WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

EQUIS ACCREDITED AACSB ACCREDITED ASSOCIATION AMBA ACCREDITED

The Dynamics of Critical Success Factors of Enterprise Resource Planning Programs

Müller, Stefan Klaus

DOI:
10.57938/7050671f-2f56-4aa6-adba-c5f7c2ee24d4

Published: 01/01/2016

Document Version
Unknown

Link to publication

Citation for published version (APA):
Müller, S. K. (2016). *The Dynamics of Critical Success Factors of Enterprise Resource Planning Programs*. [Doctoral thesis, WU Vienna].

Download date: 23. Mar 2025

Dissertation

The Dynamics of Critical Success Factors of Enterprise Resource Planning Programs

Wirtschaftsuniversität (WU) Wien - Vienna University of Economics and Business

Department of Information Systems and Operations - Institute for Information Business

Author: Mag. Stefan Klaus Müller

First Supervisor: Univ.Prof. Dr. Jan Mendling

Second Supervisor: Univ.Prof. Dr. Edward W.N. Bernroider

Abstract

Research on Critical Success Factors (CSFs) for Enterprise Resource Planning (ERP) implementations has been carried out since the late 1990s, identifying various CSFs, empirically testing them and summarizing them in taxonomies. Little attention has been paid so far to ERP programs, which are employed frequently in practice. In this context, a program is an additional entity which supervises and monitors the single projects within an ERP implementation, and during all phases of the ERP life cycle. It is important to note that research barely considers the notion of programs explicitly and often abstracts from challenges stemming from interdependent, related projects and the dynamics over the implementation life cycle.

This research approaches this gap from the perspective of phases by investigating the CSFs of two large ERP programs in-depth over the course of their life cycles. We employ a variant of the "Straussian" grounded theory approach for our interpretive case studies. The structures and the contexts of the two programs were significantly different. Consequently, as we deem the contextual information particularly important, we (1) perform two independent analyses of the programs. In this step we present two models which give us further insights into the dynamics of CSFs in ERP programs. The first model (a) attributes different perceptions of salient groups in relation to a CSF as determinants for IS-success. The second model (b) presents the program construct as a means of organizational learning to impact CSFs over the life cycle of an ERP program. In a second analysis step (2), we continue with a comparative cross-case analysis and discuss differences and commonalities. Furthermore, a common set of CSFs and the benefits of ERP programs are presented.

The results show us that CSFs can change over the program life cycle and a more dynamic view is warranted. Furthermore, we illustrate programs as powerful tools that increase the likelihood of successful implementation efforts. We present two models highlighting the roles of perceptions (a) and organizational learning (b) and how they can shape their underlying CSFs. These parsimonious, easily applicable models provide the basis for empirical research in this area, and can be used by practitioners as a point of reference, increasing the likelihood of a successful implementation. Lastly, we demonstrate that an ERP program as an additional entity is most beneficial in contexts with a high degree of integration, dependencies and interrelations between the projects, where the resources need to be allocated and prioritized efficiently.

Keywords: Program, Program Management, Enterprise Resource Planning, ERP, ERP Implementation, Enterprise Systems, ES, Critical Success Factors, CSFs, ERP Governance, Benefits

Abstract (German)

Forschung im Bereich kritischer Erfolgsfaktoren (KEF) für Enterprise Resource Planning (ERP) Implementierungen wurde seit den späten 1990er Jahren durchgeführt. Dabei wurden verschiedene KEF identifiziert, empirisch getestet oder in Klassifizierungen zusammengefasst. Nur wenig Augenmerk wurde bisher auf ERP Programme gelegt, die in der Praxis häufig eingesetzt werden. In diesem Kontext, wird ein Programm als eine zusätzliche Entität verstanden, welche die einzelnen Projekte der ERP Implementierung während aller Phasen im ERP Lebenszyklus steuert und überwacht. Dabei ist es wichtig zu erwähnen, dass die Forschung kaum das Programmkonstrukt explizit berücksichtigt und dabei die Herausforderungen von abhängigen, miteinander verbundenen Projekten, und die Dynamiken über den Lebenszyklus außer Acht lässt.

Diese Studie schließt diese Lücke, indem zwei detaillierte Fallstudien von großen ERP Programmen über den gesamten Lebenszyklus untersucht werden. Dabei wenden wir für die interpretativen Fallstudien eine Variante der "Grounded Theory"-Methode nach Strauss an. Nachdem wir den Kontext als besonders wichtig erachten, und sich die untersuchten Programme auch in ihren Strukturen beträchtlich unterscheiden, werden (1) zwei unabhängige Analysen der Programme durchgeführt. In diesem Schritt präsentieren wir zwei Modelle die uns weitere Einsichten in die Dynamiken von KEF in ERP-Programmen bieten. Das 1. Modell (a) spricht den verschiedenen Wahrnehmungen bedeutsamer Gruppen hinsichtlich eines KEF eine entscheidende Rolle für den Erfolg von ERP-Programmen zu. Das 2. Modell (b) präsentiert das Programmkonstrukt als „Instrument zum Lernen in Organisationen“, um die KEF über den Programmlebenszyklus zu beeinflussen. In einem zweiten Analyseschritt (2), führen wir eine fallübergreifende Analyse durch und diskutieren Unterschiede und Gemeinsamkeiten, indem wir für beide Fälle gültige KEF und den zusätzlichen Nutzen von ERP-Programmen präsentieren.

Die Resultate zeigen uns, dass sich KEF über den Programmlebenszyklus ändern können und eine dynamischere Betrachtung zielführend ist. Des Weiteren zeigen wir Programme als wirkungsvolle Werkzeuge, die die Wahrscheinlichkeit einer erfolgreichen Implementierung erhöhen. Wir präsentieren zwei Modelle mit dem Hauptaugenmerk auf (a) Wahrnehmungen, und (b) Lernen in Organisationen, die KEF formen. Diese einfach (auch für andere Fälle) anzuwendenden Modelle dienen als Basis für empirische Forschung in diesem Bereich, und können in der Praxis als Referenzmodell für eine höhere Erfolgswahrscheinlichkeit verwendet werden. Schließlich zeigen wir in welchem Kontext der zusätzliche Nutzen eines ERP Programms am besten generiert werden kann. In einem Kontext mit einem hohen Grad an erforderlicher Integration, Abhängigkeiten und Verbindungen zwischen den Projekten, wo die Ressourcen effizient und nach Prioritäten verteilt werden müssen.

Stichwörter: Programm, Programmmananagement, Enterprise Resource Planning, ERP, ERP Implementierung, Enterprise Systems, ES, Kritische Erfolgsfaktoren, KEF, ERP Governance, Nutzen

Follow your bliss. If you do follow your bliss, you put yourself on a kind of track that has been there all the while waiting for you, and the life you ought to be living is the one you are living. When you can see that, you begin to meet people who are in the field of your bliss, and they open the doors to you. I say, follow your bliss and don't be afraid, and doors will open where you didn't know they were going to be. If you follow your bliss, doors will open for you that wouldn't have opened for anyone else. (Joseph Campbell, 1904-1987)

Acknowledgements

In March 2012, after a SAP ERP rollout, I followed my bliss. Before then, I had never stopped pursuing the thought of starting a doctoral thesis. I approached Jan Mendling and told him about my idea to investigate ERP programs. Jan liked the idea, opened the first door to me and became my first supervisor. Thank you, Jan, for opening this door. Without your ongoing trust and passion, it would not have been possible to follow my bliss and to finish this thesis. The same is true for Edward Bernroider, my second supervisor. Thank you, Ed, for your continuous guidance and support throughout the journey. I was in the lucky position to work with you both, two extraordinary and smart academics, but mostly I loved your positive attitude. I hope that we can keep our friendship alive for the decades to come. Furthermore, I hope the models and outcomes of this thesis will inspire others to follow their bliss.

Additionally, I am grateful to the members of my doctoral committee Alexander Kaiser (defense and research proposal) and Volker Stix (research proposal). I would like to thank all the other members of WU Vienna (Vienna University of Economics and Business), particularly from the Institute for Information Business and the Department of Information Systems and Operations, who supported me throughout the journey. A big thank you to all the fellows from WU Vienna, and from University of Liechtenstein, Goethe-University Frankfurt, Queensland University of Technology (QUT), University of Ljubljana, University of Cologne. Particularly, I enjoyed our time at the Flumserberg, Switzerland. I also want to express my appreciation to the academic community (e.g. the people I met at the International Conference on Information Systems 2014 in Auckland, New Zealand), too many to name personally. I enjoyed my journey with you and I am sure I will stay connected with the academic community in one form or another.

I want to say thank you to the research participants at A1/Telekom, particularly to the program manager. I would also like to thank the research participants at Pantheon (pseudonym), particularly the leader of the ERP Competence Center. A big thank you to all the other research participants who did single interviews and my former colleagues Rainer Stierschneider, Christian Standler, Stefan Glatz, Christian Fliesser, Michele Candelori and Frank Merzinger. A very big thank you to Tobias Tripolt and Sonja Leisser, who did a great job in transcribing most of the interviews, as well as Ryan Weldzius and Daniel J. Kirby for their thorough proofreading and editing work.

A special thanks to my mother, Elke, for her continuous support, and my father, Karl who is now very proud that I finished a doctoral thesis, a long time after him. Thanks to my entire family and my friends, who trusted in me when I needed it the most. Thanks to Joseph Campbell and his legacy. His quotes and wisdom are prudent sources of inspiration.

I dedicate this thesis to all those who passed away and left their legacies, foremost Markus Presslauer, who passed away last year, aged 41. May the force be with you (Star Wars).

