our empirical findings we strongly recommend portfolio and project managers to write and deploy a BC for all projects, including mandatory projects as it helps to get a better overview of the expected costs and benefits and further can be used as a management instrument during the implementation process.

5.10 Design specifications for an improved BCD method

In this chapter we have assembled and analyzed our empirical insights on BCD during IS implementations both from the perspective of IT advisors as well as adopting organizations. Based on these findings, Table 5.14 presents a set of design specifications for improved development and deployment of BCs during the IS implementations. Similar to the design specifications from literature presented in Table 3.5 we also structure the design specifications from practice using the generic attributes of a methodology (Avison and Fitzgerald, 2006). This way, our findings can be applied to existing implementation methodologies or be used as a foundation for complete new initiatives. The source of the design specification is

coded with "C" when it was a requirement mentioned by consultants and "A" when experts from IT adopting organizations mentioned it.

The foundation behind our design specifications was created by an iterative approach of structuring and clustering the findings, internally (performed independently by two researchers); and externally (focus group). During this clustering an iterative approach of discussion, comparison and inspection of the original categories by Avison and Fitzgerald was followed.

We arrived at a set of design specifications that will actively be addressed in this thesis when describing our method design. We will do so by using the reference code listed in the third column and check which of the criteria our new defined methodology fulfills. We continue the reference code numbering from Table 3.5. For example, Chapter 3 resulted in four design specifications related to the philosophy of a method (labeled P1-P4 in Table 3.5), then we will start with the label "P5" in Table 5.14.

Table 5.14 Design specifications for an enhanced BCD approach based on practice (A = adopting organization, C = consulting organization)

Avison category	**A/C**	**Ref code**	**Critical issues/success factors**
Philosophy	A	P5	• Iterative process with a focus on benefits identification quality -and progress.
	C	P6	• Fit the ES packaged paradigm (specific dynamics of the staged process and configuration dynamics).
		P7	• Be simple, well defined and integrated into current constructs of implementation methods (e.g. project management).

Model	A	M2	• Integration of the method with existing business process models:
			  • Deliver a plan or report as output (necessity to support integration).
			  • Attuned to existing business processes & key performance indicators.

	C	M3	• Adapt the BCD process based on the drivers behind the project
Technique and tools	A	T8	• Install appropriate processes for benefit identification, measurement and realization.
	C	T9	• Support an idea generation and change initiation process, e.g with brainstorming, deBono, Janusian thinking.
		T10	• Provide negotiation support to get agreement from stakeholders with conflicting interests.

Table 5.14 (continued) Design specifications for an enhanced BCD approach based on practice (A = adopting organization, C = consulting organization)

Avison category	A/C	Ref code	Critical issues/success factors
Scope	C	S3	• Incorporate a repetitive or incremental process dynamics to consult and update BC at various moments during the ES implementation.
		S4	• Be holistic, focus on the whole implementation process from the start when the first issues that require a change in the organizational are recognized, till the end when the system went live.
Outputs	A	O2	• The method must not be too abstract/high-level.
		O3	• The method must contribute to the correct quantification of benefits, also in complex business cases.
		O4	• The method should result in well-defined responsibilities that specify who is accountable for the realization of the benefits.
	C	O5	• Provide a bridge between idea generation and system selection.
		O6	• Include a wider focus than cost/savings, package selection, system functionalities and package options on benefits management.
Practice	C	Pra3	• Help to evaluate different implementation options, including vendor selection against the option that no new system is implemented.
		Pra4	• Make the link to the motivation/drivers to start the project and the benefits that one can expect.
Product	A	Pro3	• Different reports for different stakeholders available.
		Pro4	• The method should be practical in application and contain accessible tools and templates.
		Pro5	• A practical handbook should accompany the method.
	C	Pro6	• Improve support for benefits management, so that it can become a standard such as cost estimation methods are already now.

As meta finding we report here that there are no contradictory statements between the two sources. Each design specification mentioned by one expert was confirmed by at least one other expert. Analyzing the core issues and options for BCD during IS implementations we plead for an improved BCD approach. Different experts report the need for a higher variety of instrumentation and a repetitive deployment of specifying the BC.

The design specifications show that there is a need for a BC methodology that goes beyond explaining the reasoning for initiating a project towards being a management tool. Such a tool should be used during the entire implementation

cycle and should further provide possibilities to be integrated in an implementation method. It is important that the methodology is not too abstract and is adaptable to the different needs of different stakeholders. One important element of such an extended BC methodology could be a benefits management method that includes a benefit identification and specification matrix (Eckartz et al., 2009a, Shang and Seddon, 2002, Eckartz et al., 2012b). By structurally classifying the expected benefits of each implementation option one can avoid that important benefits are forgotten. A benefits specification matrix helps to identify benefit owners and required actions to realize the planned benefits. During and after the IS implementation the framework can be used as an evaluation instrument to analyze the value added for the organization.

We will address the design specifications by our improved BCD methodology that will be introduced in Chapter 6 and elaborated on in the remainder of this thesis. One element of the methodology focuses indeed, as discussed above, on benefits management.

6

Introduction to the BC4IOP Methodology[6]

"What is a cynic? A man who knows the price of everything and the value of nothing."
(Oscar Wilde)

This chapter will introduce the main achievement of this research project, our business case development methodology for inter-organizational projects: BC4IOP. Our methodology is designed to address both the challenges of inter-organizational projects (Table 4.7) and design specifications for an improved method (Table 3.5 and Table 5.14) identified in the problem investigation phase of this research project. In Chapter 4 we identified the following four challenges:

- *Challenge 1*: Explicate conflicting goals and objectives of multiple actors in a shared business case (BC). Resolve conflicting goals or compensate actors with a negative BC, given that the overall BC is still positive.
- *Challenge 2*: Overcome barriers that hinder the business case development (BCD) and agreement process due to differences in organizational culture between the actors.
- *Challenge 3*: Overcome barriers that hinder the BCD and agreement process due to differences in semantics between the actors.
- *Challenge 4*: Find ways to increase the willingness of the actors to share (sensitive) information with other actors and to quantify the BC.

These four challenges will be addressed by our BC4IOP methodology and its components, introduced in Section 6.1. Following, Section 6.2 will introduce the viewpoints and Section 6.3 the deployment process of BC4IOP. In Section 6.4 we will focus on one of the methodology components, namely the VM4IOP (value model for inter-organizational projects) method. The discussion and validation of the other two methods will be presented in separate chapters: The BM4IOP (benefits management for inter-organizational projects) method in Chapter 7 and

[6] This chapter is based on the following publication:
Eckartz, S.M. and Katsma, C.P. and Wieringa, R.J. (2012). *Using Value Models to Improve the Cost/Benefit Analysis of Inter-organizational System Implementations.* In: Collaborative Networks in the Internet of Services - 13th IFIP Working Conference on Virtual Enterprises, PRO-VE 2012 (forthcoming)

8 and the SID4IOP (structured information disclosure for inter-organizational projects) method in Chapter 9 and 10.

6.1 Components of the methodology

The main result of our research activities is the development and validation of our BC4IOP methodology. BC4IOP is built to support actors in an inter-organizational project with the assessment and management of the benefits, and the distribution of the costs of a joint investment. Our methodology helps stakeholders to develop a shared BC based on the individual BCs of all stakeholders participating in the inter-organizational project. The methodology consists of the following three independent but complementary components illustrated in Figure 6.1:

- **VM4IOP**: a method that extends current value modeling logic to the area of inter-organizational BCD. It helps actors to get better insights into the value creation in their network.
- **BM4IOP**: a comprehensive method for benefits identification, evaluation and specification. By encouraging discussion it supports actors in realizing more of their expected project benefits. This method will, among others, address design specification Pro5.
- **SID4IOP**: a method that, helps actors to achieve agreement on the cost distribution in a shared project. It is based on the structured disclosure of sensitive financial information. This method will discuss design specification T10, calling for negotiation support.

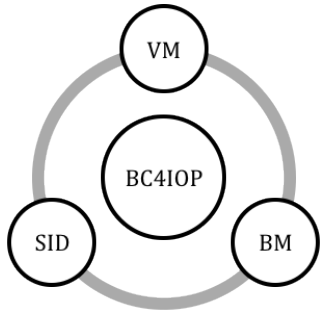


Figure 6.1 BC4IOP methodology and its components

Quite some methods exist, both in literature and practice, which are built to support the BCD process in single organizations. However, they are not suitable for inter-organizational projects, which are characterized by their complexity. Developing a method that supports the BC development in inter-organizational projects is rather challenging as in a network,

- actors may have conflicting goals,
- benefits may not appear at the site where costs occur and

- competition or confidentiality might prevent actors from sharing information.

We developed a methodology that addresses these challenges, present in IOS implementation projects, by combining insights from value modeling, benefits management and group decision support systems literature.

The first challenge concerning conflicting goals is addressed by all three method components, shown in Figure 6.1. Value models and benefits management help to point out conflicts in the goals of different project participants. Following, GDSSs and serious gaming (e.g. as introduced by SID4IOP) can help to resolve conflicting goals or get to an agreement where actors with a negative BC are compensated, to that the overall BC is still positive.

SID4IOP provides the possibility for structured anonymous information exchange and asynchronous communication, which helps to overcome barriers that hinder the BCD and agreement process due to differences in organizational culture and semantics between the actors (Challenge 2 and 3, as introduced in Chapter 4, page 57). The information disclosure mechanism of the SID4IOP method is designed to increase the willingness of the actors to share (sensitive) information with other actors and to quantify the BC (Challenge 4, see page 57). Chapter 9 and 10 will elaborate on the properties of the SID4IOP method.

We find that the combination of: the *identification and specification* of costs and benefits for an *individual BC* and the *decision* about the cost and benefit distribution in a *shared BC*, makes BC4IOP different from other current BCD methodologies. The applicability of each of the components separately makes the methodology flexible (by definition). In the remainder of this dissertation we will validate the usability of the methodology and its component techniques.

The three methods (Figure 6.1) can be deployed individually in separate projects, e.g. the BM4IOP method can provide useful insights in a intra-organizational project, and the VM4IOP method can be used to gain general understanding of the value distribution over the network. However, the combined deployment of all three elements in one IOS implementation project leads to real synergy effects and makes the methodology as a whole more valuable than the sum of its parts. This can be explained as follow: Starting a project with the VM4IOP method provides actors with useful insights about the network situation as the method specifies how value is distributed. If deployed successfully, this process will deliver all actors in a network with very valuable insights about the constellation of their network and the mechanism that plays a role. Having improved understanding of the value distribution is beneficial for the development of a BC, especially in the phase when the benefits need to be identified. Thus, the deployment of the VM4IOP method will lead to better results in the deployment of the BM4IOP method. This is where both methods interact and BM4IOP benefits from VM4IOP. Continuing, the BM4IOP method helps all actors in the network to assess the different implementation options. It identifies, evaluates and specifies the benefits of each solution option. Detailed insights about the benefits of each solution option provide a valuable input for the discussion of who pays what part of the costs in an IOS implementation project. This delivers input for SID4IOP and represents the part where these two methods interact. The SID4IOP

method provides actors with a structured approach to manage this decision making process. Its success significantly depends on the quality of the benefits specification done before by the different actors. The profitability of the final agreed upon cost distribution can best be assessed using the VM4IOP method. This condensed description of the deployment and interrelations of the three methodology components makes the synergy effects present in the BC4IOP method very clear.

The BC4IOP methodology as a whole covers the entire BCD process (addressing design specification S4). It is meant to be used, e.g. by project managers, as a management instrument during an IT implementation. We designed the BC4IOP methodology to have the following characteristsics:

- The solution options [that are assessed with BC4IOP] involve the implementation of an IS.
- [BC4IOP] is designed for the assessment of ISs that are complex.
- [BC4IOP] is designed for the assessment of ISs that cross functional as well as organizational boundaries.

The crossing of functional boundaries is often a determining feature of an ES implementation. The crossing of organizational boundaries is characteristical for inter-organizational systems. BC4IOP generically supports the assessment of an IS, but it is technology independent. Thus, the methodology can be used to assess an ES as well as a cloud-based CRM implementation. We acknowledge that the characteristics of e.g. ES have a big influence on the costs and the benefits within the BC. However, we do not build a methodology specific for the assessment of ES. We rather indicate where the differences lie and account for the characteristics of such softwares within the different method elements.

We acknowledge that there is overlap between our methodology and other BCD methods. This research project focuses on BM and cost distribution in inter-organizational projects (addressing design specification O6), therefore we will not define new methods for the estimation of costs and risks but use methods from others for this part of the business case.

6.2 Viewpoints to each method

We describe components of our methodology using the following three viewpoints borrowed from method engineering (Brinkkemper, 1996): the required *concepts*, *techniques & tools* and the *process steps* to execute the method.

- Concepts: Description of all elements that are necessary for a successful application of the method. The elements can be described on different levels of abstraction. Whereas some elements can be quite similar, or of similar nature, others might be very different. Some elements can be passive; others can be active, e.g. including processes, people and roles.
- Techniques & Tools: Refers to all artifacts, such as models, tables, frameworks and software tools that we developed to support the BCD process, but also the specification of already existing artifacts or their specific adjustments to our problem domain. They are the heart of every

method and provide structure to the deployment of the method. Techniques and tools further make the method to be applicable in practice. This addresses design specification Pro4. Whereas techniques describe the procedure with a possibly prescribed notation, tools refer to the possibly automated means to support the process (Brinkkemper, 1996).

- Process steps: In order to make use of the concepts and tools and to make the method work, a deployment process is needed. It is a description of how the method can be deployed in an inter-organizational IS implementation project to support the BCD process.

We specify the three views for each of the three methods in Table 6.1. We note that some concepts are the same for some or all of the methods, such as the presence of a structure is at the heart of all three methods and the need for a facilitator to guide the process is mentioned twice.

Table 6.1 Specification of concepts, techniques, tools and deployment process of each method

Views	**VM4IOP** *(Description & illustration in Chapter 6.4)*	**BM4IOP** *(Description in Chapter 7, validation in Chapter 8)*	**SID4IOP** *(Description in Chapter 9, validation in Chapter 10)*
Concepts	• Provision of a structured approach to provide a value distribution that fits the BC dynamic • Relation to other stakeholders in the network	• Provision of a simple and structured approach to identify, evaluate and specify benefits • Facilitator • Benefit owner & subject matter expert • Suggestions for benefits • Dependencies between benefits • Ranking of benefits	• Structured disclosure of information • Facilitator • Anonymous information exchange & chatting • BC data as input • Online bidding process • Base factors for cost distribution
Techniques	• Value Model	• Benefits identification matrix • Benefits ranking technique • Benefits specification technique	• Serious Gaming
Tools	• e3value editor & simulator	• Spilter tool	• Google docs • Online chat tool

Table 6.1 (continued) Specification of concepts, techniques, tools and deployment process of each method

Views	VM4IOP	BM4IOP	SID4IOP
Process steps	**Phase A:** • Step 1: Assessment of the current network constellation **Phase B:** • Step 1: Individual assessment of current network situation • Step 2: Assessment of solution options • Step 3: Profitability assessment of final selected solution	**Phase B:** • Step 0: Setting direction & identify the scope and goals of the project. • Step 1: Benefit identification • Step 2: Benefit ranking • Step 3: Benefit specification process • Step 4: Check if benefits match goals • Step 5: Specify dependencies between benefits **Phase D:** • Step 1: Benefit tracking	**Phase B.4:** Start-up phase: • Enter BC information into system, receive information about the costs to be distributed Negotiation phase: • Bidding • After each bid: Get feedback on the bids of the others and the difference to total costs • Throughout the negotiation process: Structured disclosure of extra information Closing phase: • Enter agreed upon costs into BC

6.3 Deploying the BC4IOP methodology

In this section we will describe the deployment of the BC4IOP method showing that the three method elements are related and linked to each other, as it is discussed in Section 6.1.

In IS implementation projects, a generic timing structure can be observed (Markus and Tanis, 2000). We continue their work and categorize the activities during the deployment of the BC4IOP methodology into the following four phases, shown in Figure 6.2 (addressing design specification P6). We also indicate in this figure the sub-phases and which method is used in which phase.

A. Business need identification: when a business need is recognized and the project idea is defined;
B. Project preparation and approval: at the start of the project to get investment approval, a detailed study of the processes and system requirements is conducted and documented;

C. Project realization and implementation: once the investment decision is taken, the go live of the system is prepared by implementing all business and process requirements;
D. Project reflection and improving: the system is implemented and business starts its activities using the new system.

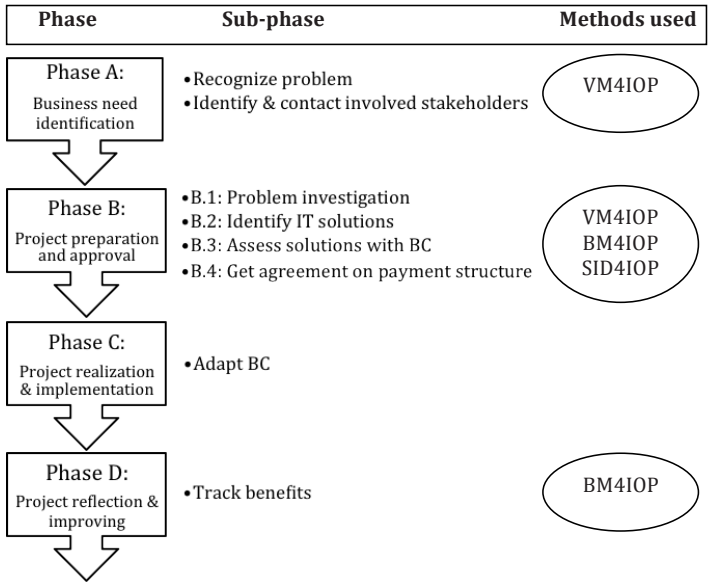


Figure 6.2 Meta-level overview of BC4IOP phases based on (Markus and Tanis, 2000)

Figure 6.2 shows an overview of the four deployment phases. Although the figure depicts the four phases as a linear process, we do not imply that the actual IS implementation has to follow such an approach. Rather, the implementation can follow an agile, spiral or incremental implementation approach. We encourage project participants to go back to previous steps if needed during the BCD process. For example, it might be that the problem is changed or the involved stakeholders need to be adapted during the course of the project, which requires that one goes back to Phase A. For each phase we suggest an order in which the activities can best be executed, e.g. the problem investigation should happen before the stakeholders can get agreement on the payment structure. However, the order of the sub-tasks comprised in each phase is up to the project managers.

As the total deployment process of the BC4IOP method is rather complex, we introduce the following four categories that help us to structure the discussion process in the remainder of this chapter:

- **Input:** Conditions that have to be met for the success of the method. One can distinguish between:
  - Knowledge that has to be present;
  - Techniques and tools that are needed;
  - Permissions, power that need to be present.
- **Activity**: Describing the activities that are performed in each phase of the IS implementation, related to the BCD.
- **Stakeholder involvement**: Describes if the activity is performed by one individual stakeholder or jointly by several stakeholders. Specifies, if possible which stakeholders are involved.
- **Expected output:** Gives examples of the expected output of that specific activity.

The relation between these categories and the four phases is shown in Figure 6.3 using the example of Phase A. The next sections, 6.3.1 - 6.3.4, describe the role of our BC4IOP methodology in the different phases in detail.

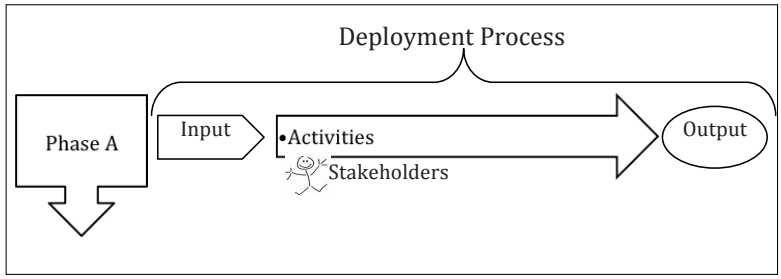


Figure 6.3 Deployment process – Discussion structure

Focus on Phase B

Our insights from research and practice (Chapter 3 and 5) show that in many cases the BC is only prepared at the beginning of the project to get investment approval. Afterwards the BC is often put aside and not further updated or used to track costs and benefits. Thus Phase C and D are in practice hardly supported by the BC.

In this chapter we will put the focus on the BC preparation activities of the second phase, however, we also stress the importance of the BC activities in Phase C and D once the investment decision is taken. Phase A, concerned with the identification of a business need, has in practice often the shortest time frame.

6.3.1 BC4IOP during Phase A: Business need identification

Before any project can be started, one or several stakeholders need to recognize that there is a problem or improvement possibility in the current network setting. In our research we only consider business goals that can be addressed by the implementation of an IS.

Our methodology covers two goals in this stage: the creation of a shared understanding and the specification of a project goal. To create an understanding

of the entire business network using a holistic view, we propose to develop a value model. Business value models help the stakeholders to share their understanding regarding the collaboration and enable them to analyze economic sustainability of the network. Problems in the current situation can be identified and located when the different stakeholders have a shared understanding of how the different actors exchange value in a network. A second outcome of Phase A is the definition of a business goal that starts the project at hand. All activities, involved stakeholders, expected outputs and pre-conditions are summarized in Table 6.2.

Table 6.2 Deployment of BC4IOP – Phase A

Activity	Input	Stakeholder involvement	Expected output
• Recognize that there is a problem in a current network situation that can be addressed by the implementation of an IS solution	• **VM4IOP method**	• Initiative taken by one or more actors that perceive a problem as urgent	• VM of the current network • Defined business goal for the project at hand
• Identify affected stakeholders • Identify those stakeholders whose commitment is absolutely necessary for a project to be started • Get in contact with affected actors and invite them to participate in discussions about the problem situation, solution brainstorming and BCD activities	• Stakeholder identification matrix	• At least one knowledgeable actor from each affected network should be involved in the project	• "List" of affected stakeholders • Decision by each stakeholder if he is willing to participate in the project, especially the next step: the problem investigation

6.3.2 BC4IOP during Phase B: Project preparation and approval

The project is analyzed during the project preparation phase. Most BC preparation activities are happening during this phase. The overall goal of Phase B (see Figure 6.2) is to perform a deeper investigation of the project. This involves among others, the assessment of the current business situation of each involved stakeholder, the determination of the problem to be addressed in the project, the identification of possible solution options, the evaluation of these options using a BC, the decision for one solution option and finally the determination of a payment structure for this solution to distribute the costs and benefits in the network. Such an analysis prepares each involved stakeholder to get investment approval from his upper management. Based on these activities we decided to split Phase B into four sub-phases:

B.1: Problem Investigation

B.2: Identification of IT enabling options

B.3: Assessment of solution options
B.4: Consolidation of BCs and agreement on a payment structure

1) Problem investigation – BCD & Decision making

In order to ensure that the BC is build upon a solid foundation, BC4IOP starts the BCD process with an elaborate problem investigation phase. The goal of the first step of the project preparation phase is to encourage all involved stakeholders to carefully analyze their current business situation in order to identify the problem with that current situation and to judge whether or not the project at hand will impact their current business situation. As part of the problem analysis stakeholders should identify the drivers behind the project. Following, the BCD process should be adapted based on these project drivers (addressing design specification T1, M3 and Pra4). For example, the assessment of an innovation project, falling into the category "do new things", is likely be more extensive than the assessment of a mandatory project, where the null option is the only alternative to the proposed solution.

Individual stakeholders perform most of the activities in this phase. A discussion between all involved stakeholders finalizes this phase in order to agree on the problems that will be addressed in the project. All activities, involved stakeholders, expected outputs and pre-conditions are summarized in Table 6.3.

Table 6.3 Deployment of BC4IOP – Phase B.1

Activity	Input	Stakeholder involvement	Expected output
Identify As-Is (current) business situation • Identify organizational mission and vision • Identify organizational goals • Develop value model from the perspective of an individual actor	• Documents describing the companies mission and vision • **VM4IOP method**	• To be done by each individual actor separately	• Description of current situation • VM of the network (individual perspective)
Specify the scope of the project • Identify affected business processes • Identify stakeholders (in each org.) involved in the project, e.g. subject matter experts and actors with decision power (design specification Pra1)	• Process diagram of organization • Stakeholder identification matrix	• To be done by each individual actor separately	• List of affected business processes • List of people that need to be involved in the different activities

Table 6.3 (continued) Deployment of BC4IOP – Phase B.1

Activity	Input	Stakeholder involvement	Expected output
Identify problems with current business situation to be addressed in this project → goal of the project • Define project drivers (classification of change: do new things, to things better/cheaper/faster, stop doing things) • Define investment objectives	• VM from the first activity in this table	• First, to be done by each individual actor separately • Second, to be discussed with all involved actors	• List of drivers behind the project • Agreement on the problems to be solved with the project

2) Identification of IT enabling options

The goal of this step is to identify solution options that help to address the problem at hand. This step bridges the gap between idea generation and system selection (design specification O5). The solution options consist of a combination of an IT enabler and an implementation approach, addressing design specification Pra3. The project team members can choose to assess all or a subset of solution options in the next step. The deployment process of BC4IOP in Phase B.2 is specified in Table 6.4.

Table 6.4 Deployment of BC4IOP – Phase B.2

Activity	Input	Stakeholder involvement	Expected output
Identify IT enablers (possible solutions) • Identify functionality of the system, e.g. ES package or cloud based CRM system	• Matrix as shown in Table 6.5	• Joint activity • External advisor might help in defining possibilities	• List of IT enablers
Identify implementation approach (e.g. Big bang, phased roll-out, parallel adoption, agile, spiral)	Matrix as shown in Table 6.5	• Joint activity • External advisor	• Different implementation scenarios for each solution

Table 6.6 provides an example of how the matrix from Table 6.5 can be used to identify the different IT enabler – implementation approach combinations that possibly provide a solution to the problem at hand and should be assessed with a BC.

Table 6.5 IT enabler – Implementation approach matrix

		IT enabler	
		Enabler A	Enabler B
Implementation approach	Approach 1	A'	B'
	Approach 2	A''	B''

Table 6.6 Example of IT enabler and implementation approach matrix

		IT enabler		
		COTS (Packaged)	Web technology	Hybrid
Implementation approach	Staged	e.g. ES with ASAP (tm SAP)	Salesforce with PRINCE2	SAAS with Sure step (tm MS)
	Incremental	Agile implementation of a BI solution (e.g Oracle)	Ticketing system with SCRUM	Incremental EAI implementation using various SAAS (e.g Dell Boomi)

3) Assessment of solution options

The identified and chosen solution options in sub-phase B.2, are assessed in this step of the project preparation phase. Each solution option consists of an IT enabler and an implementation approach. Each individual stakeholder evaluates the different options with the help of BCs, specifying the benefits, costs and risks of the option. The BC is either prepared per end-to-end process or complete system implementation, depending on size and nature of the IS. It might be that the involved stakeholders differ per solution option, as some solutions might be irrelevant for some stakeholders. Each actor should perform the activities described in Table 6.7 for each implementation option to be able to compare the resulting cost-benefit analysis and VMs with each other.

The goal of this step is for each stakeholder to have good understanding of the costs, benefits and risks of each solution option. Whereas benefits management is in scope of this thesis, we will not elaborate on the specification and management of the project costs and risks, as motivated in Chapter 1. In line with this, none of our methods provides direct support for these activities.

We will now shortly discuss the effect that ES as one specific IS technology have on the solution assessment phase. The fact that an ES is a packaged software might have an influence on the cost factors that stakeholders use during their BCD, however, it does not affect the execution of the BCD process. Real time data access and a central enterprise-wide database are two more ES characteristics that are expected to lead to very specific benefits. We deal with these in a similar way as within the costs: We give stakeholders the space to specify them, but we do not make our methodology specific for one type of technology only.

Table 6.7 Deployment of BC4IOP – Phase B.3

Activity	Input	Stakeholder involvement	Expected output
Benefits identification • Structure the benefits: owner, required changes, measurements (quantifications), time span, probability, frequency • Identify dependencies*/ relations between benefits within this project as well as with other projects	• **BM4IOP**	• To be done by each individual actor separately • Involve subject matter experts as well as business managers responsible for the affected processes	• A list of benefits** and for each benefit details specified • A map which shows the relations between the benefits of the project at hand and other projects
Cost identification *(out of scope = not further specified by our methodology)*	• Existing cost estimation models, such as COCOMO, FPA, LCC	• See above	• An overview of the expected costs** for each option
Risk identification *(out of scope = not further specified by our methodology)*	• Existing risk management models, such as COBIT	• See above	• An overview of the expected risks for each option

*Dependencies: Both benefits that support and exclude each other should be identified to be achieved later on and to resolve conflicts between stakeholders early in the process
** The benefits and costs identified by our methodology are technology dependent.

The final outcome of this step is for each option and stakeholder a positive (✔) or negative (-) business case, as exemplified in Figure 6.4.

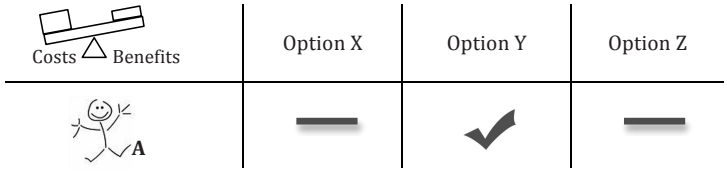


Figure 6.4 Summary of BCs for stakeholder A for three different solution options

4) ***Consolidation of BCs and agreement on a payment structure***

The insights from the BCD activity described above are used as input for sub-phase B.4. The goal of this step is threefold: (i) to consolidate the BCs of the different stakeholders, (ii) to identify a payment structure for each option and (iii) to decide which of the options is finally implemented. This phase is characterized by its collaborative nature. Whereas before most activities could be performed by each individual stakeholder separately, in this phase most activities are joint activities that involve:

- Sharing of sensitive information
- Discussion about costs and benefits of each option
- Distribution of the costs between involved stakeholders
- Coming to an agreement on which option is finally implemented

All these activities are rather challenging and need careful management in order to finalize the project preparation phase successfully. Our SID4IOP method accounts for the inter-organizational challenges described in Chapter 4 by providing a structure to guide the decision process, and by supporting anonymous information exchange and chatting. Table 6.8 will specify the stakeholders, expected output and pre-conditions for each of the activities in this step.

Table 6.8 Deployment of BC4IOP – Phase B.4

Activity	Input	Stakeholder involvement	Expected output
Share outcome of option assessment with other actors (anonymous if demanded) • Informal discussion about who prefers which option • Share information about costs and benefits of each option	• **SID4IOP** (allowing for anonymous information exchange)	• Joint sharing and discussion (involving decision makers & subject matter experts)	• Insights into the high-level costs and benefits of each actor
• Get agreement on the terms used → identify benefits/costs that are common between actors	• **SID4IOP method**	• Joint discussion	• Example of different terms!
• Rate importance of all collected benefits	• Spilter GDSS as add-on to **BM4IOP method**	• Each actor individual	• → get list with top 10 benefits

Table 6.8 (continued) Deployment of BC4IOP – Phase B.4

Activity	Input	Stakeholder involvement	Expected output
For each option: Identify payment structure per process and/or entire system • Based on costs and benefits of the system for each actor the proportion of the costs covered by each actor will be determined	• **SID4IOP method**	• Joint negotiation process	• Payment structure for all (relevant) options • See Table 6.9
Get agreement which solution option is chosen	• **SID4IOP method**	• Joint negotiation process	• Decision for one option
Evaluate if the entire network is profitable once the investment option and its accompanying payment structure (distribution) are implemented	• **VM4IOP method**	• Joint activity	• VM of the new network situation

Table 6.9 shows one example of a payment structure that can be the outcome of the negotiation process in Phase B.4. Other payment structure schemes can be though of.

Table 6.9 Final agreed upon cost distribution in % for each option and process

	Option X		Option Y		Option Z	
	Process A	Process B	Process A	Process B	Process A	Process B
Stakeholder A	20%	10%	10%	10%	20%	5%
Stakeholder B	15%	20%	20%	20%	10%	10%
Stakeholder C	30%	5%	25%	15%	30%	25%
Total	100%		100%		100%	

6.3.3 BC4IOP during Phase C: Project realization and implementation

Once the investment decision is taken that one solution is implemented and a payment distribution has been agreed upon the project realization and implementation phase can begin. During this phase the system is configured according to the user requirements. As the project precedes the initial system specifications might change and some of these changes might impact the costs, benefit and risks of the project. Thus, it is essential that the BC is updated with each major change in the business blueprint, data models or organizational design shown in Table 6.10. Such an incremental consultation and updating process

addresses design specification S3. During this phase the BC can be used as a controlling instrument.

Table 6.10 Deployment of BC4IOP – Phase C

Activity	Input	Stakeholder involvement	Expected output
• With each major change in the business blueprint, data models, organizational design: Recalculate/re-check BC of all involved actors → make decision if you still want to continue/adapt planning if necessary	• Previously prepared BC • Insights into changes in the project	• Individual and joint • Decision-makers in each actor's organization	• Adapted BC/ planning if necessary

6.3.4 BC4IOP during Phase D: Project reflection and improving

Once the system is operational and the project is formally closed, it is important to keep on using the BC4IOP methodology (design specification S4). It is during this phase of the project that most benefits get actually realized. We propose to track and evaluate the realization of benefits during a before specified period of time after the system went live (Table 6.11) using the BM4IOP method. In addition stakeholders are advised to track and evaluate the costs at these prior defined checkpoints in the future. However, as most of the costs are encountered before the project goes live, we will not include the cost tracking as an extra activity in this project phase. The support of our methodology ends after the evaluation of realized benefits. Thus, we will not provide additional guidelines to steer the decision making process on new request for changes that get discovered once the system goes live. We advice the users of the method to either repeat the BCD steps of our method for their new decision options or use their own methods to come to a decision.

Table 6.11 Deployment of BC4IOP – Phase D

Activity	Input	Stakeholder involvement	Expected output
Track/evaluate benefits realization • use BC document especially BM technique to evaluate success of the project	• Previously prepared BC • **BM4IOP**	• Individual if needed evaluate and discuss with jointly • Business managers of the affected processes	• Overview of which benefits got realized

6.4 Deploying the VM4IOP method

After having described the deployment of the BC4IOP methodology during the four project phases, in this section we zoom in on the deployment of the VM4IOP method only. The other two methods, BM4IOP and SID4IOP, will be discussed in Chapter 7-10.

Within the timeframe of the current research project we did not have the time to validate the deployment of the VM4IOP method. However, in order to illustrate the deployment of the VM4IOP method, we will use the example of port of Rotterdam, introduced in Chapter 4 (page 59), in this section of the chapter.

6.4.1 VM4IOP: An overview

The VM4IOP uses value models as main technique to provide insights into the network structure in an inter-organizational project. It does so by the following concepts behind VM4IOP:

- Providing a structured approach that helps to specify the value distribution over a network. This structured approach fits the dynamics of the BCD process.
- Explicating the relation between stakeholders in a network

These concepts are used in a deployment process that consists of the following main steps:

- Business need identification (Phase A): Assess the entire network with the help of a VM.
- During the project preparation (Phase B.1): Assess the VM of each individual actor.
- For each solution option (Phase B.2/B.3): Clarify the changes in the network when a certain solution is implemented with the help of the VM.
- After the decision is made (Phase B.4): Assess the profitability of the new network situation.