Stefan Klaus Müller (Vienna, May 2016)

Publications and Submissions Related to this Thesis

The research presented in this thesis led to three articles. One article has been published in the conference proceedings of ICIS 2014, whereas two further articles were submitted for publication in a journal. The submitted articles are currently (June 2016) in review. Find below an overview of the related articles and references to the chapters they are mostly related to:

Title	Published in/Submitted to	Main Reference
Mueller, S.K., Mendling, J. and Bernroider E.W.N. 2014 "Converging Perceptions After a Crisis Leading to Successful Change - Dynamics of CSFs in a Post-Merger ERP Program"	Published in: *Proceedings of the 35th International Conference on Information Systems (ICIS)*, Auckland 2014, New Zealand.	Chapters: 1, 4, 11
Mueller, S.K., Mendling, J. and Bernroider, E.W.N. 2016 "The Salient Group IS Success (SGISS) Model of Different Perceptions"	Submitted to a journal, currently in review	Chapters: 1, 4, 6, 11
Mueller, S.K., Mendling, J. and Bernroider, E.W.N. 2016 “Program as Means of Organizational Learning for ERP Implementations - A Case Study in a Multisite Environment”	Submitted to a journal, currently in review	Chapters: 1, 5, 6, 12

Table 0-1 Publications and Submissions Related to this Thesis

Table of Contents

Abstract I

Acknowledgements III

Publications and Submissions Related to this Thesis V

Table of Contents VI

List of Figures XII

List of Tables..... XIII

List of Abbreviations XIV

1 Introduction 1

1.1 Significance of Enterprise Resource Planning (ERP) and Program Research 1

1.2 Research Gaps and Central Research Questions – CSFs, Phases, Dynamics of ERP Programs and Associated Benefits 2

1.3 Research Approach and Design – Position of the Work 5

1.4 Summary 7

2 Theoretical Background 8

2.1 Enterprise Resource Planning (ERP) 8

2.2 Challenges of Large Scale ERP Implementations 9

2.3 Dynamic Nature of ERP Implementations 10

2.4 Programs 11

2.4.1 Projects, Programs, Portfolios and their Relationships 11

2.4.2 Program Organization - Structures & Roles within a Program 12

2.4.3 Existing Program Literature in the ERP Context 14

2.4.4 Benefits of ERP Programs 15

2.5 Research on Critical Success Factors 16
2.5.1 Establishment of a Business Case and a Vision 21
2.5.2 Securing Top Management Support 21
2.5.3 Definition of Stakeholder- & Communication Management Strategy 22
2.5.4 Securing Change Management 22
2.5.5 Establishment of a Company-Specific ERP Strategy 23
2.5.6 Establishment of a Program Governance Structure 25
2.5.7 Business Process Reengineering 26
2.5.8 Appropriateness of the ERP Vendor 28
2.5.9 Risk- and Issue Management 28
2.5.10 Definition of an Integration Management Strategy 29
2.5.11 Time, Scope and Financial Management 30
2.5.12 Definition of a Program Methodology 31
2.5.13 Proper Use of Consultants 34
2.5.14 Ensuring of Data Migration Accuracy & Management 35
2.5.15 Readiness of Organizational Culture 35
2.5.16 Realization of Benefits 36
2.6 Success in the Context of ERP Implementations and Programs 37
2.7 Summary 38
3 Research Method 39
3.1 Philosophical Stance 39
3.2 Grounded Theory Method 41
3.2.1 Constant Comparison 44
3.2.2 Iterative Conceptualization 45
3.2.3 Theoretical Sampling 45
3.2.4 Scaling Up 46
3.2.5 Theoretical Integration 46

3.3 Quality Assurance – Principles of Interpretive Research (Klein and Myers, 1999) Applied to the Grounded Theory Method 47
3.3.1 The Fundamental Principle of the Hermeneutic Circle 47
3.3.2 The Principle of Contextualization 48
3.3.3 The Principle of Interaction Between the Researchers and the Subjects 49
3.3.4 The Principle of Abstraction and Generalization 50
3.3.5 Principle of Dialogical Reasoning 50
3.3.6 The Principle of Multiple Interpretations 51
3.3.7 The Principle of Suspicion 51
3.4 Field Access and Sampling 53
3.5 Preparation and Application of the Interview Guide 55
3.6 Data Collection - Multiple Sources of Evidence 55
3.7 Data Analysis 56
3.8 Summary 58
4 The Case at A1/TA – The Salient Group IS Success (SGISS)-Model of Different Perceptions 59
4.1 Case Selection 59
4.2 Research Objectives of this Chapter 61
4.3 Data Collection 62
4.4 Data Analysis and Coding Procedure 63
4.5 SIT (Social Identity Theory), Interplay between CSFs and Perceptions 64
4.6 The Case at A1/TA - The Salient Group IS Success (SGISS) Model of Different Perceptions 67
4.6.1 Contextual Information 68
4.6.2 Social Identities and Groups Shaping the ERP program 69
4.6.3 Pre-Crisis: Implementation Attempt 1 – The Pre-Crisis Phase Marked by a Low Fit of Perceptions 72
4.6.4 Crisis and Reflection 78

4.6.5 Post-Crisis: Implementation Attempt 2 – The Post-Crisis Phase Marked by a High Positive Fit of Perceptions 80
4.6.6 SGISS Model of Different Perceptions 83
4.7 Discussion 88
4.8 Implications 91
4.9 Conclusion 93
5. The Case at Pantheon – An Organizational Learning Model in the ERP Program Context 94
5.1 Case Selection 94
5.2 Research Objectives of this Chapter 96
5.3 Data Collection 98
5.4 Data Analysis and Coding Procedure 99
5.5 Multisite Environments & Organizational Learning in the ERP Context 100
5.6 The Case at Pantheon 103
5.6.1 Contextual Information and Governance Structures 103
5.6.2 A Model of Interpretation 107
5.6.3 The Development Project and the First Rollout (Wave 1) at Apollo1 (2007-2011) 108
5.6.4 Wave 2: Vesta2 and Neptune2 – The Watermelons (2011-2012) 111
5.6.5 Wave 3 – First Rollouts with Complete Scope – Performance Problems (2012) 114
5.6.6 Wave 4 – First Go-live Without Functional Problems – Ongoing Performance Problems 115
5.6.7 Wave 5 – Continuous Improvement, High Product Quality (2012, 2013) 116
5.6.8 Wave 6 – Sourcing Out of External Consultants 118
5.6.9 Critical Success Factors in Relation to Organizational Learning- Selective Coding 119
5.7 Discussion 125
5.8 Implications 127
5.9 Conclusion 128
6 Cross-Case Analysis and Discussion 129

6.1 Comparison of Contextual Characteristics of the Programs 129
6.2 Comparison of CSFs and Relation to Seed Concepts 131
6.2.1 Top Management Support 134
6.2.2 Establishment of a Vision, a Dynamic Business Case and Associated Benefits 135
6.2.3 Stakeholder- & Communication Management 136
6.2.4 Securing Change Management 138
6.2.5 Establishment of a Company-Specific ERP Strategy 139
6.2.6 Establishment of a Governance Structure 141
6.2.7 Business Process Redesign 143
6.2.8 Risk and Issue Management (Tracking and Tools) 145
6.2.9 Integration Management 147
6.2.10 Time and Scope & Financial Management 149
6.2.11 Methodology 151
6.2.12 ERP Implementation Partner 153
6.2.13 Ensuring Data Migration/ Accuracy & Management 155
6.3 New CSFs – No Coverage in Seed Concepts 156
6.3.1 Collaboration and Decision Making 156
6.3.2 Human Capital Management 158
6.3.3 Flexibility of Program Components 160
6.4 Axial Codes Without Direct (1:1) Reflection Within Seed Concepts 161
6.4.1 Commitment of Key Players and Team (Considered in Stakeholder- & Communication Management) 161
6.4.2 Readiness of Organizational Culture (Considered in Change Management) 162
6.4.3 Realization of Benefits (Considered in Establishment of a Vision and a Dynamic Business Case) 163
6.4.4 Appropriateness of the ERP Vendor (Dropped for our Contexts) 163
6.5 Perceived Success and Benefits (Dependent Variable) 164
6.6 Application of SGISS-Model of Different Perceptions (A1/TA) within Pantheon 165

6.7 Application of the Organizational Learning Model in the ERP Program Context (Pantheon) within A1/TA 167
6.8 Benefits and Goals of ERP Program Management 169
6.9 Summary 169
7 Overall Discussion of Results 173
7.1 Elaboration on Central Research Questions 173
7.2 Overall Implications for Research 179
7.3 Overall Implications for Practice 180
7.4 Limitations 181
8 Conclusion 182
9 References 184
10 Appendix A – General 200
10.1 Example of an Invitation Letter 200
10.2 Information Sent to Pre-Identified Interviewees 201
10.3 A Version of the Interview Guide 202
11 Appendix B - A1/TA 207
11.1 The Case at A1/TA – Results from a CSF Perspective 207
11.2 Axial Coding – Network View – Realistic Timeframe - A1/TA 218
11.3 Integrative Memos – Realistic Timeframe - A1/TA 219
12 Appendix C - Pantheon 224
12.1 Some Reference CSFs (Concepts) 224
12.2 Sample Quotations for Concepts: 226
12.3 Axial Coding – Network View – Business Process Redesign - Pantheon 232
12.4 Integrative Memos – Business Process Redesign - Pantheon 233
13 Curriculum Vitae 236

List of Figures

Figure 1-1 Information Systems Research Framework (Hevner et al. 2004, p. 80) 6
Figure 2-1 Generic Program Structure and Roles – MSP (Cabinet Office, 2011) 12
Figure 2-2 Growing Added Value Versus Increasing Complexity in an SAP Consolidation. Business Benefit in Comparison to the Degree of SAP Rationalization (Accenture, 2011, p. 7). 27
Figure 3-1 A Framework for Analyzing Grounded Theory Studies (Urquhart et al., 2010). 44
Figure 4-1 Formal Groups within the ERP Program at A1/TA 70
Figure 4-2 The SGISS-Model of Different Perceptions at A1/TA 84
Figure 4-3 SGISS-Model Step 1. Assessing Perceptions in Relation to CSF. 86
Figure 4-4 SGISS-Model Step 2. Scenario 1 with 1 Salient Group 87
Figure 4-5 SGISS-Model Step 2. Scenario 2 with Different (2 or More) Salient Groups 87
Figure 5-1 The Program Structure “Saturn” at “Pantheon” 105
Figure 5-2 Plan vs. Actual Go-Live Dates 106
Figure 5-3 Relationships Between Organizational Scanning, Interpretation & Learning (Daft and Weick, 1984) 108
Figure 5-4 Organizational Learning - Continuous Improvement in the Program Context 124
Figure 5-5 Implementation Success Increased at Later Stages Through Organizational Learning 126
Figure 6-1 Success as a Result of Organizational Learning at A1/TA 168
Figure 10-1 Example of an Invitation Letter 200
Figure 10-2 Information Sent to Pre-Identified Interviewees 201
Figure 10-3 A Version of the Interview Guide (Page 1) 202
Figure 10-4 A Version of the Interview Guide (Page 2) 203
Figure 10-5 A Version of the Interview Guide (Page 3) 204
Figure 10-6 A Version of the Interview Guide (Page 4) 205
Figure 10-7 A Version of the Interview Guide (Page 5) 206
Figure 11-1 Salient Groups of the Program at A1/TA 207
Figure 11-2 Axial Coding – Network View – Realistic Timeframe - A1/TA 218
Figure 12-1 Axial Coding – Network View – Business Process Redesign - Pantheon 232

List of Tables

Table 0-1 Publications and Submissions Related to this Thesis V
Table 1-1 Overview of Program Phases, Program Management Literature & our Approach 3
Table 1-2 Inputs (Actions) and Outputs of the Research Journey – Executed Work Plan 7
Table 2-1 Responsibilities of Program & Business Change Manager (Cabinet Office, 2011) 13
Table 2-2 Program Management Goals and Benefits (Lycett et al., 2004). 16
Table 2-3 Relevant Research Accounts Clustered (Time/Area of Research) 18
Table 2-4 Seed Concepts, Derived and Conceptualized from Existing Literature 20
Table 2-5 Acronyms Typically Used for Functional Workstreams and Descriptions (Sullivan, 2014) 26
Table 2-6 ASAP Phases (Italic) Mapped to Other Approaches 32
Table 2-7 ASAP-Methodology. Phases and its Deliverables (Sullivan, 2014) 33
Table 2-8 Benefits of ASAP (SAP AG, 2016) 34
Table 3-1 Principles of Interpretive Field Studies & Grounded Theory Guidelines / Means to assure quality 52
Table 3-2 Criteria to Identify Suitable Cases 54
Table 4-1 Suitable Cases: How the Program at A1/TA Met the Predefined Criteria 61
Table 4-2 Program Roles of Interviewees and Interview Schedule 63
Table 4-3 The Program Structure at A1/TA 69
Table 4-4 The Timeline of the ERP Program at A1/TA 71
Table 4-5 The Salient Group IS Success (SGISS) Model of Different Perceptions, Pre-Crisis 72
Table 4-6 Most Important Corrective Actions During the Crisis 79
Table 4-7 The Salient Group IS Success (SGISS) Model of Different Perceptions at A1/TA, Post-Crisis 80
Table 5-1 Suitable Cases: How the Program at Pantheon Met the Predefined Criteria 96
Table 5-2 Interview Partners at the Program (shaded) and Product Level 99
Table 5-3 The Development Project and its Challenges 109
Table 5-4 Minutes, Steering Committee, 10-Aug-2011, Tasks, Program Cluster 113
Table 5-5 Selective Coding, Concepts Related to “Lessons Learned-Continuous Improvement” 123
Table 6-1 Characteristics of Programs as Determinants for Integration Complexity 130
Table 6-2 Cross-case Comparison of CSFs, Linkage to Seed Concepts 133
Table 6-3 Program Management Goals and Benefits (Lycett et al., 2004) in Relation to the Context of A1/TA and Pantheon. 172
Table 7-1 Final List of Critical Success Factors (CSFs) Meeting Our Program Contexts, After Cross-case Comparison of CSFs 177
Table 11-1 Timeline of the Project ASAP 208
Table 11-2 Representative Quotations (Pre-Crisis) 211
Table 11-3 Most Important CSFs and Involved Groups (Pre-Crisis) 212
Table 11-4 Representative Quotation (Crisis – Re-planning and Reflection) 213
Table 11-5 Most Important Corrective Actions During the Crisis 214
Table 11-6 Representative Quotations (Post-Crisis) 216
Table 11-7 . Most Important CSFs and Involved Groups (Post-Crisis) 217

List of Abbreviations

A1/TA	A1 Telekom Austria - Telecommunications Company
ASAP (1)	Accelerated SAP Methodology
ASAP (2)	ERP project within the ERP program at A1 Telekom Austria
BI	Business Intelligence
BW	Business Warehouse
BSAP	Reporting project within the ERP program at A1 Telekom Austria
BTM	Business Transformation Management
CASE	Computer-Aided Software Engineering
CFO	Chief Financial Officer
CRM	Customer Relationship Management
CSAP	Change management project within the ERP program at A1 Telekom Austria
CSF	Critical Success Factor
CTO	Chief Technical Officer
CTP	Contract-to-pay
ERP	Enterprise Resource Planning
ES	Enterprise Systems
HANA or S/4 HANA	New SAP ERP product uses (in-memory) database technology
HCM	Human Capital Management
KEF	Kritischer Erfolgsfaktor
MSP	Managing Successful Programmes (Cabinet Office)
OTC	Order-to-cash
PMBOK	Project Management Body of Knowledge (PMI)
PMI	Project Management Institute
PMO	Program Management Office
PRINCE2	Projects In Controlled Environments
PTD	Procure-to-demand
PTP	Procure-to-pay
PTR	Plan-to-report
PTS (1)	Plan-to-schedule
PTS (2)	Plan-to-stock
Q	Quotation
QCCC	Quotation Cross Case Comparison

RTR (1)	Record-to report
RTR (2)	Recruit-to-Retire
SCM	Supply Chain Management
SDLC	Software Development Life Cycle
SIT	Social Identity Theory
SRO	Senior Responsible Own
TCO	Total Cost of Ownership

1 Introduction

In the first chapter of this doctoral thesis, we start with an elaboration on the significance of Enterprise Resource Planning (ERP) research and why programs as an implementation method become increasingly important (Section 1.1). In the following Section 1.2 we highlight some important accounts and identify important research gaps before we pose our central research question. Thereafter, in Section 1.3 we present the way this thesis intends to answer the central research questions and we lead over to the executed work plan of the research and the structure of the thesis. Finally, we close this chapter with a summary (Section 1.4).

1.1 Significance of Enterprise Resource Planning (ERP) and Program Research

An Enterprise Resource Planning (ERP) system is a standard software package that integrates various business functions, such as purchasing, production, sales and financials along the value chain and across geographic boundaries. All the data are stored in an integrated database such that holistic reporting in real time is enabled. Benefits such as cost savings (Holland and Light, 1999; Poston and Grabski, 2001; Seddon et al., 2010; Sullivan, 2014) tend to be as substantial as the implementation costs. Although SMEs[1] are included in the 2014 ERP report, the average cost of an ERP implementation has been $6.5 million with an average duration of 16.1 months. 54% of all projects have exceeded their projected budgets, while 72% have gone past their planned durations. Furthermore, 66% of the respondent organizations realized less than 50% of their expected benefits (Panorama Consulting Solutions, 2014). We assume that for ERP programs the budgets and the durations might be higher, since the 2014 ERP Report includes also data from SMEs, while programs are typically in place within large organizations. This observation underlines the importance of ERP research in order to better manage its sheer size, risks and costs (Bernroider, 2013), such that the dream of seamless integration does not turn into a nightmare (Davenport, 1998), or implementation failure (Pan et al., 2008). The advent of new technologies, as in-memory databases (e.g. SAP HANA), provide opportunities to review long-standing and obsolete processes and new integration possibilities (Krüger, 2016). This indicates that the tremendous importance of ERP implementations will continue.

CSFs are the underlying guiding principles and activities that must be regarded (Caralli et al., 2004; Bullen and Rockart, 1981) for an implementation to be successful. Although considerable research effort has been spent during the last two decades to investigate critical success factors (CSFs), we believe that specific aspects of a program can inspire novel perspectives on this topic. First, there is typically a structure defined around an implementation with a dedicated program management at work, which

[1] Find an overview about ERP integration issues and critical decisions for SMEs in the account of Malhotra and Temponi (2010). As we specifically focus on ERP programs we do not discuss the challenges within SMEs.

pays attention to competing resources and the interrelations between the projects (Chang et al., 2014; Jiang et al., 2014; PMI, 2008). Such program management and its governance mechanisms are an important locus for studying the course of implementation and the related organizational change (Cabinet Office, 2011; Pellegrinelli, 1997; PMI, 2008). Second, and beyond the formal organizational structures, there exist social networks and potential emerging group memberships and perceptions that alter during the implementation (Schwarz and Watson, 2005). This means shifting the focus of research from the outcomes as a result of the perceptions and the interplay between human action and technology (Leonardi, 2011; Orlikowski, 2000; Schwarz and Watson, 2005) towards the dynamics of evolving stakeholder perceptions (Besson and Rowe, 2001; Grainger et al., 2009; Markus et al., 2000b). Third, depending on the program type (Evaristo and van Fenema, 1999) a program could contain several implementations in a multisite context. Thus, it is interesting if a program can increase its knowledge base through organizational learning from previous implementations to apply this knowledge to subsequent implementations (Robey et al., 2002; van Fenema et al., 2007).