Figure 6.5 gives an overview of the deployment of VM4IOP:

- It clarifies the deployment of the VM4IOP activities in Phase A and B.
- It emphasizes the relation between VM4IOP and the other two methods.
- It shows which of the VM4IOP activities an individual actor performs and which involve a group effort. This distinction is essential for inter-organizational projects.

As the individual activities deliver input for the joint activities it is important that all individual actors finish a specific individual activity before moving on to a collaborative effort. For example in Phase B, all actors need to complete the individual analysis of the current network situation and the individual assessment of the investment options before the collaborative negotiation about the distribution of the costs can begin. This implies that the different actors deploy the individual activities in parallel. We describe both the processes (rounded shapes) that are executed and the outcomes (squared shapes) of these processes.

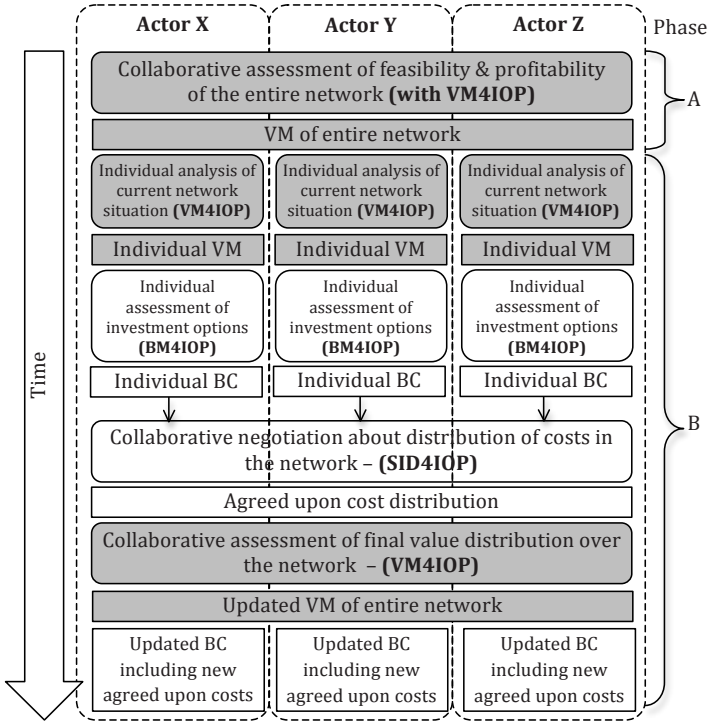


Figure 6.5 Deployment of the BC4IOP methodology, phase A and B

6.4.2 VM4IOP during Phase A

Step 1: Assessment of the current network constellation

Figure 6.5 shows that before the start of the project (Phase A) the VM4IOP method is deployed to assess the profitability of the entire network. This activity results in a VM of the entire network, showing from a holistic point of view how the different actors are interacting with each other and how value is exchanged. Value models help the stakeholders to share their understanding regarding the collaboration and enable them to analyze the economic sustainability of the network. The main goal of value modeling is to reach agreement amongst profit-and-loss responsible units in a network regarding the question "Who is offering what value to whom and expects what value in return?", in order to deliver a product or service to a consumer. Once it is understood how different actors exchange value in a network,

problems in the current network situation can be identified and located. An example of a VM is shown in Figure 6.6 using the e3-value method (Gordijn, 2002).

The diagram shows how actors exchange value objects with each other. Value objects can be money, products, services, or even experiences. Actor A is called the consumer of the model, because it has a need, represented by the bullet. The need is satisfied by executing commercial transactions, each of which consists of the exchange of two or more value objects between two actors. The dashed lines, called dependency path, connect the transactions. A dependency path is an acyclic and-or graph rooted in a need. The end nodes of a dependency path are called boundary nodes, to indicate that a further expansion of the path would lead us outside the model boundary. The value model in Figure 6.6 expresses that two transactions must be performed to satisfy the consumer need of A. The dependency path says nothing about the order in which these transactions must be performed. Rather, it expresses only the economic transactions that must be performed to satisfy a consumer need.

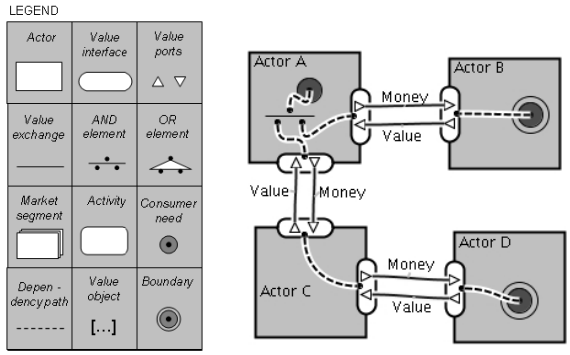


Figure 6.6 Collaborative value model of the entire network

Illustration: When we started our case study in the port of Rotterdam project there was no common understanding how the different actors currently create value in the network they are involved in. However, it was known how goods are flowing through the network and which actors have a contractual relation with each other. The contract model presented in Figure 4.5 (page 59) was used as a basis for drawing the VM of the current network situation, shown in Figure 6.7.

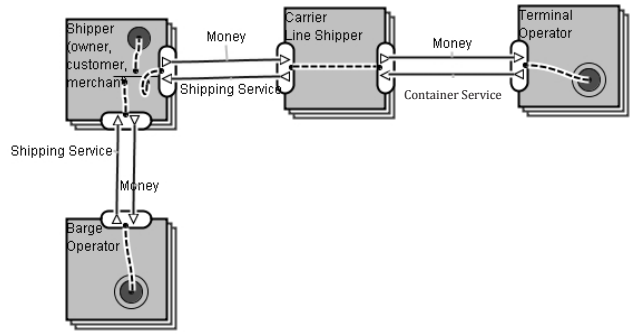


Figure 6.7 Value model harbor network – current situation

The analysis of the models shows where in the current network constellation a problem exists and why it might difficult to be solved. In this case we find that although the container flow between BOs and TOs is the core of the network (Figure 4.5, Chapter 4), there is no contractual relation or value exchange between these two important actors. As they might have conflicting goals they might tend to act selfish, as there is no contract with consequences specified.

6.4.3 VM4IOP during Phase B

Step 1: Individual assessment of current network situation

Once the problems with the current network constellation are identified and the project is started (Phase B), each individual actor is encouraged to zoom in on the collaborative VM and, based on it, develop their own VM. This activity should happen in the problem investigation phase (Phase B.1) when the as-is business situation is analyzed in terms of organizational mission, vision and goals. In this phase each actor can analyze how he exchanges value with other actors in the network. Based on this analysis each actor should decide if a change in his current situation is needed and if this change incorporates better alignment, collaboration or information transfer with other actors in the network. The resulting "actor specific VM" (as shown in Figure 6.8) can be used to identify problems with current business situation and support the stakeholder to decide if he wants to continue to participate in the project at hand. Each actor specific VM is consistent with the overall VM, but might include additional stakeholders.

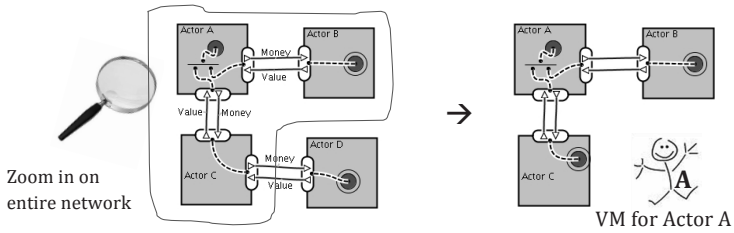


Figure 6.8 Actor level VM of current situation

Illustration: When zooming in on the network from the perspective of the barge operator, we arrive at the VM shown in Figure 6.9. This VM shows all actors that the barge operator has a transaction with, given the focus of the project. The figure shows that in the current value network the barge operator exchanges value with the shipper by providing shipping service in return for money. Even though the barge operator and the terminal operator physically meet in the harbor no value exchange is depicted in their current VM. Not having a specified exchange of value makes the problem at hand very complex.

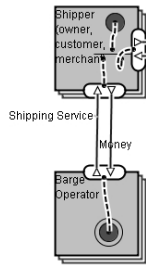


Figure 6.9 VM from the perspective of the barge operator in harbor case

Step 2: Assessment of solution options – link costs and benefits to the VMs
Following the problem investigation, the next steps in the BC4IOP deployment process are executed: solution options are identified and assessed first by each stakeholder individually, afterwards collaboratively. Depending on the complexity of the implementation options, the actors might find it useful to construct a VM for each solution option that can be used as input to clarify the BC (BM4IOP, Phase B.3). The VM allows the actors to specify for each solution scenario how their network changes once a solution is implemented e.g. it might be that the actors with which an actor does business change and that new actors enter the network.

With respect to the linkage between the BC and the VM we expect that all costs listed in the BC can be translated into cash outflows, be it expenses or one-time

investments. Cash outflows are represented as value exchanges in the e3value-modeling notation and can further be specified in the properties of actors (expenses and one time investments) or value ports (only expenses).

Including the benefits, identified by the BM4IOP method, in the VM seems to be more difficult. Financial benefits can be shown as cash inflows related to a particular value exchange. However, adding all financial benefits as value exchanges in the VM is expected to result in a very complex VM. The idea of value modeling (in the e3value sense) is to translate everything into financial numbers based on which the profitability analysis can be run. Thus, including intangible benefits as value streams (e.g. loyalty, reputation) in the VM is only useful when a financial value can be assigned to it. However, this is often a challenging or impossible task which is based on many assumptions as some of the benefits can only be expressed through indirect effects e.g. on the overall profitability.

Illustration: Two example VMs from our harbor case are shown in Figure 6.10 and Figure 6.11. The first VM specifies a solution scenario that is based on loyalty & reputation in return for on-time container service relation between the barge and terminal operators. Compared with the original VM, this is the only change; no new actors enter the network.

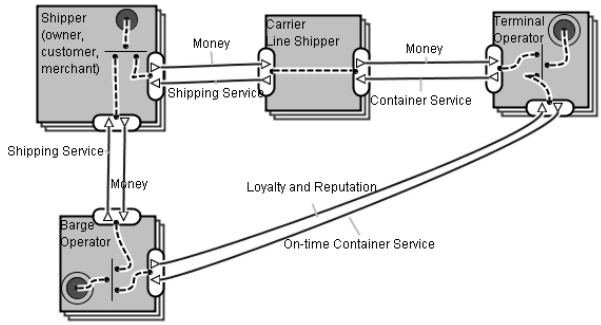


Figure 6.10 VM solution option 1 for the harbor case

The second VM specifies a solution scenario where an IOS (in this case called PAT) is implemented that is operated by a third party. Figure 6.11 shows how the network constellation and value exchanges in the network change, e.g. by adding a new actor to the network. Other solution options one can think of can be assessed using the VMs in a similar way.

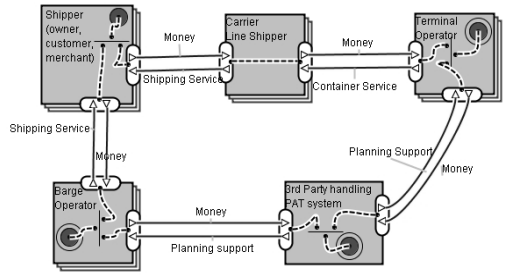


Figure 6.11 VM solution option 2 for the harbor case

The developed VMs provide useful insights for each individual actor, but also for the network as a whole that can be used during the cost distribution and agreement forming process. This process can be supported by the SID4IOP method described in Chapter 9. Knowing how value is currently distributed over the network and how the different implementation options change this value distribution serves as a solid basis for discussing which actor pays what part of the total investment costs. In the end it is the VM that illustrates if the actors that pay most costs also realize most benefits or if there is an imbalance that needs to be fixed. Therefore the last step in the VM4IOP method, the profitability assessment of the final solution is very important.

Step 3: Profitability assessment of final selected solution

Once the network has decided which solution option will be implemented and how the costs for the investment will be distributed in the network (using SID4IOP), the VM4IOP method comes once more into play. The VM4IOP method can be used to assess if the agreed upon investment option and its value distribution are indeed economically sustainable for the entire network. Such an assessment shows if the benefits indeed appear at the site where the costs occur. For this purpose a shared VM can be constructed that specifies the value exchanges among the actors and the payment structure agreed upon. An example of such a value model is shown in Figure 6.12.

If this final assessment results in a positive outcome, as a last step in the project preparation and approval phase (Phase B), each actor has to update the cost section of his BC to account for the new agreed upon costs. The deployment of the VM4IOP method ends at this point of the project.

As we did not had the chance to validate the deployment of the VM4IOP method in practice no illustration of the final agreed upon value distribution can be given.

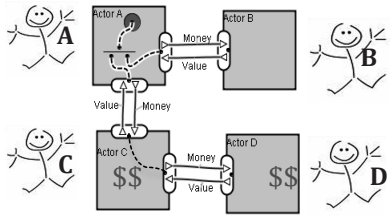


Figure 6.12 VM to evaluate shared investment decision

6.4.4 Conclusion

The VM4IOP method is designed to be used during the project initiation and project preparation phase (Phase A and B). In the beginning of a project the method helps to explicate the current situation including the current value exchanges. However, the main potential of the method lies in comparing multiple solution scenarios by a) serving as a brainstorming tool and b) by providing an overview of different solution options and their accompanying value exchanges.

7

Benefits Management 4IOP[7]

"Everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted."
(Albert Einstein)

As shown in Chapter 6, benefits identification and tracking plays an essential role in an IS implementation project. It is an important ingredient in the business case development (BCD) process during the project preparation and approval phase (Phase B) and can further be used after the IS goes live (Phase D) to track the benefits of the project. In this chapter we will discuss one of the business case for inter-organizational projects method (BC4IOP) elements introduced in Chapter 6 in detail, namely the benefits management for inter-organizational projects method (BM4IOP). As the name "benefits management for inter-organizational projects" suggests, the method is designed to be used in inter-organizational projects. At the heart of the BM4IOP method are three techniques that support the identification, ranking and specification of benefits. Throughout this chapter we will indicate how the BM4IOP method can also deliver value for intra-organizational IS implementation projects. We start this chapter with discussing the research method behind our iterative method development process. In section 7.2 we describe the method improvement suggestions made during the iterative development process that resulted in the BM4IOP method. The following sections will present the final method in terms of concepts (7.3), techniques & tools (7.4) and process steps (7.5). We finalize this chapter with a discussion of the method, including a comparison of the method with the one by Ward and Daniel (2006) which is used as the basis for BM4IOP.

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[7] This chapter is based on the following two publications:
Eckartz, S.M. and Katsma, C.P. and Oude Maatman, R. (2012). *A Design proposal for a Benefits Management Method for Enterprise System Implementations.* In: Proceedings of the 45th Hawaii International Conference on System Sciences (HICSS 2012).

Eckartz, S.M. and Daneva, M. and Wieringa, R.J. and van Hillegersberg, J. (2009). *Cross-organizational ERP Management: How to Create a Successful Business Case?* In: Proceeding of the 24th Annual ACM Symposium on Applied Computing (SAC'2009).

7.1 Research method

This chapter covers part of our solution design phase. We follow method engineering (Aydin, 2006, Brinkkemper, 1996) and extend it with elements from Avison and Fitzgerald (2006). We will structure the research method section based on the three techniques that are at the heart of the BM4IOP method. For each technique we explain the research process that resulted in the final consolidated method. An overview of the research methods and the resulting techniques is shown in Figure 7.1.

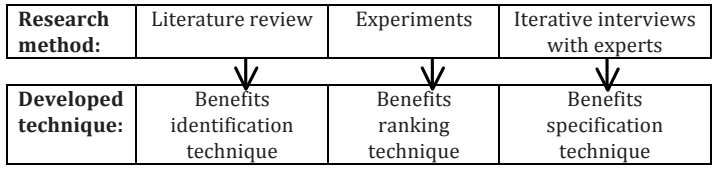


Figure 7.1 Research methods used to develop the three techniques behind the BM4IOP method

7.1.1 Development of the benefits identification technique

Based on an extensive review of literature we developed an overview of benefits examples identified in literature. These benefits are clustered according to some categories that together form our benefits identification matrix. Our extensive literature review is based on the guidelines by Webster et al. (2002) and Kitchenham et al. (2002). We review literature that discuss "IS benefits". To get a comprehensive overview of past research, the following eight databases were consulted: ACM Digital Library, Compendex, IEEE XPlore, ISI Web of Science, Science direct (including Elsevier), SpringerLink, Wiley Inter Science and EBSCO Business Source Elite. Additionally, a secondary search was performed, tracing the reference lists of the papers, which resulted in the original sources and new relevant articles. Our primary and secondary search yielded a total of 150 papers. As our search was rather broad, we defined the following three quality criteria (Herrmann and Daneva, 2008) which papers should meet in order to be included in our review:

(1) The paper is credible, i.e. the method described is meaningful and intuitive to follow.
(2) The paper provides enough detail on the context.
(3) It is an original paper, for each paper we tried to find the original publication.

All articles reviewed were written in English only and include qualitative as well as quantitative research. The review process left us with 30 articles, which we then further analyzed by means of a concept matrix (Webster and Watson). Our SLR was complemented by a literature review by Cruijssen et al. (2007) on general collaboration benefits. This resulted in several new articles that were included in our benefit comparison.

7.1.2 Development of the benefits ranking technique

In order to address the challenges that are present in inter-organizational projects we were looking for a way that supports the benefits management process when multiple actors need to agree on the benefits of a project. After reviewing several online group decision support systems (GDSS) we decided to use a system called Spilter (www.spilter.nl) as support for our benefits management activities. The system allowed us to set-up an environment that can be used during the BCD process.

In order to test the functionality of the technique we performed eight experiments with master students and recently graduated young professionals. As part of the experiment, participants had to develop a BC for an inter-organizational case. Hereby the focus was on the identification and ranking of the benefits.

The first experimental setting covered a face-to-face traditional meeting and took place in a room with an oblong oval shaped table. All four participants were facing each other and had sight on the projected steps including the contributing information from the actors that is processed by a moderator. This setting was executed twice.

The second experimental setting consisted of a web-based GDSS meeting and took place in a room with tables placed in a half circular shape. The four participants are facing a TV-screen with an overview of the agenda and the current agenda item processing. All participants were seated behind a laptop with access to the web-based GDSS Spilter. This setting was executed six times.

In both cases the participants did not receive any up-front training; they were only given a short instruction on how to log in and on how the experiment would proceed. This comparative set-up allowed us to assess the usefulness of the GDSS for the problem at hand.

7.1.3 Development of the benefits specification technique

Using the insights from literature and the method comparison presented in Chapter 3, we chose the Ward and Daniel (2006) method as the foundation for the BM4IOP method element of our BC4IOP methodology. Given that Ward's method has shortcomings when being deployed in inter-organizational projects, see Chapter 3-5 (Section 3.3.1, page 32) for a list of shortcomings, we decided to follow an iterative approach to improve the benefits management method. We did so by conducting six in-depth interviews with experts from consultancy companies (five different large consulting organizations were represented). Involving experts from practice allowed us to extend an academic method into effective working practices, addressing design specification O1. Each interview resulted in an adjusted version of the benefits management method. During this iterative and participatory approach we presented the first interviewee the "current" version of our method. We incorporated the feedback and stated requirements of the first interviewee to improve the method. The improved method was then presented to the next expert. This iterative cycle was repeated five times until hardly any new requirements were added and a saturation point was reached.

The experts were approached after a workshop on building IS BCs at the University of Twente, where they volunteered to participate in follow up research. Despite that our research design is not based on random selection of the subjects,

it made sure that all of the experts had relevant experience in IS BCs. Information about the experts, their experience and relation to IS BC development is given in Table 7.1 One can see that five out of six experts have more than 10 years of experience with developing and using IS BCs.

Table 7.1 Interviewed experts

Expert	Occupation	Experience with IS BC (task)	Experience with IS BC (time)
A	Freelancer	Creating/Approving/ Implementing BC	> 10 years
B	Consultant	Implementing BC	> 10 years
C	Manager IT-governance	Judging BC outcomes	> 10 years
D	Solution Architect (outsourcing)	Creating BC	5 – 10 years
E	Partner IT-Advisory	Judging BC	> 10 years
F	Manager ERP Advisory	Creating/implementing BC	> 10 years

Before the interview, each interviewee was provided with a document explaining the current version of the benefits management method, which he was supposed to review. During the interviews we used semi-structured questions (Appendix B) to discuss the different aspects of the method with the experts. The interviewees were invited to ask questions, request for clarifications and provide feedback. Each interview lasted between 60 and 90 minutes. At the end of the interview several questions were asked to assess the expected usability of the redesigned method (Appendix B, Section 3).

The insights gained during the interviews were coded using the framework by Avison and Fitzgerald (2006), that we also used in chapter 3 (page 32), and following the method was updated after each iteration. The coding of the interview script was done independently by the author of this thesis and one of her supervisors. As expert E and F were interviewed together, we had in total five (and not six) iterations to improve the method. The next section will present the details of the iterative method development process.

7.2 Iterative method development

This section presents the results of the iterative method development process that resulted in the third technique for benefits management, our benefits specification matrix. Instead of showing the method after each iteration, we structure the discussion around the change requests expressed during our expert interviews. Table 7.2 summarizes the improvements made during each iteration using the seven categories developed by Avison and Fitzgerald (2006) to compare methodologies: Philosophy, model, techniques and tools, scope, outputs, practice and product. The numbering in the table is used to easily refer to each change request in the discussion section. Following the table we will shortly discuss the

development process itself. Afterwards we will provide a detailed discussion of the changes made with respect to the seven aspects of the Avison framework.

Table 7.2 Iterative improvement of the method

Avison category	**Changes made to the method during each iteration (= requirements for a method)**				
	Iteration 1	**Iteration 2**	**Iteration 3**	**Iteration 4**	**Iteration 5**
Philosophy	1. Use the method as input for BC; 2. Use as toolbox; 3. Add reason of existence to steps; 4. Deploy as group process	7. Include business change		17. Describe viewpoint of method; 18. Increase flexibility of the method further	21. Add technology change to business change
Model	With respect to the model, no change requests were made by the experts				
Techniques and tools	5. Delete BDN; 6. Describe/ mitigate potential risks	Add: 8. probability, 9. frequency, 10. dependency between benefits; 11. Increase measurement explicitness	15. Use method to determine state of project		22. Specify time span
Scope				19. Add tools to determine goals	
Outputs				20. Treat sensitive information carefully	
Practice		12. Split benefit owner & subject matter expert; 13. Make owner accountable			
Product		14. Provide info on execution setting	16. Extent execution setting info		23 & 24. Provide better examples that help guiding the process

7.2.1 Discussion of the method development process

Based on the analysis of the changes made during each iteration we observe an equal distribution in contributions between the five iterative cycles and thus the separate interviewees. Considering our method development process it is clear that the practitioners mostly contributed on the philosophy and techniques/tools categories. No improvement suggestions were made in the model category. We also observe that our enhanced method becomes more stable towards the end of our design iterations as the contributions become less extensive in range and more

practical. In the beginning of our design process mainly extensive changes in techniques were proposed whereas in the final cycles the interviewees emphasized more the outputs and products of the method. Finally, we observe that the philosophy category is strongly related to the paradigms of each individual interviewee. This is inherently tied to the philosophy concept itself and our method improvements therefore adopts the situational method engineering principle (Aydin, 2006) to allow practitioners to deploy the method according their individual paradigm, knowledge and the situation at hand.

The interviewed experts did not make any comments about the *model* behind BM4IOP itself; therefore it is left empty in Table 7.2. However, not all change suggestions were totally clear to classify into the seven categories, thus it might be that some suggestions could have been classified as falling in the model category as well.

Below we describe the change requests made in more detail. We structure the discussion per aspect of the framework by Avison and Fitzgerald (2006) and use the numbering from Table 7.2 to refer to the different changes.

7.2.2 Philosophy

The *philosophy* is an important aspect of a methodology, as it underscores all other aspects (Avison and Fitzgerald, 2006). It describes the theories, objectives, principles and assumptions that underlie a methodology. Our first expert suggested making explicit that the content of the method should be used as input in a session to create a BC (1). BM4IOP helps the practitioner by guiding the benefit determination process by providing a reference guide. They further suggested making the steps in the method more independent, thereby making it usable as a toolbox (2). This will reduce the threshold to use the method and provide more freedom to practitioner. Another request related to philosophy was to describe the reason of existence for each step in the method (3). This will improve the understandability of the method and increases the reference guide capabilities. Further, the method should be a used in a group process (4). This is supposed to improve the quality of the benefits as several experts can provide input from several viewpoints. Extending BM4IOP by including the business changes (7) and technology changes (21) required to achieve the benefit (process, people, organization) is essential to determine what needs to be done to reach the benefit. The experts further perceived it important to describe from which viewpoint the method operates (17). This provides insights in how to use the method and increases its reference guide capabilities. As a final request on the aspect of philosophy experts proposed to provide practitioners with more freedom by making the deployment of the method as flexible as possible (18).

7.2.3 Techniques and tools

The following change requests were made with respect to the *techniques and tools* of the BM4IOP. The experts discussed this aspect extensively during our interviews and suggested the following changes: First of all, they suggested deleting the Benefit Dependency Network (BDN) (5), which is at the heart of the BM method by Ward and Daniel (2006) showing how benefits can be created.

Although the experts valued the intentions behind this "tool" (as the emphasize on business changes in suggestion 7 confirms) they perceived the BDN as being too complex, thereby creating a large burden for practitioners to actually use the method. We understand that the exclusion of the BDN is a rather rigorous change to the BM method by Ward et al. that might trigger discussion, however, our in-depth discussions with experts convinced us to follow up on this step and only keep the ideas and principles behind the BDN. In our benefits specification matrix that is presented later in Figure 7.4, we try to suggest a new form of how the ideas of the BDN can be presented in a more simple and accessible way to practitioners.

When presenting our improved BM4IOP method to the experts, in particular early versions of Figure 7.4 (page 127), they suggested the following additions:

- Add the probability of the benefit occurrence given that a certain condition occurs. This takes into account that not every expected benefit will be realized (8).
- Add the frequency of the benefit occurrence within a certain time span. This takes into account that some benefits occur more than once (e.g. weekly) (9).
- Specify the time-span (starting at project start or go live) in which the benefit is expected to be realized (22).
- Add a scale that increases the explicitness of the benefit measurement. This reduces the possibility that practitioners can provide ambiguous and vague answers (11).

The experts further suggested adding a step in the method that determines dependencies between benefits (10). Such dependencies can be observed on different aspects, two examples are: (i) dependencies between resources needed to achieve certain benefits and (ii) dependencies between the effects of certain benefits. The identification of dependencies is essential when selecting the benefits to follow up on. It is further essential to make sure no conflicting benefits occur in the BC. It can also provide great insights for portfolio management, as we will discuss in Section 7.5.2.

The experts made us aware of the importance of finding a way to describe and mitigate potential political risks (6). During the process of benefits specification the "wrong" people might discover information. Having an improved benefit tracking mechanism in place is beneficial to the project. However, being able to track the realization of benefits can also be used to evaluate the performance of the people involved in the project. If the result of the benefits realization is positive, the people involved in the project activities are likely to be evaluated positive as well. However, in the case of underperformance the people responsible for the project run the risk of being evaluated negatively. Thus, benefit tracking has its advantages and disadvantages for the involved project members. In any case it is something project managers and participants should be aware of.

Related to this, experts stressed the importance of actually using the method during the project implementation to determine the state of the project (15). This can be a straightforward task consisting out of reviewing the fully described benefits.

7.2.4 Scope

The *scope* of the method defines what phases of the BM life cycle are covered. With respect to this category the experts suggested to include mission, vision and SWOT (strengths, weaknesses, opportunities & threats) analysis as tools to determine project goals (19). Those tools are deemed important, as the project should meet organization goals to be beneficial to the organization.

7.2.5 Outputs

With *outputs* Avison and Fitzgerald refer to the deliverables produced by the method, e.g. a working implementation or a requirements specification. The experts were concerned about the visibility of the outputs (20). On the one side the visibility should be increased, however, the disclosure of sensitive information should be treated carefully. Using the benefit information, without context, might create wrong impressions. Further, the benefit information should not be available to each organization layer.

7.2.6 Practice

Practice describes the background of the method, the user base and the participants of the method, including required skill levels. In our case experts suggest to distinguish between benefits owners and subject matter experts (12). The person, who owns the benefit, is, most likely, not the person who knows how to realize the benefit in detail. It is further important that the owners are made accountable for achieving the projected results. This guarantees achieving the outcome by using leverage (13).

7.2.7 Product

The last element of the framework is the *product* of the methodology, that is, what is finally sold to the customers of the methodology. Experts specify that in order for BM4IOP to be optimally used the product should provide information on the setting in which the method should be executed (14). This information on the setting is very important and should include extensive details on the deployment of BM4IOP (16). In order to simplify the deployment and increase the applicability of the BM4IOP method, a clear and concise example should be delivered together with the method (23). Such an example should also cover examples on making the benefits measurable (24). This way a better ”feeling” can be created and practitioners receive increased guidance when using the method.

7.2.8 Initial validation of the method

Our iterative development of the improved BM method provided us with early validation opportunities, as the requirements identified by one expert were included in the method before the interview with the next expert, who in turn validated the improved method. In order to validate the method, we asked all experts about their opinion on general usability, understandability, guidance and efficiency of the method (Appendix B).

The evaluation of the method by the experts was positive, as most of the experts (80%) would use the method when requested to assess the benefits for a

BC during an IS implementation. Especially the ease of use and the flexibility of the method were rated positively, as it gives the practitioners the possibility to use the method as a toolbox, instead of a fixed series of steps/tools. All experts were satisfied with the level of guidance provided by the method and evaluated the method as having "good" understandability. They perceived the "step size", and the language in the method as adequate. Experts further valued the explanation about the "reason of existence" for each step, as it helps practitioners to use the method as a toolbox. 80% of the experts rate the method as efficient as they state that the potential results of the method outweigh the effort and time required to use it. However, they also indicate that the efficiency will depend on the type and size of the project in which it is used.

7.3 BM4IOP method concepts

The concepts are all components that are necessary for a successful application of the method. We especially focus on those components that are unique to our method and that bring advantages to the user of the method.

First and most important, BM4IOP provides the user with a simple and structured approach to *identify, rank and specify* benefits. Further, BM4IOP provides a mechanism that supports users in the identification of benefits. Another important ingredient is the clear separation of a benefit owner from a subject matter expert. Involving both actors in the BM process ensures that the decision power as well as the knowledge about a certain process or benefit are available to the project team. BM4IOP encourages the users to deeply get involved into the benefits *identification, ranking and specification* process. This allows the users to, among others, rank the benefits based on their impact and importance. Such a benefit ranking can be very important when time is limited. Additionally, the method helps stakeholders to identify dependencies between benefits. Finally, BM4IOP strongly suggests the users to appoint a facilitator that is independent of the project and helps to guide the BM4IOP deployment process.

7.4 BM4IOP method techniques

This section discusses the three techniques that are at the heart of our BM4IOP method:

- A matrix that supports the users with the *identification* of the benefits.
- An online tool that supports the *ranking* and prioritization of the benefits.
- A matrix that assists the users when *specifying* each benefit in more detail.

This list makes clear that the three activities benefits identification, prioritization (also referred to as ranking) and specification are at the heart of our BM4IOP method (design specification T8). We will now discuss each of the techniques in more detail.

7.4.1 Benefits identification: The benefit identification matrix

A complete enumeration of all benefits that one can expect from the project is a rather challenging task. Project members often do not take the time and effort to identify all benefits they want to reach with the project. In a BCD project, the focus is often put on the identification of the expected costs, not the benefits. Thus, many

projects are started with an incomplete list of benefits. This might create problems later on in the process, as a proper list of expected benefits is the foundation for successful benefits management.

In this section we propose a benefit identification matrix (Figure 7.2) that supports the process of defining an extensive benefits list. It is structured around five categories that, as discussed in Chapter 3 (design specification S1 and T4), were found to be applicable by researchers (Anthony, 1965, Shang and Seddon, 2002). They classify benefits to be of operational, managerial, strategic, organizational and IT-infrastructure nature. The other axis is based on an extension of the balanced score card categories: Process, customer, finance, innovation and HR (Kaplan and Norton, 1996).

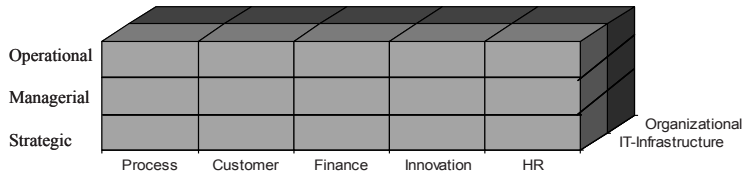


Figure 7.2 Benefits identification matrix

Literature and experience indicates that soft, intangible or subjective benefits (e.g. those associated with innovation, learning and improved co-ordination) are critical for an organization to successfully implement an IS (Legare, 2002, Murphy and Simon, 2002). Achieving these benefits will increase the commitment by many stakeholders, such as customers and staff members, as they are interested in the realization of these benefits. Financial benefits on the other hand, mainly serve the interest of senior managers and shareholders. By stressing the importance of intangible benefits we address design specification T6.

We argue that activities to realize the benefits associated with the innovation/HR and IT-infrastructure/organizational (found at the right side of Figure 7.2) are crucial for the success of an IS implementation. Special attention needs to be paid to these benefits. Their realization is often dependent on additional investments and initiatives, such as knowledge- and change management, training and learning, which can be very costly.

A list with benefit examples, reported in literature, for each category of the benefits identification matrix is presented in Table 7.3. The list is just a starting point and does not pretend to be exhaustive. A number indicates the source of the benefit example after the example benefit. Whereas a [1] stands for a reference to Chand et al. (2005), [2] for Shang et al. (2002), [3] for Gattiker et al. (2004), [4] for Davenport (2000) and [5] for Robinson et al. (2001). To keep the table readable, in the case that several benefits got reported from one author, the reference to the authors original publication is given only after the last benefit. Intangible benefits are presented in italic letters (Murphy and Simon, 2002).