Given the importance of this phenomenon, research has hardly discussed ERP programs within their life cycle extensively, and we see the absolute need to close this gap, as we will show in the next section.

1.2 Research Gaps and Central Research Questions – CSFs, Phases, Dynamics of ERP Programs and Associated Benefits

Typically, programs are divided into phases, referred to as the program life cycle phases (PMI, 2008), sometimes referred to as stages (Ross and Vitale, 2000). Table 1-1 depicts an overview of program phases, as they are seen in program management literature and the ASAP (Accelerated SAP) methodology established from the software vendor SAP (SAP, 2016; Sullivan, 2014). All the different approaches have one delivery phase in common, and differ in regard to the preceding and succeeding phases. For our purposes, we will use three phases. All three phases[2] together we denote as the ERP program life cycle (Table 1-1).

The preparation & chartering phase includes all the organizing aspects, e.g. program charter, initial business case, program structure and implementation strategy at the beginning of each program. During the implementation & project phase the ERP implementation and the work on the systems are performed. This might include a template project and one or more rollouts. Furthermore, additional projects, e.g. a change management or a documentation project, might be subject to this phase. In each case multiple related projects are comprised within an overarching program. During the operations phase typically all the projects are formally closed and the benefits are realized. Often the program

[2] For the reason of completeness, we want to emphasize that the different phases themselves consist of different phases, as emphasized, for example, by Parr and Shanks (2000). They subdivide their project phase into set-up, reengineering, design configuration and testing, installation. Regardless how the phases are named exactly, it depends on the research objective and the content of the setting which subdivision makes sense.

mandate is renewed (e.g. Pellegrinelli, 1997), a new program is created, and the cycle continues with the preparation & chartering phase. In the program management context, the results of Ritson et al. (2012) suggest that program design and structure need to be continually assessed from program formation through to program closure.

Ferns (1991)	Preparatory	Establishment		Program Management				
Pellegrinelli (1997)	Initiation	Definition & planning		Delivery			Renewal	Dissolution
Thiry (2004)	Formulation	Organization		Deployment				Dissolution
PMI (2008)	Pre-program preparation	Program initiation	Program setup	Delivery of benefits				Closure
Cabinet Office (2011)	Identifying	Defining		Managing the tranches & delivering the capability			Closing	Realizing the benefits
ASAP (SAP, 2016)	Preparation			Business blueprint	Realization	Final Preparation	Go-Live and support	
ERP program life cycle	*Preparation & chartering phase*			*Implementation & project phase*			*Operations phase*	

Table 1-1 Overview of Program Phases, Program Management Literature & our Approach

Our research approach, focusing on all phases of the ERP program life cycle, is particularly useful to describe the dynamics of CSFs, thus paying attention that the static view and antecedents are not sufficient to predict success (Markus and Robey, 1988; Lyytinen and Newman, 2015). This approach is exemplified by Sarker and Sahay (2003), taking the process view when they develop their theoretical model, describing the development of virtual teams over the life of a project. They employ their grounded theory approach, with an underlying interpretive stance (Sarker et al., 2001; Sarker and Sahay, 2003). Similarly, we will use two derived phase models (one for each case, grounded in data) as a lens for interpreting our case studies, and we will investigate which CSFs are relevant in which phase of each case and aim to highlight the dynamics of CSFs.

With this approach we aim to answer two central research questions:

Central research question 1: What are the CSFs of a successful ERP program and how do they dynamically evolve over the course of the program?

Central research question 2: How can the dynamics of CSFs be considered in a general, parsimonious phase model?

As interpretive researchers, we will relate our models to general ideas and concepts (Klein and Myers, 1999). Theory building is particularly a strength of the grounded theory method (Strauss and Corbin, 1998) and is well exemplified in the accounts of Sarker and Sahay (2003) and Sarker et al. (2001). Thus,

our approach is well established to create a theoretical account in the form of general, parsimonious phase models.

Our phase models put the CSFs into a framework, and describe what makes an ERP program a success. This approach is similar to the one used by Parr and Shanks (2000). They use a project phase model (planning phase – project phase – enhancement phase) and add CSFs to each phase. This is done for two ERP implementation projects and afterwards similarities and differences are compared. Furthermore, the consideration of phases is consistent with Markus and Tanis (2000)[3] who associate CSFs and activities with each phase of the ERP implementation, and state that the outcome of each phase becomes a starting condition for the next phase. Therefore, it is of major importance to consider phase-specific CSFs during all phases of the ERP program.

In some publications, research on program management acknowledges the use of programs in major IT- and ERP implementations. So does the PMI (2008), which refers to ERP implementations, major IT implementations, and business process improvement initiatives, as programs that deliver incremental benefits during their life cycle, which is typical for a phased approach. Pellegrinelli (2002) mentions an ERP implementation as an example, when he investigates missing capabilities of project managers in managing programs. The Cabinet Office (2011) uses ERP as an example of a specification led program, and Yu and Kittler (2012) of a centralized program where an ERP system is centrally imposed from the headquarters to its subunits. Within ERP research (Chang et al., 2014; Davenport et al., 2004; Jiang et al., 2014; Ribbers and Schoo, 2002; Seddon et al., 2010; Seidel, 2009), the existence of programs as a means to implement an ERP system is acknowledged. Hence we can conclude that, as well from the perspective of existing research, the use of programs and program management within ERP implementations is recognized.

Also from practical experience it is emphasized that program management is actually applied to implement ERP systems (Sullivan, 2014), with budgets sometimes exceeding $100 million, e.g. Sarkis and Sundarraj (2003) report an implementation budget of $250 million. The experts at Gartner use programs for Information Technology (IT) transformations (Gartner, 2014).

The various benefits of program management are mentioned in the literature (Cabinet Office, 2011; Lycett et al., 2004; Pellegrinelli et al., 2007; PMI, 2008) which might have the potential to be realized also in the ERP context. Although countless research in relation to ERP systems and CSFs accounts exists (e.g. Finney and Corbett, 2007; Dezdar and Sulaiman, 2009), previous ERP research has hardly discussed the program construct in the ERP context and its potential benefits. Given the importance of this

[3] Four phases for ES implementations are used: 1) Project chartering phase, 2) project- or configure and rollout phase, 3) shakedown phase, 4) onward and upward phase. One needs to mention that the model of Markus and Tanis (2000) does not consider multiple projects. In our model the shakedown will take place during the implementation & project phase, or within the operations phase when a big bang approach is applied.

phenomenon, research has failed to discuss it appropriately, and has "blind spots" which need to be filled. Therefore, one central intention of our research is to answer the following central research question, which is relevant for research and practice:

Central research question 3: What are the benefits for companies of structuring their ERP-implementations in programs?

1.3 Research Approach and Design – Position of the Work

The arguably most important aim of our research is to develop a theoretical account as a basis for future researchers. The grounded theory approach is appropriate to develop new theories of information systems phenomena, which are firmly grounded in empirical data, as stated by Urquhart et al. (2010). They furthermore propose two guidelines, which should increase the scope of the theory. Scaling up is the grouping of higher-level categories into broader themes, whereas theoretical integration is the process of comparing substantive theories with, previously developed, theories. This helps to consider the "who, where and what" aspects of the theory, and in the generation of more formal theories (Urquhart et al., 2010). Our research therefore provides a theoretical account to the limited knowledge base of ERP programs, including its benefits, its CSFs, and two general parsimonious phase models. Consequently, we contribute to more formal theories.

We position our work as Information Systems Research, according to the framework of Hevner et al. (2004). As depicted in Figure 1-1, we develop theories, following the paradigm of behavioral science. According to them, the environment (research context) - that is the people, organization and technology - define the business needs. "Behavioral science addresses research through the development and justification of theories that explain or predict phenomena related to the identified business need" (Hevner et al. 2004, p.79). We take the existing knowledge base, that is e.g. theories and methodologies identified in prior literature (Hevner et al., 2004), and inductively develop a theoretical understanding of a new phenomenon grounded in data (Sarker et al., 2001). Through continuous interplay between data collection and analysis (Urquhart et al., 2010), we subsequently refine the theory, following the fundamental principle of the hermeneutic circle (and the other principles) for interpretive case studies (Klein and Myers, 1999). In this way, we will add to the knowledge base for practice and further research. Future researchers can build on this increased knowledge base, and continuously assess and refine the theory. Practitioners can use the increased knowledge base to improve the effectiveness and efficiency of an organization (Hevner et al., 2004).

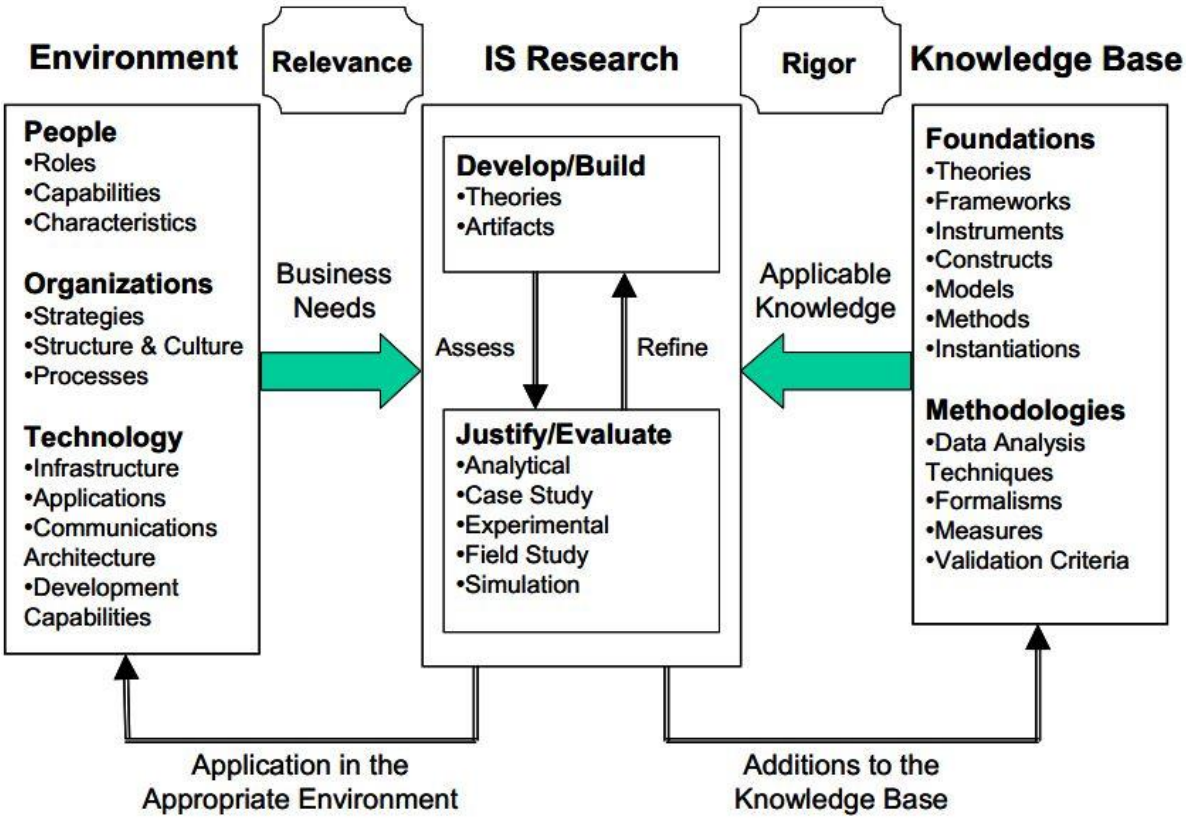


Figure 1-1 Information Systems Research Framework (Hevner et al. 2004, p. 80)

Table 1-2 depicts the executed work plan of our research project, structured according to the guidelines of Urquhart et al. (2010). The first row contains all inputs (actions) we conducted to generate our final theoretical account. In the second row we provide an overview of the intermediate and the final product(s) of our research. Furthermore, in the third and fourth row we refer to the chapters and which research questions are answered within those chapters. One principle of grounded theory is the continuous interplay between data collection and data analysis (Strauss and Corbin, 1998). Therefore, we have, in column 4 and 5, likewise intermediate results* as outputs.

Inputs (Actions)	'Lived' Experience, Anecdotal Evidence, Other Theories, Hunches Urquhart et al. (2010)	Literature review and method definition	Interpretive case studies (semi-structured interviews, document analysis, public documents), A variant of the "Straussian" grounded theory approach (Sarker et al. 2001; Strauss and Corbin, 1998)	Coding according to the variant of the "Straussian" grounded theory approach (Open, axial, selective), relate to literature (Sarker et al. 2001; Strauss and Corbin, 1998)	Increase scope of grounded theory (Scaling up and theoretical integration)	Cross-case comparison and relating to literature. Application of models to 2nd case.
Outputs	Area of inquiry, Initial research questions	Refined research questions (considered already in Chapter 1). Interview guide, Seed concepts, Method and philosophical stance	Raw data, Intermediate results*	Intermediate results*. Grounded theory.	More formal theoretical account grounded in empirical data. Models explaining the dynamics of CSFs.	Integration of ERP program-CSFs into literature. 1st test of models in different setting. Benefits of ERP programs.
Chapter	1	2, 3	4, 5			6, 7, 8
Research Questions			2			1, 2, 3

Table 1-2 Inputs (Actions) and Outputs of the Research Journey – Executed Work Plan

1.4 Summary

In this chapter, we highlighted the significance of ERP program research. Afterwards, we presented some important research gaps and posed our central research questions. Lastly, we provided an overview of our research journey and the structure of this research account. In the next chapter, we focus on the theoretical backgrounds which are important in our research context.

2 Theoretical Background

In this chapter, we elaborate on the necessary research background of ERP and program management. We begin with the characteristics of ERP systems. Thereafter, we highlight typical challenges of large scale ERP implementations and the dynamic nature of ERP systems. Next, we elaborate on programs, discuss some typical differentiation points to projects and portfolios, and highlight organizational program structures and roles. We lead then over to existing research in the ERP program context and its potential benefits. Next, we discuss existing research about CSFs, and present our seed concepts as a result of our structured literature review. We close this chapter with the definition of success and a summary.

2.1 Enterprise Resource Planning (ERP)

ERP systems are off-the-shelf systems standard solutions in contrast to custom applications (Scheer and Habermann, 2000). They are designed with a best practice approach to fit the needs of many organizations, supporting generic business processes (Markus and Tanis, 2000). ERP systems incorporate best practices to facilitate rapid decision-making, cost reductions, and greater managerial control (Bernroider and Hampel, 2005; Holland and Light, 1999).

ERP systems are often defined as a specific type of enterprise system. “Enterprise systems are large-scale, real-time, integrated application-software packages that use the computational, data storage, and data transmission power of modern information technology to support processes, information flows, reporting, and business analytics within and between complex organizations” (Seddon et al., 2010, p. 305). According to this view, the term Enterprise System (ES) includes, amongst ERP systems and other applications, Customer Relationship Management (CRM), Supply Chain Management (SCM) and data warehousing. This is in line with Davenport et al. (2004) who stress the benefits of ES in terms of process integration. Great benefits stem from seamless information flows within a company and across the inter-organizational supply chain (Markus and Tanis, 2000). Apart from the integration of business functions within the company, ERP systems are therefore also increasingly used to share information beyond organizational boundaries or as Davenport et al. (2004, p. 19) state “Integration also does not stop within a company’s own four walls”.

ERP systems are typically vast and costly (Bernroider, 2013). While ERP systems were initially designed for organizations reaching a certain size, the major ERP software vendors have been targeting the small- to medium-sized enterprises for over a decade (Bernroider and Koch, 2001). However, the efforts required to implement ERP solutions are very high even for smaller businesses, which more regularly experience an initial decline in organizational performance after going live (Bernroider and Hampel, 2005). Generally, business process modeling methods can help to reduce the cost of software implementation, and increase user acceptance (Scheer and Habermann, 2000; Dumas et al., 2013), while

extensive business reorganization increases the time needed for ERP implementations (Bernroider, 2013).

2.2 Challenges of Large Scale ERP Implementations

Certainly the most important challenge of a large scale ERP implementation is the major business change, which is concurrently triggered by the introduction of such a system. Norms, underpinned by the stakeholders´ values and beliefs, can be violated, since the organizational environment is changed through the implementation of the ERP system. This is suggested to be the root cause of most ERP implementation problems (Krumbholz and Maiden, 2001). In order to realize the full range of business benefits, an ERP implementation should be accompanied by business process redesign (Accenture, 2011). A prominent example is the massive business process reengineering effort at Texas Instruments for the whole organization with the goal of setting standard processes globally (Sarkis and Sundarraj, 2003). However, the higher the level of business process redesign (associated changes), the higher the implementation complexity (implementation challenge) (Ribbers and Schoo, 2002; Accenture, 2011), and, consequently, the more resources are expended for ERP implementation (Bernroider, 2013).

The definition of harmonized business processes is a huge challenge, especially when more than one business unit (and/or more than one site) is subject to a large scale ERP implementation. This is usually the case since scale effects lead to cost reductions and time savings during the configuration of the new system (Huber et al., 2000). The definition and the adoption of new harmonized business processes, the establishment of key information entities, the settlement of reporting and information aggregation structures, are time consuming activities (Davenport, 2000). Often, local sites are quite independent and strong, which may result in tensions between local sites and central management. A common understanding of the future business must be developed. This process may be blocked by political conflicts, prestige, communication problems and different priorities and habits. Changes can be forced by a strong management (Gulla and Mollan, 1999). Thus, with respect to the organizational changes and the harmonization of business processes, large scale ERP implementations are strongly interrelated across business units and sites (Klaus et al., 2000) such that strong management attention is indispensable.

Beside changes how daily business is conducted, a large scale ERP implementation is always associated with interrelations between its elements, which increase the implementation complexity. Ribbers and Schoo (2002) propose three measures for implementation complexity. *Variety* reflects the interrelations in a system and will increase with the number of sites affected or the functions of an implemented package. *Variability* is related to dynamics over time and the interrelations between the elements of a system. Examples are scope changes, lack of resources, and dependencies on other implementations that are competing for resources. *Integration* refers to the planned changes which will be realized, the

innovation in IT and business processes (Ribbers and Schoo, 2002). In our research, we associate a large scale ERP implementation with interrelations between its elements (e.g. projects) and with a change in the business processes (Seidel, 2009) and the measures for implementation complexity proposed by Ribbers and Schoo (2002). Since interrelations and changes are key characteristics of large scale ERP implementations, we will use the term ERP programs (in contrast to projects) for the remainder of this study.