Table 7.3 Examples for each benefit category

Operational benefits					
	Process	**Customer**	**Finance**	**Innovation**	**HR**
High level benefit	Improve process efficiency	Meet customer needs more efficient	Reduce cost	Increase productivity	
Indicator benefits	- Error/rework reduction - Faster processing - Consistent data - Reduction in processing time - Increased throughput[1] - Productivity improvement - Quality improvement [2] - Centralization of adm. Activities [3] - Savings through new work approaches [4] - Faster order response [5]	- Improved response time - Reduced customer complaints - Reduced errors [1] - Customer services improvement [2]	- Reduced inventory carrying cost - Lower labor cost [1] - Decrease cost of circulation - Increase the turnover rate of capital [5]	- Power user involvement in user training for operational tasks [1] - Savings through new work approaches [4]	
Tactical/Managerial benefits					
High level benefit	Improve tactical decision making	Identify and meet customer needs proactively	Increase revenues	Make workers more effective decision makers	Worker empowerment
Indicator benefits	- Improved work scheduling - Improved work assignment - Improved access to information - Improved quality management - Improved control [1] - Better resource management - Improved decision-making and planning - Performance improvement [2] - Improve coordination of the circuit of capital [5]	- Better customer expectation setting - Improved customer satisfaction - Improved engine repair scheduling and delivery [1]	- Better forecasting - Increase market Share [1] - Revenue enhancement benefits [4]	- Training for access of enterprise information - Training for decision making skills [1]	- Worker empowerment for taking actions [1]
Strategic benefits					
High level benefit	Adapt to radical environment changes routinely	Meet new customers needs or new needs of customers	Improve market value	Absorb radical change routinely	
Indicator benefits	- Technology changes - Regulatory changes - Competition changes [1] - Support business alliance - Build external linkages [2]	- Increased customer base - Partnership with customers [1] - Generate product differentiation [2]	- Growth capitalization - New markets [1] - Built cost leadership [2] - Compete on product markets [5]	- Change management Processes - Breadth and broader horizon [1] - *Build business innovation* [2]	

Table 7.3 (continued) Examples for each benefit category

IT-Infrastructure benefits					
Indicator benefits	- Increased IT-infrastructure capability [2]		- IT cost reduction [2] - Reduction in IS maintenance cost [3]	- *Build business flexibility for current and future changes* [2]	
Organizational benefits					
Indicator benefits				- *Support org. changes* - *Facilitate Business learning* - *Empowerment* [2]	- *Built common visions*[2]

The following table (Table 7.4) presents the benefits that are specific for the implementation of inter-organizational business applications (McLaren et al., 2002, Cruijssen et al., 2007).

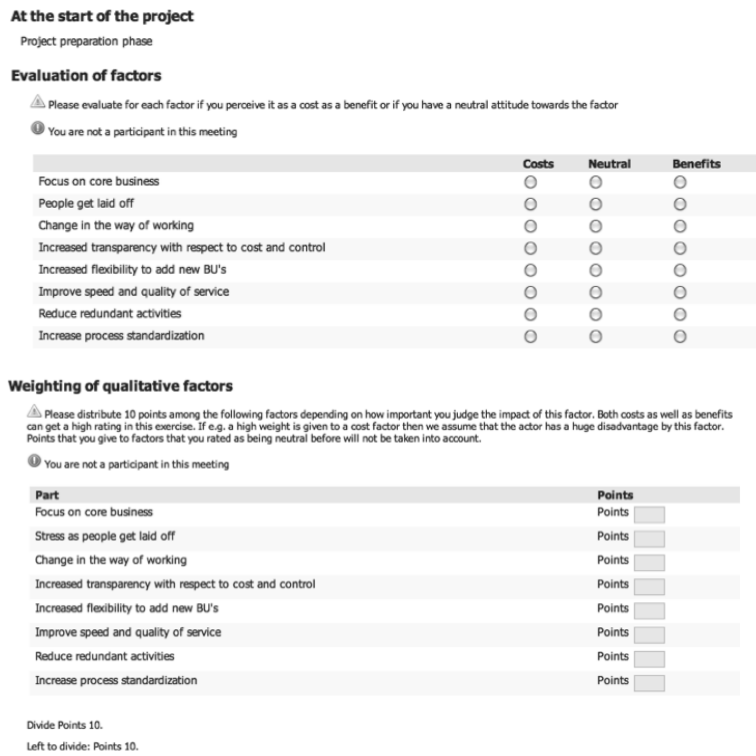
Table 7.4 Example benefits for inter-organizational IS implementations

	Process	**Customer**	**Finance**	**Innovation**	**HR**
Operational	Effective governance		Reduced coordination costs, reduced purchasing costs, supply chain cost reduction		
Managerial		Increased customer value			
Strategic	Synergy effects (economies of scale and scope)	New products	New products and market	Increased responsiveness to the market	
Organizational				Knowledge transfer	
IT-Infrastructure					

7.4.2 Benefits ranking: An online GDSS

Using the benefits identification matrix might result in a very long list of expected benefits. Different project members might value the importance of these benefits differently. If one would have unlimited time and capacity all above identified benefits could be further specified using the benefits specification matrix

described below. However, as this is usually not the case we suggest using existing groupware tools, such as Spilter to (i) assemble a list of benefits and (ii) rank the benefits that got identified. This is especially important in inter-organizational projects where stakeholders might value the benefits differently, both in terms of impact and importance. It might even be that a factor that is perceived as beneficial by one stakeholder is perceived negatively by another stakeholder. Two example screenshots of the tool are shown in Figure 7.3.



At the start of the project

Project preparation phase

Evaluation of factors

Please evaluate for each factor if you perceive it as a cost as a benefit or if you have a neutral attitude towards the factor

You are not a participant in this meeting

	Costs	Neutral	Benefits
Focus on core business	○	○	○
People get laid off	○	○	○
Change in the way of working	○	○	○
Increased transparency with respect to cost and control	○	○	○
Increased flexibility to add new BU's	○	○	○
Improve speed and quality of service	○	○	○
Reduce redundant activities	○	○	○
Increase process standardization	○	○	○

Weighting of qualitative factors

Please distribute 10 points among the following factors depending on how important you judge the impact of this factor. Both costs as well as benefits can get a high rating in this exercise. If e.g. a high weight is given to a cost factor then we assume that the actor has a huge disadvantage by this factor. Points that you give to factors that you rated as being neutral before will not be taken into account.

You are not a participant in this meeting

Part	Points
Focus on core business	Points
Stress as people get laid off	Points
Change in the way of working	Points
Increased transparency with respect to cost and control	Points
Increased flexibility to add new BU's	Points
Improve speed and quality of service	Points
Reduce redundant activities	Points
Increase process standardization	Points

Divide Points 10.

Left to divide: Points 10.

Figure 7.3 Spilter tool to rank benefits – two screenshots

We tested the functionality and way of working of the technique during eight experiments with students as described in Section 7.1.2. When executing the experiments we were especially interested in the behavior of the students when ranking the benefits. We analyzed the experiments based on two aspects:

- Does the GDSS help participants to identify and rank benefits? Is it better than with traditional face-to-face brainstorming techniques?

- Does the GDSS support participants in finding agreement on a BC and the distribution of costs and benefits in the BC?

During the course of the experiments, the participants were asked to identify and rank benefits for a project described to them. Based on their information a joint BC including costs and benefits was calculated by us. The cost distribution in this BC was based on the following logic: The more benefits somebody indicated to have from the implementation of a system, the more of the project costs he would need to pay in the end.

Based on this relation between costs and benefits one would expect that the experiment participants intentionally try to value the benefits of the project as low as possible, in order to avoid to pay a large share of the costs eventually. However, the results of our experiments show that the process of first identifying, then clustering and finally evaluating each factor one-by-one made the experiment participants more objective about their judgment. Although the participants knew that the factors that are rated highly positive by them would in the end lead to a larger cost share, they took the evaluation procedure seriously. Thus, participants actually admitted when they were benefiting from the project and agreed to pay a bigger part of the costs. This result was achieved by providing a structural approach that shifted the focus from costs to benefits. However, this will only work if the participants are actually willing to get to an agreement.

Although our insights are from experiments with students, which did not have real stake in the problem at hand, we show that our technique provides a way to come to an agreement and is thus a feasible option to consider when ranking benefits. However, we are confident that the results can be transferred to real life projects. We expect that a structured discussion and evaluation of each benefit one-by-one, as Spilter supports it, leads to a more honest specification of the benefits and distribution of the costs than an unstructured BCD process. A careful analysis of the benefits provides valuable input for the distribution of the costs discussed in Chapter 9 and 10.

7.4.3 Benefits specification: The benefits specification matrix

The third key technique of our BM4IOP method is the benefits specification matrix shown in Figure 7.4. It can be used to specify each identified benefit in more detail.

Benefit	Benefit owner:	Classification of change	Required business changes	Measurement of effect	Time span:
		Do new things (grow the business):	Process level:	Financial:	**Probability:**
	Subject matter expert:	Do things better/ cheaper/faster:	People level:	Quantifiable:	**Frequency:**
		Stop doing things:	Organizational level:	Measurable:	
			Technology level:	Observable:	

Figure 7.4 Benefits specification matrix

For each benefit selected throughout the steps before, the benefits specification matrix shown in Figure 7.4 should be completed. Each benefit is specified in a conditional way, namely that if the system is implemented then the project participants assume that the benefit is reached with a probability of X. Although we propose to start at the left of the table there is no strict pre-defined order in the execution of the benefits specification process. This technique covers design specification T3 asking for a clear explanation of each benefit.

7.5 BM4IOP method process steps

This section will discuss the deployment process of the BM4IOP method, discussing how and when the concepts and techniques can be used during the implementation of an IOS. We especially emphasize on the interaction of the three different techniques in one joint deployment process.

The structure and deployment of the BM4IOP method is based upon the concept of method fragments and the situated method engineering approach (Aydin, 2006). Scholars in the method-engineering domain state that it is more important to initiate a knowledge-exchange process through the method and its parts than to meticulously define the structure and method deployment in advance. This fits with the different experiences and paradigms of practitioners discussed in Section 7.2.

It is crucial to update the BC throughout the IS life cycle (Markus and Tanis, 2000). We therefore suggest to (i) deploy our method dynamically from the early start of the implementation and (ii) gradually increase the amount and accuracy of the benefits specification towards the go live stage of an IS implementation.

Our BM method can be deployed in several project contexts:

a) To identify and manage the benefits of a single **intra**- or **inter**-organizational project

b) To identify and manage the benefits of multiple **intra-** or **inter-**organizational projects using portfolio management

The deployment of the method for one single intra- or inter-organizational project (a) is described in 7.5.1 and validated in Chapter 8. How the BM4IOP method can support the decision-making on a portfolio management level (b) is described in 7.5.2. No matter in which project context (a or b) the BM method is deployed we propose to use the method during the *Project preparation and approval* (referred to as Phase B in Chapter 6, Figure 6.3) and *D. Project reflection and improving phase* (Phase D).

7.5.1 Deploying the BM4IOP method in single BCD projects

In this section we discuss the method deployment process for single BCD projects. The deployment process can be applied to both intra- and inter-organizational projects. We will indicate when there are differences between the two contexts. We will first describe the deployment during Phase B and then shortly discuss the deployment during Phase D.

PHASE B

In the BC preparation and approval phase (Phase B) the deployment of our BM4IOP method consists out of the following six steps that are split over Phase B.1 and B.3. Step 0 is titled "0" as it is a preparation step for the actual BM4IOP deployment.

We make the note that the BM4IOP method is not needed in Phase B.2 (the identification of IT enabling options) and B.4 (the consolidation of BCs and agreement on a payment structure). We will therefore not discuss these phases in this and the next chapter.

Phase B.1

- Step 0: Setting direction & identify the scope and goals of the project

Phase B.3

- Step 1: Benefit identification
- Step 2: Benefit ranking
- Step 3: Benefit specification process
- Step 4: Check if benefits match goals
- Step 5: Specify dependencies between benefits

As one can see in Table 7.5, we propose three techniques that support the BM4IOP deployment process in step 1-3. We indicate with an "X" if a step is relevant for intra-/ inter-organizational projects. A "0" means that the step is not relevant. This is the case for Step 2, which is not relevant for intra-organizational projects as discussed in Section 7.4.2. The techniques and tools are presented in section 7.4. All steps can best be executed in workshop settings that are if needed preceded by individual interviews. In the workshops, participants from different disciplines within the organization should be involved. Required are people with authority and power to initiate changes in the organization, but also subject matter experts.

The main role of the facilitator during the workshops is to plan and design the workshops, to recommend deliverables and to lead the process (Gottesdiener, 2003). We will not cover the actual design of the workshop in this thesis, but refer the interested reader to articles by Barbacci et al (2003), Gottesdiener (2003), Hannola et al (2010), Moens et al (2010) and Ward and Daniel (2006).

Table 7.5 Tool support during the different BM4IOP deployment steps

BCD Phase	**BM4IOP deployment steps**	**Techniques that can be used to support the BM4IOP deployment**	**Intra-org**	**Inter-org**
Phase B.1	Step 0: Scope & goals	Company own tools	X	X
Phase B.3	Step 1: Identify benefits	Benefits identification matrix Benefits ranking technique	X	X
	Step 2: Rank benefits	Benefits ranking technique	O	X
	Step 3: Specify benefits	Benefits specification matrix	X	X
	Step 4: Match benefits & goals		X	X
	Step 5: Benefit dependencies		X	X

Step 0 – Setting direction & identify the scope and goals of the project:
Before starting to deploy the BM4IOP method, participants should reach agreement over the direction of the project. This proceeds during the problem investigation phase (Phase B.1) of our BC4IOP deployment described in Chapter 6. During this phase organizational goals, critical success factors (CSF) and KPI, etc. can be identified. The goals (which are assumed to be given by the project owners) can serve as input for a discussion about which means and solutions are needed to reach the goals. Discussions about which CSF and KPI are considered important to manage and measure the success of a solution implementation can help in creating consensus amongst the participants. Hereby, it is essential that the BM4IOP method is integrated with existing business process models. Such integration addresses design specification M2.

Further, it might be useful to identify the drivers behind the project. In the case of a problem driven (bottom up) project, a problem description should be formulated, which is to be solved by this project. In the case of a strategic driven (top-down) project, the organization vision and mission should be specified.

Step 1 – Benefit identification process:
The actual BM process starts in Phase B.3 when the different solution options are assessed in detail. At the start of every BM trajectory stands the actual identification of the benefits that are to be reached with the execution of the project. Experience shows that often only the most obvious benefits are stated in the BC and other equally important benefits are forgotten. This is especially crucial in inter-organizational projects where the final distribution of costs will be linked to the benefits. In order to reach a fair distribution of the costs it is important to start with a list of benefits that is as complete as possible. The identification of benefits can happen during an unstructured brainstorming session or using a more structured framework (see Figure 7.2), which helps the project participants

to identify a complete set of applicable benefits and not just the ones that come first to their minds (Eckartz et al., 2009b).

In inter-organizational projects this step can best be performed using a group decision support systems, such as Spilter. Each individual actor can first enter his benefits into the system. Afterwards the system allows for the categorization and grouping of all identified benefits. This way double entries can be detected and deleted. Once one list with all benefits has been compiled, Step 2, the ranking of the benefits can be initiated.

Step 2 – Benefits ranking & prioritization:
If more than a handful benefits have been identified in Step 1, the benefits for further continuation need to be selected in the remaining BM process. This might be necessary if the time available for the project preparation is limited and thus is not sufficient for a full specification of all identified benefits.

Another reason for which one might choose to evaluate the benefits, is that the benefits identified in Step 1 by the different actors might be partly conflicting. Such a situation can often happen in inter-organizational projects when multiple actors (from different profit -and loss responsible units) with different or even conflicting goals are involved in a project. If such conflicts arise, Step 2 gives all involved actors the chance to evaluate and weigh each of the benefits identified in Step 1 to rank the benefits. It might be that a benefit that is valued high by one actor, is valued differently or even perceived negatively, and thus not as a benefit by another actor. Identifying conflicting goals and benefits early on in the BCD process is important to get clarity on the shared goals of the project and to make sure that all participating stakeholders profit from the cost-benefit distribution in the end.

The weighting of the benefits in this step will impact the individual BCs and the final distribution of the costs. Actors that in this step indicate that they gain a high amount of benefits from the system can expect that they are later in the process asked to pay a higher share of the costs than actors that do not expect many benefits from the project. By supporting a structured discussion and evaluation of each benefit one-by-one we hope to encourage stakeholders to honestly weight each benefits. The efficacy of our method on the stakeholders will be evaluated and presented in Chapter 8.

In 7.4.2 we suggest to use an online GDSS to assist in the benefit evaluation process. This process normally happens in Phase B.3 but might in inter-organizational project also be extended to Phase B.4 where the BCs of multiple actors are consolidated. The process looks like the following:

1. Collect all factors that are perceived as beneficial by the stakeholders in a project (using the benefits identification matrix described in Figure 7.2 and Step 1).
2. Cluster the factors into groups to identify double entries.
3. Present the entire list of factors to each stakeholder (via the system). Following, each stakeholder has to indicate if he perceives the factor as positive (benefit), negative (cost) or if he has a neutral attitude towards the factor.

4. All participants are asked to assign weights to the factors that got evaluated before. Each stakeholder should distribute e.g. a total of 10 points between the factors. Both costs as well as benefits can get a high rating in this exercise. If e.g. a high weight is given to a cost factor then we assume that the actor has a huge disadvantage by this factor. Factors evaluated as neutral in Point 3 should not get any points in this step.
5. The weighting is used as input for two next actions:
    a. The benefits are ranked according to the weights. Following, the project team can decide to specify the first X (e.g. five, depending on time available) benefits more detailed using the benefits specification matrix shown in Figure 7.4 and described in Step 3 below.
    b. Both the positive and the negative weighted factors are translated into costs and benefits to be entered into each individual BC.

Step 3 – Benefit specification process:
The goal of this step is to conduct an in-depth discussion on each benefit, determining if and by what means the benefit can be achieved. In inter-organizational projects the benefits specification can happen in two ways: (i) each individual actor first separately specifies the benefits (Phase B.3) and afterwards shares his insights with the other actors (Phase B.4); or (ii) the benefit specification process is done collaboratively with all involved actors (Phase B.3). In both cases the benefits specification matrix shown in Figure 7.4 will iteratively be filled out for each in Step 2 identified benefit (addressing design specification P2 and P5). Although we propose to start at the left of the table there is no strict pre-defined order in the execution of the benefits specification process. This loosely coupling of method steps addresses design specification P4. Going through each step of the method will help creating a discussion and will thereby make the benefits more clear and precise. The method should be seen as a collection of blocks that can be specified if needed, but do not need to necessarily. Our method encourages the users to continuously update the benefits during the IS implementation process.

The following activities should happen during the deployment of the benefits specification matrix to get a complete picture for each benefit:

- Identify a benefit owner (who should be accountable) and a subject matter expert (who has the best knowledge of the process) (addressing design specification Pra2 and O4).
- Classify the change the benefit implies into one of the following categories:
    - Do new things (grow the business, transform the business).
    - Do things better, cheaper or faster.
    - Stop doing things.

  The requirement to place the benefits in a change category encourages discussing the benefits and helps in making it explicit.
- Determine the required business changes to achieve the benefit, using process, people, organizational and technology level changes as categories. The cost estimates made while analyzing the required business changes can be included here, but should definitely be included in the cost

calculation of the business case. By focusing on business change and not only IT change we address design specification P1 and P3.

- Determine the measure to evaluate the effect of the benefit using the following four categories. It is the idea that project participants try to make each benefit as specific as possible, thus try to reach a level of high measurability.
    - Observable: Assign e.g. a 1 if it is observable or a 0 if it is not.
    - Measurable: Assign a rating e.g. from 1 (low) to 5 (high) describing how much the benefit is going to change. This implies that the benefit can be measured somehow. But it is not possible to estimate by how much exactly the performance will improve once the changes are completed.
    - Quantifiable: This category is filled out if sufficient evidence exists to forecast how much improvement will result from the changes.
    - Financial: This category is filled out if financial numbers can be added to calculate the economic value of the benefit.

  When having difficulties in quantifying, the following actions can be performed to find data: Perform a pilot, use reference sites, use external benchmarking, modeling or simulation and try to find/use detailed evidence (internal) for assumptions. For non-quantifiable benefits, it will not be possible to go up to the highest levels. Determining the outcomes of the benefit and making them measurable will help making the benefit more explicit and clear. This step in the benefit management process addresses design specification T5 and O3.
- Determine the time span of achieving the benefit (design specification T7). By making the time span explicit, it will be known when the benefit is likely to occur. This makes the benefits, and therefore the BC, more explicit and realistic. The time span is also useful in determining the moment when goal achievements should be measured. When scheduling a big bang implementation the time span starts when the implementation is finished. In the case of an incremental implementation the time spam starts at the first delivery of a project result.
- Determine the probability of achieving the benefit (in percentages). The probability is the chance of achieving the effects stated for each benefit given a certain condition. Explicating the probability of a benefit makes it easier to compare different benefits of a project. Showing in which likelihood range the results of the BC can be found will make the BC more realistic.
- Determine the frequency of achieving the effects of the benefit in a certain time span. This makes it easier to compare different benefits within a project and it will help determining a realistic size of the expected effects. A distinction can be made between:
    - Benefits that are realized once, e.g. selling a department.
    - Benefits that reoccur periodically e.g. increased earnings once per quarter.

- Benefits that reoccur after a certain event happens, e.g. € saved at each plane takeoff.

Step 4 – Check if benefits match goals:
Once all benefits got specified (Step 3) the project participants should connect them to the goals defined in Step 0. This matching activity enlarges the chances that the project in the end will reach its initial goals. Connecting the benefits to the goals makes clear whether, and by which means (benefits), each goal can be achieved. If there are benefits that do not contribute to a goal, the initial goals from the problem investigation phase should be discussed and maybe extended. If there are goals, which are not supported by benefits, additional benefits might need to be identified (Step 2 and 3) or the relevance of the goal for the particular project needs to be re-examined.

Step 5 - Dependencies between the benefits:
The goal of this last BM deployment step in Phase B is to make sure that the benefits identified and specified before do not exclude each other. Dependencies between benefits can be determined by e.g. drawing a connection between related benefits and assigning the amount of coupling to them. For each negative dependency, the benefit that is most favorable for the goals (Step 0 and 4) will be chosen. The identification of dependencies is an important aspect during the benefits management process, which also got defined in our design specifications, namely T2.

PHASE D
Step 1 – Benefit tracking
Later on in the project, in Phase D once the system went live, the BM4IOP method can be used to track the realization of the planned benefits. A good elaboration of each benefit during the project preparation (Phase B) is the basis for successful tracking of the benefits after going live. The benefits tracking should happen at pre-specified points in time. These can e.g. be the times identified in the "time span" category of the benefits specification matrix during the benefits specification (Step 3). The realization of the benefits should be evaluated focusing on the experienced business changes, the final measurement of effects and the time in which the benefits were reached. We propose to use the benefits specification matrix (Figure 7.4) for tracking benefits, however, the details of this tracking activity are not discussed in this thesis.

If needed the value models constructed earlier should be updated as well in this phase of the project, as they are based on the benefits.

7.5.2 BM4IOP @ IT portfolio management

In this paragraph we will shortly elaborate on how the BM4IOP method can be of value in the context of portfolio management. Quite some research has been done on the topic of IT project portfolio selection and prioritization (Jeffery and Leliveld, 2004, Jiamthubthugsin and Sutivong, 2006, Bardhan et al., 2004, Daneva, 2011). We position our BM4IOP method in respect to this field.

The challenge of resource allocation and value maximization plays a crucial role in portfolio management, where an optimal set of projects has to be selected. Interdependencies between IT projects play a big role in this context. An IT infrastructure project might not create much value by itself, but might enable other projects or contribute to the value creation in another project. Another example concerns projects that are subdivided into different phases, with funding considered at each phase. Early phases might not appear attractive on their own, as they do not result in direct benefits, but they are essential and enable for later phases and thus facilitate the completion of the entire project (Bardhan et al., 2004).

If an organization decides to use BM4IOP as input during the BC development of all or a set of its projects, the users of BM4IOP will be able to better compare these projects with each other. Being able to compare the BCs of multiple projects with each other makes it easier for portfolio managers to decide on the most favorable portfolio composition. The identification of dependencies between benefits, described above in Step 5, can be extended to multiple projects. This implies that the portfolio manager analyses if the benefits of one project are linked to another project. For example it might be the case that the realization of benefits from Project A will have a positive effect on Project B, or that two projects are dependent on the same resources changes and the execution of both projects will make the change process for both projects less costly. Required resources are normally mentioned in the benefits specification matrix when the required business changes are specified, especially on the technology level.

Our method suggests portfolio managers analyze the interdependencies between different projects starting either from a resource point of view, or from a benefits point of view. Both ways can be supported by the BM4IOP method. Table 7.6 provides a simplified example of how dependencies between projects can be detected. Obviously not all projects are leading to the same benefits, and in order to achieve these benefits, different projects might make use of different resources. However, it is the overlap in resources between projects that we are interested in.

Resources can be scalable and non-scalable. Scalable resources include mainly technology and non-scalable resources include people. Composing a project portfolio with projects that make optimal use of a set of scalable resources will lead to cost reductions.

Table 7.6 Schematic portfolio management table

	Benefit X	Benefit Y	Benefit Z
Project A	Resource 1 Resource 2	Resource 1 Resource 3	Resource 1
Project B	Resource 1 Resource 5	Resource 4	
Project C	Resource 1	Resource 3	

Table 7.7 Example of portfolio management table

	Faster processing	Increased customer satisfaction	Increased customer base
Project A	• Planning software • Change Process X	• Planning software • Training	• Planning software
Project B	• Planning software • Change Process Y	• CMS	
Project C	• Planning software	• Training	

Table 7.6 gives a schema example of a portfolio management table. The table shows the interdependencies between the resources that are needed to reach the benefits of three different projects. Table 7.7 gives an example of the schema. In particular one can see that in Project A the resource "planning software" can be used to achieve three benefits: faster processing, increased customer satisfaction and increased customer base. As the planning software is a scalable resource it can also be used to achieve benefits for Project B and C. A similar analysis can be done for the other resources.

Other dimensions, such as risk alignment can be used to construct a portfolio. An analysis of the interdependencies helps portfolio managers to decide on an optimal project portfolio, based on a certain factor.

7.6 Discussion

This chapter presented our BM4IOP method, its concepts, techniques & tools and the deployment process. The BM4IOP method addresses design goal 1, design challenge 2 and research question 2.1 introduced in Chapter 1. We can observe several improvements when we compare our final product with our initial starting point, the benefits management method by Ward and Daniel (2006). These improvements address the design specifications listed at the end of Chapter 3 and 5. First, there is a difference in the level of complexity. The initial method uses a "Benefit Dependency Network" to structure the goals and benefits of a project. Some people perceive this network as being very complex. BM4IOP has replaced this technique by several smaller and more accessible steps, which make the entire process more structured and usable. We further observe a difference in the amount of guidance by the methods to the user. The BM4IOP method offers additional guidance that explains in each (sub) step; the reason to execute it and how to execute it. Further, BM4IOP provides improved support for the initial benefit identification, supported by a list of potential areas for benefit identification. Such a framework (Eckartz et al., 2009b) not only simplifies the benefit identification process but also increases the completeness of the identified benefits.

The method by Ward and Daniel (2006) provides a good basis for BM, nevertheless, several factors have been added throughout the redesign process: In addition to a benefit owner, a subject matter expert was added. Furthermore, a more specific time line, and the probability and frequency of occurrence of benefits have been added to the method. These factors encourage practitioners to have a

more detailed discussion about each benefit, thereby increasing the quality, measurability and completeness of the benefit.

BM4IOP further helps in finding and eliminating conflicting benefits, thereby improving the ability to realize the proposed benefits. Investigating the possibilities of GDSS, BM4IOP provides practitioners with the means to determine a prioritization of benefits, in the case that not all benefits can be achieved, due to limited resources. Further, we encourage users to specify the dependencies between benefits within one and between several projects, providing a link to portfolio management. BM4IOP is especially designed to open up the flexibility towards its users. We see it as a toolbox, with components that can be freely applied by practitioners, depending on their context and project-specific needs.

8

Validation of the BM4IOP Method

"All progress is precarious, and the solution of one problem brings us face to face with another problem."
(Martin Luther King, Jr.)

8.1 Introduction

In this chapter we will discuss the applicability of our benefits management for inter-organizational projects method (BM4IOP) in real life IS implementation projects. We searched for situations where we could test our method in practice. We selected projects where an IS was about to be implemented and the project owners were interested in investigating the potential benefits of the project. We embedded the deployment of our case studies in two Master-thesis projects, executed by Ruud Oude Maatman (2011) and Kelvin Divendal (2011). With the support of the Master students we deployed the BM4IOP method in five case studies within four multinationals. Three of the five projects were concerned with the implementation of an enterprise system (ES), each in a different company. The other two projects happened independently from each other in one company. One project was a mobile and social media integration project and the second project was a compulsory automation project obliged by a new legislation. The goals of the projects were quite different, reaching from inexpensive compliance with a new legislation over standardizing processes to creating awareness among and getting support from managers/users. All projects had a benefits management focus.

All five case studies were conducted using a participatory action research approach (Baskerville, 1997, Walter, 2009). This means that we as researchers were helping the actor in its field to use the techniques that we developed, using a workshop setting. We got involved at different stages of the project life cycle. Four projects were just started, and one project was close to going live. All projects were concerned with the project preparation and approval phase (Phase B). No system in our projects went already live during the timeframe that the study was conduced, so we could not validate the aspects of BM4IOP that are concerned with benefit tracking, described in Phase D in Chapter 7. Given the different nature of the projects, the process of deploying our BM4IOP method looked quite different in the five projects. We had the freedom to structure the entire benefits management (BM) project and thus deploy our entire method in three of the projects. However, the project managers of two projects only agreed to deploy parts of our method. In these two cases we could only validate the benefits

specification step of our method, but not the entire deployment process. In the remainder of this chapter we will, in each section, first discuss the three cases where we could deploy our entire method (A-C) and then the two projects where only parts of our method could be deployed (D and E).

In this chapter we will discuss the validation of the BM4IOP as it is deployed during the BC preparation phase (referred to as Phase B in Chapter 6 and 7 and specified in Table 7.5). Table 8.1 gives an overview of the six deployment steps and the techniques used in each step.

Table 8.1 The BM4IOP method: Deployment steps and techniques

BCD Phase	**BM4IOP deployment steps**	**Techniques that can be used to support the BM4IOP deployment**
Phase B.1	Step 0: Scope & goals	Company own tools
Phase B.3	Step 1: Identify benefits	Benefits identification matrix (Figure 7.2) Benefits ranking technique (Figure 7.3)
	Step 2: Rank benefits	Benefits ranking technique
	Step 3: Specify benefits	Benefits specification matrix (Figure 7.4)
	Step 4: Match benefits & goals	
	Step 5: Benefit dependencies	

8.2 Research method

We conducted five case studies to validate the BM4IOP method in a real life context. This activity is part of the solution validation step in the design science approach. All case studies are executed using a participatory action research (PAR) approach, described in Section 2.2.7. PAR is intended to have some real world effects and is guided by a research topic that emerges from the community of interest. The real world effect of PAR is very prominent in our five case studies, as they are all executed in real life projects. The project owners agreed to deploy the BM4IOP method for the benefits management activities within their projects. We set out to answer the following research question:

Is the application of the BM4IOP method in real life projects effective and useful?

With respect to effectiveness we will analyze if the application of the BM4IOP method helps to reach the desired effect, in this case a benefit specification that can be used as input for the business case. With respect to usefulness we analyze if the method provides value to the stakeholders, in the sense that it is better than other methods. The analysis of effectiveness and usefulness is based upon observations and evaluations of practitioners.

Role of the researcher

The role of the researcher of this study is threefold (Avison et al., 1999): a method developer role, a practical facilitating role and an observing research role. The

method developer role was to develop the BM4IOP method before the start of the project in such a way that it was deployable in the case studies. After the case study the author of this thesis, as method developer, took the lessons learned into account and improved the method accordingly. The practical role was to implement BM4IOP in such a way that a mutually agreeable outcome for all participants was produced. It was necessary to adopt different roles at various stages of the process, including those of planner, catalyst, observer, reporter, teacher and facilitator. However, the main practical role was to support participants until the point where they could take responsibility over the process themselves and carry on when the researcher leaves. This role was taken over by the Master-students. The role of the researcher was to evaluate the process, participants' feedback and the participants' attitude and knowledge. In each individual case a similar pattern considering the role(s) of the researcher(s) can be observed.

At the beginning of the case studies a presentation was given to explain the process steps and give examples for clarification. During the deployment process the researcher gave explanation when asked, but mainly stuck to its role of facilitator and observer. The facilitator documented the participants' suggestions on e.g. a whiteboard, which noticeably have him a different role than the participants. The participants identified benefits and discussed them. In Case D and E the researcher added *benefits realization progress* to the meeting agenda of the already existing project progress review meetings and observed the process without active involvement in the meeting.

Survey & unstructured interviews

After the last workshop (in each individual case), a survey and unstructured interviews were conducted with the participants to evaluate the benefits management process and outcome. During the survey we asked questions about:

- The time spent on the project, and if the participants perceived this time well spent.
- The minimum project budget threshold that should be exceeded for the method to be viable.
- If the BM4IOP results in more feasible benefits.
- If the workshops were a good setting to deploy the BM4IOP method.
- If they would use the BM4IOP method in future projects.

The unstructured interviews helped us to better interpret the survey answers. Per case we surveyed all present project participants. Table 8.2 shows the number of participants per case an their roles. We distinguish between people with an IT and a business background. In case B not all participants were present during all workshops. The cases were executed simultaneously, thus lessons learned from one case were not incorporated into the next case.

Table 8.2 Number of participants per case and their roles

	Total # Participants	Business	IT
Case A	6	5	1
Case B	7-9	7	2
Case C	21	5	16
Case D	5	3	2
Case E	5	3	2

The remainder of this chapter is organized as follows. We present for each case:

- The project context (8.3);
- The process of deploying the BM4IOP method (8.4);
- The outcome of deploying the BM4IOP method and its evaluation (8.5);

We will finish the chapter with a cross case analysis (8.6) and some conclusions (8.7).

8.3 Description of the project context of the five cases

8.3.1 Case A

Company A is a large audit and consulting firm. Company A is planning to implement a SAP system to comply with the demands of the Europe wide head quarter. While implementing this system, Company A, is free to choose its own planning module. The goal of the project is to (i) reduce problems in planning projects that involve multiple business units (BUs) and to (ii) increase efficiency of the planning. Company A wants to use the BM4IOP method in this project to consolidate the knowledge that is required to start and manage the project and to create a more specific view of the benefits of the project. Before the start of the project, only the high level benefits of the project were known, no knowledge on how to achieve the benefits was present. There is a good match between the intentions of Company A and the ideas of the BM4IOP method. This implies deploying the method in this case will be a good validation to see if the method can support Company A in making their project benefits more specific and feasible.

8.3.2 Case B

Company B is a global supplier of office products. It already has performed SAP rollouts in several European countries. For the next roll out in country X Company B wants to know whether a new roll out is viable and what the benefits are of performing such a roll out. Company B further wants to develop a BC that can be used to persuade local management to cooperate in the project. The overall goal of the project is to standardize processes around Europe (especially in country X) and to make their current business processes more efficient. For the new SAP roll out the benefits are (partially) known on a company wide level, however, for country X the benefits are still unclear.