2.3 Dynamic Nature of ERP Implementations

A second problem we see in the fact that in previous research the life cycle of large-scale ERP programs, including organizational change and the adoption of business processes, is insufficiently investigated. Lyytinen and Newman (2015) stress that the majority of previous research aiming to explain the success of ERP implementations only considers antecedents and static elements of the implementation context. They largely ignore the role of process events in explaining the outcomes. The static view of the factors assumes that the influences of CSFs are frozen in time, and neglect the dynamics of the process of organizational implementation (Nandhakumar et al., 2005). An exception here is the account of Parr and Shanks (2000), which considers CSFs during different phases of two investigated implementation projects; nonetheless, they focus on projects not programs. Markus and Tanis (2000) explicitly consider different implementation phases and stress that the starting conditions may not remain the same over the life cycle of the implementation. Grainger et al. (2009) stress two implementation attempts and address the often incomplete view of accounts, which only presents the outcome at one point in the project life. Similar results are emphasized by Mueller et al. (2014) and Akkermans and van Helden (2002). Wagner et al. (2010) describe a turnaround process and exemplify how a troubled project at go-live becomes a working ERP system. Thus, we conclude that a view spanning the entire program life cycle is beneficial for a comprehensive view of an ERP program and might describe its course beyond the formally defined life cycle phases.

In their accounts regarding IT enabled BTM (business transformation management) Safrudin and Recker (2013; 2014; Safrudin, 2014) exemplify that different managerial capabilities are needed during different key periods (concept development - blueprint design - solution delivery - post transformation). These key managerial capabilities are invoked by strategic triggers, which are pertinent to a key period, and inform senior management when certain resources and capabilities are required. Safrudin and Recker (2013; 2014; Safrudin 2014) derived their insights from three case studies in the ERP context and they define “business transformations as a collection of management services that are demanded and enacted at a program level, defined as abstract resources that provide the managerial capabilities necessary for business transformations” (Safrudin and Recker, 2013, p. 2). As an organizational change program an ERP implementation is directly related to the life cycle of organizational strategy (Seidel, 2009). Mintzberg (1978) refers to conception, elaboration, decay, and death. If we now link the phases

of an ERP program to these life cycle phases of organizational strategy, the dynamic treatment is absolutely necessary, also in the tradition of management science. Thus, these accounts are supporting the view to pay attention to the strategic and dynamic nature of ERP programs, which is in line with the approach and views in this study.

2.4 Programs

In the next sections we elaborate on programs, and the demarcation points of programs in contrast to projects and portfolios. Furthermore, we highlight generic and potential program structures and roles. Finally, we discuss existing research in the ERP program context, and potential benefits.

2.4.1 Projects, Programs, Portfolios and their Relationships

Apart from projects, the increasing importance of programs and portfolios (of programs) as mechanisms for managing organizations could be observed (Maylor et al., 2006). Although program management is often seen as an extension or variant of project management (Pellegrinelli, 2011; Partington et al., 2005), there are some points that clearly distinguish the two. Whereas programs are focused on a change of the permanent organization, its strategy with a wide set of impacts, a project is more narrowly defined and focused on concrete business results. A program has far-reaching, long term implications and outcomes, whereas a project is more focused on short-term outputs (Artto et al., 2009). According to the PMI, “a program is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits and control not available from managing them individually.” (PMI, 2013a, p. 9). Moreover, program management contributes to achieving the program´s strategic objectives and benefits (PMI, 2008).

The relation of projects in a program through a common outcome or common capability (PMI, 2013a) is also the major differentiation point between a program and a portfolio. If this relation does not exist, then it is better to manage the projects as a portfolio, or whereas a program always consists of projects, a project may not be part of a program (PMI, 2008; PMI, 2013a). On the other hand, portfolio management aligns with organizational strategies, selects the right programs and projects, whereas program management harmonizes its projects, subprograms and program components and controls their interdependencies to realize specified benefits. Lastly, project management is driven by the objectives of the program or portfolio, and implements plans to achieve a specific scope (PMI, 2013a). A good overview of the creation, administration and optimization of portfolios can be found in the account of De Reyck et al. (2005), whereas we focus specifically on the management of a bundle of related projects, a program.

Several organizations emphasize the importance of program management as part of their standard guidelines. Most important is the Project Management Institute (PMI which published three editions (a fourth edition is projected to be published in 2017) of their program management guidelines “The

Standard for Program Management" (PMI, 2006; 2008; 2013c). The second edition is by far the most comprehensive source and thus we stick to this edition (PMI, 2008). These guidelines are closely linked to the PMBOK guide (A Guide to the Project Management Body of Knowledge) currently in its fifth edition (PMI, 2013a). A second prominent guideline is published by the Cabinet Office, "Managing Successful Programmes", fourth edition (Cabinet Office, 2011), which is closely linked to PRINCE2 (Projects in Controlled Environments), the well-known project management methodology. The growing interest in program management is reflected by the importance which is attributed to this knowledge area within those project management methodologies. These program management approaches focus on business changes (Gareis, 2010; Lehtonen and Martinsuo, 2008), which is often associated with ERP implementations, or as Hong and Kim put it ITIT-managers see "ERP systems as their organizations' most strategic computing platform" (Hong and Kim, 2002, p.25). Thus, we conclude that program management is a well-established knowledge area which also warrants sufficient consideration in the ERP context. In this section we elaborate on the demarcation points of programs in contrast to projects and portfolio. In the next section we will elaborate on generic program structures and roles

2.4.2 Program Organization - Structures & Roles within a Program

A program setup typically depends on the context. Figure 2-1 depicts a generic program structure and roles according to the MSP guidelines (Managing Successful Programmes) published by the Cabinet Office (2011). In this section we will elaborate on these generic program setups.

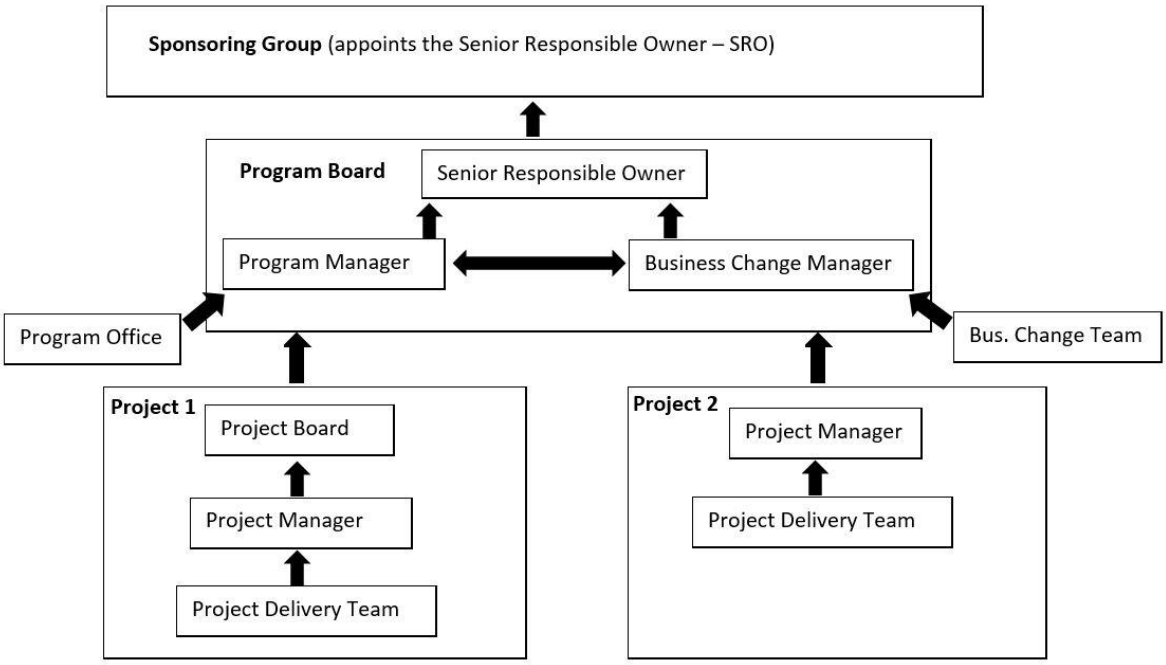


Figure 2-1 Generic Program Structure and Roles – MSP (Cabinet Office, 2011)

At the top level the sponsoring group represents the senior management. This level is responsible for the investment decision and provides strategic direction. The sponsoring group ensures ongoing

strategic alignment of the program with the strategic direction of the organization. The sponsoring group authorizes the program mandate and the appropriate funding, and is responsible for the sign-off at closure. The role of the sponsoring group could be performed by an existing executive committee or other board of the organization. One of its members will become the senior responsible owner (SRO).

The senior responsible owner (SRO) is accountable for the program, for realizing the benefits and achieving its strategic outcomes. Consequently, the SRO must have seniority, be visible, and communicate the program´s vision to key stakeholders. The SRO secures the funds over the entire life cycle and establishes the program board.

The program board has the responsibility to drive the program forward and deliver the outcomes and benefits. The program board reports to the SRO. The SRO may delegate some responsibilities and action to the members of the program board. The program board defines an acceptable risk profile, ensures that the program delivers within boundaries and resolves strategic and organizational issues between the projects. Furthermore, the program board assures the integrity of the benefit profiles, the realization plan and assures operational stability. The SRO, the program manager and the business change manager are mandatory members. Optional members are project executives, representatives of corporate functions and lead suppliers.