8.3.3 Case C

Company C is a global provider of power products, systems and services. Throughout the world (more than 25 locations) they have currently three different SAP entities (v4.7) in place. Company C would like to consolidate the different SAP entities to one central SAP entity. This consolidated SAP entity should run on SAP v6. Besides aiming for one global and upgraded SAP entity, Company Cs overall project goal is harmonize their business processes throughout the world. For the project at hand Company C would like to use BM4IOP (i) to get a better view on the benefits the project offers, and (ii) to increase stakeholder commitment. So far, Company C has identified three main benefits: having one source of data, efficiency improvements in business processes and an increased technical flexibility of the system. However, in this project they want to find additional, specific and feasible benefits.

8.3.4 Case D

Case D is a project at one of the world's largest beer brewing companies. Project D is about the implementation of a computerized system that monitors the movement of goods within the European Union (EU) to prevent tax fraud. It will replace the paper documents that are currently used for this purpose. Company D has to comply with the regulations of the EU and thus implement the new IS. For this reason the project we were involved in was started. The goal of the project was to (i) comply with the rules as efficient as possible and (ii) get acceptance for the system within the responsible departments within Company D. When we entered the organization the project preparation phase was about to be finished, but we could still deploy some parts of our BM4IOP to support the BCD process and the achievements of the goals.

8.3.5 Case E

Case E is a project at the same organization as Case D. The project is about digitalization and online interaction with customers. The goal of the project is to (i) integrate all online propositions into one coherent message and (ii) extend current channels towards social media integration and mobile applications. When we started our case study, the project was just started in the commerce department. In order to assess the potential benefits of the project, the project managers decided to make use of some parts of the BM4IOP method.

Table 8.3 provides an overview of the project context for all five cases. We consolidated the information on company branch, the goals of the project and the moment when we entered the project.

Table 8.3 Overview of the project context, Case A – E

	Branch	Project goal	When we entered the project
Case A	Audit and consulting firm	• Reduce problems in planning and increase efficiency in planning using SAP	The project had just started and only the high level benefits of the project were known.
Case B	Supplier of office products	• Assess feasibility of rolling out SAP in country X	The project had just started only the overall goal of the project was known.
Case C	Provider of power products, systems and services	• Consolidate different SAP entities to one central SAP entity • Get commitment from stakeholders	The project had just started.
Case D	Brewing business	• Implementation of a computerized system that monitors the movement of goods within the EU	The project preparation phase was about to be finished.
Case E	Brewing business	• Integrate all online propositions into one coherent message and • Extend current channels towards social media integration and mobile applications	The project had just started in the commerce department.

8.4 Deploying the BM4IOP method

Table 8.4 Deployment process of BM4IOP method

	Steps executed according to BM4IOP	Techniques used
Case A	• All = Step 0-5	• Benefit identification matrix • Benefits ranking technique • Benefits specification matrix
Case B	• All = Step 0-5	• Benefit identification matrix • Benefits ranking technique • Benefits specification matrix
Case C	• All = Step 0-5	• Benefit identification matrix • Benefits specification matrix
Case D	• Step 1 • Step 3 with some adjustments	• BDN • Benefits specification matrix
Case E	• Step 1 • Step 3 with some adjustments	• BDN • Benefits specification matrix

Table 8.4 provides an overview of which of the five BM4IOP method steps were executed in each case study and which techniques were used to support the process.

In Case A, B and C we deployed all steps of the BM4IOP using the following set-up: one personal interview with the participants, followed by two workshops. During the individual interviews, we explained the process and the BM4IOP and its goals to the participants. This ensured that the participants understand the method with each techniques. Workshop 1 was used to deploy Step 1-3 of the BM4IOP method. During workshop 2, the participants reviewed the benefits specification (Step 3) and then continued the benefits management process with Step 4 and 5. In between the two workshops participants were asked to review their work and to think of improvements. In all five case studies experts with the following six roles were present during each of the workshops: Subject matter expert, IT-expert, ES expert, financial expert, project manager and benefit owners. Sometimes, more than one expert filled out a role, as one can see in Table 8.2.

In Case D and E we only deployed Step 1, the identification of benefits and Step 3 the specification of benefits. The workshops were set-up differently for both cases. A role description of the involved experts and further details about the deployment process can be found in Section 8.4.4 and 8.4.5.

8.4.1 Case A

In total six people participated in Project A. Five of them were business-managers and one IT manager. Two workshops, each lasting three hours were planned to execute the benefits management process. The workshops happened within an interval of one week. After all participants were familiar with the method and its deployment process, **Workshop 1** was started. The first step (Step 0) was to identify the goals of the project. A set of photos was used to help the participants to find the best description for the project goals. The photos showed e.g. a

mountain, an animal, or a group of people. The photos were meant to assist the people to find an image that represents their goal. Working with the photos to identify the project goals went smoothly and resulted in a clear list of goals for the project. The discussion of the goals showed that the participants started the workshop with a clear understanding of the project in mind. All participants at that time had the same interpretation of the goals of the project.

Two BM4IOP techniques and tools supported the benefits identification process (Step 1).

- The benefits identification matrix (Chapter 7, Figure 7.2, page 122) provided the users with examples of potential benefits;
- The GDSS Spilter (Chapter 7, Figure 7.3. page 125) was used to structure the brainstorming process.

The brainstorming went well and resulted in a total of 38 identified benefits. As a pre-step to the prioritization of the benefits, the group collaboratively categorized all benefits using the two dimensions size and importance.

Following, the participants started Step 2 and used the Spilter tool again, this time to prioritize all benefits into the "high size, high importance" category. Spilter proved to be a valuable tool to support the prioritizing. The participants needed 10 minutes to agree on the top five benefits that have the highest priority for the project and therefore should be specified in more detail in the next steps.

The specification of each of the five agreed upon benefits (Step 3) was executed by filling out the benefit specification matrix (Chapter 7, Figure 7.4, page 127). For this purpose the table was printed on A1 posters that were attached to the walls. The participants were asked to start filling out the template in groups of two. This process created a large amount of discussion and input on each of the benefits. However, the duration of the 1st workshop was too short to grant the participants the opportunity to deeply engage on each benefit. When discussing the elaborated benefits in the group, it became clear that the participants had difficulties understanding the "measurement of effect" aspect: e.g. measurement techniques were placed in the quantifiable section, instead of in the measurable section. In order to assist the participants during the **2nd workshop** to correctly specify the benefits using the template accordingly, they received a manual on how to use the method and an exemplary filled out benefit template. While improving and finishing the benefits specification, the participants found that their original benefit definitions were not always correct or lacked specificity. After revising the benefit definition participants were able to enter more aspects of each benefit.

Once sufficiently specified the group collaboratively connected the benefits to the project goals (Step 4). The result showed that all benefits were connected to at least one of the goals and that all goals were addressed by at least one benefit.

Last, the group collaboratively determined the interdependencies between the benefits (Step 5). After a slow start, the group identified several positive interdependencies and no negative interdependencies between the benefits. Based on the interdependencies the group reviewed the "effect" aspect of each of the connected benefits to determine when a specific result could be achieved. This resulted in several changes of benefit effects and removal of duplicate benefit effects. For example, "better planning" was listed as an effect of the benefit:

"improved data quality" *and* it was listed as an individual benefit. Therewith, the interdependency activity provided an unexpected but valuable source to improve the outcome. We could observe that the project participants had a learning curve from workshop 1 to workshop 2: The participants did not only become more familiar with the method but also got increasingly involved with the project.

8.4.2 Case B

Nine stakeholders were involved in the project to assess the feasibility of the SAP role out in country X. Two workshops, the first lasting three hours, the second lasting 4,5 hours were executed to deploy the benefits management process. The workshops happened within an interval of one month. Seven people from the business departments and two IT specialists took part in the workshops. After the introductory interviews, **workshop 1** was started. The participants were using a set of photos to identify the project goals (Step 0). This activity resulted in a healthy discussion and set of goals. It became noticeable that the project specifics were unclear to some participants as some of the defined goals were to be achieved on European level, while others were on national level.

Spilter was used to guide the brainstorming process in Step 1 to identify the benefits of the project. This activity went very well and resulted in 52 identified benefits. As in Case A the group collaboratively categorized all benefits using the two dimensions size and importance. Reviewing all results in the "high size, high importance" category resulted in a discussion of the benefit definitions used.

The group decided to group several benefits before entering the prioritization (Step 2). The prioritization again supported by Spilter, resulted in a clear ranking for the first four benefits. However, three benefits were ranked fifth. After renaming and regrouping the fifth benefit could be selected. During the break a new participant (expert in Sales) entered the workshop, and identified an additional sixth benefit that should be specified in the following steps. A sales representative was missing until that point but is important for the business case.

The specification of each of the six identified benefits (Step 3) was executed by filling out the benefit specification matrix (Chapter 7, Figure 7.4) printed on A1 posters that were attached to the walls. The participants experienced difficulties in entering all specific information. They discovered that their initial benefits were not defined well enough yet and started a discussion again on these definitions. At the end of the workshop the group noticed that they lack certain specific knowledge to complete the benefits specification, so additional participants were invited for the second workshop. After the workshop the project owner asked the participants to take responsibility for a benefit, find the shortcomings and improve it, by finding the information required to finish the specification process before the start of the 2nd workshop.

The planning of the workshop was adapted by increasing the length by 1,5 hours to improve the quality of the outcome. At the start of **workshop 2** the case owner requested the participants to share the new insights on the benefits they prepared. This brought up a strong and valuable discussion about each of the benefits and the general scope of the project, resulting in better and shared understanding of the benefits. The participants then started completing the benefits specification in pairs. Based on the results of the benefits templates, the

participants engaged a new group discussion around two topics: general planning of the project and the immediacy of reaching the benefit. Even though the first topic was not directly contributing to the deployment of the BM4IOP method, the participants carried on with it to get additional project insights. During the discussion of the second topic, which was directly related to benefits management, the participants found that not all benefits would be reached immediately by this project. Some of the benefits were found to be enabling benefits, that either directly enable starting a subsequent project ("hard enabler") or help reaching the goal of another project ("soft enabler"). Assigning benefits an "enabling" status helped the participants to clarify the scope of the project. For the hard benefits, high-level estimates of the expected results were defined.

Matching the benefits with the goals (Step 4) showed that one goal had to be reformulated, as it was a precondition of the project rather than a goal itself.

Determining the interdependence between the benefits (Step 5) got off with a slow start, but resulted in transferring one "measurement of effect" from the originating benefits to the receiving benefit.

8.4.3 Case C

This project involved 21 participants from several different countries, mainly IT professionals (16). We could execute our case study during a two-day meeting the mother company had planned to discuss the SAP update and consolidation with representatives from all over the world. As it was very difficult to gather all participants for a second meeting, we executed the workshops on two consecutive days. Each workshop lasted 3 – 3½ hours.

The large amount of participants forced us to make some small adaptions to the method deployment process. Instead of having a personal interview with each participant before the first workshop, only a selection of experts received an in-depth introduction into the method. All other project participants received an introduction into the process and the method at the start of **workshop 1**.

Determining the goals for the project got off with a quick start using the set of pictures (Step 0). However, when consolidating the goals with the entire group, the process stopped after two goals were noted on the whiteboard. It took the group some time to review the results before they engaged into an intense discussion from which in total six goals were defined. Looking at the goals from an outsider's perspective the goals were described on a too abstract level to be reached by the project. The goals lacking specificity, showed that the group was facing difficulties to determine what the project was actually about and that little knowledge was present on the details of the project.

Given the limitations of available IT-equipment we could not use the Spilter GDSS to support the identification of benefits (Step 1). Instead four small groups were formed in which the participants performed the brainstorming. Following, 38 benefits were identified.

Prioritizing the benefits (Step 2) was a challenge for the participants. To arrive at a maximum of five benefits the group had to consolidate several benefits.

Specifying the five benefits (Step 3) using the benefits management template was rather difficult as the definitions of the benefits were not specific enough. At

the end of workshop 1, the different groups had identified very few and very abstract aspects for each benefit.

Given the outcome of workshop 1, the initial workshop setup was adapted and most of the time of **workshop 2** was devoted to completing the benefits specification. Further, the setup of specifying the benefits was changed to increase the time for in depth discussion of the benefits. Originally all groups would rotate on the five selected benefits, in the new setup one group was made responsible for one benefit. The groups were asked to start their work with improving the definition of the benefit. The aspects of the redefined benefits were easier for the group to "answer" and resulting all groups generated a large amount of new and improved output. To maintain the synergy between the groups, each group presented their final specified benefit to the other groups, which were asked to provide feedback. Presenting the completed benefits to the other groups resulted in a healthy discussion on the benefit aspects, which helped to improve the benefits further.

Following, the participants were again split into four groups to connect the benefits to the goals (Step 4). The consolidated results showed that each benefit was connected to several other goals, and likewise, which showed that the project would be able to achieve each goal. Looking at the benefits, the group indicated that no conflicting benefit dependencies (Step 5) were present.

8.4.4 Case D

The first step in the deployment of the method was to plan a workshop to identify and plan the benefits of the project. The following participants were invited for the workshop: the principal of the project, a business project manager, a project manager IT, a business IT manger and a controller. Getting the necessary people to participate was a rather challenging task, as the principal of the project did not see the added value of deploying benefits management for a compulsory project. After some discussion the principal agreed to cooperate in the project and attended the workshop. During the workshop the BDN (Ward and Daniel, 2006) was used to identify benefits and to create an overview between IT enablers and planned benefits (Step 1 of BM4IOP). Afterwards our benefits specification matrix (Chapter 7, Figure 7.4) was deployed to specify each of the identified benefits (Step 3 of BM4IOP). During the workshop it turned out that, due to the *must do* nature of the project, the initially planned progress review meeting and benefit realization workshop had no added value. This observation confirms our suggestion that the BCD process needs to be adapted based on the drivers behind the project. In this case the project was mandatory and therefore did not require the comparison of different solution options (besides the null option) or a very extensive analysis of the benefits.

8.4.5 Case E

For the deployment of the project, two benefits management workshops were organized and one regular project progress meeting between the workshops was extended with benefits management aspects. In the first workshop project stakeholders could get acquainted with the benefits management method, identify benefits and plan the benefits delivery. In the project progress meeting the

realization of benefits was discussed. In the second workshop, the benefits realization and the benefits management method in general were evaluated. All workshops and meetings were executed during the project preparation phase. The time between workshop 1 and the review meeting was roughly one month, the same holds for the time between the review meeting and workshop 2. The total time span of the pilot was roughly two months. The following participants were invited to participate in our case study: two principals from different departments within the organization, one project manager IT, one business IT manager and one controller.

When starting the deployment of the BM4IOP method, the participants had first some difficulties with understanding the definitions and distinctions of a business objective, benefit and enabling activity.

Following, the workshop facilitator exemplified the definitions again to make sure that all participants use the same definitions in order to keep the results of all workshops and projects comparable. The participants used the BDN to execute Step 1, the identification of benefits. The identified benefits were not prioritized, but all of them were specified in the following step (Step 3 of BM4IOP) using the benefits specification matrix. The participants did not have any difficulties using the BM4IOP method to specify the benefits, until they reached the point where benefits needed to be quantified. The participants had some first ideas on the quantification, but no specific measurements could be identified. The workshop ended with giving the benefits owners the homework to identify benefit measures. This task is successfully completed before the progress review meeting. After one month, the project participants were asked to report on the project progress during the progress review meeting.

Parts of the project went live before our final workshop, thus the last workshop was used to review the benefit realization results and evaluate the project, also looking for new opportunities resulting from the project.

8.5 Outcomes of deploying the method

In this section we will elaborate on the outcomes of deploying the BM4IOP method in each of the five case studies. Table 8.5 gives an overview of the results, showing the number of goals and benefits that got identified and specified. For Case D and E our method was not used in the first steps of the process, so we cannot report on any results from these steps. For these two cases we only discuss the insights gained during the benefits specification phase.

Table 8.5 Summary of the outcomes when deploying the BM4IOP method

	# of identified goals	# of identified benefits	# of fully specified benefits	# benefits specified financially
Case A	5	38	5	1
Case B	3	52	6	1
Case C	6	38	5	1
Case D	-	-	5	1
Case E	-	-	5	2

This section will further present the evaluation of the project participants and owners as well as our own observations, as facilitator and observer during the deployment process. We start with the feedback by the project participants, which we describe in a consolidated way jointly for all cases. Afterwards, we will describe the insights from the case owners and our own observations for each case study.

The project participants agreed that the workshops were a suitable format to deploy the BM4IOP method. Most participants would use the method for a similar project in the future. They were especially satisfied that the method results in the identification of additional benefits and that the BM4IOP method helps the participants to make these benefits specific, feasible and relevant. All participants agreed that the overall project results would be better when the benefits are managed successfully.

8.5.1 Case A

The benefits management process resulted in specific and feasible benefit. Five main project goals got identified. The benefit identification activity resulted in 38 benefits of which five were selected of being the most important and having the biggest impact. These five benefits were successfully specified. Based on the discussions and agreements made during the benefits specification process, the benefits manageability increased. Deploying the BM4IOP method in the way described in Section 8.4.1 evoked a lot of discussion between the participants resulting in new insights into the project.

The project owner valued the increased insights in the project and that the stakeholders in the project had the opportunity to bond with each other. He expects that the five specified benefits will help him to manage the project, during the actual implementation phase. With respect to the quality of the outcome, the case owner indicated that after workshop 1 the outcome was too “high level” and he found it difficult to see where the project was going. However, he was satisfied with the quality after workshop 2. The progress made during workshop 2 endorses the fact that the benefit quality and specificity improved during workshop 2. The case owner indicated that the process was smooth and successful: a high amount of energy was created and each participant was able to contribute to the discussions, thereby increasing the quality of the result.

From the facilitator’s point of view, the outcome of the evaluation of the planning project was of good quality. The aspects entered in the benefit templates

were well defined and to the point. The benefits were defined on a level that helped to pinpoint what activities should be performed next to reach one of the specified outcome measures. The weakest point of the benefits as they were specified was the "effect" category, describing the actual expected results of the benefits. Even though some measurements were introduced, future work is required to define the result financial terms, as currently only one benefit is expressed in Euros. The process to arrive at the outcome was smooth and fast. The Spilter tool helped to ease the BM4IOP deployment process.

8.5.2 Case B

The two workshops resulted in the identification of three project goals and 52 benefits. Of which six could be specified in detail. The following qualitative outcomes could be observed:

- More specific benefits.
- More feasible benefits.
- Additional insights in the project.
- Better definition of the scope of the project.
- Increased commitment by the project participants.
- Moderately to high quality of the benefits specifications.
- Division of benefits into immediate and enabling benefits.

When evaluating the process, the case owner indicated a significant improvement in the quality of the outcomes comparing the 1st and 2nd workshop. He indicated that workshop 1 generated a good amount of benefits and a healthy discussion, but the benefits were too high level to actually be used in national BC. The discussions between the workshops have improved the quality of the preparation for workshop 2, more information was available and aspects could be made more specific. During workshop 2 this could be noted by the high amount of in-depth discussion, leading to increased projects insights and improved results. The case owner indicated he was happy with the quality of the outcome, even though the benefits specification was not completely finished, it showed him how to proceed with the BC. Finally, the case owner valued the identification of enabling benefits, as they helped him with creating the (non-financial) BC for higher management.

From a facilitator's point of view the result at Company B was at moderate quality after workshop 1 and of good quality after workshop 2. The individual preparations for workshop 2 have proven to be a valuable addition to the deployment process. The intermediate discussions also showed that the commitment of Company B to the project and the deployment of the BM4IOP method are very high. The method deployment process went smooth, resulting in high quality specifications of the benefits. Even though the participants were sometimes hard to keep on track during the second workshop, the commitment during the process showed that the participants were motivated to execute the project and continue using the BM4IOP method.

8.5.3 Case C

The deployment of the adapted BM4IOP method resulted in the definition of six goals and the identification of 38 benefits of which five go specified in more detail.

In comparison with the other cases, the outcome of workshop 1 was less specific. Big improvements in the specification of the benefits could be achieved during the second workshop, resulting in five benefits of moderate quality. In the end, the effect of one benefit could even be expressed in financial terms. This is a big improvement to the first workshop. The deployment process further resulted in additional input for the project and increased commitment of the project participants. Last but not least the project resulted in a constructive discussion of the project scope.

Even though the outcomes after workshop 1 were very high-level, the project owner enjoyed and valued the process. The outcome from workshop 2 increased his satisfaction, and more importantly, it also provided input, which could be used for the remainder of the project. We think that the increased quality of the outcome after workshop 2 is staggering when taking into account that the actual preparation time between the workshops was only one day. Considering the end result, the case owner values the benefits as more specific and feasible, additionally they helped him to create new insights in the project. Next to the benefits outcome of deploying the BM4IOP method, the case owner greatly valued the increased project commitment of the participants.

From the facilitators point of view the outcome after workshop 1 was too high level to actually work with in the BM4IOP method. Fortunately the method showed the lack of specificity by forcing the participants to redefine the benefit. From the discussion of the deployment process in section 8.4.3 we can see that the adapted method deployment setup turned out to be effective. The outcome after workshop 2 improved greatly, but still is of moderate quality. The benefits serve more as a starting point for building the benefits side of the BC, than being the benefits side itself. Some work is needed to process the current input of the templates to the actual specific content, which can be directly entered in a BC.

Most of the groups identified a lack of business knowledge present in their group to be able to fully describe all aspects of the benefit.

8.5.4 Case D

The results of the benefits management workshop did not bring any surprises. In total five benefits were specified, but no unexpected benefits or activities were identified. The most important benefit from complying with the new regulation was to be able to continue the exporting business. Sustainability, through less printing of documents was another benefit that got identified, however, the participants had problems quantifying the amount of sustainability or attaching financial figures to it. The participants decided not to have a follow-up workshop in which such calculations could have been made, e.g. based on templates.

The project participants did not have the feeling that extensive benefits management, such as it is supported by BM4IOP, adds much value for compulsory projects. They perceive the method as too detailed for such a project. However, they admit that taking a moment to identify additional benefits also adds value for compulsory projects.

8.5.5 Case E

After the terms used in the BM4IOP method had been clarified, workshop 1 was run successfully resulting in the in-depth specification of five benefits. The still missing quantification of the benefits got later completed with the necessary measurements. Given that the project was still in the beginning of its life cycle no benefits were identified during the progress review meeting. However, the participants applied some minor changes and additions to the BDN and the specification of the benefits. For example an IT enabler was added to the business change.

Even though some parts of the project already went live, the second workshop was too early to track the realization of some first benefits. Thus, the focus in the second workshop was on the evaluation of the process and the method.

The participants agreed that the thinking process evoked by the BM4IOP method helped them in setting directions for the project. However, they would welcome some more guidance on what can be done with the results of the workshops. Measuring benefits and steering on benefit realization is one thing, actually using it in everyday project life is another.

The principal notices that at first he needed some time to figure out how benefits management works and what his contribution could be in the first workshop. But that become clear in the course of the first workshop.

The workshop participants evaluated the benefits specification matrix that can be used to support Step 3, positively. They value that the template gives a clear frame for the discussion of each benefit. Participants also value that they are able to see their input for one element in context to the other elements, which helps them to prevent and solve inconsistencies between the benefits. Especially seeing the specification of the elements “time span”, “probability” and “frequency” next to the “measurement of effect” element was perceived valuable. This combination makes the measurement of effect specific and time bound.

The participants of this case study also used the BDN (Ward and Daniel, 2006) to identify benefits and specify the dependencies between them. Although we, in our BM4IOP method propose to replace this step with the benefits specification template, participants did not want to miss this step. They especially valued that the BDN gives a quick overview of the benefits and their interrelatedness with objectives, business changes and IT enablers. However, they admitted that the BDN might be too complex for external communication. Concluding we can say that the participants in Case E valued our BM4IOP method, however, they do not want to see it as replacement for the BDN.

8.6 Cross-case analysis

In this section we will perform a cross-case analysis about (i) the context in which the method is supposed to be valuable, (ii) the method deployment process and (iii) the outcome of the method.

Context & resource requirements

There is substantial evidence that the BM4IOP method performs better in non-compulsory projects. Based on the opinion of the participants from the five case studies we conclude that using the BM4IOP method for IS projects becomes viable for projects with a minimum budget of around € 500.000. The case study participants discussed that the BM4IOP method can best be deployed in projects that have between five and ten participants. However, many other factors are expected to influence the successful deployment of the BM4IOP method. Case study C with 21 participants was very challenging to manage and the BM4IOP method needed some adjustments to be used efficiently. All participants should have certain knowledge about the project and the involved processes. Both subject matter experts as well as decision makers should be included in the project team.

As it is usually the case when deploying a method, a facilitator is very valuable in guiding the participants through the benefits management process. Thorough knowledge of the method as well as good communication and leadership skills are require prerequisites for the facilitator.

The participants indicate that the time required to deploy the method is time well spent and that they would use the BM4IOP method for future BCD.

The fact that we successfully deployed the method in four different branches shows that our method can be used branch independently.

Method deployment process

As already described in Table 8.4 we could not deploy the entire method in all five cases. In Case A and B the entire method was deployed without major adaptions. The benefits specification technique was deployed successfully in all five cases. As the online benefits ranking technique was not suitable for such a large group as it was present in Case C, we deployed the principles of the method using pen and paper.

Analyzing the process we see that the outcomes after the 1st and the 2nd workshop differ greatly. This does not come as a surprise as the intention behind the two workshops is different: workshop 1 should collect benefits and insights that should be converged in workshop 2. All case owners evaluated the outcomes of workshop 1 too high level, which made it difficult for them to imagine the final outcome. On the other hand, they evaluated the outcomes of workshop 2 as being specific and feasible. These results let us conclude that the workshop participants experienced a learning curve, both with respect to our method as well as the general project. When working with the same method for a longer period of time, it is logically to assume that the participants get more advanced in using the method, which lead to better project results. The other learning effect is related to an increased understanding of the project that is achieved during the second workshop. At this point in time, participants already got many new insights, which again led to new insights that helped them to describe the benefits on a very detailed level.

Outcome

During the workshops we have seen the participants having difficulties specifying the benefits when the benefit itself is ill defined. This means that the BM4IOP

method forces the participants to revise the benefit definition. Which results in an improved definition and understanding of the benefit. Thus, using the method starts by improving the quality of the benefit definition.

Looking at the overall outcome we can conclude that the BM4IOP method has helped each of the companies identifying additional benefits and making them more specific, feasible and relevant. The method also creates new insights into the project and improves the manageability of each of the benefits. Based on the comments from the participants we can conclude that the better the benefits got specified, the higher the satisfaction of the stakeholders with the final quality of the benefits. We further observe that an increase in knowledge about the project positively influences the quality of the outcome.

We find that the BM4IOP method is less suitable for compulsory projects, such as Case D. This can be explained by the fact that participants do not see the value of identifying and specifying benefits of a project that they anyway cannot influence much as its implementation scope is determined by an external entity. The method is especially successful when the project participants feel that they can still influence the implementation process and outcome.

Last but not least, the method brings together multiple viewpoints, which increases the commitment of the stakeholders and leads to better understanding of the project. It further increases the chance of successfully reaching the project goals.

8.7 Conclusion

Based on our discussion of the findings from our five case studies, we finalize this chapter with drawing conclusions on each of the steps of our BM4IOP method. We further provide some concluding remarks on the context in which the method should/ should not be used. Based on these insights we can answer our research question positively: the BM4IOP method is found to be effective and useful in real life projects.

We will now consolidate the findings on the usability (effectiveness) of each method step:

Step 0: Determining the goals of the project with all participants, let to a shared understanding of the project to be executed. Pictures were used in three cases to inspire the participants to think out of the box and come up with new project goals. This method has shown to work successfully.

Step 1: Taking the time to brainstorm about potential benefits in all five cases lead to the identification of additional benefits. In all projects, except Case D, a tenfold of the benefits described by the case owners upfront could be identified.

Step 2: Spilter, a GDSS, was used to ease the benefits identification and selection process. Using this GDSS has improved the process and quality of categorizing the benefits on the dimension importance and size. However, the most substantial improvement by the GDSS was on selecting the benefits to be specified in the project. Comparing Case A and B with the other projects we see that the selection process in these two cases speed up and the prioritization resulted in better-consolidated benefits. However, Spilter does have its own flaws. In order to be applicable for large groups of participants, a GDSS needs to be able

to automatically collect and cluster the benefits information that is provided as input. It further should be able to automatically calculate results based on the input from different questions. With the current system, these points still require some manual work.

Step 3: One of the most important activities of the BM4IOP method is the specification of the detailed benefits aspects. Requiring participants to enter aspects in the template lead in all workshops to valuable discussion. Even when no new information could be entered into the benefit template, the discussion still helped the participants to create additional insights in the project. We noted that in order to use the template successfully, a manual with a detailed description including an example of a filled out template was useful.

Step 4: Connecting the benefits to the goals provided an overview that was used to check whether the goals match with the benefit and was valuable for the project. By drawing these connections, our method ensures that all previously identified goals are actually reached when executing the new project plan that is based on reaching the specified benefits.

Step 5: Determining the interdependence between the benefits resulted in valuable information. Based on the identified dependencies, most projects were able to improve the benefits by revising their effects.

Besides being able to successful support the deployment of the five steps described above, the BM4IOP method was especially valued by the participant for providing a structure to deploy the process and guide the discussion. The method encourages knowledge sharing by involving participants with different background and viewpoints in the project.

We expect that the method is most valuable in projects that have a non-compulsory character as the method then still can make a difference on the decision to implement the system. Based on the opinion of the participants from the five case studies we conclude that using the BM4IOP method for IS projects becomes viable for projects with a minimum budget of around € 500.000.

9

Structured Information Disclosure for Inter-organizational Projects – The SID4IOP Method

"Let us move from the era of confrontation to the era of negotiation."
(Richard M. Nixon)

9.1 Introduction

Based on the experience from the case study described in Chapter 4 at the port of Rotterdam we identified the need to extend our business case development (BCD) method to support decision-making in inter-organizational networks. After consulting the literature we found that the following factors have an influence on the BCD process: consensus of goals, cultural and semantic similarities, willingness of the actor to share information (Chapter 4, Figure 4.3). Trust and hidden profiles are two additional factors that are found to influence the decision-making process in inter-organizational projects. The discussion in Chapter 4 shows that the factors can either support or hinder the BCD process.

A method to structure the process is necessary, whenever there are no fixed rules or procedures to deal with the opposing preferences of multiple actors (Thompson, 1990). This is the situation when a shared BC is developed in an inter-organizational network. The existing literature identifies four main ways of dealing with opposing preferences: negotiation, mediation, struggle and arbitration (Carnevale and Pruitt, 1992). Negotiation and mediation have been deemed the most successful as they are less costly and friendlier than struggle. They further make it easier to find an acceptable solution for all actors and will be used in our solution.

Empirical research has shown that group decision support systems (GDSS) fit well for highly complex problems with a lack of structure (DeSanctis and Gallupe, 1987), like it is the case for BCD in inter-organizational projects. GDSS can improve decision quality and time efficiency in negotiation processes (DeSanctis et al., 2008). GDSS are less suitable for group meetings that involve "one-to-many" communications.

In this chapter we will design SID4IOP, a method that provides support during the BCD process and its accompanying decision making and negotiation process. The method takes the factors that influence the BCD process, discussed above and in Chapter 4, into account. In order to improve the possibilities for information sharing we are designing a method where information is only shared with a GDSS. This system gives, based on the decisions of a facilitator, some information back to each participant. SID4IOP stands for Structured Information Disclosure for Inter-Organizational Projects.

The concrete problem that will be addressed in this chapter (as shown in Figure 9.1) is about a project where multiple actors, three or more, investigate the option to implement an IS to get closer to their goals. The investment costs need to be shared among the project participants. As part of the project the actors need to collaborate and develop a joint BC for the investment, including a fair cost distribution. Each actor knows his own costs and benefits from using the new IS, however, this information is not shared with the other actors.

The SID4IOP method helps the project participants to arrive at a fair cost distribution by supporting the negotiation process. During the negotiation process actors are making bids for their cost share. The method uses input from each individual BC to arrive at a shared quantitative BC. During the negotiation process more and more information is structurally disclosed to the participants.

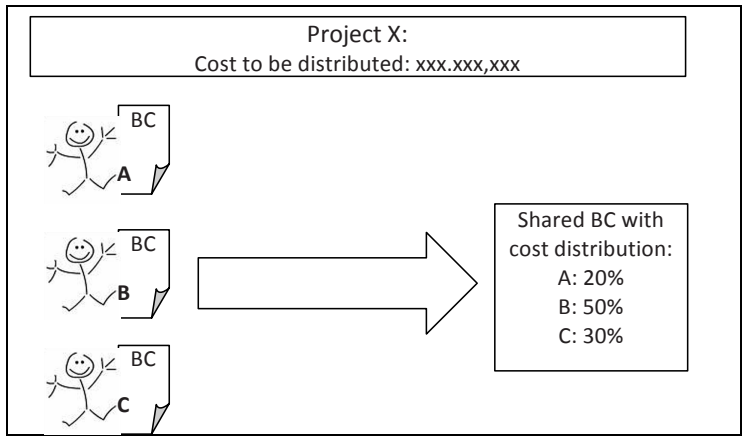


Figure 9.1 Overview of the problem that the SID4IOP method adresses

The method was developed iteratively in several design cycles. During each design cycle we received informal feedback from experts from industry as well as academia.

In this chapter we will first shortly discuss our research approach (Section 9.2). Afterwards, we will present the SID4IOP method itself (Section 9.3), its concepts

(Section 9.4), techniques and tools (Section 9.5) and the deployment process (Section 9.6) that comes with it.

9.2 Research method

As introduced in Chapter 2, we follow a design science paradigm in this research. This chapter describes parts of the solution design process following method engineering. Based on our literature analysis (See chapter 4 and Section 4.6) we started designing the SID4IOP method. Informal discussions with experts iteratively improved the method until it finally got its current format. During the method design process we continuously collected feedback from experts in their field. As the final validation of the SID4IOP method (Chapter 10) was planned to be conducted using an experiment, we performed several pilot experiments during the method design process to improve the method. We performed two types of pilot experiments (Figure 9.2):

a) Two pilots with students to iteratively assess the functionality and the serous game aspect of our method. During these experiments all bugs were repaired.
b) Three pilots with academics that have low to medium experience with IS investment decision making. During these three pilots we iteratively improved our method and guidelines that we used to explain the purpose and steps of the experiment process.

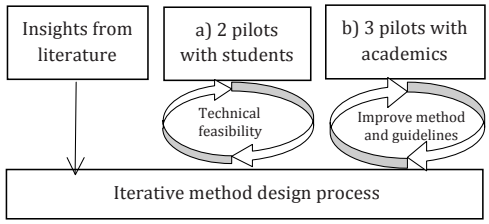


Figure 9.2 Research approach

9.3 Introduction of the SID4IOP method

Our SID4IOP method is designed to deliver the following contributions:

- Provide stakeholders in a complex and unstructured problem context with a structure that supports their decision making process.
- Help stakeholders in inter-organizational projects to come to an agreement on a shared BC, focusing on agreeing on a fair distribution of the investment costs.
- Hide the identity of the participating stakeholders to each other and keep their sensitive BC data confidential. Thus, no harm is done to stakeholders that need to cooperate in future projects or that are competitors of each other.

During the remainder of this chapter we will use the following three roles to refer to the actors involved in the projects. If we talk about all three roles, we either refer to them as project participants or actors.

Project Manager: The project leader who officially steers the negotiation process.

Facilitator: Controls and manages the negotiation process. He is mainly responsible for operating the tool. If the facilitator is the same person as the project manager this will have several advantages and disadvantages. An independent facilitator would be preferred, but if it is the same person this might safe costs and ensures that the facilitator knows already a lot about the project.

Stakeholders: The representatives of the different profit and loss responsible units are referred to as stakeholders. One stakeholder might consist out of one or more persons. It might, e.g. be the case that a decision maker and a subject matter expert form a team and together act as one stakeholder during the BCD process. This is consistent with the discussion of the importance of both subject matter experts and benefit owners in Chapter 7 when discussing the BM4IOP method.

We developed the SID4IOP method to be applied in two ways:

- As a *serious game* to make stakeholders aware of the mechanisms in place in inter-organizational BC negotiations, using fictitious financial data.
- As a *technique* to support the BC negotiation process, using the actual BC figures of the stakeholders involved.

The main difference between these two different ways of applying the method is that if it is used as a serious game the method is already filled with data, while as a negotiation technique, the data entry is part of the process. This implies that the method concepts are exactly the same for both utilizations. However, the tool and deployment process are slightly different.

Using the method as a serious game at the beginning of a project, gives all project participants the opportunity to get to know the method and the mechanisms that are playing a role, before the actual negotiation begins. Once all participants are familiar with the tool and the project we suggest using the SID4IOP method as technique to support the actual negotiation process. This involves using real financial BC data from all involved stakeholders. If no problems are expected with the usage of the method, the project manager can decide to skip the first gaming phase and directly use the method as a negotiation technique.

The remainder of this chapter will describe the SID4IOP method in more detail. We will describe the method, as it would be used as a negotiation technique and indicate when there are differences for the usage as a serious game. The method will be analyzed using the three viewpoints introduced in Chapter 6:

1. An concept viewpoint (Section 9.4), where we in-depth discuss the chunks that characterize our method;
2. A technique viewpoint (Section 9.5), where we describe the different elements of the method and how they are translated into a tool;

3. A deployment process viewpoint (Section 9.6), where we explain how the SID4IOP method can be deployed to support the BC negotiation process.

In order to test the method on its practical applicability we deployed the method as a serious game during four experiments with experts. This validation will be discussed in Chapter 10.

9.4 Method concepts behind the SID4IOP method

In this section we describe the concepts behind the SID4IOP method and the mechanisms that explain their impact and importance. We will discuss the following concepts: BC data input, anonymous information exchange & chatting, facilitator, base factors for cost distribution and process formalization (online bidding process & structured disclosure of information). When describing the concepts we focus on those elements that deviate from the standard understanding.

9.4.1 BC Data input

One of the crucial elements of the SID4IOP method is the data that it is based on. Thus, in order for the method to be valuable, all stakeholders involved in the project are required to prepare an individual BC for the project. This individual BC should include an analysis of the impact of the project specifying the expected costs and benefits of the investment.

9.4.2 Anonymous information exchange & chatting

The SID4IOP method is built in such a way that each stakeholder owns parts of the total information. The anonymous chatting possibility of the method encourages the actors to communicate with each other and pool their unique knowledge to determine the best distribution of the costs. However, each individual stakeholder can decide to keep some information private during the entire negotiation process. The anonymous chatting facility gives the stakeholders the opportunity to discuss the motivations for their bid/cost distribution without revealing their identity.

9.4.3 Facilitator

The method introduces the possibility for a facilitator (either human or a smart system). The stakeholders in a network can chose to make use of a facilitator that supports the decision and negotiation process. He or she can support the people in the network to collect the data important to come to a profound decision. The facilitator is able to access the information of all stakeholders and thus has an overview of all financial information available. Having such an overview allows the facilitator to support the decision and negotiation process more effectively.

By brokering the information the facilitator is in the ideal position to control the information disclosing process described below as part of the process formalization (Valley et al., 1992).

9.4.4 Base factors for cost distribution

The project manager should inform the facilitator before the start of the negotiation process about which factors would be reasonable to be used as a basis for the cost distribution. If the project manager does not do this, all stakeholders of the project should agree on these base factors before starting the negotiation process. Two commonly used base factors are expected profit of the investment and usage of the system.

9.4.5 Process formalization

The SID4IOP formalizes the negotiation process by (i) introducing an online bidding process and (ii) providing a structure for controlling the disclosure of information about other stakeholders. The structure provided by the SID4IOP method is expected to help the participants to focus on the actual discussion during the decision making process and do not get distracted by random talk and the repetition of already know facts as we experienced it in our motivational case study described in Chapter 4.

Online bidding process

The introduction of a bidding process itself provides structure to the process of getting to a cost distribution. Without such a process, stakeholders would need to communicate the amount of money they are willing to pay openly in a face-to-face discussion with all stakeholders involved in the project. Our experience with the case study described in Chapter 4 shows that stakeholders are hesitant to talk about their individual BCs openly and also do not want to share the maximum amount that they are willing to pay openly with all other stakeholders. By introducing an anonymous online bidding procedure we hope to get to a more fair cost distribution. The SID4IOP method suggests a negotiation process of maximum seven rounds. During the first three rounds no extra information is disclosed to the stakeholders. We think that it is important to have time for free bidding rounds in the beginning, as these uncontrolled bids show clearly how much the stakeholders value the system, and who values it the most. After the third round extra information is disclosed (see below). Following each bidding round the bids of all stakeholders are disclosed. Thus, each individual stakeholder can see his amount in relation to the amounts of the others. This comparison can be used as input for the decision on the height of the next bid of each individual actor.

Structured disclosure of information

The SID4IOP method encourages and supports the incremental disclosure of stakeholder specific data. Based on a brainstorming session we decided to call this concept “structured information disclosure”. The term “structure” refers to something that is incremental, dynamic, changing and variable. It further describes a process that is objective and where trusted information can be exchanged in an unbiased way. The SID4IOP method gives the facilitator the power to manage which information is shown to all actors at which point in time.

The facilitator uses the base factors agreed upon, as described above, to calculate the percentage of the total investment each stakeholder should pay. For example based on profit, Stakeholder A should pay 40% of the costs, while Stakeholder B should pay 60%. This percentage might be the other way around when the division is made based on shared service center (SSC) usage or another base factor. The amount of money that these percentages can be translated into can be structurally disclosed to the stakeholders. First this information should only be disclosed to the individual actors themselves to give them a suggestion what their fair share of the investment would be. If the stakeholders cannot come to an agreement on the cost distribution based on this advice, the SID4IOP suggests going to a next level: the incremental disclosure of the different suggested cost distributions (=benchmarks) of all stakeholders to all stakeholders. We propose to first disclose the costs distribution benchmark, which is based on the least sensitive cost base factor. For example information about the SSC usage of others might be less sensitive than profit information. This strategy gives stakeholders the opportunity to agree on a cost distribution before all sensitive information is disclosed.

The SID4IOP method suggests the following schema (Table 9.1) for the disclosure of information during the bidding process. For this example, we assume that the project manager decided on three base factors (Factor A,B,C) and that there are three free bidding rounds before information is disclosed. Optionally, one could chose to (i) increase the process duration by disclosing the individual information in three separate rounds; or (ii) shorten the process by reducing the number of rounds in which no extra information is provided to the stakeholders.

Table 9.1 Pattern for information disclosure

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7
No information	X	X	X				
Individual financial information				Factor A-C			
Financial information about all actors					Factor A	Factor B	Factor C

9.5 Techniques and tools behind the SID4IOP method

In this section we will discuss how the mechanism that characterize our method can be transformed into an operational tool. Chapter 10 will discuss the validation of the technique during an experiment. All figures and image captures of the tool shown in this section are just examples for illustrative purposes, coming from our experiment, and not intended to be clear enough for replication.

Given our time and budget constraints we decide to build the technique based on the free, web-based office suit "Google Docs" which allows for real-time collaboration with multiple stakeholders. This is decided after a comparison of comparable tools and desired functionalities.

In order to support the BCD process, we develop two types of documents (see Figure 9.3): (i) a master data sheet, which is only available to the facilitator of the negotiation process, and (ii) one specific dashboard per stakeholder showing, among others, individual information, like the individual BC, for that actor. The master data sheet is linked to all stakeholder specific sheets. The facilitator can both send data through the tool to the participants and can also retrieve data from the documents of the stakeholders. Further, the participants get access to a simple chat web-interface (via gmail) that allows them to chat with one or several other actors during the course of the negotiation. The chat can be logged and saved for later analysis.

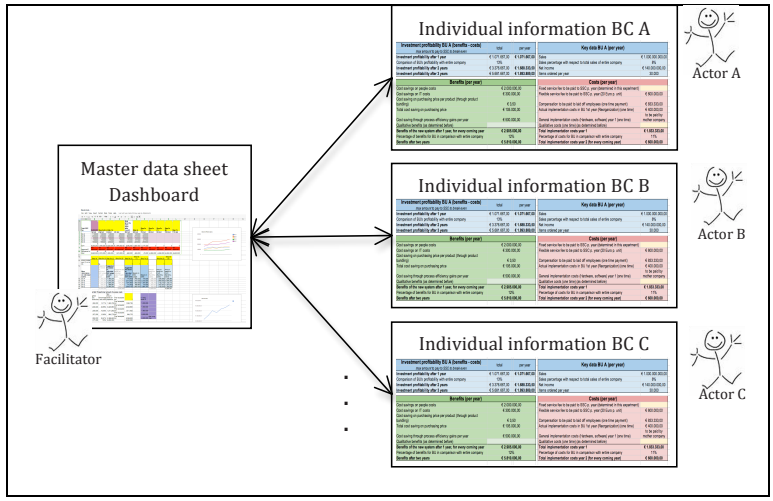


Figure 9.3 Relation between Master data dashboard and actor specific information (individual BC)

The Master data document (shown in Figure 9.4) consists out of one sheet that is used during the entire negotiation process for the following purposes. The facilitator of the BCD process operates the sheet.

- Collect and summarize the bids of the different stakeholders during all before defined maximum number of bidding rounds. In our example the maximum number of bidding rounds was set to seven.
- Calculate the total sum of all bids; compare the sum to the total costs that needs to be divided. Send feedback about the difference to the total costs to all stakeholders.

- Control the visibility of the last bid of all stakeholders on the individual sheets of the different actors.
- Control the amount of extra information available to the participants, from the fourth round onwards. This is specified in our pattern in Table 9.1.
- Calculate the final bid amount for each actor. If the sum of all last bids was higher or lower than the total sum that needed to be divided, then the final bid will be calculated based on a percentage of the final cost distribution.
- Analyze the bids and produce a graph of the bid development of the different stakeholders that can be shown to the project participants at the end of the negotiation process as input for further discussion and reflection.

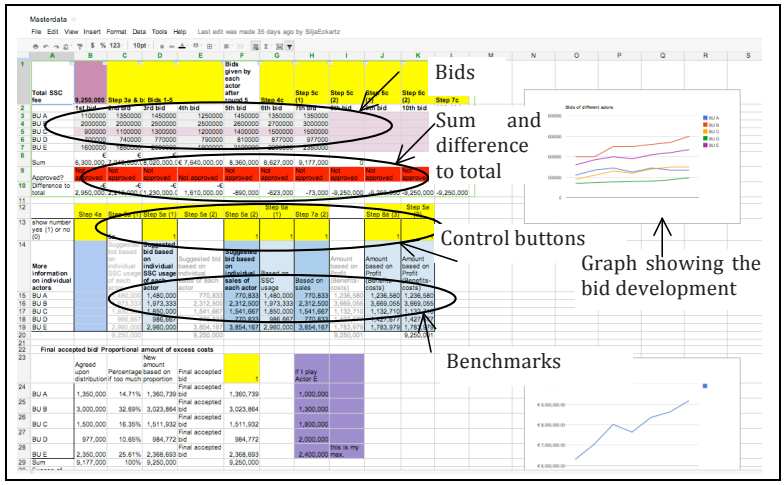
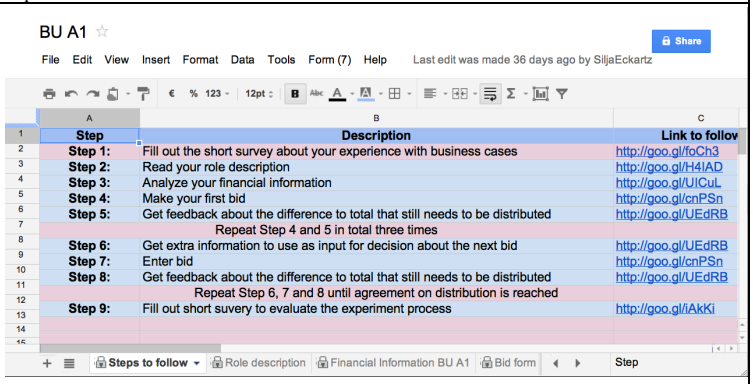


Figure 9.4 Masterdata sheet – View of the tool from a facilitator perspective

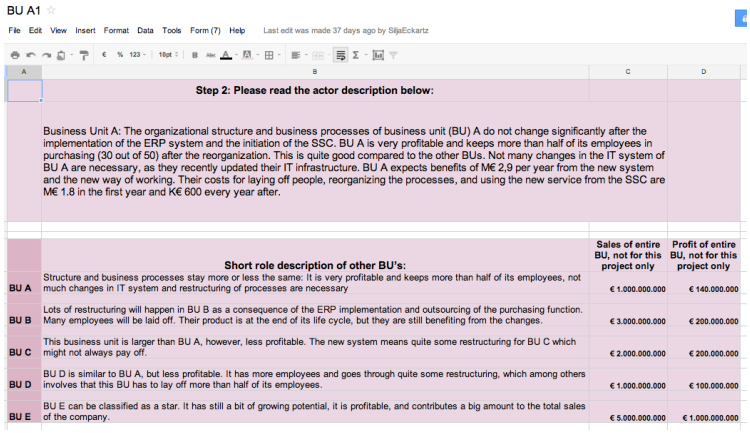
The dashboard that we designed for each stakeholder consists out of six sheets, of which all, except the last one, are protected, so that the participants can only read and not write. In the case that the method is used not only as a serious game but as a negotiation technique more sheets need to be made editable. We show image captures of each sheet in Figure 9.5, to give some impression of the tool.

Process steps:
An overview sheet where all steps of the negotiation process are shortly described. For each step a link is included that brings the participants to the respective sheet.



	Step	Description	Link to follow
2	Step 1:	Fill out the short survey about your experience with business cases	http://goo.gl/foCh3
3	Step 2:	Read your role description	http://goo.gl/H4IAD
4	Step 3:	Analyze your financial information	http://goo.gl/UICuL
5	Step 4:	Make your first bid	http://goo.gl/cnPSn
6	Step 5:	Get feedback about the difference to total that still needs to be distributed	http://goo.gl/UEdRB
7		Repeat Step 4 and 5 in total three times	
8	Step 6:	Get extra information to use as input for decision about the next bid	http://goo.gl/UEdRB
9	Step 7:	Enter bid	http://goo.gl/cnPSn
10	Step 8:	Get feedback about the difference to total that still needs to be distributed	http://goo.gl/UEdRB
11		Repeat Step 6, 7 and 8 until agreement on distribution is reached	
12	Step 9:	Fill out short suvery to evaluate the experiment process	http://goo.gl/iAkKi

Role description:
A sheet, which for each stakeholder contained a role description of his or her individual role in the serious game. It also includes a short role description of all other actors (business units), including sales and profit numbers. This sheet is not needed in the deployment of the method in a normal negotiation process.



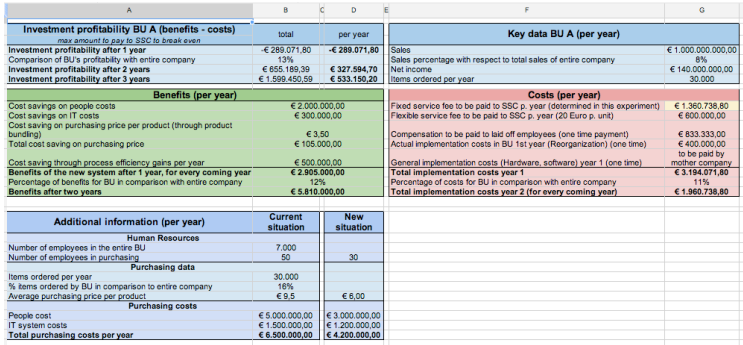
Step 2: Please read the actor description below:

Business Unit A: The organizational structure and business processes of business unit (BU) A do not change significantly after the implementation of the ERP system and the initiation of the SSC. BU A is very profitable and keeps more than half of its employees in purchasing (30 out of 50) after the reorganization. This is quite good compared to the other BUs. Not many changes in the IT system of BU A are necessary, as they recently updated their IT infrastructure. BU A expects benefits of M€ 2,9 per year from the new system and the new way of working. Their costs for laying off people, reorganizing the processes, and using the new service from the SSC are M€ 1.8 in the first year and K€ 600 every year after.

	Short role description of other BU's:	Sales of entire BU, not for this project only	Profit of entire BU, not for this project only
BU A	Structure and business processes stay more or less the same: It is very profitable and keeps more than half of its employees, not much changes in IT system and restructuring of processes are necessary	€ 1.000.000.000	€ 140.000.000
BU B	Lots of restructuring will happen in BU B as a consequence of the ERP implementation and outsourcing of the purchasing function. Many employees will be laid off. Their product is at the end of its life cycle, but they are still benefiting from the changes.	€ 3.000.000.000	€ 200.000.000
BU C	This business unit is larger than BU A, however, less profitable. The new system means quite some restructuring for BU C which might not always pay off.	€ 2.000.000.000	€ 200.000.000
BU D	BU D is similar to BU A, but less profitable. It has more employees and goes through quite some restructuring, which among others involves that this BU has to lay off more than half of its employees.	€ 1.000.000.000	€ 100.000.000
BU E	BU E can be classified as a star. It has still a bit of growing potential, it is profitable, and contributes a big amount to the total sales of the company.	€ 5.000.000.000	€ 1.000.000.000

Figure 9.5 View of the tool from an individual stakeholder perspective

Financial information/ Input:
A sheet, which contains financial information such as the business case for each stakeholder. The data should include key figures, the profitability of the stakeholder, the costs and benefits expected from the investment and some additional information about e.g. changes in the number of employees. In the case that the method is used as a negotiation technique, this sheet is extended with an input screen where stakeholders can upload their BC information.



Investment profitability BU A (benefits - costs) *max amount to pay to SSC to break even*	total	per year
Investment profitability after 1 year	-€ 289.071,80	**-€ 289.071,80**
Comparison of BU's profitability with entire company	13%	
Investment profitability after 2 years	€ 655.189,39	**€ 327.594,70**
Investment profitability after 3 years	€ 1.599.450,59	**€ 533.150,20**

Benefits (per year)	
Cost savings on people costs	€ 2.000.000,00
Cost savings on IT costs	€ 300.000,00
Cost saving on purchasing price per product (through product bundling)	€ 3,50
Total cost saving on purchasing price	€ 105.000,00
Cost saving through process efficiency gains per year	€ 500.000,00
Benefits of the new system after 1 year, for every coming year	**€ 2.905.000,00**
Percentage of benefits for BU in comparison with entire company	12%
Benefits after two years	**€ 5.810.000,00**

Additional information (per year)	Current situation	New situation
Human Resources		
Number of employees in the entire BU	7.000	
Number of employees in purchasing	50	30
Purchasing data		
Items ordered per year	30.000	
% items ordered by BU in comparison to entire company	16%	
Average purchasing price per product	€ 9,5	€ 6,00
Purchasing costs		
People cost	€ 5.000.000,00	€ 3.000.000,00
IT system costs	€ 1.500.000,00	€ 1.200.000,00
Total purchasing costs per year	**€ 6.500.000,00**	**€ 4.200.000,00**

Key data BU A (per year)	
Sales	€ 1.000.000.000,00
Sales percentage with respect to total sales of entire company	8%
Net income	€ 140.000.000,00
Items ordered per year	30.000

Costs (per year)	
Fixed service fee to be paid to SSC p. year (determined in this experiment)	€ 1.360.738,80
Flexible service fee to be paid to SSC p. year (20 Euro p. unit)	€ 600.000,00
Compensation to be paid to laid off employees (one time payment)	€ 833.333,00
Actual implementation costs in BU 1st year (Reorganization) (one time)	€ 400.000,00 to be paid by mother company
General implementation costs (Hardware, software) year 1 (one time)	
Total implementation costs year 1	**€ 3.194.071,80**
Percentage of costs for BU in comparison with entire company	11%
Total implementation costs year 2 (for every coming year)	**€ 1.960.738,80**

Bid form:
A sheet where an overview of the individual bids is shown. The participants cannot directly enter their bid into this sheet, but get a link to a form (see image below) through which they can make their bid in each negotiation round.

BU A1

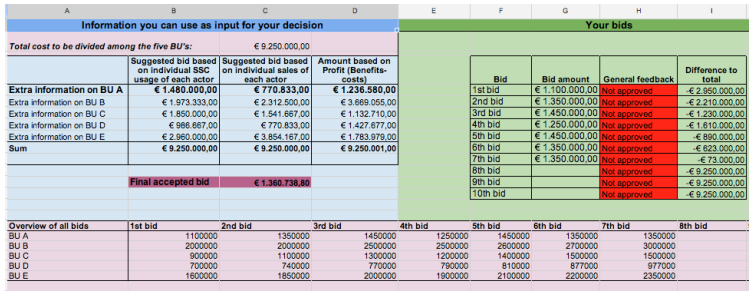
Please enter your next bid below in Euros
Press the submit button only once and wait until your bid is processed
* Required

My next bid *

Submit

Figure 9.5 (continued) View of the tool from an individual stakeholder perspective

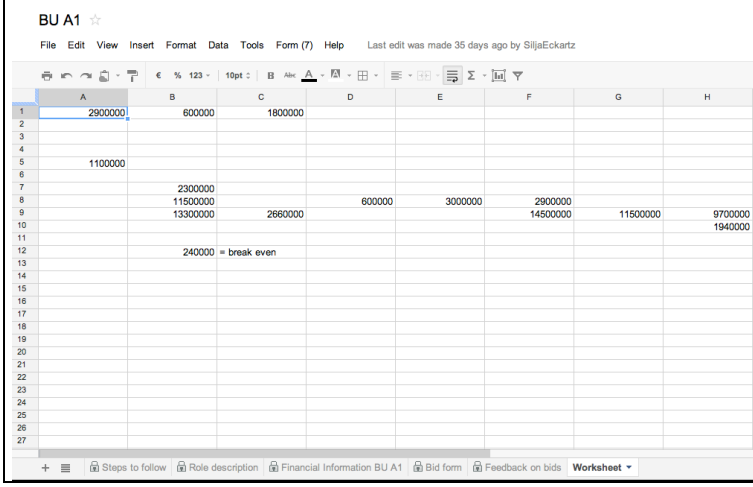
Feedback form:
A sheet, which provides the participants with feedback on their bids (e.g. if the total amount of costs already got divided or not). After each round an overview of the bids of all other actors is shown. Most importantly, this is the sheet where the extra information, that participants can take into account for their next bid, is shown from the forth round onwards.



Information you can use as input for your decision				Your bids			
Total cost to be divided among the five BU's:		€ 9.250.000,00					
	Suggested bid based on individual SSC usage of each actor	Suggested bid based on individual sales of each actor	Amount based on Profit (Benefits-costs)	Bid	Bid amount	General feedback	Difference to total
Extra information on BU A	**€ 1.480.000,00**	**€ 770.833,00**	**€ 1.236.580,00**	1st bid	€ 1.100.000,00	Not approved	-€ 2.950.000,00
Extra information on BU B	€ 1.973.333,00	€ 2.312.500,00	€ 3.669.055,00	2nd bid	€ 1.350.000,00	Not approved	-€ 2.210.000,00
Extra information on BU C	€ 1.850.000,00	€ 1.541.667,00	€ 1.132.710,00	3rd bid	€ 1.450.000,00	Not approved	-€ 1.230.000,00
Extra information on BU D	€ 986.667,00	€ 770.833,00	€ 1.427.677,00	4th bid	€ 1.250.000,00	Not approved	-€ 1.610.000,00
Extra information on BU E	€ 2.960.000,00	€ 3.854.167,00	€ 1.783.979,00	5th bid	€ 1.450.000,00	Not approved	-€ 890.000,00
Sum	**€ 9.250.000,00**	**€ 9.250.000,00**	**€ 9.250.001,00**	6th bid	€ 1.350.000,00	Not approved	-€ 623.000,00
				7th bid	€ 1.350.000,00	Not approved	-€ 73.000,00
				8th bid		Not approved	-€ 9.250.000,00
	Final accepted bid	**€ 1.360.738,80**		9th bid		Not approved	-€ 9.250.000,00
				10th bid		Not approved	-€ 9.250.000,00

Overview of all bids	1st bid	2nd bid	3rd bid	4th bid	5th bid	6th bid	7th bid	8th bid
BU A	1100000	1350000	1450000	1250000	1450000	1350000	1350000	
BU B	2000000	2000000	2500000	2500000	2600000	2700000	3000000	
BU C	900000	1100000	1300000	1200000	1400000	1500000	1500000	
BU D	700000	740000	770000	790000	810000	877000	977000	
BU E	1600000	1850000	2000000	1900000	2100000	2200000	2350000	

Worksheet:
A final sheet (unprotected), named "worksheet" is provided to the participants to offer them some space where they can make their own calculations.



	A	B	C	D	E	F	G	H
1	2900000	600000	1800000					
2								
3								
4								
5	1100000							
6								
7		2300000						
8		11500000		600000	3000000	2900000		
9		13300000	2660000			14500000	11500000	9700000
10								1940000
11								
12		240000	= break even					
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Figure 9.5 (continued) View of the tool from an individual stakeholder perspective

9.6 The SID4IOP method – Process steps

The SID4IOP method is deployed during the project preparation phase (Figure 6.2, Phase B.4) of a project to support the BCD for an IS investment in an inter-organizational setting. More particular in the phase when the different BCs are consolidated and project participants try to find agreement on a payment structure. We propose to implement SID4IOP together with the benefits management method described in Chapter 7. We suggest that the project participants first identify the benefits and then use the identified benefits as input for the decision about the cost distribution. Thus, the benefits can serve as a basis for discussion and help all actors to motivate and justify why they are willing to pay a certain amount of the costs. Both the specified costs and benefits should be summarized and followed up in the business case.

The SID4IOP method can either be deployed in a face-to-face project meeting, or, if all participants are familiar with the interface and way of working, be deployed in a remote setting as the entire system is web-based and no face-to-face communication is directly required.

We divide the BCD process into three phases: start-up, negotiation and closing. Following, we will describe for each phase how the SID4IOP method is deployed and who is involved.

9.6.1 Start-up phase

Once the project got started, the *project manager* invites the stakeholders to enter their BC data into the system. He determines the total costs that need to be distributed during the project among the stakeholders. Following, he identifies the factors that a cost distribution could be based upon. The project manager or the *facilitator* checks if all stakeholders provide information about these factors in their financial information sheet, if not he asks stakeholders to complete their information.

The *facilitator* makes sure that all stakeholders have access to the system. Each stakeholder gets access to a dashboard with the following screens (described in detail in Section 9.5):

- One sheet with an overview of the steps in the negotiation process;
- An input screen where stakeholders can upload their individual BC;
- A screen that shows a summary of the entered financial information;
- A form in which stakeholders can input their bids during the process;
- A screen through which stakeholders receive feedback on the total costs already distributed; see the bids of the others and receive extra information about possible cost distributions;
- Finally, each stakeholder has a worksheet screen where he can make calculations.

Furthermore, the facilitator makes sure that all stakeholders have access to the chat program.

Each *stakeholder* determines his own BC for the project and enters that data into the system using the input screen described above. The BC should contain financial information about the current and expected situation. The stakeholders are further encouraged to enter information about their expected benefits (as part

of the BC) into the system. Such identification of benefits can be done with methods such as BM4IOP, described in Chapter 7.

In the case of a serious game, participants will see one additional sheet describing their role in the game and providing them with some general background information about the project. Further, stakeholders do not have to determine their BC, as this data will be given to them via the system.

9.6.2 Negotiation phase

As soon as all information is entered into the system, the actual negotiation phase is beginning. The negotiation process is structured through several bidding rounds and supported by our tool. Our method suggests planning for a maximum of seven bidding rounds. Each round should last at least 4 minutes, but if the project team has more time available, this time span can easily be extended to allow stakeholders to make calculations, chat with each other and come to a profound decision about the height of their bid. Once all actors entered the amount that they are willing to contribute into the system, the system calculates the total and compares it with the total costs to be distributed. The stakeholders receive feedback about the difference to the total and the bids of the others via the system. During the entire negotiation process stakeholders are encouraged to make use of the anonymous chat program provided by the tool. Our method proposes to structurally make information about the individual financial situation available: First to the individual stakeholders, later to all stakeholders. A pattern for the disclosure of information is presented in Table 9.1. Once the sum of all bids is equal or larger than the costs to be distributed, the bidding process is stopped. In the case that the sum is larger, a new cost distribution will be calculated based on the last proportion of the bids. This final cost distribution will be shown to the stakeholders via the system for approval.

9.6.3 Closing phase

Once the entire costs of the investment are distributed among the stakeholders and all participants agree upon this distribution, the negotiation process is closed. Now, the fraction of the costs taken over by each stakeholder is entered into the individual BC of that stakeholder. Further, the shared BC is finalized. The project manager can further chose to use the VM4IOP method (Chapter 6) to evaluate the final cost distribution and to assess the profitability of the entire network.

9.7 Summary

This chapter presented the design of SID4IOP, the component of the last BC4IOP methodology to be discussed. The provision of a technique that supports the structured, incremental disclosure of information is intended to help stakeholders in a network during the BCD process. The focus of SID4IOP is especially on the last part of the BCD process, the part that distinguishes networked BCs from single organizational BCs. Namely, the distribution of costs and benefits among all participating actors in away that is favorable to all actors.

10

Validation of the SID4IOP method

"It's not that I'm so smart, it's just that I stay with problems longer." (Albert Einstein)

In this chapter we will research the applicability of the structured information disclosure for inter-organizational projects method (SID4IOP) (developed in Chapter 9) in a practical setting by deploying the method in four experiments with experts from industry and academia. We especially focus on supporting the negotiation process that leads the participants of an inter-organizational network to a joint decision about, for example, the distribution of the costs for an investment specified in a business case. We analyze the changes in the BC negotiation- and decision- making- process if more information is structurally made available to the participants during the course of the experiment. We further analyze the impact of what is called "structured information disclosure" on the outcome of the business case (BC).

This chapter starts with a discussion of the research method used. Afterwards, the deployment of the SID4IOP method in four experiments is presented. The results and lessons learned from the experiments are presented and discussed in the last part of this chapter.

10.1 Research method

One important step in design science is the solution validation. In order to validate the SID4IOP method we conducted four experiments with experts. This section discusses our unit of study, the research questions, the research design and execution, and finally the data sources we used to collect our data.

10.1.1 Unit of study

Our unit of study are inter-organizational IS projects for which (i) a business case needs to be developed and (ii) multiple actors need to distribute the costs for the project among each other and thus have to agree on a cost distribution. We assume that experts with both decision power as well as sufficient knowledge about business cases are using our method.

The inter-organizational setting imposes several characteristics and challenges, such as conflicting goals, cultural and semantic differences, limited willingness of the actors to share information, limited or low trust and hidden profiles (for more details, see Chapter 4, page 63). These factors need to be taken into account when validating the method.

10.1.2 Research questions

From literature (O'Reilly, 1982, Valley et al., 1992) we learn that the quality and speed of the decision making process, as well as the final outcome, is influenced by which and how much information is available for the different actors. For our research we decided to focus on two kinds of information: (i) information about the bids of the other actors during the process of the experiment (RQ 1.3) and (ii) additional information that the actors can use as input for their next bid (RQ 1.1). We analyze how the disclosure of this information influences the decision making process and outcome when multiple actor with competing goals need to agree on a shared business case.

We further are interested in analyzing the effect of anonymity on the BC decision process and outcome (RQ 1.2). These questions are summarized in our first research question stated below. Our conceptual model (Figure 10.1) shows the relation between our independent variables (financial info, anonymity, bid info) and dependent variables (decision process and outcome). We acknowledge that other factors not analyzed by us might influence our causality relation.

1. *What is the influence of disclosing different kinds of information and anonymity on the business case negotiation process and outcome?*
   1.1. How does the structured disclosure of financial information about one or several actors, influence the negotiation process and outcome?
   1.2. What is the influence of anonymity (anonymous chatting and information exchange) on the negotiation process and outcome?
   1.3. What is the influence of being able to see the bids of others on the negotiation process and outcome?

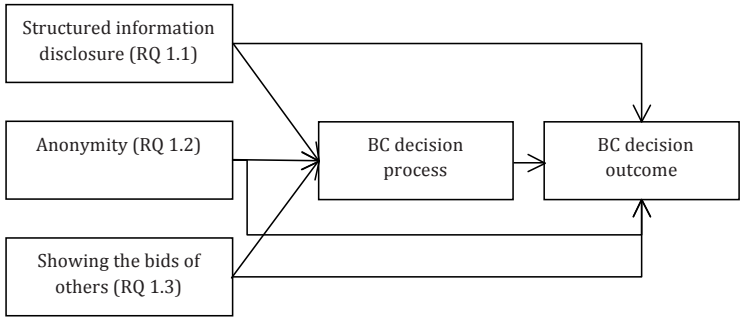


Figure 10.1 Conceptual model – Research question 1

Next to analyzing the mechanisms behind our method, we also want to research the applicability of the SID4IOP method in real life. Our second research question is therefore:

2. Is the SID4IOP method usable in real life projects?

We will answer the 2nd research question by deploying the method in a case setting using an experiment with professionals in business case development (BCD). After the experiment we will use a questionnaire to assess the option of the experts with regards to the method.

10.1.3 Research design

In order to assess the usability of the SID4IOP method we conducted four experiments with each time a group of five experts. We invited experts in the field of IT project decision making and business case design from both academia and industry to serve as our unit of data collection. The SID4IOP method was applied as treatment in all our experiments.