The program manager is responsible for delivering the new capabilities of the program. The business change manager is responsible for the benefits realization via the organizational adaption, the usage of the capability and the transition to the desired outcome. Table 2-1 depicts the responsibilities of the program manager and the business change manager.

Responsibilities of Program Manager	**Responsibilities of Business Change Manager**
Day-to-day management of the program; being the day-to-day agent of the SRO; planning, designing and monitoring of the program; defining and maintaining program governance; coordination of interdependencies between projects; risk- and issue management; maintaining overall integrity; monitoring the budget and costs against benefits; assuring appropriate quality of outputs and the meeting of requirements; ensuring delivery in time; allocating resources efficiently; reporting to the SRO; developing and maintaining working relationships with key players and third-party service providers.	Primarily benefits-focused; defining the benefits and future state; assessing progress towards the realization of benefits; achieving measured improvements; the business change manager is "business-side" and thus communicating with all areas of business; identifying and monitoring the performance metrics; reporting to the SRO on the readiness to change; optimizing the timing of the release and securing business stability.

Table 2-1 Responsibilities of Program & Business Change Manager (Cabinet Office, 2011)

The responsibilities of the two functions are quite extensive. Thus, the business change manager receives assistance from a business change team. The business change team ensures that the organization is

thoroughly prepared for the transition. The program manager is assisted by the program office, which has two distinct roles. The first is to provide guidance and support to the projects. The second is to be the home for governance and control, including standards, financial monitoring, and health checks. As such, the program office must be independent of the initiatives.

The appropriate level of integration between the program and its projects is a key part of an effective program organization. The organizational structures on the project-level need to have a clear leadership, a direction-setting and guidelines how they are operating. Different forms of integrating a project into a program exist. Project 1 in Figure 2-1 has a dedicated project board. That is not the case for Project 2. In Project 1 the project manager reports to the project board (should have clear responsibilities defined on the program level). In Project 2 the project manager reports to the program manager, who is fulfilling the project executive role and maintaining a very tight relationship between the project and the program.

In this section we provide an overview about potential program structures, as they are defined in MSP (Cabinet Office, 2011). They are generic and several different options exist. As such, it depends on the context which program roles are considered and how an appropriate setup could look like.

2.4.3 Existing Program Literature in the ERP Context

A generally accepted definition of program management has been developed in recent years (e.g. Cabinet Office, 2011; PMI, 2008) and the practical use of ERP programs is acknowledged in these accounts. Pioneering research on the specifics of program management of ERP implementations was conducted by Ribbers and Schoo (2002, p. 45), who define a program as “a portfolio of projects, defining a set of related activities, both for the IT and the business side, which have defined goals and benefits, and need to be controlled as a whole.” In their view, a program is the controlling instance of the transformation process. This definition is comprehensive and includes in principle the same aspects of a program, as they are used in the guidelines of the PMI (2008) and the Cabinet Office (2011).

Several insights into the management of ERP implementations using programs have been reported in the literature. Ribbers and Schoo (2002) describe how different contextual factors as the degree of change, the number of sites included, and the degree of concurrency shape the design of the program. Seidel (2009) develops a model intended to predict the probability of a successful ERP program but without considering the actual implementation phases. Markus et al. (2000a) use the term multisite ERP implementation, which shares characteristics with a program, and describe elements such as architecture, business strategy, software configuration, technical platform, and management execution. Grainger et al. (2009) use the term “umbrella project” for a series of implementation projects, with a dedicated single overall project coordinator and multiple project leaders, but neither mention the term program nor program management. A recent study by (Jiang et al., 2014) highlights the positive effect

of shared commitments and understandings of program goals between key-managers as one specific program-related aspect; Chang et al. (2014) have a similar focus using a case study approach. Apart from this these contributions, program management in the ERP context was rarely explicitly considered in the past.

2.4.4 Benefits of ERP Programs

Other definitions in program management literature (Cabinet Office, 2011; Ferns, 1991; Lycett et al., 2004; Thiry, 2004) are in line with the definitions of Ribbers and Schoo (2002) and the PMI, 2008; 2013) and refer to the strategic nature of programs. Programs are used for business transformations and adoption of new technologies (as ERP systems), for multi-organizational delivery and globalization of technology services (Cabinet Office, 2011), and generate additional benefits by grouping related projects (Cabinet Office, 2011; Ferns, 1991; Lycett et al., 2004; Thiry, 2004). Some of those additional benefits and goals are categorized (see Table 2-2), by Lycett et al. (2004), who also refer to some exemplary literature (e.g. Pellegrinelli, 1997). Pellegrinelli (1997) mentions all those benefits apart from the more effective knowledge transfer compared to traditional project structures. Programs are effective organizational structures to cope with the impacts of resource interdependence (Parolia et al., 2011). Nowadays, ERP implementations often consist of related projects which are coordinated through some sort of overarching program (Chang et al., 2014; Jiang et al., 2014; Seddon et al., 2010). Consequently, we conclude that programs are generally accepted as additional entities which supervise and monitor the often related projects and products in an ERP implementation. As such, programs generate additional benefits, which could not be generated by managing related projects individually (PMI, 2008).

An “ERP-project can be viewed as an organizational change project, rather than as the replacement of a piece of technology” (Boonstra, 2006, p. 38). The strategic nature of an ERP implementation is therefore consistent with the goals for program management. Programs are becoming accepted as a mechanism to manage strategic change and organizations are now exploiting their potential (Reiss and Rainer, 2013; PMI, 2008; Pellegrinelli and Bowman, 1994).

In the previous sections, we highlighted the knowledge areas of ERP and program management, and focused on the challenges of ERP programs, which warrant the central intention of our research. In the next section, we continue with research on critical success factors (CSFs).

Goal	Description
Improved coordination	Identification and definition of project interdependencies
Improved dependency management	Reduce the amount of re-engineering required due to inadequate management of the interfaces between projects
More effective resource utilization	Improve the effectiveness and efficiency of the allocation of shared resources. Assist in providing justification for specialist resources that deliver an overall improvement to program delivery
More effective knowledge transfer	Provision of a means to identify and improve upon transferable lessons. Facilitate organizational learning
Greater management visibility	Enable senior management to better monitor, direct and control the implementation process
More coherent communication	Improve communication of overall goals and direction both internally and externally to the program
Improved project definition	Ensure that project definition is more systematic and objective, reducing the prevalence of projects with a high risk of failure or obsolescence. Bundling of projects leads to economies of scale
Better alignment with business drivers, goals and strategy	Provide an enabling framework for the realization of strategic change and the ongoing alignment of strategy and projects in response to a changing business environment

Table 2-2 Program Management Goals and Benefits (Lycett et al., 2004).

2.5 Research on Critical Success Factors

The objective of this section is to present the approach of our structured literature review, and the presentation of the preliminary results, which we name seed concepts. Given the increasing popularity and importance of ERP implementations, research on critical success factors has a long history and evolved in the 1990s. CSFs are defined as "the underlying or guiding principles of an effort that must be regarded to ensure that it is successful" (Caralli et al., 2004., p. 27). Paying attention to the dynamics of ERP program, we add a second definition. "Critical success factors are the few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his goals. Because these areas of activity are critical, the manager should have the appropriate information to allow him to determine whether events are proceeding sufficiently well in each area" (Bullen and Rockart, 1981, p. 3).

Based on the definitions above we define in the ERP program context:

CSFs in the ERP program context are the underlying guiding principles and activities, in certain key areas, that must be regarded by managers to reach the goals of the ERP program. To ensure that CSFs are proceeding sufficiently well in each area, CSFs are continually assessed during all phases of the ERP program life cycle.

Thus, it was of major importance to conduct an initial literature review at the beginning of our research journey. The method applied for our literature review is based on Webster and Watson (2002), who propose a structured approach; (1) creating an initial basket through identifying major contributions, (2) going backward by reviewing the citations of the initial basket, (3) going forward to accounts which cited the accounts of the first two steps, (4) to the three steps suggested by Webster and Watson (2002) we added standard works. The keywords we used included: program management, programme management, program, programme, ERP, enterprise resource planning, enterprise systems, ES, implementation, multinational, global, CSF, critical success factors, risk factors, multisite, multi-project, phases, and various combinations of these keywords. The leading journals on which we put a special focus include all journals in the "AIS Senior Scholars' Basket of Journals". Although the initial literature review was one of our first steps on our research journey we considered accounts which were published during our research project. However, the results presented in this section include mainly the concepts as present at the beginning of our research journey, reflecting our historical starting position.

In Table 2-3 we depict some major accounts we deemed most relevant for identifying our seed concepts. Particularly, but not solely, we selected accounts which encompassed more than one CSF (taxonomies), and which were cited many times according to Google Scholar. It is interesting that accounts of journals included in the "AIS Senior Scholars' Basket of Journals[4]" were not overly represented. One exception is the account of Akkermans and van Helden (2002) published in the European Journal of Information Systems. Furthermore, the list of accounts depicted in Table 2-3 is not an exhaustive list, apart from the accounts listed in the cluster "CSFs of ERP programs" in the 4th row. We clustered the accounts according to the date of publication and the area of research[5] we assigned them to. The results reveal that particularly within 1991-2000 and 2001-2010 ERP CSF research was very prominent. We did not identify any major accounts from 2010-2014, so we would assume that the research community considered this area of research to be saturated. We found accounts in the research area of programs within all three timeframes, indicating that the continuing importance of program research. In the area "CSFs of ERP

[4] We want to emphasize that many interesting accounts were published in in the "AIS Senior Scholars' Basket of Journals" related to ERP implementations and CSFs. Many of those accounts can be found elsewhere in this thesis. A reason most of these accounts are not used in our compilation of CSFs is our premise that we were mainly looking for the most cited taxonomies.
[5] We are aware that the area "CSFs of ERP programs" is a subset of ERP CSF research and of programs too. We depicted it in this table as separate area of research to show the research gap.

programs" we found only three accounts (third row of table 2-3). The accounts of Ribbers and Schoo (2002) and Seidel (2009) only cover antecedents of successful programs, neglecting the dynamics of ERP programs. The account of Sullivan (2014) was identified at a later stage of our research project, and was published as a book for practitioners in SAP Press (indicating the practical importance of ERP programs). Thus, we shaded the relevant row in Table 2-3 to illustrate that no dedicated research accounts exist which examine the dynamics of CSFs of ERP programs.