Based on the insights from the pilot experiments (see Chapter 9) we decided to vary only one independent variable, namely *structured information disclosure.* The other two variables, anonymity and "showing the bids of others", were left unchanged during all experiments. Thus, in all experiment the bids of all participants were revealed after each bidding round, information sharing and chatting happened anonymous, and the amount of extra information was incrementally increased. The variation of the variable "structured information disclosure" is self-explaining, as the term "structure" already refers to something that is dynamic, changing and variable. We reflected on this decision with the experimental participants during the focus group discussion after each experimental round.

More specifically, about this variable, two kinds of information about three different factors were incrementally disclosed to the participants. The actors can use this extra information as input for the decision about the height of their next bid. We used the following three factors to suggest bids to the experts: SSC usage, sales and profit of the project. About each factor either no information, information about the individual actor, or about all actors was given. The order in which the information was made available to the actors is shown in Table 10.1. The SID4IOP suggests a maximum of seven negotiation rounds to come to a decision.

Table 10.1 Order in which information was disclosed

	Round 1	**Round 2**	**Round 3**	**Round 4**	**Round 5**	**Round 6**	**Round 7**
No information	X	X	X				
Individual information				Factor A-C			
Information about all actors					Factor A	Factor B	Factor C

Given our method, the experiment participants had a maximum of seven negotiation rounds to get to an agreement on the distribution of the costs.

Depending on how long it took the participants to reach an agreement sometimes less rounds were needed and the experiment was stopped earlier.

We note that the treatment (disclosure of information) was applied in all four experiments in the same way, thus there is no control group.

10.1.4 Research execution

In this section we will describe the execution of our research. We describe what happened during the experiment to help the readers of this thesis to better understand our results. We also discuss validity concerns that play a role in our research.

The experiments were conducted on central locations in Utrecht and Enschede. We invited a heterogeneous group of consultants to participate in our experiment. For each session five experts were planned to participate. However, due to last minute cancellations, people from the project team were asked to participate in three sessions as back-up to substitute the missing actors and to allow the experiment to take place. The participation of people from our project team, which have background information, might result in validity concerns, however, we tried to limit these concerns by instructing the back-up participants to act according to their actor role without considering the additional knowledge they have about the project context. Two times one of these back-up participants participated remotely in the experiment (after getting an extensive introduction into the method and spreadsheets used). In total 17 different experts from industry and academia and 3 experts from the project team participated in our experiments. Our ex-ante and ex-post surveys were filled out by all 17 experts. This is equal to a 100% response rate, as the project team members were not asked to fill out the questionnaire.

The experiment was set up as a serious game (Zyda, 2005) in order to motivate the participants to take their role in the experiment serious and to make the experiment a bit more fun. This includes a competition between the different groups of the different experiments. For this competition the groups were ranked based on their performance during the experiment. Performance was measured based on the number of rounds it took the group to agree on a cost distribution and the fairness of the distribution. No financial motivation was needed as we expected that the participating professionals wanted to win by definition. Setting up the experiment as a serious game increased the external validity of our treatment, as it now got more similar to reality.

The SSC outsourcing case (described in Section 10.2.1) we used as an example during our experiments is representative for many different industries. The main reasoning behind using a case setting is to provide the experiment participants with a real life example. The problem of cost distribution is not specific to the SSC outsourcing context. We therefore expect that one can generalize our findings about the cost distribution process to other case settings, unrelated to SSCs, outsourcing and ES implementations. In order to make sure that our reasoning is valid, our qualitative data was coded by at least two researchers, who compared their coding results and discussed differences.

10.1.5 Use of data sources

The following table (Table 10.2) gives a summary on the data sources that were used to collect data, the data analysis techniques that were used to analyze the data and the insights that we expected to gain from each data source. As our sample of four experiment sessions is rather small, we want to note that all our analysis is of qualitative nature and will only include descriptive statistics and no sophisticated statistical analysis of the results. We also indicate in which section of this chapter the data collected is presented.

Table 10.2 Data source, data analysis technique and expected insights per data source

Data source	Data analysis technique	Expected insights
Ex-ante survey 10.3.1	Descriptive statistics.	Learn about the background and experience of the participants. These insights help to better understand and explain the findings of the experiment and to evaluate the appropriateness of our sample.
Ex-post evaluation survey 10.3.5	Descriptive statistics, open questions were coded by the authors.	Learn about how satisfied the participants were with the negotiation process, the outcome, the set-up of the experiment and if they perceive the experiment as realistic.
Focus group (qualitative unstructured interviews) 10.3.6	Qualitative analysis of the answers, coded by the authors when applicable.	Get more in depth insights from the participants to learn about their bidding strategy, their evaluation of the experiment and if they perceived it as realistic.
Bid amounts during process 10.3.2	Comparative analysis of how bid amounts changed during the process and in the different experiments.	Learn about how the size of the bid amounts changed during the negotiation process as extra information was incrementally disclosed.
Final bid amounts 10.3.3	Calculation of the difference between final bid and suggested amount.	Fairness of the agreed upon distribution.
Number of bidding rounds until agreement was reached 10.3.2	Comparison of the different number of bidding rounds.	Insights into the speed (=effectiveness) of the negotiation process, how fast an agreement was reached.

Table 10.2 (continued) Data source, data analysis technique and expected insights per data source

Data source	Data analysis technique	Expected insights
Chat log 10.3.4	The chat log was analyzed using content analysis. Two aspects in the focus of this analysis: (i) *"how"* the participants communicate with each other, in particular who Is talking to whom; (ii) *"what"* the participants chat with each other. We defined several categories in which the content of the chat conversations was classified by two researchers independently.	Learn about the thoughts, motivations, bidding strategies negotiations and discussions of the participants during the bidding and negotiation process.

Next to analyzing the insights from the different data sources separately, we also analyze the effect that the independent variable "amount of information" has on the different insights. Exemplary insights we looking for are: How the bid amounts changed as a response to actors receiving more information; if the addition of extra information resulted in a more fair distribution of the costs; and how this change was discussed with the other actors using the chat. We further analyze if insights from the different data sources can be combined to get new insights. For example we analyze if the number of bidding rounds influences the satisfaction of the actors with the process and outcome of the experiment.

10.2 The experiment: Deployment of the SID4IOP method

This section describes the setup for deploying the SID4IOP method, developed in Chapter 9, in four experiments. We will first describe the case setting that we introduced to deploy the method before presenting the steps that were followed during the method deployment process during the experiments.

We refer to the participants of our experiments as actors. In our context they represent business units of one international company. However, in a different context they might stand for different entities, e.g. different companies that are collaborating in a business network. For our experiment we distinguish five separate actors that can enter data via their unique dashboard in Google docs.

10.2.1 Experiment case description

In order to test the SID4IOP method on its possible applicability and usability in practice we designed a case example that we presented to the experimental participants. The project described in our case is situated in an inter-organizational environment where multiple actors with shared power but different goals need to agree on a cost distribution within the scope of their business case. The case stems from our own case experiences and is designed to cover the characteristics of inter-organizational projects, such as shared power and differences in goals as described in Chapter 4. The case is just one example of a

context where the SID4IOP method is expected to support the negotiation and decision process. We expect that the SID4IOP method can also be applied to different cases with similar characteristics.

The case example that we invented was described as follows to the participants:

> *"A multinational consisting of five business units (BUs) wants to improve its processes by implementing an ERP system and outsourcing its purchasing function to a shared service center (SSC). Every BU has to pay a fee (variable) to the SSC based on their actual usage of the purchasing services of the SSC. Irrespective of the actual usage a fixed fee has to be paid to the SSC. This fee is 9,250,000 Euro and has to be divided between the five different BUs. The task of the participants is to negotiate and agree on a distribution of the fixed SSC fee (9,250,000 Euro). It is important to notice that the entire organization and all BUs will be better off with this reorganization."*

Following this short introduction of the case, the participants were given two figures (see Figure 10.2) that exemplify the difference between the as-is and to-be situation. The author of this thesis explained to the participants that during the experiment they would receive more financial information about their own BU, which they could use to develop their own individual BC. This information should also be used to justify the size of the amount that the actors are bidding in the negotiation process about the SSC fee distribution. The goal of the experiment was described as follows:

> *"On a group level your goal is to agree on a fair distribution of the SSC fee. Where "agree" means that the entire SSC fee is distributed and "fair" means that the distribution makes sense based on the financial information provided. On an individual level the goal is to optimize your own profit."*

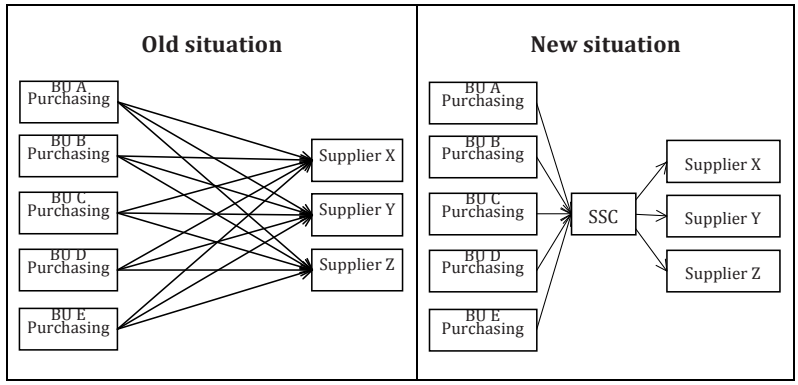


Figure 10.2 Overview of the case situation

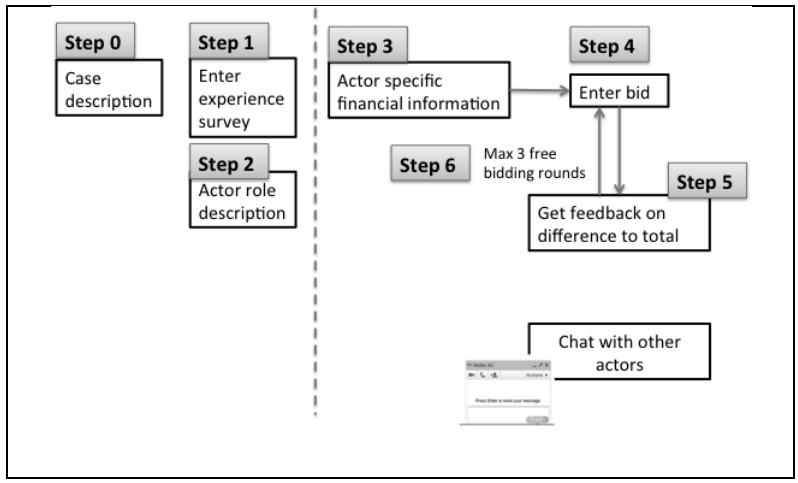
10.2.2 Steps in the experiment process

In this section we will describe the actual experiment process using the deployment process phases introduced in Chapter 9: Start-up, negotiation and closing. In this experiment we simulate activities that would happen in the "agree on payment structure" phase of a BCD project (referred to as Phase B.4 in Chapter 9). The actual experiment was organized using the eight steps Figure 10.3.

Start-up phase:

After arrival in our workshop room, the participants received a short introduction into the research project and the case (as described in 10.2.1). This introduction was given in the form of a PowerPoint presentation. Questions were answered and the participants got a handout of the presentation, so they could review all slides during the experiment process.

- **Step 1:** The participants filled out a short survey about their background and experience with business case development.
- **Step 2:** The participants received a description of their own role in the experiment, and a short description of the other actor roles (including profit and sales information about all actors).
- **Step 3:** The participants received detailed financial information about their BU. This information included cost and benefit information as well as more background information about the sales figures of the BU.



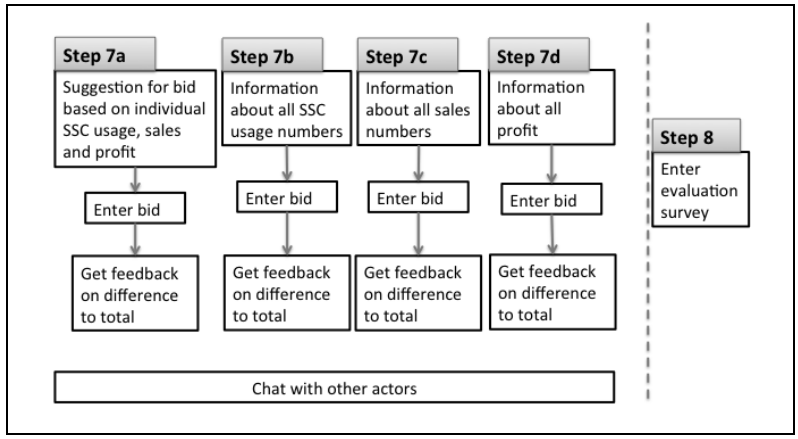


Figure 10.3 The experiment process

Negotiation phase

Once all participants were familiar with the method and all questions were answered, the first bidding round started.

- **Step 4:** The participants had 8 minutes to analyze their information, discuss and negotiate with each other via the chat functionality of the method and finalize their first bid. The participants were instructed to not reveal their sensitive financial information to the others, as it would also not be done in real life projects where competition plays a role.
- **Step 5:** Once all bids were entered into the system, the system calculated the sum of all bids and following the difference to the total SSC fee to be distributed. The participants received information about their own bid, the sum of all bids and the difference to the total SSC fee via the feedback form of the method. They further received an overview of the bids of all actors in the first bidding round.
- **Step 6:** If no agreement was reached after the first bidding round, meaning that there was still a difference between the sum of all bids and the SSC fee, the process of "free bidding" was repeated a maximum of two times. The process is hereby exactly the same as in Step 4 and 5, however, these times the time available for bidding was reduced to four minutes.
- **Step 7:** If no agreement was reached after the third round, the experiment continued for a maximum of in total seven rounds. At the beginning of each of these rounds the participants received extra information via the feedback sheet of the method. The rest of the bidding process stayed unchanged. The following information was provided subsequently in the respective rounds (see also Table 10.1):
  a) Hints on "where to focus on" in your *own* financial information. In particular participants received three bid amounts based *SSC usage, BU sales* and *BU profit*, that they could use to base their bid on.

b) Suggested bid amounts for all actors based on the *SSC usage* of *all* actors. This information about all actors was made visible to all actors in this step.
c) Suggested bid amounts for all actors based on the *sales* of *all* actors. This information about all actors was made visible to all actors in this step.
d) Suggested bid amounts for all actors based on the *profit* of *all* actors. This information about all actors was made visible to all actors in this step.

Closing phase
As soon as the total cost sum was distributed the experiment process was considered finished.

- **Step 8:** The participants filled out a short survey to evaluate the experiment process.

Depending on how fast the participants arrived at a shared agreement on a distribution of the SSC fee among the five actors, the bidding process was stopped and no more information was given to the participants. Thus, in some sessions all information described in Step 7 had to be revealed to the participants where in other sessions agreement was reached in the first three bidding rounds where no extra information was yet provided to the participants.

During the experiment the participants were located in the same room but were not allowed to communicate with each other, other than via the online chat. Participants were encouraged to chat with the other actors. This allowed us to have a complete log of all communications between the different actors to be saved for later analysis.

10.3 Results of the experiment

In this section we will present the results of our experiment. The presentation of our results is organized according to the source that was used to collect the data, as introduced in Table 10.2 and consists of the following:

- Ex-ante surveying of the experience of the participants
- The bidding and negotiation process
- Final bid amounts = outcome of the bidding process
- Chat log
- Ex-post evaluation survey
- Focus group (qualitative unstructured interviews)

At the end of each section we will provide a short discussion of the findings. Section 10.4 will provide an in-depth discussion that is aimed at answering the research questions.

10.3.1 Ex-ante surveying of the experience of the participants

In order to get some background information about the participants of our experiments we conducted a short survey before the start of the experiment. 17

experts took part in the survey that consisted out of six multiple-choice questions (Appendix C). The results of all relevant questions are presented in Figure 10.5, including a graph and a short textual description of the results.

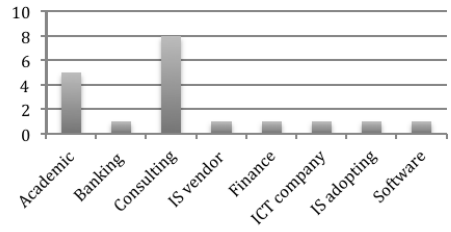
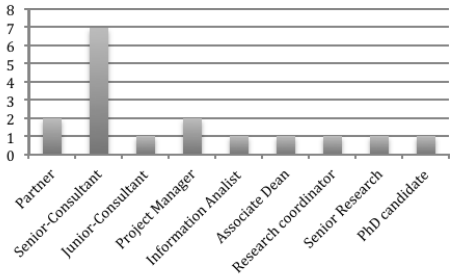
Background information		
Question	**Graph**	**First result**
Type of Organization actors are working for		Most experts work for consulting companies.
Position in company		Most participants are senior consultants.

Figure 10.4 Results of ex-ante survey: Background information

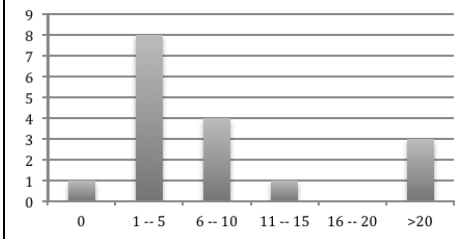
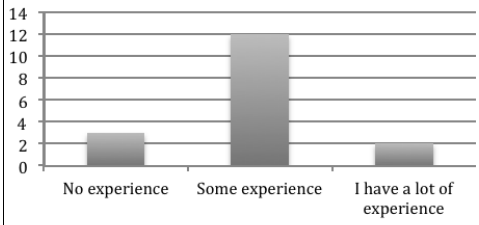
Experience with business case development and negotiation		
Question	**Graph**	**First result**
Number of business cases prepared so far		All except one participant have prepared a business case before. Most of them have prepare 1-5 business cases, but 8 also have prepared more than five.
Level of experience with negotiating cost and benefit distribution in inter-organizational projects		Three participants have no experience with the distribution of costs and benefits in inter-organizational projects, the majority has some experience with such decision processes.

Figure 10.5 Results of ex-ante survey: Experience

The results of our ex-ante survey show that the participants of our experiment are experienced with BCD. Also they seem mostly familiar with negotiating about the distribution of costs and benefits in inter-organizational projects. Two participants have very extensive experience with BCD and negotiation in inter-organizational projects (three and two respectively). As our method is designed to be used by experts as well as non-experts, we conclude that the level of knowledge of our sample is appropriate for the purpose of our experiments.

10.3.2 The bidding and negotiation process

We analyzed the bidding process based on two aspects, (i) the number of rounds that it took the participants to agree on a cost distribution and (ii) the actual amounts that the participants were bidding during the different rounds, and how these developed over time. Figure 10.6 shows the graphs of the bid variations during the bidding and negotiation process in the four experiments. From these graphs we see that agreement on the distribution of the SSC fee was reached in Experiment 1 after two rounds. All other experiments needed more time; namely, once six rounds (Experiment 3) and twice the entire seven rounds.

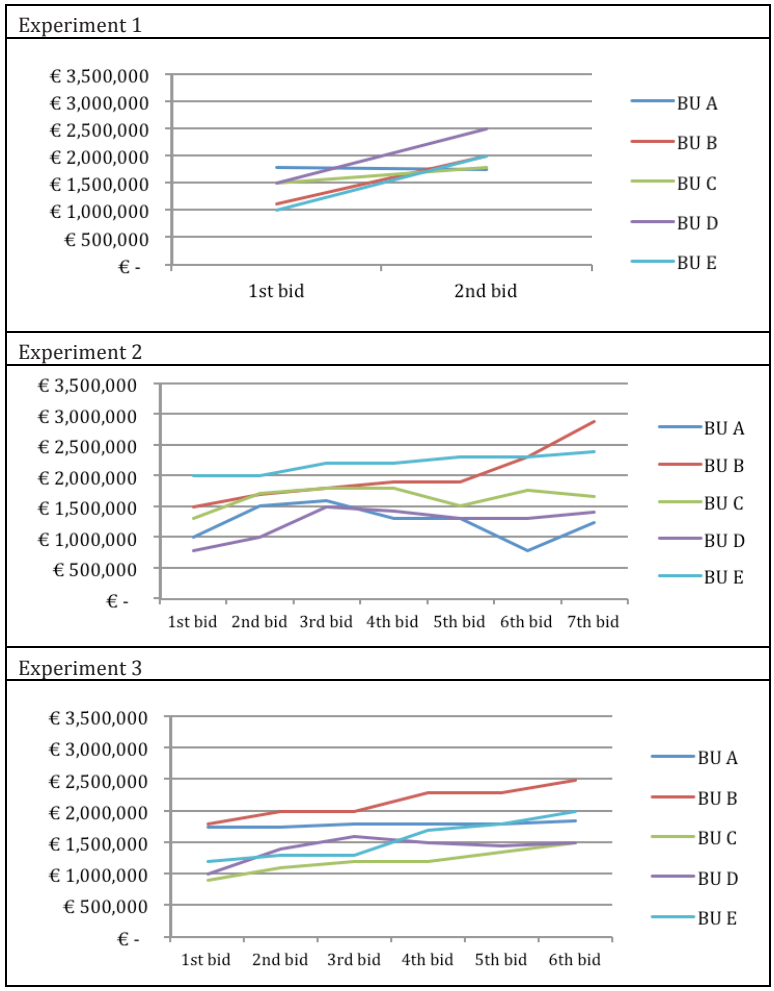


Figure 10.6 Bid amounts during bidding process – Experiment 1-4

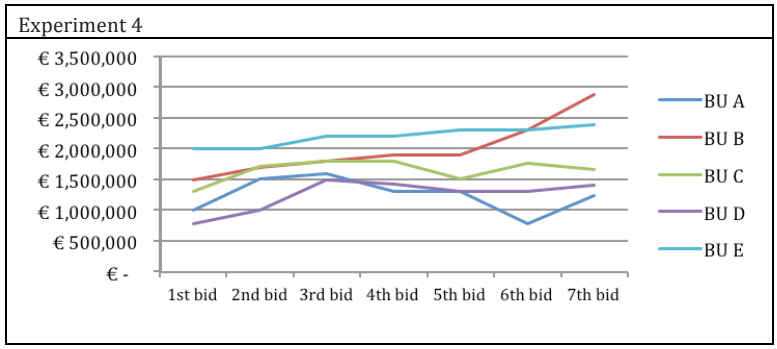


Figure 10.6 (continued) Bid amounts during bidding process – Experiment 1-4

10.3.3 Final bid amounts = outcome of the bidding process

All four groups reached an agreement at the end of the experiment. We analyzed the difference of the final bids to the two benchmarks (SSC usage and profit) to determine the profitability and fairness of the final agreed upon cost distribution. The final agreed upon cost distribution can be found in Table 10.3, the benchmarks based on SSC usage and profit can be found in Table 10.4.

Table 10.3 Final agreed upon bid distribution

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Actor A	€1,610,696.52	€1,193,391.00	€1,830,214.00	€1,360,739.00
Actor B	€1,840,796.02	€2,798,104.00	€2,473,262.00	€3,023,864.00
Actor C	€1,656,716.42	€1,592,024.00	€1,483,957.00	€1,511,932.00
Actor D	€2,300,995.02	€1,350,809.00	€1,483,957.00	€984,772.00
Actor E	€1,840,796.02	€2,315,672.00	€1,978,610.00	€2,368,693.00
Sum	€9,250,000.00	€9,250,000.00	€9,250,000.00	€9,250,000.00

Table 10.4 Benchmarks based on SSC usage and profit

	SSC usage	Profit
Actor A	€ 1,480,000	€ 1,236,580
Actor B	€ 1,973,333	€ 3,669,055
Actor C	€ 1,850,000	€ 1,132,710
Actor D	€ 986,667	€ 1,427,677
Actor E	€ 2,960,000	€ 1,783,979
Sum	€9,250,000	€9,250,000

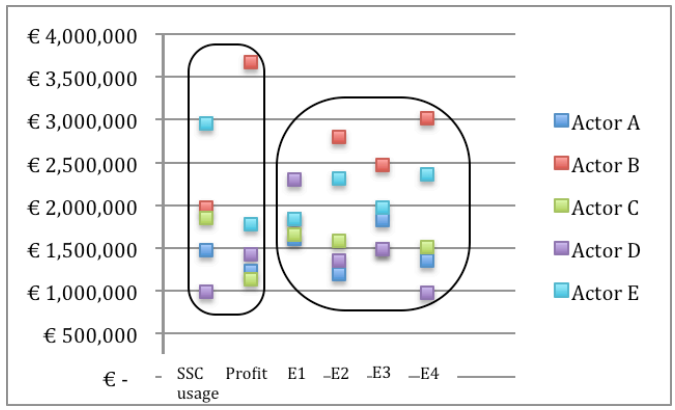


Figure 10.7 Benchmarks and actual bids per actor

Analyzing the results presented in Table 10.3, Table 10.4 and Figure 10.7 brings us the following observations:

- The differences between the actors are greater for the benchmarks based on SSC usage and profit (shown on the left part of the figure) than for the final bid amounts in the four experiments (shown on the right part of the figure). This can be explained by the fact that the actors rather stayed in the middle of the two benchmarks than going for the extreme values.
- For each actor the final bids are quite varied in the different experiments. This means that the final bid amount is highly dependent on (i) the people "playing" the actors and how they interpreted the data given to them, and (ii) the negotiation process including the bids of the others.

Analyzing the results with respect to the profitability of the agreed upon cost distributions we find the following observations (Table 10.5, Table 10.6). For the purpose of our research, we call a distribution fair if the total of the bids has the biggest negative difference to one or both of the benchmarks.

- Compared with the SSC usage benchmark, Actor E was the most profitable in all experiments, as indicated in italics in Table 10.5. Based on the SSC usage, Actor E should have paid most of the costs with an amount of € 2,960,000. However, the final bid amount of Actor E was always way below this amount, so compared to the SSC usage benchmark he was profitable.
- Compared with the profit benchmark, Actor B was the most profitable in three experiments, as indicated in italics in Table 10.5. Based on the profit, Actor B should have paid most of the costs with an amount of € 3,669,055. However, the final bid amount of Actor B was always way below this amount, so compared to the profit benchmark he was profitable.
- The analysis of the profitability of the experiments is less clear and no conclusions can be made.

Furthermore, we define a distribution as fair if the total of the bids is close to one or both of the benchmarks. With respect to the fairness of the final distribution we find that:

- The actors that reached the most fair distribution with respect to the two benchmarks are indicated in Table 10.5, however, no clear pattern can be indicated.
- The total difference to both benchmarks is the smallest in Experiment 4, as can be see in italics in Table 10.6. Thus, there the fairest distribution was reached.

Table 10.5 Comparison of experiments based on profitability and fairness

	Most profitable		**Most fair**	
	SSC usage	**Profit**	**SSC usage**	**Profit**
Experiment 1	*Actor E*	*Actor B*	Actor B	Actor E
Experiment 2	*Actor E*	*Actor B*	Actor C	Actor A
Experiment 3	*Actor E*	*Actor B*	Actor C	Actor D
Experiment 4	*Actor E*	Actor D	Actor D	Actor A

Table 10.6 Comparison of actors based on profitability and fairness

	Most profitable		**Most fair**	
	SSC usage	**Profit**	**SSC usage**	**Profit**
Actor A	Exp. 2	Exp. 2	*Exp. 4*	Exp. 2
Actor B	Exp. 1	Exp. 1	Exp. 1	*Exp. 4*
Actor C	Exp. 3	Exp. 3	Exp. 1	Exp. 3
Actor D	Exp. 4	Exp. 4	*Exp. 4*	Exp. 3
Actor E	Exp. 1	Exp. 1	*Exp. 4*	Exp. 1

10.3.4 Chat log

As indicated earlier, during the experiment, we collected information in the form of a chat log. This chat log was analyzed using content analysis. Two aspects were in the focus of this analysis: (i) *"how"* the participants communicate with each other, in particular who is talking to whom; (ii) *"what"* the participants chat with each other.

Who is talking to whom:

In Experiment 1 all chat conversations took place between two actors. All actors were involved in the conversations. Figure 10.8 shows which actor was talking how much with the other actors, whereas the numbers on the lines stand for the number of chat lines that got exchanged. From this figure we see that Actor D was the most active in communicating (21 chat lines) and initiating conversations.

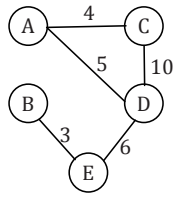


Figure 10.8 Who is talking to whom – Experiment 1

In all other experiments one actor initiated a group chat and most communication went through this group chat. An exemplary communication graph for the group chat is shown in Figure 10.9. In Experiments 3 and 4 individual conversations took place between some of the actors, in addition to the group chat. However, this was very limited and did not result in extensive discussions. We do not draw any communication graphs for these individual conversations in Experiments 3 and 4.

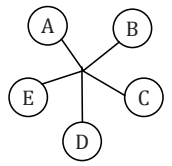


Figure 10.9 Online communication pattern – Experiment 2-4

During the group chats questions/comments were either asked/addressed to everyone or to one specific actor. Especially in the category of social pressure (see below) individual actors were addressed in the group chat.

Content of the chat logs:
We identified three main categories that can be used to analyze the content of the chat conversations during the four experiments. The actors communicated information about the bid heights, both about their last bid as well as their next bid. The second category is called social pressure; this includes statements that put pressure on an actor to enlarge their size of the bid. The third category is titles as sharing of information, including both sharing of financial information as well as disclosure of the bidding strategy.

- Bid information
  - Last bid: General discussion and reflection of the size of the bid and the bidding process.
  - Next bid: Promises of one actor to one or several actors to change his bid in the next round.
- Social pressure
  - Behavior/statements that can be interpreted as putting pressure on one or several actors to increase their bids.

- Sharing of information
    - Financial information: statements in which actors share general or financial data of their business unit with the other actors.
    - Bidding strategy: statements where the actors explain their bidding strategy to the others; discussion about which factor (SSC usage, sales or profit) should be used as a basis for the bid.

Figure 10.10 shows how much the experiment participants communicated about each of the topics during each experiment. One can see that the distribution largely varies per experiment, and no pattern can be detected. The amount is measured in chat messages. Thus e.g. in Experiment 1, 52% of all chat messages were about the last bid.

Figure 10.11 shows the distribution of the different chat topics based on the entire sample of all experiments. It is interesting to see that when comparing the four different experiments the distribution among the five topics largely varies, however, when consolidating the results one can see that the distribution is very balanced. Each topic is discussed about 20% of the time.

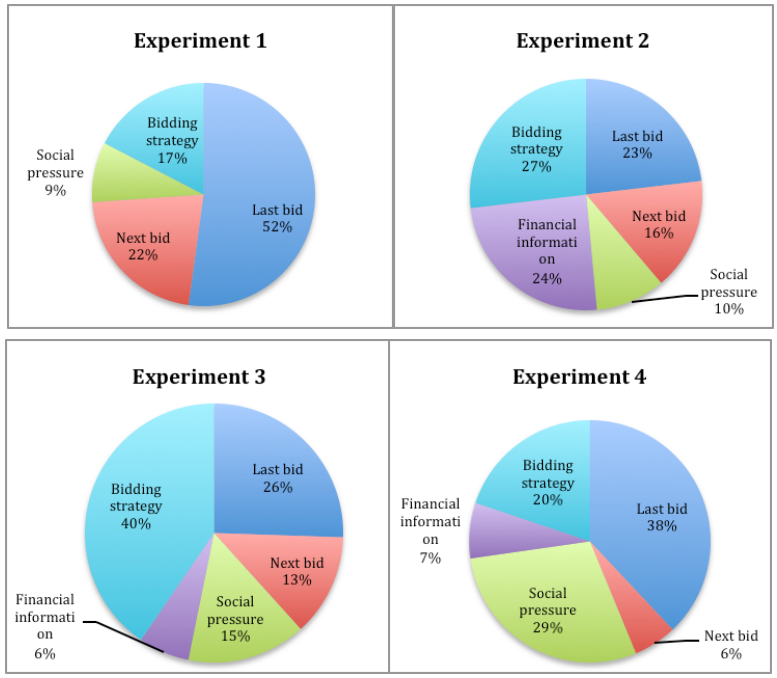


Figure 10.10 Overview of chat content distribution during each experiment

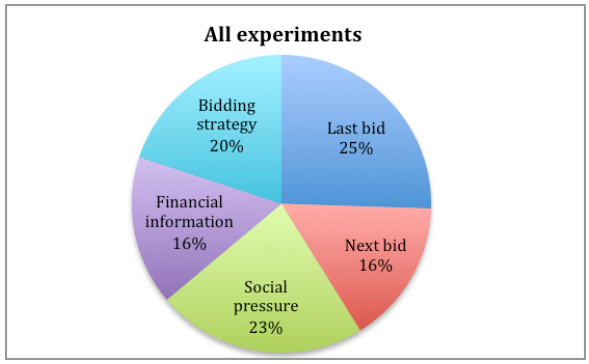


Figure 10.11 Distribution of chat content in all experiments together

Communication patterns

We analyzed the chat logs to see if any patterns in the communication could be detected. Generally we observe that most chat conversations start with discussing the last bid and the bidding strategy. Following, financial information is exchanged. After 3-4 bidding rounds the actors started using social pressure. Only very late in the process participants started discussing on which factor they should base their bid (part of bidding strategy). This finding is not surprising as the actors received information about the different benchmarking factors only in the later negotiation rounds.

10.3.5 Ex-post evaluation survey

The same 17 experts that answered the experience survey before the start of the experiment were asked to fill out an evaluation survey after the experiment itself was finished. This second survey consisted out of 15 questions, of which four open and eleven closed (multiple choice) questions. The results are shown in Figure 10.5 until Figure 10.17 Table 10.7 and Table 10.8. In each figure we present the question asked in the questionnaire on the left side, the graph with the data in the middle and a short summary of the results at the right side of the figure.

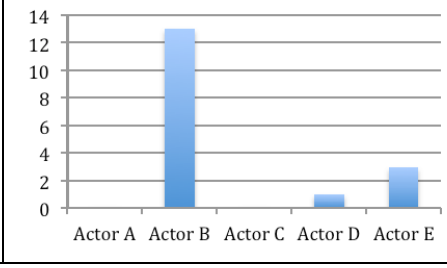
Q1: Who do you think profits the most?		
Which actor do you think profits the most from the agreed upon payment distribution ?		13 out of 17 experts thought that Actor B profited the most with the agreed upon payment distribution.

Figure 10.12 Results of ex-post evaluation survey: Who profits the most?

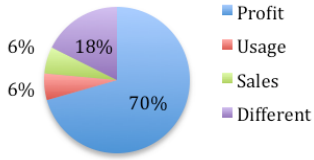
Q2: Bidding strategy		
Please describe your bidding strategy that you followed during the negotiation game		70% of the experts based their bidding strategy on the profit that they expect from the IT investment

Figure 10.13 Results of ex-post evaluation survey: Bidding strategy

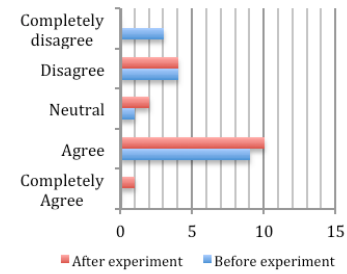
Q3: Anonymous information exchange		
Expected effect: *The possibility of anonymous information exchange makes it easier for competing actors to agree on a shared investment decision*		We compared the attitude of the experts before and after the experiment to the statement and found that experts are more positive about the effect of anonymous information exchange after they took part in the experiment

Figure 10.14 Results of ex-post evaluation survey: Anonymity

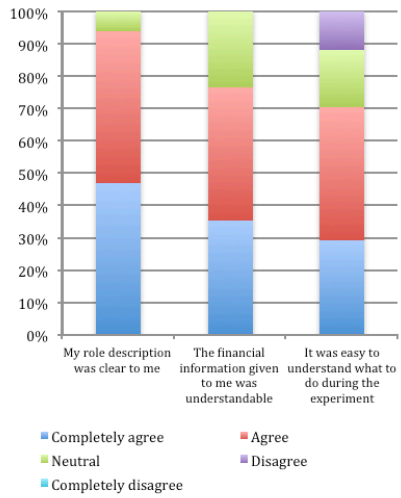
4 – Q6: Satisfaction with experiment		
Role description (Q4)		The role description was clear to all participants (one neutral)
Financial information (Q5)		The financial information was understandable to all participants (4 neutral)
What to do during experiment (Q6)		All, except two participants had no problems understanding what to do during the experiment

Figure 10.15 Results of ex-post evaluation survey: Satisfaction

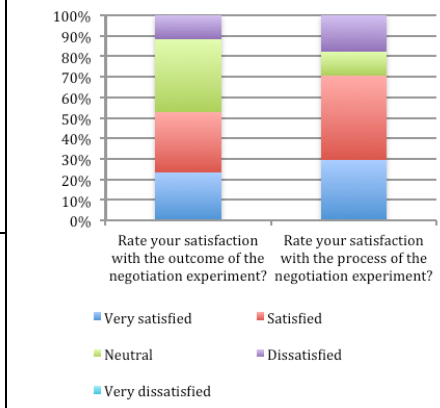
Q7 – Q8: Satisfaction with Outcome and Process		
Outcome (Q7)		More than 50% of the participants is satisfied with the outcome of the experiment. 2 experts were dissatisfied with the outcome
Process (Q8)		70 % were satisfied with the negotiation process during the process. 3 experts (18%) were dissatisfied with the process.

Figure 10.15 (continued) Results of ex-post evaluation survey: Satisfaction

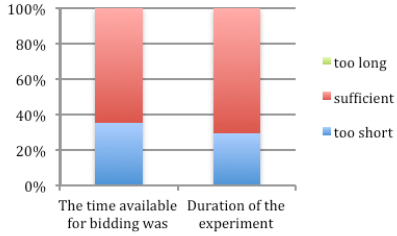
Q9 – Q10: Time available during experiment		
Time for bidding (Q9)		Most experts perceived the time for biding as sufficient (65%). Six experts found it too short.
Total experiment (Q10)	<u>Time available for bidding:</u> Experiment 1: 4 minutes per round Experiment 2, 3, 4: 8 minutes for round 1, 4 minutes for each further round <u>Duration of the experiment:</u> Experiment 1: 60 minutes Experiment 2, 3, 4: 90 minutes	Most experts perceived the duration of the experiment as sufficient (70%). Five experts found it too short.

Figure 10.16 Results of ex-post evaluation survey: Time available during experiment

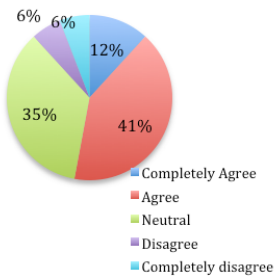
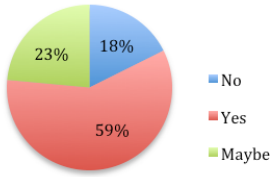
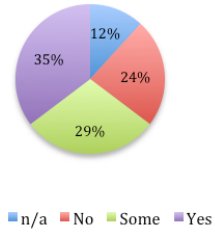
Q11– Q13: Applicability in real life (based on 1 MC (is the experiment realistic) and 2 open questions, which were coded by the author)		
The experiment was realistic (Q11)		Most experts (53 %) judge the experiment as being realistic. 12 % disagree with this.
Would you use the method for a real life project? (Q12)		59% of the experts would use the method in a real life project. An additional 23% would use the method if certain circumstances are given.
Does the negotiation game address problems that you experience in real life negotiations? (Q13)		35% of the experts think that the experiment addresses problems that they might experience in real life. 29% report that the experiment addresses some or partial problems. 24% do not experience such problems in real life.

Figure 10.17 Results of ex-post evaluation survey: Applicability in real life

Table 10.7 Answers to the open question: "Would you use the method for a real life project?" (Q12)

Yes	• Yes. • Yes, I even did this in practice. • Yes, it may make the process more transparent. • Great for using in education programs. • Could be used as a pilot first; may also be supportive during the negotiation process. • Yes, but only as one method, not as the main negotiation method. It could help to speed up the process. • Yes, I think it is a great way to negotiation anonymously. The experiment showed that iteratively adding information during the different rounds greatly supports the negotiation process. • Yes, to gain acceptance, but for decision making I would let a central management team decide on what criteria to use. • Yes, because it gives more insights in each other's positions. Yet, it is questionable whether you will have all information in real life. • Yes, if all information is available and similar to all players.
No	• No, the process should be guided by an objective controller. • No, the extra information is given in the wrong order. • Probably not yet, but I have not much real-life experience yet.
Maybe	• Possible. • Probably, if the overall financial information is available. • Maybe, as it is helpful as a method, but face-to-face will make the real decision. • I think that there should be more top down directive of guidance.

Table 10.8 Answers to the open question: "Does the negotiation game address problems that you experience in real life negotiations?" (Q13)

Yes	• Absolutely yes. • Yes, I have examples of negotiations that run in a similar way. • Yes, you are able to get a little bit more insight in the information from the different stakeholders and it helps to discuss a negotiation strategy. • Negotiation should be based on a strategy as will it be in real life. • Yes, the lack of use of agreed methods, numbers and the lack of combined information. • Yes, as it supports structuring information overload.
No	• Not really, the negotiation is more about what criteria to use for decision making. Then the final calculations are made based on that decision. • No not for me. I am in sales/business development and not in buying circles involved. • Not really. • No, this type of negotiations are not present in a small and medium enterprise (SME).
Some	• Partially, mostly not all figures are available. • It is based on information that you will not always have. • Sometimes. • Maybe, I am not sure. • A bit.

10.3.6 Focus group (qualitative unstructured interviews)

After each experiment session, we conducted a focus group (Morgan, 1997) with all experts that participated in the experiment. During these focus groups we collected feedback and reflected together with the participants on the experiment process and outcome (see Appendix D for the questions that were used to structure the discussion).

The following three themes were used to provide focus:

A. Experience of participants with design decisions
B. Bidding strategy
C. Real life applicability of the method

An aggregation of all insights is presented below (Table 10.9).

Table 10.9 Compiled answers of focus group discussion

A. Experience of participants with design decisions	Structured information disclosure: - "If you do not give extra information in the beginning, you see who values the system how much and who values it the most." - "The 1st bid is the most difficult." - The order of information is not logical (sales not so important, profit should be shown earlier not at last). - The profit information that is now provided last is actually the most important. Anonymity: - Participants do not perceive anonymity during the experiments as important. - Participants question which information can be dealt with the other actors without finding out who is actually playing which actor. Impact of seeing the bids of others: - "If one could not see the bids of the others, it would be very difficult to get to a decision." - Seeing the bids of the others was important as a basis for discussion. o First, one gets information about the relation of ones own bid to the bid of the other actors. o Then, one gets to see a norm (extra information).

B. Bidding strategy/Order of information	Explanation of bidding, chatting and negotiation behavior: - "E has the disadvantage of the rising star syndrome." - "B is the engine behind the entire organization, profiting quit a lot, could bid higher." - "Maybe if a "total crash" would happen somewhere during the process, e.g. the sum would drop significantly this might result in a better group motivation to actually get the money together." - The level of experience with games and negotiation of the actors might play a role in the negotiation via chat (e.g. if they stick to their position or if they are easily influenced by others). - "Rules, such like you can only go up and not down with your bid or a margin in which you can bid might be useful." o A was bidding very high in the beginning but did not dare to lower the bid during the process. o D lowered its bid during the process. - Different general bidding strategies described by the participants: o "I base my bid on financial information." o "I start low and went slowly higher during the process." - "A penalty for the case that many rounds are needed could be useful." Factor that bidding decision was based on: - The experts agreed that sales of the business unit would not be a viable factor to base the cost distribution on. - SSC usage and profit/profitability were found to be good factors to be used as a basis for the amount that experts find reasonable to bid. - Suggestion by one participant: "First discuss with the group on which factor the decision will be based on and afterwards discuss the amount." The participants expect that even if one actor would not agree on the factor the others might be willing to pay a little bit more to get to an agreement.

C. Real life applicability of the method	Method process improvement suggestions practical: - "Provide more time in the beginning, minimum of 8 minutes, afterwards less time is needed, e.g. 4 minutes." - "More time is needed in the beginning to understand the information." - Send PowerPoint presentation (guidelines) and login details to the experiment participants before the start of the experiment so they can already get familiar with the experiment. Method process improvement suggestions general: - "A funnel model would help: e.g. o First agree on a method, o then on a factor to base the bid on and o then on the value of the bid." - "When the difference to total was - € 623.000 one might have better stopped with bidding rounds, as each extra bidding round costs money but does not add much from that point onwards." - "Option to opt-out should be there." → Note: This option is there. - "The case is realistic, as information of one BU within one company is isolated from other BUs." - "In a real life project top management would most probably take a more active role and lead the process more." - "A controller would lead the discussion, manage the discussion, or at least decide which factor should be used to base the bid amount on." → Note: this is exactly the opposite of the situation we want to simulate: a situation where no actor has the power to make a decision but all actors have to jointly arrive at a shared decision. - "In real life projects, decisions are made more pragmatic (e.g. OV chipcard): 50% is distributed through usage, and 50% is distributed via volume of value." - "It is questionable, if usage, sales and profit information would at all be shared among actors in real life settings." - "Normally, there is always one actor that profits anyway, no matter if he participates in the project or not. So this might influence the negotiation to a big part as this actor is not dependent on the success of the project." System usefulness - "The system would help large organizations (Rijkswaterstaat, Kadaster), where not everybody has insights into other ones costs and benefits, and the decisions are made based on "dikke duim"." - "Getting to a decision would be more difficult if people would not have the support of the system, as people would just sit at a table and negotiate. Alternatively an external project leader could try to get input from everybody but this is more manual/personal effort." - "The face-to-face aspect of the system is important, as the system provides support (structure) but does not replace face-to-face aspects." - "The process helps to get everybody involved, so not one external person makes the entire decision by himself and then presents it to the people, but it is a group effort where the voice of the involved people is actually heard."

10.4 Discussion of results

In this section we will use the results presented in section 10.3 to answer our research questions and discuss the experiment process and outcome.

At the beginning of this chapter (see page 172) we defined the following research questions:

1. What is the influence of disclosing different kinds of information and anonymity on the business case negotiation process and outcome?
   1.1. How does the structured disclosure of financial information about one or several actors, influence the negotiation process and outcome?
   1.2. What is the influence of anonymity (anonymous chatting and information exchange) on the negotiation process and outcome?
   1.3. What is the influence of being able to see the bids of others on the negotiation process and outcome?
2. Is the SID4IOP method usable in real life projects?

We will first answer Question 1 describing how the BC negotiation process and outcome have been influenced by the three factors: structured information disclosure, anonymity and seeing the bids of others. In the remainder of this chapter we will use a simplified version (see Figure 10.18) of our conceptual model (Figure 10.1) to indicate which relationship we are discussing.

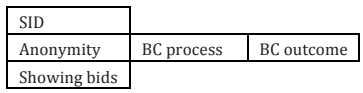


Figure 10.18 Outline: Simplified research model

10.4.1 Factors influencing the BC negotiation process and outcome

We will start this section with a discussion of the BC negotiation process. Then we will discuss the influence of the different factors on the BC negotiation process (first part of RQ 1.1-1.3). Following, the second part of research question 1.1-1.3 will be discussed focusing on the effect the three factors have on the outcome of the BC negotiation process.

BC negotiation process

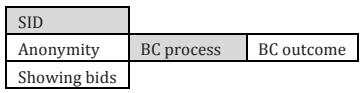
Analyzing the negotiation process, shown in Figure 10.6, one can observe the following developments:

Experiment 1: The negotiation process only lasted two rounds; an agreement about the payment distribution was reached after the second round. All except one actor increased their second bid.

Experiment 2: Consensus about the cost distribution was reached after all seven rounds were played. The final cost value for each participant was higher than the

begin value. Two of the actors (B and E) always increased their bid from phase to phase. The other three actors dropped their bids after round 3/4, when they received extra information about the different benchmarks.
Experiment 3: The actors in this experiment needed six negotiation rounds to reach consensus about a cost distribution. Again, the final cost value for each participant was higher than the begin value. Four of the actors either constantly raised their bid or kept it constant for one round. Only one actor (D) dropped his bid after receiving the extra information in round 4. He did not go up with his bid anymore.
Experiment 4: The actors in this experiment needed all seven negotiation rounds to reach consensus about a cost distribution. Again, the final cost value for each participant was higher than the starting value. Two of the actors (B, D) either constantly raised their bid or kept it constant for one round. Three actors (A, C, E) dropped their bids after receiving the extra information in round 4. Actor A dropped his bid significantly again, after the 5th round when he received another piece of extra information.

Comparing the four experiments we see the largest difference between the duration of Experiment 1 and the other three experiments. Next we will discuss the impact of the three factors (structured information disclosure, anonymity and seeing the bids of others) on the BC negotiation process.



Structured information disclosure → BC negotiation process

Analyzing the effect of structured information disclosure on the negotiation process we find the following:

Connecting the benchmarks with the bids of the actors at the moment when the benchmark was disclosed to the actors shows clearly that most actors actually took the benchmarks into account and adjusted their bids accordingly. This was nearly always the case when the adjustment meant a decrease in the bid and only sometimes the case when the adjustment meant an increase in the bid. During the focus group discussion, the participants explain that the suggested bid amounts provide an important norm to the participants. Some experts mention that they did not dare to decrease their bid during the bidding process.

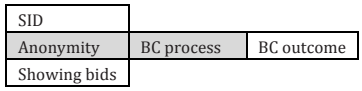
From the three benchmarks that we used to base the suggested bid amounts on, sales was perceived as the least appropriate factor to base the actual bid on. SSC usage and profit on the other hand were evaluated as appropriate factors. This result from the focus group is consistent with the findings of the survey for profit and sales. Based on the survey we see that 70% of the participants based their bidding strategy on profit and only 6% based it on sales. For SSC usage we see a different story in the survey than in the focus group, as only 6% report that they used SSC usage as a basis for their bidding strategy, while the focus group discussion suggested that this number should be much higher (more similar to

profit). Once the actors had received several suggested bids, they report in the focus group discussion (and we have verified it based on the data) that they base their bid on the factor that seems most logical to them, not the factor that would result in the lowest bid for them. They further believe that this would also be the case in real life projects, as going for the lowest amount would be too opportunistic and would not happen that often.

Our data does not indicate one unique/best order in which the information should be shown to the actors, but if used in a real case someone (project leader) could decide to provide some hints/extra information to the participants during the process of negotiation. Our method provides structure, but the order of information might change depending on the project. We chose to keep the profit information hidden as long as possible, as this was the most sensitive information, and might not always be desirable to be shared with all actors. The actors perceived it as the most important information and were complaining that it was only revealed in the last bidding round. Thus, a compromise has to be made between getting to an agreement as fast as possible and revealing sensitive information.

Participants of the experiments suggest during the focus group discussion to introduce a penalty for each extra round that is needed to come to an agreement. We think that its questionable if a penalty would indeed work. The more rounds the participants need to get to an agreement, the more of their sensitive information is disclosed to the others, which in itself is already a penalty.

Providing an answer to the first part of RQ 1.1, we found that: Actors indeed use the factors as benchmarks. They base their bid on the factor that seems most logical to them, not the factor that would result in the lowest bid for them.



Anonymity of data → BC negotiation process

Our research suggests that using a GDSS and allowing for anonymity leads to a better negotiation process, which is positive for all stakeholder in the network. Thus, we confirm the positive effects described by Wittenbaum (2004). In the focus group, participants mentioned that a group size of five actors was too small to not know who is playing which actor, however, a small "guess who played which actor" game after the experiment showed that the participants were wrong and that it was indeed already possible to stay anonymous with five actors.

The anonymous negotiation process allows actors to safely express their thoughts. We expect that we do not find the "social pressure" mechanism that was present in the anonymous group chat in a face-to-face discussion round where the identity of everyone is known. The two actors that participated remotely in two different sessions (each in one) valued the anonymity highly.

All actors value highly that their financial information is not know to the other actors at the beginning of the negotiation process.

Answering the first part of RQ 1.2, we found that anonymity (chatting and private information) aided the negotiation process.

SID		
Anonymity	BC process	BC outcome
Showing bids		

Seeing the bids of others → BC negotiation process

We decided to show the bids of the others in the experiment from the first round onwards. However, the answer to RQ 1.3 was already provided after our pilot experiments. During the three pilot experiments with academics we played around with our independent variable "show bids" to see what the effect would be on the experiment process. In 2 out of 3 pilot experiments the bids of the other actors were only visible after the fifth round. In one experiment all bids were made public after each round. Based on the discussions with the participants in the pilot experiments we decided to make the bids public after each round in the experiment set-up to provide a better base for a decision.

Comparing the way how the bid amounts changed in the two pilot experiments where the bids were not shown, with the pattern in the experiment where the bids were shown after each round leads to the following observations:

- The bid of the involved actors does not change much (stays stable) when the actors do not get information about the bids of the other actors.
- The bid of the involved actors fluctuates highly when the actors see the bid amounts of the other actors.

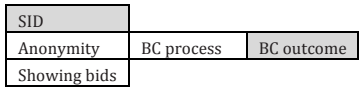
Thus, in the first case the actors seem to miss any motivation to adjust their bid amount after each round. In the second case the actors get this extra information, which is used as an input for discussion and to adjust the bid amount in the next round. The possibility to see one's own bid in relation to the bids of the other actors is valued highly by the participants. It provides an important basis for discussion during the negotiation process. Later on, when in round 5-7 the extra information about the other actors is disclosed, the comparison with the other actors bids becomes even more crucial. Being able to see the actual amount bid by an actor and his SSC usage, sales and profit numbers allows the other participants in the experiment to judge how much profit or loss the other actors are making with the current distribution. This information is very sensitive and had a big impact on the chat discussions between the different actors. We experienced that based on this combined knowledge (actual and proposed bid of other actors) several actors tried to jointly "push" one actor to increase his bid amount in the next round as he was until that point in time the one who would make the most profit with the current bid distribution. *We therefore conclude that (RQ 1.3): Seeing the bids of the others is crucial to have a reference point and is further an important basis for discussion during the negotiation process.*

After having described the impact of the three factors on the BC negotiation process we will next focus on their impact on the BC negotiation outcome.

BC negotiation outcome

Analyzing the outcome of the four experiments we find that more negotiation rounds lead to a more fair distribution of the costs. The participants in Experiment 2 and 4 needed more negotiation rounds to come to a cost distribution than the participants of Experiment 1 and 3.

Next we will discuss the impact of the three factors (structured information disclosure, anonymity and seeing the bids of others) on the BC negotiation outcome.

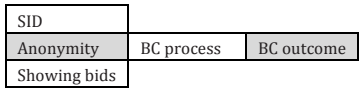


Structured information disclosure → BC negotiation outcome

In all pilots and the first experiment a decision was reached before any extra information (individual or group level) was revealed to the actors. In the other three experiments most information was disclosed before a decision was made.

Based on the analysis of the difference between the final bid amount and the two SSC usage and profit benchmarks, we find that if there is a big difference between the two amounts, then the final value of that one actor during the course of the four experiments varies a lot. If the difference between the SSC usage and profit benchmarks is lower, most participants playing that one actor settle around the same final bid amount. This shows that the benchmarks highly influence the outcome.

We further see that the outcome gets better when more negotiation rounds were needed, thus more information was structurally made available. However, at the same time when we see that the quality of the decision gets better with each round, we also see that the costs of giving up the anonymity of the information goes up. This provides an answer to the second part of RQ.1.1.



Anonymity of data → BC negotiation outcome

The two surveys show that the participants positively value the impact of anonymous information sharing on the easiness to reach an agreement about a shared decision. When comparing the attitude before and after the experiment we see that their attitude is more positive once they participated in our experiment. However, no conclusions can be drawn about the impact of anonymity on the outcome to the BC. *More research is needed to answer the second part of RQ 1.2.*

SID		
Anonymity	BC process	BC outcome
Showing bids		

Seeing the bids of others → BC negotiation outcome

In the focus group discussions the participants reflect on the importance of being able to see the bids of the others. They state that: "If one could not see the bids of the others, it would be very difficult to get to a decision." *However, as we decided not to vary this variable during the course of our experiment, we cannot make any definite conclusions about the relation between being able to see the bids of the others and the final outcome of the BC negotiation process (RQ 1.3, part 2).*

Summary on RQ1 (Influential Factors)

We can summarize that the impact of the three variables on the business case decision-making process is found to be positive. We did not have enough data to provide clear insights on the influence of anonymity and showing of bids on the BC outcome. We could, however, observe a positive effect of structured information disclosure on the BC outcomes. The distribution of the BC costs became better when more information was disclosed to the experiment participants.

For future usage we conclude that our method provides a structured way to reveal bits of information in an incremental fashion, however, we do not want to make any suggestions on the best order of revealing the different information pieces. This is dependent on the nature and content of the project itself. It is further questionable in how far the project leader would agree to share sensitive information with all other actors, even if it would be the only option to actually get to an agreement.

10.4.2 Real life usage of method

In order to answer our second research question: "***Is the SID4IOP method usable in real life projects?***" we are taking insights from all data sources into account. We will first discuss the practical applicability of the method. Following, we discuss in detail if the experiment participants perceive the method as being usable in real life. Finally, we shortly review if the method actually addresses problems that the experts experience in real life.

Practical applicability of the SID4IOP method

Already our pilot experiments have shown that the method has a potential to be applicable in a practical case setting. The seven questions asked in the ex-post survey about the satisfaction of the participants with the experiment itself, and the process and outcome of the negotiation as well as the time available support the findings from the pilot experiments. In particular we see that the role description and financial information given to the participants was clear and easy to understand (Figure 10.17). The navigation through the different screens during the experiment was not always clear to the participants, due to the fact that the entire experiment was based on Google docs and therefore slightly complicated, following, some (two) participants had difficulties understanding what to do during the experiment. When surveying the participants about their satisfaction

with the experiment process and outcome we find that 70% are (very) satisfied with the process, however, only slightly more than half of the participants (53%) are satisfied with the outcome of the experiments. 35% are neutral about the outcome and 2 people are dissatisfied with the outcome. Analyzing the data in more detail no relation can be found between the roles that the participants played in the experiment (e.g. Actor B or Actor D) and the satisfaction with the outcome or the process of the experiment.

All experiments, except Experiment 1, lasted about 90 minutes. This included an introductory presentation of about 15 minutes and time to evaluate the experiment (also 15 minutes). Thus, the actual negotiation process took about 60 minutes. Only the first experiment had a much shorter negotiation process of about 15 minutes as an agreement was reached after that time (2 rounds). Most participants perceived the total duration of the experiment as sufficient. Five experts would have liked to have more time, none of the experts found that it took too much time. We interpret this as an indication that the experts perceive the time as well invested, as we expect that they would have otherwise ticked that the experiment was too long. Three of the five experts that would have liked more time participated in the first experiment that took only 60 minutes.

65% of the participants evaluated the time available for bidding as being sufficient. Six participants felt that they had not enough time to bid (chat and calculate the next bid), especially in the beginning of the experiment. Three of these six participants took part in the first experiment where participants had 4 minutes during each round to come up with the next bid. Based on the feedback of this first experiment we increased the time available for bidding in the first round to 8 minutes in Experiments 2 to 4. This extra four minutes gave the people the time to get familiar with the game environment and process the huge amount of data that they got at the beginning of the experiment. After we adjusted the time available for bidding in the first bidding round to 8 minutes the general satisfaction with the time available was increased.

Does the method address real life problems?

35% of the experts experienced problems in real life projects that are addressed by the SID4IOP method. 29% report that the experiment addresses some or partial problems that they experience in practice and 24% do not experience problems addressed by the method in real life.

The experts mention (Table 10.8) that the SID4IOP method supports the development of a strategy that can be used during the negotiation process. They further experienced the problem of unstructured or even lacking information in real life projects, which were addressed by our method.

The experts that did not experience any of the problems addressed by the method in practice give two reasons for this: (i) the different nature of the projects (e.g. projects in SMEs and/or sales do not have such complex negotiations); and (ii) that they think that negotiation should be based on the criteria to use and not the final calculations. This aspect came back in the focus group discussion, where a funnel approach was suggested. In such a funnel approach the people should first agree on which method they want to use for the negotiation process, then use the

method to agree on a factor to base the final decision on and only then agree on the final value of the cost distribution.

The case itself that was used during the experiments was perceived as being representative for many business problems, where even within one company the information of different BUs is isolated from each other.

Usability in real life

Realism:

During the focus group discussion the experts reported on cases where the costs and benefit distribution was largely unknown and decisions were made based on rough judgments. They believe that the negotiation game would be usable in such projects.

Based on this survey we find that most experts (53%) judge the experiment approach as being realistic compared to their prior negotiation experience. 35% have a neutral attitude and 12% disagree with this. When interpreting these numbers we have to take into account that three of the participants have no experience with negotiation in inter-organizational projects. Thus, they have no projects to compare the experiment with, and we therefore expect that these people might a hard time to judge whether the experiment was realistic. Two of these three participants without experience with inter-organizational decisions agreed, that the experiment was realistic; one of them disagreed. We conclude that the method is feasible and that experts are able to deploy it in real life cases.

Usage in real life:

The next question, about the usage in real life was asked as open questions to the participants, thus the answers had to be coded and interpreted by the author of this thesis and another researcher. We find that 59% of the experts would use the method in a real life project. An additional 23% would use the method if certain circumstances were given. The motivation and doubts mentioned by the participants are listed in Table 10.7. The participants of the experiments value that our SID4IOP method supports the negotiation process as it fastens up the process and makes it more transparent. Another benefit of the method is that it provides insights into the situation/position of the other stakeholders. Thus, it helps to gain acceptance among the different project partners. Another participant mentions that the method provides a great way to negotiate anonymously. And that the experiment showed that iteratively adding information during the different rounds greatly supports the negotiation process.

One expert notes that the method would be very useful for large organizations, where not everybody has insights into the costs and benefits of the others, and decisions are currently made based on rules of thumb.

Other participants were more uncertain whether or not they would use the method in a real life project and therefore expressed some doubts, limitations and requirements. One requirement deemed important is that all financial and other information that is used as input for the method is actually available to the different actors. This is an important concern, and should be included as requirement for the method to be used in a real life project.

Central authority:

Another issue that got addressed by the experiment participants is the wish for a central authority – objective controller or manager – that has more power over the negotiation process and e.g. guides the negotiation process or decides on which criteria is used as a basis for the height of the bided amount. Given that, in this research project, we always focus on situations where the involved actors have shared decision power, adding a central authority to the negotiation process is not desirable. We admit that adding a central authority might indeed improve the negotiation process, as in the end one actor has the power to make the final decision. However, as this is not always possible in inter-organizational settings, in this research we are focusing on developing a method that provides support when not one actor has the power to make a decision, but this power is shared.

The decision making process:

The structured disclosure of information raised some questions among the experts. One questioned if, in a real life setting, usage, sales and profit data would actually at all be shared with competitive parties. We note that our method relies on the assumption that this kind of data can be shared (although this might not be preferable). Another actor felt that the extra information was given in the wrong order, as he perceived profit as most important and was not satisfied that this information was only given in the last round. We note that the order in which the information was given in the experiments was a selection, but other orders are possible. If one uses the SID4IOP method in a real life project the project leader or project management team would need to decide in the beginning of the project which information is used as input and which of this information is iteratively shared during the process, thus determine the factors that are suggested for decision making. The project leader should also determine the order in which the information is shown to the stakeholders. We have chosen to keep the most sensitive information, in our case the profit information, hidden as long as possible and only show it as a last possible input to help the actors to come to an agreement. Not all participants were happy with this decision. We will give some advice on this decision when discussing the design requirements in section 10.5.

The participants agree that getting to a decision would be more difficult if people would not have the support of the method and just sit at a table and negotiate. As an alternative to the method an external project leader could try to get input from everybody and then lead the discussion, however, this would require more manual effort.

Another actor expressed the thought that, although the SID4IOP method is helpful during the negotiation process, the final decision should be made during a face-to-face discussion. We believe that the necessity of having a face-to-face discussion in addition to the method supported negotiation process is highly dependent on the nature of the project. We will give some guidelines on deciding whether or not such an additional discussion is necessary in Section 10.5.

Finally, the experts value the method highly for its process that helps to get everybody involved. Thus, it is not one external person making the entire decision

by itself and then presenting it to the people as a fact, but it is a group effort where the voice of the involved people is actually heard.

10.4.3 Additional method improvement suggestions

During the focus group discussion, the participants of the experiment came up with some more improvement suggestions for the method and its deployment process to make it better applicable to practical cases.

- Stop the bidding process:
  First of all, the project team might decide to stop the bidding process as soon as a distribution within a certain margin was reached. Thus, do not wait until the entire amount got distributed but stop as soon as only a certain amount is left to be distributed. The logic behind this idea is that the distribution of such a small amount (e.g. 623.000 Euro in Experiment 4) might involve more effort and costs than if this remaining sum would simply be distributed proportionally among all actors.
- Do not allow a decrease in bids:
  The participants also suggested to add additional rules to the method that allow people to only go up and not down with their bid or to add a margin in which one can place a bid. We do not have any experience with such rules, but the focus group discussion showed that it is definitely a topic that plays a role. Some participants reported that they started with a bid that they considered being too high after they saw the bids of the other actors, but that they did not dare to lower the bid afterwards anymore. Other actors did not have a problem with lowering the bid during the negotiation process. Thus, as it seems to be highly dependent on the person, a regulation including restrictions might be a useful addition to the SID4IOP method.
- Deal with actors that always profit from the project:
  Normally, there is always one actor that profits anyway, no matter if they participate in the project or not, so they might influence the negotiation to a big part as they are not dependent on the success of the project. A way to deal with such actors needs to be found.

10.5 Design requirements

In this section we will compile a list of design requirements that need to be included in an update of our SID4IOP method. The requirements are based on the insights we gained during the experiments and the discussions we had with the participants afterwards. Some of the listed requirements are already included in our current version of the method, but we, nevertheless, mention them to stress their importance for the success of the method. We will structure our design requirements along the following three topics: Requirements related to (i) the tool, (ii) the context and (iii) the content important during the method deployment process:

Requirement related to the *tool*:

1. Our current version of the method is based on Google docs. Given the complexity of the problem a more intuitive tool that allows for easier navigation throughout the negotiation process will increase the usability of the method significantly.
2. It might further be valuable to include a dashboard where actors can see the effect of their bid heights on their own financial situation before they make the actual bid.
3. Make an overview of data that necessarily needs to be included in the financial information. Such a document can serve as guideline to the people that prepare the financial information input. The project manager or facilitator needs to make sure that this basic information is actually available to all involved actors (least common denominator). The availability of information is important for selecting a benchmark factor.

Requirements related to the deployment process *context*:

4. The role of the facilitator is very important, in order to successfully lead the process the facilitator should be:
   - Experienced with BC development
   - Carefully selected
   - Be independent from the project team (not be biased)

   It might further be useful to set up a list with rules of behavior that specify what the facilitator is allowed to do, e.g. on which requests/questions of single actors he is allowed to answer. In an ideal case there is no human facilitator but a smart system that cannot be influenced by the people during the process.
5. Before the start of the project it is important that all involved participants get a thorough introduction into the method. One might chose to distribute preparation material before the actual project session via email.
6. A list that describes the requirements which the different project participants need to fulfill is useful to ensure that enough knowledge is present in the project team to arrive at a decision. Hereby it is especially important that:
   - Subject matter experts are involved in the project.
   - The involved participants are decision makers or actors with the power to actually make financial decisions.
   - It is advisable that all involved actors have experience with BCD. This will ease up and shorten the process.
7. If there is enough time in the project process, the time available for bidding might be increased. In our experiment we set the time to a minimum of 8 minutes in the first rounds and a minimum of 4 minutes in later rounds. The time aspect might play a smaller role in a real negotiation process than in a game environment.

Requirements related to the deployment process *content*:

8. Compile a list with topics that should come to the surface during the chat communications, as guideline for the facilitator.
9. Examine a funnel approach for the method deployment. Such an approach could look like the following:
   - First, agree on a method.
   - Second, determine factor (benchmark) to base the bid on.
   - Third, determine the final value of the bid.
10. With respect to the order in which the benchmarking information is shown, two strategies can be identified. For both strategies it is important that the different actors are all willing to share their data with the other parties. Which of the strategies is preferred depends on the project context.
    - Strategy one: share less sensitive data first; keep sensitive information until the last moment (like it was done in our experiment).
    - Strategy two: show most important but also maybe most sensitive information at the beginning of the negotiation, and shorten negotiation process by this.
11. About the topic whether the negotiation process should be held fact-to-face or during a complete online session we conclude that both options are generally possible. Which option is more suitable depends on:
    - The knowledge of the involved experts about the method;
    - The level of competition in the project group;
    - The importance of anonymity;
    - And the physical distance.

10.6 Limitations

Exploring the BCD process and its connected negotiation process is a rather complex and challenging task. Given the complexity most negotiation studies are done under laboratory conditions, focusing only on some aspects. Our choice to do this research in an experiment setting has several implications.

- The actors are only "playing" a case and have no real stake in the decision.
- Our experiment setting might manipulate the natural way of discussing of the individual actors.
- A weakness of focus group techniques is that they are driven by the researcher, meaning that there is always a residual threat to the accuracy of what focus group members say.
- Another validity concern in focus group studies is that the researcher influences the group interaction. However, a study by Morgan (1997) indicates that "in reality, there is no hard evidence that the focus group's moderator's impact on the data is any greater than the researcher's impact in participant observation or individual interviewing."

10.7 Conclusion

We first thought that the study of the bidding behavior and the chat messages would be the most interesting part in this experiment, but it turned out that the discussions after the actual experiment, provided the most valuable insights into the usability of the method. Answering RQ 1.1. we found that the benchmarks and information that was made structurally available influences the bidding behavior and helps participants to find a reasonable bid. The anonymous environment provided by our method gives actors an environment in which they feel safe to share parts of their sensitive information. The anonymous chat functionality produces a group dynamic in which not only information is shared and discussed but in which also social pressure is executed to get to a more fair distribution of costs (RQ 1.2). Last but not least we experience that seeing the bids of the others is essential to have a good basis and a reference point for discussion (RQ 1.3). Summarizing the answers to RQ 2 we find that the SID4IOP method is usable for real life projects if all necessary information is actual available to the actors. However, the structure and order of the disclosed information might need to be adapted according to the practical case setting.

11

Conclusion

"Talk about a dream – try to make it real" (Badlands, Bruce Springsteen)

This last chapter presents the conclusions of this dissertation, discusses the findings and their validity and it identifies topics that we believe are relevant for future research. The chapter is structured as follows: Section 11.1 reviews our three research questions presented in Chapter 1. Next, Section 11.2 presents the main contributions of our research. Following, we discuss our research approach taken and the limitations of our business case for inter-organizational projects (BC4IOP) methodology (Section 9.3). Finally, Section 11.4 describes directions for future research.

Before answering our research questions we specify the context in which our research was carried out: inter-organizational IT projects. We shortly introduce the essential characteristics and mechanisms that define our research context.

We define inter-organizational projects as follows (Chapter 4): Several profit and loss responsible units, either within one company or, for example a network of companies, that work together to reach a goal. In order to reach this goal they need to make a joint investment. The actors in our context have shared decision power. This means, that no actor has the exclusive power to determine which option is chosen but that all actors jointly need to evaluate the different investment options and distribute the costs of the investment.

Four mechanisms were found to play an essential role when jointly developing a business case (BC) (Section 4.4.2): (i) The level of competition, (ii) the similarity of the semantics, (iii) the alignment of the goals and objectives and (iv) the willingness to share information.

11.1 Answers to research questions

The purpose of this research is to improve the development of shared BCs in inter-organizational projects. In order to learn about current ways of business case development (BCD) described by literature and experts, we formulate our first research question as follows:

1: What are advantages and shortcomings of current business case development methods and practices in the IS domain, according to both scientific literature and practitioners?

When researching the concept of a BC, one needs to be aware that a BC uses inputs from cost estimation, benefits management and risk management. In this thesis the first two elements are investigated. The main focus was on benefits management, as the problem investigation (Chapter 1, Figure 1.1) showed that most challenges were found with respect to benefits and that cost estimation is better understood by current literature.

With respect to the benefits of an IS implementation a detailed analysis of scientific literature was conducted that resulted in the identification of 17 different benefits management (BM) methods (Chapter 3, Table 3.4). This list was continued with a detailed discussion and a multi-criteria analysis with a group of experts. The Cranfield Process Model of Benefits Management (Ward and Daniel, 2006) was selected as being most complete and fulfilling most of the criteria listed below (Figure 11.1). Therefore this method was used as foundation for the improved BM method. Based on an investigation with practitioners, it is concluded that a successful BM method should fulfill the criteria listed in Figure 11.1.

A BM method is expected to:
i) be able to correctly quantify benefits,
ii) be not too abstract and include practical tools,
iii) be able to clearly assign responsibilities for benefit identification, measurement and realization and
iv) be able to the method with existing project approaches and key performance indicators.

Figure 11.1 Selection criteria for BM methods

Based on our literature study as well as interviews with practitioners we identified a list of in total 40 design specifications (listed in Table 3.5 and Table 5.14). These design specifications were used as input for our method design process.

We use the findings from RQ1 as input for our second research question, where we attempt to design a solution for the problems identified in our first research step.

2: Design a methodology to improve the development and use of BCs to support investment decisions of inter-organizational information system implementations. (D)

The major result of our research activities is the development and validation of our BC4IOP methodology (Chapter 6). *BC4IOP* stands for *business case for inter-organizational projects*. It is built to support actors in an inter-organizational project with the assessment and management of the benefits, and the distribution of the costs of a joint investment. It consists of three main components:

- **BM4IOP**: a comprehensive *benefits* identification, specification and *management* method;
- **VM4IOP**: a method that extends current *value modeling* logic to the area of inter-organizational BCD. It helps actors to (i) get better insights into their network and (ii) develop a shared BC based on an individual BC;
- **SID4IOP**: a method that, helps actors to achieve agreement on the cost distribution in a shared project. It is based on the *structured disclosure* of sensitive financial *information*.

During our method design process we addressed most of the design specifications identified in the problem investigation phase. Section 11.2 will discuss which of the design specifications are covered by the BC4IOP methodology and why some design specifications are not addressed.

BM4IOP: Building upon existing BM methods, described in literature and by practitioners, we developed an improved BM method that supports (i) the development of an individual BC and (ii) serves as input for a joint decision making process (Chapter 7). The method is designed to be used as a self-selective toolbox and therefore has the following properties:

- Flexible in offering tools & techniques.
- Easy to use by reduced complexity.
- Differentiates between a benefit owner and a subject matter expert.
- Supports the initial benefits identification process, resulting in a more complete benefits list (see Chapter 7).
- Comes with a manual that provides extensive guidance throughout the process.
- Encourages experts to have detailed discussions about each benefit by:
    - including an expected benefit delivery time frame;
    - specifying the frequency and probability of reaching the benefit;
    - increasing the quality, measurability and completeness of the identified benefits.
- Supports the identification of dependencies between benefits within one project and on a portfolio level between several projects.
- Provides participants with a platform and process that generates discussion.

VM4IOP: Our second method component to support the BCD process in inter-organizational setting is based on value modeling logic (Chapter 7). We argue that using value models (VM) in the BCD process helps to (i) analyze how each actor is currently exchanging value with the other actors in the network and (ii) specify how costs and benefits are distributed in an inter-organizational network. VMs do not necessarily offer in-depth specifications and value quantifications, but they can initiate knowledge sharing. Their ability to differentiate between private and public value streams and information is expected to positively influence the BCD process. Our research shows first indications on this phenomenon. We propose that complementing a BC with a VM will improve the quality of the BC because the various investment or implementation options relevant to the network's actors are presented explicitly and, in turn, are understood better.

SID4IOP: To address the biggest challenge of our research, the distribution of costs and benefits, we designed a method to allocate the costs and benefits of a project to partners in a way that the entire network is profitable (Chapter 9). The SID4IOP method provides competing actors with a way to structure their decision making process during the BCD process. Our research shows this is especially important in complex settings where stakeholders lack a way to structure their negotiation process. The method builds upon the structured and anonymous disclosure of sensitive financial information. This information covers both data about each individual stakeholder as well as about all involved actors. Our empirical evaluations within our design cycle show that making sensitive information gradually available is an effective way to support the issues of this specific problem, both conceptually and from a practitioner's perspective. The SID: (i) provides a structure to find the right percentage each individual actor should pay as part of the costs, (ii) provides valuable input for the discussion with other actors, and (iii) encourages stakeholders to come to an agreement before all sensitive information is shared.

After conducting several design cycles to arrive at our method described above the last step in our research is to answer the following question:

3: What is the contribution of our proposed methodology? (K)

To empirically validate the contribution of the BC4IOP method, we conducted four case studies and one experiment with four sessions. Whereas the case studies (Chapter 8) were used to assess the usability of the BM4IOP component, the experiment (Chapter 10) was used to validate the SID4BC different component of our BC4IOP method. We assessed the deployability of the method, the quality of the outcome and the efficacy of the deployment process.

BM4IOP method: The results of deploying the BM4IOP method in four case studies are evaluated based on: (i) the outcome of the method itself (the benefits) and (ii) the results of a survey used to capture the evaluation of the participants. Evaluation of both results shows that the BM4IOP method greatly improves the quality of the identified benefits during the BCD process. The case owners and participants indicate that they identify additional benefits and that the found benefits are specific, feasible and relevant for the project at hand. They further report increased insights into the project and increased commitment of the project participants. The only negative feedback we got was that the participants perceived the workshops as too short. They would have liked to have more time for in-depth discussion and the creation of shared understanding about each benefit.

The results further show that the BM4IOP method is operational for use. Deploying the method requires an average of 8 hours per participant with a maximum of 10 participants. Participants perceive the time invested as well spent and would use the method for future projects. The participants believe that the method is viable to use (benefits > costs) once the budget of the project exceeds

€500.000. The results of the case studies show that both the workshop planning and the right composition of project participants are essential to the success of the BM process.

VM4IOP method: We deployed this component of our method in an exemplary case, where we explain the project situation once without value models and once with value models. Afterwards we evaluated what the VM4IOP brings as extra value for the BCD process and outcome, using six evaluation criteria. This first evaluation of the VM4IOP method shows the following results with respect to process and outcome:

- BCD process: VMs help actors to get insights into the value distribution of the entire network. They further encourage actors to separate private and public information. However, the VM4IOP method lacks decision and negotiation support elements.
- BC outcome: The development of a VM supports actors in developing a shared understanding of how value can be defined. Although the VM allows for a quick overview of the network constellation, it does not include any detailed description of the actual situation. Given that all actors use the same compatible dimensions (value exchange, costs, benefits), VMs can be a very valuable addition to increase the comparability of different investment/implementation options.

VM4IOP thus has an effective, but when deployed on its own, limited contribution to the entire BCD process. We, therefore, propose to deploy the method together with at least one other method element to exploit the full potential of VM4IOP.

SID4IOP method: We deployed the SID4IOP method in a serious game. This enabled us to investigate:

i) if the method helps a group of people to agree on a cost distribution,
ii) if the participants perceive the method as useful and
iii) how the structured disclosure of information influences the negotiation process and outcome.

We found that all groups agreed upon a distribution of the investment costs. Most participants were satisfied with the negotiation process and outcomes as it was supported by the method. We could not find any relation between the satisfaction of the participants and other parameters, such as the absolute outcome of the process or the length of the process. Most participants agreed that the possibility of anonymous information exchange makes it easier for competing actors to agree on a shared investment decision. We observe that the structured disclosure of information impacts the bidding behavior of the actors. However, the impact varies between the different experiments. Most actors settled with their final bid in the middle between the suggested amount based on SSC usage and profit. Although we analyzed the chat log using content analysis, no direct relation between, e.g. the content of the chats and the outcome could be found. We observed that social pressure was used during the course of the experiment, however, future research is needed to get more insights into this effect.

The discussion of our research questions shows that we developed and successfully validated a methodology that is grounded in scientific literature and addresses the demands of practitioners. Our BC4IOP methodology consists out of three individual method components: BM4IOP, VM4IOP and SID4IOP. Based on the discussion of each of these individual parts provided above, we move one step further and conclude this section with a short discussion of the BC4IOP methodology as a whole. Once the different components are combined and deployed as a complete methodology we expect that synergy effects will evolve that make the methodology as a whole more valuable than the sum of its parts. As a whole the BC4IOP methodology is capable of covering the entire BCD process. Project managers can use it as a management instrument during the entire IT implementation. It is the combination of: the *identification and specification* of costs and benefits for an *individual BC* and the *decision* about the cost and benefit distribution in a *shared BC*, that make BC4IOP a strong and unique methodology.

11.2 Review of the design specifications

Based on our literature study as well as interviews with practitioners we identified a list of in total 40 design specifications (listed in Table 3.5 and Table 5.14). These design specifications were used as input for our method design process. Our final methodology, presented in this dissertation covers 32 of the 40 design specifications. Table 11.1 gives an overview of the design specifications (their reference codes) that are directly addressed by the BC4IOP methodology and those that are not. One can see that most unaddressed design specifications are related to the product of the method. Most design specifications that were not directly addressed were formulated on a different abstraction level than our BC4IOP methodology.

Table 11.1 Design specifications covered/ not covered by BC4IOP

	Avison Category	**Reference code**
Design specifications *that are explicitly* stated by BC4IOP	Philosophy	P1, P2, P3, P4, P5, P6
	Model	M2, M3
	Technique and Tools	T1, T2, T3, T4, T5, T6, T7, T8, T10
	Scope	S1, S3, S4
	Outputs	O1, O3, O4, O5, O6
	Practice	Pra1, Pra2, Pra3, Pra4
	Product	Pro4, Pro6
Design specifications *that are not explicitly* specified by BC4IOP	Philosophy	P7
	Model	M1
	Technique and Tools	T9
	Scope	S2
	Outputs	O2
	Practice	-
	Product	Pro1, Pro2, Pro3, Pro5

The following design specifications are included in the idea behind our methodology, but are not directly specified in the methodology description in this thesis:

- P7: A method that is simple, well defined and integrated into current constructs of implementation methods (e.g. project management).
- M1: Models that allow organizations to practice benefits management in their own common way.
- S2: Start a BCD project at the business context.
- O2: The method must not be too abstract/high-level.
- Pro 1: Methods and best practices that apply to the organization and its processes.

For future development of the method it is important that the following design specifications are addressed:

- T9: Support an idea generation and change initiation process, e.g with brainstorming, deBono, Janusian thinking.
- Pro 2: Develop guidelines, training, workshops that help users to use the method.
- Pro 3: Specify different reports for different stakeholders.
- Pro 5: Develop a practical handbook that accompanies the method.

11.3 Contributions

11.3.1 Contributions to research

This thesis combines insights from different disciplines and research domains, in particular from the IS domain, information economics and organizational science with an emphasis on: IT evaluation, systems development methods, enterprise systems, project management, benefits management and organizational learning. Using a multi-method approach we demonstrate how design science can be used to address problems that combine insights from these domains. We structure our contributions to research by addressing the following two research goals defined in Chapter 1.

Design a benefits management method for IS implementation projects, that is feasible, effective and efficient.

Design a business case development methodology for inter-organizational IS implementations that builds upon best practices from practitioners and evidence from literature.

The first research goal is addressed by our BM4IOP method. The method itself is a contribution to research, but especially the method comparison performed as part of the design process is expected to deliver added value for future researchers.

Benefits management method comparison
Building upon a systematic review of the benefits management literature by Braun et al. (2009) we provide an extensive overview of benefits management methods developed by researchers as well as practitioners. This results in the identification of 17 different benefits management methods, eleven from scientific literature and six developed in practice. There are significant differences between these methods. We show how the framework of Avison et al. (2006), developed specifically for the comparison of methodologies, can be applied to the domain of benefits management. The resulting comparison of the 17 benefits management methods shows that among others:

- 11 methods are developed in research, 6 in practice.
- Only 6 methods provide a conceptual model that guides the benefits thinking and reflection during the practical application.
- 13 methods discuss the quantification of benefits, of which 2 only briefly discuss the topic.
- 9 methods encourage the user to assign roles and responsibilities for the identification, measurement and realization of benefits.
- 5 methods support the integration of the method with existing business processes and KPIs by delivering a plan or report as output.

We reached our second research goal by developing the BC4IOP methodology and by constructing a conceptual framework that helps to understand the BCD process in inter-organizational IS implementations. The artifacts deliver the following contributions to research:

The BC4IOP methodology
Our first contribution to research is the BC4IOP methodology itself. BC4IOP is not a completely new contribution as several elements are closely related to established methods; the combination of these elements and their tailoring for inter-organizational projects is new.

Conceptual framework of inter-organizational BCD
Our research adds up to the body of knowledge on inter-organizational BCD. It provides better understanding of the mechanisms that play a role in inter-organizational decision-making and the process of coming to an agreement in such settings. To start with, we identify three distinctive project constellation patterns that help to understand different inter-organizational settings (Hong, 2002). The patterns are based on the number of actors, from the same and multiple sectors, participating in the project. These project constellations influence the quality of the BCD process significantly, via the following four mediating factors: (i) consensus of goals, (ii) cultural similarities, (iii) semantic similarities and (iv) willingness to share information.

11.3.2 Contributions to practice

Next to delivering contributions to research, this design science research was set out to eventually design a solution that is contributing to practice: the BC4IOP methodology.

The BC4IOP methodology, as outcome of this research, is build based on a thorough analysis of current literature and demands of practitioners. It provides experts in the field of IS and related fields with an approach to successfully manage the BCD process in inter-organizational settings. It can be used as business case development methodology by management and IT consulting companies, by project managers in IT adopting organizations and managers of inter-organizational projects. We claim that a thoroughly build and continuously managed BC will increase the chances that the project delivers the planned benefits in time and budget. Our methodology consists of the following artifacts:

- A theoretical description of the methodology and its components;
- Step-by-step guidelines how each component of the method can be deployed in practice and
- A tool-set that supports experts with deploying the method in practice.

Although we did not have the chance to validate the entire BC4IOP methodology in a real life case, our validation of the BM4IOP method in four multi-national companies provides great examples of how the method can be deployed in practice. Project managers interested in deploying the method in their project can learn from our industry cases. The insights gained during the deployment and the satisfaction of the users with the BM method makes us optimistic that our method will make benefits management in future projects easier, more transparent, and more successful than it is currently the case. This holds for both intra- as well as inter-organizational projects. Thus, we hope that we can contribute to an increased number of projects that actually realize their benefits.

11.4 Validity discussion

In this section we will shortly describe validity concerns that one should keep in mind when interpreting our results. We tried to overcome most validity concerns by using a mixed method approach, also referred to as data triangulation. This way we attempt to get a deep understanding of our mainly qualitative research findings. A detailed discussion of how we address the different validity threats can be found in the respective chapters.

11.4.1 Internal validity

Internal validity investigates whether any correlation found between our variables can be accounted for by a third variable. We identify several causal relations in our research. Internal validity plays especially a role for the mechanisms that we describe in our conceptual framework in Chapter 4, related to factors that influence the BCD process and outcome. Although we applied the framework in several case studies, it might still be the case that other factors, than the ones identified by us, impact the BCD process and outcome in inter-organizational projects. We further propose several relationships in Chapter 9, when discussing

the influence of structured information disclosure, anonymity and showing the bids of others on the BC decision process and outcome. For these claims, the same holds as described above: Other factors, out of the scope of our research, might as well influence the BCD process and outcome. Thus, when reading our conclusions one has to keep in mind that other factors, not researched by us, might as well explain (parts) of the relationships found.

11.4.2 External validity

This research is conducted having a general IS project implementation evaluation perspective in mind. During our research we investigated one special kind of IS in particular: Enterprise system implementations in an inter-organizational context. Throughout our research, from 2008 until 2012, the perception of what an ES is and how it can be used has changed. Early versions of our methodology were developed based on a classical ES viewpoint, as it can also be found in step-by-step methodologies such as ASAP. Our latest version of our BC4IOP methodology takes a modular approach that is still applicable to the complex setting of an ES implementation but also to more recent software delivery models. For example an investment decisions about the implementation of a software as a service (SAAS) architecture. However, the BC4IOP methodology is less suited for the determination of e.g. service compositions using such a SAAS architecture.

The main difference between ES and SAAS is the time scale and size of an average project. Whereas ES projects typically have a long time span, SAAS composition projects often are about short-term investments. The composition of services might change every day, thus one might need to want to evaluate for e.g. each customer which service composition would deliver the highest value. Although one could use the VM4BC method for this purpose we are afraid that our method is too heavy loaded for such decision. Although some parts of our method might be applicable to short-term investments, our method is primarily build with having investments for complex, rather rigid systems in mind. Thus, our method is expected to be of value for investment decisions about systems with such kind of characteristics.

11.5 Future work

As this thesis has a limited scope and time frame there are still plenty of open questions to be answered by future research. In this section we will shortly describe a few issues related to BCD in inter-organizational settings, that we think should be analyzed next. We cover two main topics, the deployment of the method/element in real life projects and the extension of the scope of the method.

Method deployment

Below we describe some ideas for future research that are directly related to the deployment, especially extended validation of our methodology.

With respect to the negotiation process and getting to an agreement process: More research is needed to analyze the role social elements, such as physical presence have on the negotiation process. Further, more experiments with remote/online usage of the SID4BC method should be executed to analyze if the BC

discussion process and outcome are still efficient if all project participants are located remotely and all interaction happens online.

Our SID4BC should be deployed in a real life project, not only an experiment, to truly validate it. Further, the VM4IOP method should be deployed in a real life inter-organizational project to validate its usability.

The entire method should be deployed in several projects to analyze the synergy between the different method elements. This can best be done in a longitudinal case study. A comparison could be made between deploying the method in an ES project and a SAAS project (see discussion above §11.4.2).

Scope of the method

The issues below cover future research ideas that go beyond the current scope of our methodology.

Future research could extend the scope of the method towards risks. Interesting questions are how the risks of a project influence the costs and the benefits of a project and how can they be dealt with in an inter-organizational project. One could e.g. research how IT governance frameworks that address IT risk management, such as COBIT (ISACA, 2012) could be used to complement our BC method.

It might further be interesting to perform a detailed discussion on how to treat uncertainty of a project in the BCD process. We further propose to extend the guidelines and tool support of the BM4IOP method to do another step towards the actual quantification of benefits. Further research might want to take insights from organizational learning and expectations management into account.

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Appendices:

Appendix A (Chapter 5):

Questionnaire interviews with experts from adopting organizations

1. Introduction

- Introduce each other
- Duration of interview (45 min) + Goal (To investigate how business cases are being developed and used throughout IT projects)
- Could you tell something about your function (department, relation to business cases)
- Could you tell us your definition of a business case (goal, elements, etc)?
- Could you tell us for what investments/projects business cases are being developed? (different categories?)

2. Development of a business case (+/- 10 min)

- Could you describe the process regarding the building of a business case (based on the image)
    - Are there different phases in the development of the business case (for example, according PRINCE2)? Are there different documents that need to be delivered for each phase?
    - How much time does this process consume?
- Is the process different for different types of investments? (e.g. run, grow, transform the business)
    - Is the content of the business case different/is the business case evaluated in a different way?
- Could you tell how you define costs, and how these costs are determined?
- Could you tell how you define benefits, and how these benefits are determined?
    - Non-financial benefits? Are these taken into account?
    - Is it determined how these benefits will be measured after the project?
- Are risks taken into account? And how are these risks identified?
- Could you tell us what the costs for developing a business case are?
- Could you tell us what departments/persons are involved in the development of a business case?
    - Is the business case being reviewed by independent parties?

3. Business case during project (+/- 10 min)

- Can different phases be recognized during a project?
- Is the business case being updated during these phases/the project?
    - What events cause the business case to be updated?
        - Is the business case also reevaluated?
    - Which elements of the business case are taken into account?

        - Financial consequences
        - Non-financial consequences
        - Risks
        - Planning
- Is the business case used to manage a project?
    - What elements of the business case are used for this?

4. Business case after a project (+/- 10 min)

- Could you tell us if the business case is evaluated directly after a project?
    - Which elements are evaluated (costs/benefits/planning)?
- Is the business case evaluated on the long term ('benefits tracking')?
    - For example after a year?
    - Could you describe this process?

5. Other questions

- Could you tell us what could be improved regarding the development and use of business cases?
- Are there any other relevant questions not asked by us?

Appendix B (Chapter 7):

Semi-structured interviews during iterative method development

1. Introduction (+/- 10 min)
   - Introduce each other
   - Duration of interview (60 min) + Goal (To investigate how business cases are being developed and used throughout IT projects)
   - Could you tell something about your function (department, relation to business cases)
   - Could you tell us about your experience with BC development

2. Our benefits management model (+/- 40 min)
   - What is your general feedback on the benefits specification matrix?
   - Please comment on each step of the model.

3. General questions about the model (+/- 10 min)
   - Do you perceive the model in its current state as being usable?
   - Is the model understandable?
   - Does the model provide enough guidance to the users of the method?
   - Do you perceive the model as being efficient? (time/effort needed to use it vs. value/results that it delivers).
   - Would you use the model in a real case?

Appendix C (Chapter 10):

Ex-ante survey experiments

1. What is your name?
2. Which type of organization do you work for?
3. What is your position in your company?
4. How many Business Cases have you prepared so far (approximately)?
5. What is the level of your experience with negotiating the distribution of costs and benefits in inter-organizational projects?
6. I expect that the possibility of anonymous information exchange makes it easier for competing actors to agree on a shared investment decision.

Ex-post survey experiments

1. What is your name?
2. What was your actor name in the experiment?
3. My role description was clear to me
4. The financial information given to me was understandable
5. It was easy to understand what to do during the experiment
6. Rate your satisfaction with the outcome of the negotiation experiment?
7. Rate your satisfaction with the process of the negotiation experiment?
8. The time available for bidding was: too long/sufficient/too short
9. The total experiment took: too little time/sufficient time/too much time
10. The experiment was realistic. *(Compare the experiment experience with your prior negotiation experience)*
11. Would you use the method for a real life project? *(Explain why, why not)*
12. Which actor do you think profits the most from the agreed upon payment distribution?
13. The possibility of anonymous information exchange makes it easier for competing actors to agree on a shared investment decision.
14. Please describe your bidding strategy that you followed during the negotiation game.
15. Does the negotiation game address problems that you experience in real life negotiations?

Appendix D (Chapter 10):

Focus group discussion questions

1. On which factor did you base your decision?
2. What was the impact of being able to see the bids of the others on your own bid?
3. How useful is the method in getting to an agreement?
4. What is your general feedback on the experiment process?

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Samenvatting

De business case (BC) is een artefact dat gebruikt wordt om een investering te beschrijven in termen van de te verwachte kosten, de baten en de risico's. Op het gebied van ICT wordt een BC vaak gebruikt om een investering in een IT-project te verantwoorden en om goedkeuring te verkrijgen van het hogere management. Managers kunnen de BC ook gebruiken om verschillende projecten in een portefeuille van projecten met elkaar te vergelijken en om te beslissen in welk project ze geld willen investeren. De rol van een business cases in *één* organisaties is vrij duidelijk onderzocht, maar de rol van de BC in netwerkorganisaties is minder goed bekend en tevens weinig onderzocht.

In dit proefschrift onderzoeken we juist laatstgenoemde fenomeen. We beschouwen daarbij de "netwerkorganisatie" als bestaande uit meerdere belanghebbenden, ieder verantwoordelijk voor een eigen winst -en verlies rekening, die in een project samenwerken om gezamenlijk een Informatiesysteem te implementeren. De belanghebbenden kunnen verschillende business units binnen een bedrijf representeren of verschillende bedrijven binnen een zakelijk netwerk.

Het feit dat de rol van de BC voor *één* organisatie vrij duidelijk is, wil niet zeggen dat in dergelijke soort situaties IT implementaties altijd volgens plan verlopen en de verwachte baten op tijd en binnen budget gehaald worden. Onzekerheden over de kosten en baten hebben een grote invloed op de realisatie van de BC.

De schatting van de kosten is een goed begrepen en onderzocht probleem, maar de specificatie van de baten wordt vaak minder goed begrepen en onderzocht. In lijn met eerder onderzoek en het feit dat veel projecten hun baten niet realiseren concluderen we dat de huidige kennis en kunde over de schatting van baten niet voldoende is.

In dit proefschrift streven we naar beter begrip van het ontwikkelen van een BC in het algemeen, en de toepassing van BC's in netwerkorganisaties in het bijzonder. Dit onderzoek levert de volgende resultaten op:

Gebaseerd op de literatuur hebben we een conceptueel model ontwikkeld dat helpt de essentiële mechanismen die bij de ontwikkeling van een BC voor netwerkorganisaties belangrijk zijn te identificeren en te begrijpen.

Naar aanleiding van "design science" als onderzoeksparadigma hebben we een methodiek, genaamd „Business case for inter-organizational projects" (BC4IOP), als oplossing voor dit probleem ontwikkeld. Onze methodologie ondersteunt stakeholders in netwerkorganisaties bij het beoordelen en het beheersen van de baten, en tevens bij de verdeling van de kosten van een gezamenlijke investering. De methodiek biedt stakeholders een platform en een proces dat de discussie tussen de verschillende belanghebbenden initieert en ondersteunt. De methodiek bestaat uit de volgende drie onafhankelijke maar aanvullende componenten:

- BM4IOP: een uitgebreide benefits management methode;
- VM4IOP: een methode die analyseert hoe de waarde in een netwerk verdeelt is, en welke impact deze verdeling op de business case heeft;

- SID4IOP: een methode die stakeholders helpt de kosten van een gezamenlijk project fair in het netwerk te verdelen. Dit wordt bereikt door informatie structureel openbaar te maken.

Tijdens onze onderzoek maken wij gebruik van verschillende onderzoeksmethoden, zoals interviews, enquêtes, iteratieve ontwerp cycli en focusgroepen met deskundigen. Deze technieken worden gebruikt om de componenten, die ten grondslag van onze BC4IOP methodiek liggen, en de methodiek zelf te ontwerpen. Wij valideren onze methodiek door het uitvoeren van (i) vijf case studies in verschillende multinationals en (ii) vier experimenten met deskundigen uit de academische wereld en het bedrijfsleven. Onze empirische resultaten bevestigen dat het ontwikkelen van een gedeelde BC in netwerkorganisaties complexer is dan in één organisatie. Uit ons onderzoek blijkt dat het gebruik van de BC4IOP methodiek in netwerk projecten haalbaar en tevens nuttig is. De methodiek ondersteunt in het overwinnen van de typische uitdagingen die meestal tijdens een BCD-proces voorkomen waarin belanghebbende partijen verschillende doelen hebben en er geen centrale beslissingsbevoegdheid is.. De methodiek helpt deze uitdagingen te overwinnen door een gestructureerde aanpak en ze biedt een manier om gevoelige informatie tussen de belanghebbenden te verwerken. Vervolgens stimuleert de methodiek diepgaande discussie tussen deelnemers van het project met name op het gebied van waarde uitwisseling en de verdeling van kosten en baten. We concluderen dat de combinatie van: de *identificatie* en *specificatie* van kosten en baten voor een individuele BC en de *beslissing* over de kosten en baten verdeling in een gezamenlijke BC, BC4IOP tot een relevante en unieke methodologie maken.

Zusammenfassung

Der Business Case (BC) ist ein Artefakt, der verwendet wird, um eine Investition im Hinblick auf die zu erwartenden Kosten, Nutzen und Risiken zu rechtfertigen. Im ICT Bereich wird der Business Case häufig verwendet um Investitionen in IT-Projekte zu verifizieren und die Zustimmung vom Top-Management zu erhalten. Manager nutzen Business Cases um verschiedene Projekte innerhalb eines Projektportfolios zu vergleichen und zu entscheiden in welche der möglichen Projekte sie ihr Kapital investieren wollen. Während die Bedeutung des Business Cases für ein einzelnes Unternehmen deutlich erforscht ist, sind die Rolle und Bedeutung des Business Cases für inter-organisatorische Projekte weniger deutlich und weniger erforscht. In dieser Doktorarbeit bezeichnen wir Projekte in denen mehrere Gewinn-und Verlust verantwortliche Interessengruppen zusammenarbeiten um gemeinsam ein IT-Systems zu implementieren, als inter-organisatorische Projekte. Diese Interessengruppen stammen entweder aus verschiedenen Business Units innerhalb eines Großunternehmens oder aus verschiedenen Unternehmen innerhalb eines Business-Netzwerkes.

Die Tatsache, dass die Rolle des BC für ein einzelnes Unternehmen deutlich ist bedeutet nicht, dass während einer IT Implementation alles nach Plan verläuft und der erwartete Nutzen innerhalb der geplanten Zeit und des zur Verfügung stehenden Budgets erreicht wird. Unsicherheiten in Bezug auf Kosten / Nutzen eines Projektes haben einen starken Einfluss auf die Realisation des Business Cases. Während die Kalkulation der Kosten ein allgemein gut verstandenes Problem ist, ist die Spezifikation der Nutzen oft schwieriger und bisher weniger gut erforscht. Übereinstimmend mit früheren Forschungsergebnissen stellen wir fest, dass gängige Praktiken zur Einschätzung und Analyse der Nutzen als nicht zufrieden stellend erfahren werden. Dies führt dazu, dass viele Projekte scheitern, da sie den erwarteten Nutzen nicht realisieren.

In dieser Doktorarbeit streben wir an, das Problem der Business Case Entwicklung im Allgemeinen und in inter-organisatorischen Projekten im Besonderen besser zu verstehen.

Als erstes Forschungsergebnis haben wir, basiert auf Erkenntnissen aus bestehender Literatur, ein konzeptionelles Modell entwickelt. Dieses Modell erklärt die Mechanismen die in inter-organisatorischen Projekten oft zu finden sind und wie diese den Business Case beeinflussen.

Basierend auf diesem Model haben wir eine Methodik entwickelt die Unternehmen in Netzwerkprojekten hilft einen Business Case zu entwickeln und erfolgreich durchzuführen. Diese Methodik trägt den Namen „Business case for inter-organizational projects“ (BC4IOP) und wurde nach dem Design Science Paradigma entwickelt. BC4IOP unterstützt Interessengruppen in organisationsübergreifenden Projekten bei Bewertung und Management der Nutzen eines Projektes sowie der Verteilung der Kosten einer gemeinsamen Investition. BC4IOP bietet den Projektteilnehmern eine Plattform und einen Prozess der Diskussionen und Verhandlungen initiiert und unterstützt. Die

Methodik besteht aus den folgenden drei voneinander unabhängigen, aber sich ergänzenden Komponenten:

- BM4IOP: eine umfassende Nutzen-Management-Methode;
- VM4IOP: eine Methode, die die Kosten-Nutzen Verteilung innerhalb eines Netzwerkes und dessen Auswirkungen auf einen Business Case Entwicklung analysiert;
- SID4IOP: eine Methode, die Projektteilnehmern hilft eine Einigung über die Kostenverteilung eines gemeinsamen Projektes zu erreichen. Diese Einigung wird durch eine strukturelle Offenlegung von Informationen über die verschiedenen Projektteilnehmer erzielt.

In unserer Arbeit haben wir eine Vielzahl Techniken verwendet, zum Beispiel: Interviews, Umfragen, iterative Entwicklungszyklen und Fokusgruppen mit Experten, um unsere BC4IOP Methodik und ihre zugrunde liegenden Komponenten zu entwerfen. Wir validieren unsere Methodik durch die Durchführung von (i) fünf Fallstudien in unterschiedlichen multinationalen Unternehmen und (ii) vier Experimenten mit Experten aus Wissenschaft und Industrie.

Unsere empirischen Ergebnisse bestätigen, dass die Entwicklung eines gemeinsamen BC's in einem inter-organisatorischen Netzwerk komplexer ist als in einem einzelnen Unternehmen. Unsere Forschungsergebnisse zeigen, dass die BC4IOP Methodik in inter-organisationalen Projekten anwendbar ist und zu guten Ergebnissen führt. Unsere Methodik hilft Herausforderungen zu überwinden die in der Regel angetroffen werden wenn Interessengruppen mit unterschiedlichen Zielen und ohne zentrale Entscheidungsbefugnis gemeinsam einen Business Case erstellen müssen. Hierfür liefert unsere Methodik eine Struktur bei der vertrauensvoll mit sensiblen Informationen umgegangen wird und die Projektteilnehmer ermutigt detaillierte Diskussionen zu führen.

BC4IOP ist eine solide und einzigartige Methodik, da sie die Identifikation und Spezifikation von Kosten und Nutzen für einen individuellen BC mit der der Entscheidung über die Kosten-Nutzen-Verteilung in einem gemeinsamen BC, verbindet.