Area of Research	**1991-2000**	**2001-2010**	**2010-2014**
ERP CSFs	Bingi et al. (1999), Holland and Light (1999), Davenport (2000), Markus and Tanis (2000), Parr and Shanks (2000), Sumner (2000),	Akkermans and van Helden (2002), Al-Mashari et al. (2003), Finney and Corbett (2007), Nah et al. (2001), Nah and Delgado (2006), Somers and Nelson (2004), Umble et al. (2003), Vosburg and Kumar (2001), Zhang et al. (2005)	No relevant accounts identified
Programs	Ferns (1991), Pellegrinelli (1997)	PMI (2006), PMI (2008), Lycett et al (2004), Thiry (2004), Vereecke et al. (2003)	Cabinet Office (2011), PMI (2013c)
CSFs of ERP programs	No relevant accounts identified	Ribbers and Schoo (2002), Seidl (2009)	Sullivan (2014)

Table 2-3 Relevant Research Accounts Clustered (Time/Area of Research)

In another form, the results of the literature review from a CSF perspective are shown in Table 2-4. Column 1 includes the seed concepts we identified. Column 2 describes the concepts and contains typical associated actions. The seed concepts were only a sensitizing device (Matavire and Brown, 2013) for the succeeding interpretive case studies. Nevertheless, the intention of this initial, structured literature review was to help us in later phases of the research, e.g. a better understanding of interviewees´ responses and posing follow-up questions, or an improved interpretation of documents.

.

Seed concepts	Description (associated actions)	Literature in alphabetic order (program related first)
A) Securing top management support	Securing sponsorship and commitment during the whole program, appointing program/project champion who promotes the program/projects actively	Cabinet Office (2011), Ferns (1991), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Bingi et al. (1999), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Umble et al. (2003), Zhang et al. (2005)
B) Establishment of a business case and a vision	Comparing additional costs for managing the change within a program against the additional benefits, defining the intended future state, communicating vision, defining and updating regularly program and project business cases	Ferns (1991), Cabinet Office (2011), Lycett et al (2004), Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Parr and Shanks (2000), Umble et al. (2003)
C) Definition of stakeholder-/communication-management strategy	Identification and categorization of all stakeholders affected by the program, deciding how and when information will be distributed, ensuring ongoing commitment from all relevant stakeholders	Ferns (1991), Cabinet Office (2011), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Somers and Nelson (2004), Umble et al. (2003), Sumner (2000), Zhang et al. (2005)
D) Securing change management	Ensuring that target business environment meets requirements of the new business model, organizing trainings and education, ensuring appropriate resources, managing transition into operations	Cabinet Office (2011), Lycett et al. (2004), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Vereecke et al. (2003), Al-Mashari et al. (2003), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Somers and Nelson (2004), Umble et al. (2003), Zhang et al. (2005)
E) Establishment of a company-specific ERP strategy	Defining the ERP strategy (Minimum customization, phased implementation approach vs. big bang strategy, rolling out a template, release and upgrade strategy), aligning the program goals with strategic goals	Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Bingi (1999), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Umble et al. (2003)
F) Establishment of a program-governance structure	Defining management structure, establishing program office, defining decision making, reporting requirements, roles, responsibilities, interfaces and communication to project representatives, formal closure	Cabinet Office (2011), Ferns (1991), Lycett et al. (2004), Pellegrinelli (1997), PMI 2008, Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Vereecke et al. (2003)
G) Business process reengineering	Redesigning business processes in accordance with the ERP strategy and envisioned target business environment	Al-Mashari et al. (2003), Bingi et al. (1999), Holland and Light (1999), Nah et al. (2001), Markus and Tanis (2000), Somers and Nelson (2004), Sumner (2000), Zhang et al. (2005)

H) Appropriateness of the ERP vendor	Choosing the appropriate ERP vendor and package, ensuring ongoing vendor support	Akkermans and van Helden (2002), Al-Mashari et al. (2003), Bingi et al. (1999), Finney and Corbett (2007), Markus and Tanis (2000), Nah and Delgado (2006), Somers and Nelson (2004), Sumner (2000), Umble et al (2003), Zhang et al. (2005)
I) Risk and issue management	Identifying and tracking of risks and defining the risk strategy, ensuring that actions taken succeed	(Aritua et al., 2011), Cabinet Office (2011), Ferns (1991), Lycett et al (2004), PMI (2008), Thiry (2004), Davenport (2000), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001)
J) Definition of an integration management strategy	Identifying interdependencies and interrelations and defining how to manage them, considering shared processes, managing transition into operations, providing customer support	Cabinet Office (2011), Ferns (1991), Lycett et al (2004), Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Thiry (2004), Vereecke et al. (2003)
K) Time and scope & financial management	Including scope management (defining what is inside the program, managing change requests), time management (program schedule, planned duration and sequencing projects, analyzing performance against the plans, milestones) and financial management (cost estimation and budgeting, performing within budget, early paybacks, ensuring funds)	Cabinet Office (2011), Ferns 1991, Lycett et al (2004), Akkermans and van Helden (2002), Nah and Delgado (2006), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Markus and Tanis (2000)
L) Definition of a program-methodology	Securing all quality aspects, regression testing, end-to-end testing, ensuring that the results meet expectations, planning and conducting of audits and reviews, securing knowledge management	Cabinet Office (2011), Lycett et al. (2004), PMI (2008), Ribbers and Schoo (2002), Thiry (2004), Al-Mashari et al. (2003), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Seidel (2009), Vereecke et al. (2003), Zhang et al. (2005)
M) Proper use of consultants	Choosing consultants, managing them, building stable relations	Akkermans and van Helden (2002), Bingi et al. (1999), Finney and Corbett (2007), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Zhang et al. (2005)
N) Ensuring data migration/ Accuracy & management	Ensuring that data is migrated accurately to the ERP system, establishing appropriate data entry procedures, data governance	Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Somers and Nelson (2004), Umble et al. (2003), Vosburg and Kumar (2001), Zhang et al. (2005)
O) Readiness of organizational culture	Considering organizational culture, readiness of sites, national cultures and legal requirements	Finney and Corbett (2007), Nah et al. (2001), Seidel (2009), Zhang et al. (2005)
P) Realization of benefits	Identifying and realizing key benefits, ensuring that key benefits meet objectives, reviewing benefits with stakeholders	Cabinet Office (2011), Ferns (1991), Pellegrinelli (1997), PMI (2008), Thiry (2004), Al Mashari et al. (2003), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Zhang et al. (2005)

Table 2-4 Seed Concepts, Derived and Conceptualized from Existing Literature, as Sensitizing Device for the Interpretive Case Studies and to Receive an Overview about the Body of Knowledge at the Beginning of our Research Journey

We now elaborate on the seed concepts presented in Table 2-4:

2.5.1 Establishment of a Business Case and a Vision

Early in the life cycle, during the initial change initiation, the intended future state should be established in the form of a vision. A successful vision reflects the overall business strategy and can then be translated into measurable goals and targets (Al Mashari et al., 2003). An initial business case can be calculated, including financial analyses (PMI, 2008), on the basis of an optimized mix regarding benefits, time, costs and risks and in accordance with other key documents (Cabinet Office, 2011), as the program charter. As the vision reflects the corporate mission and business strategy, the approval of the top management is needed, and once it is approved (Umble et al., 2003), it can be communicated to the entire organization (Al Mashari et al., 2003; Nah et al., 2001; Umble et al., 2003). In that direction the management of user expectations plays an important role, including clear goals and objectives reflecting the business vision (Somers and Nelson, 2004).

The alignment with often-international business strategies (Madapusi and d´Souza, 2005), and the system justification play an important role. A good example is the implementation at Texas Instruments, where global capacity utilization and standardization resulted in increased profits of several hundred million dollars (Sarkis and Sunderraj, 2003). Whereas it is important to develop a sound business case in the chartering phase (Markus and Tanis, 2000), it is also important that this business case remains viable and valid (Cabinet Office, 2011). As a consequence, we conclude that although the main emphasis on the vision has to be put in the beginning of the program, the tracking of goals and benefits (Holland and Light, 1999), as well as possible adjustments of the vision and its related documents, are ongoing tasks throughout the whole endeavor.

2.5.2 Securing Top Management Support

Probably the most prominent and cited CSF for ERP implementations, is the related to the assurance of top management support. An ERP implementation is always associated with major business changes (e.g. Boonstra, 2006). In a fast changing economic environment characterized by the rapid change of customer needs, mergers and acquisitions, a consistent need for business process consolidations and harmonizations is evident (Accenture, 2011), and this requires top management support. The strategic implications of the implementations must be considered by the top management, the implementations must be funded by significant means, and the progress must be constantly monitored to ensure a smooth rollout and an effective change (Bingi et al., 1999). In reality, frequently a steering committee is employed to oversee the

implementation phase (Markus and Tanis, 2000; Parr and Shanks, 2000). Ribbers and Schoo (2002) stress this under the term "program organization", and report that in 90% of their 15 observed cases the program structure included a steering committee, a program sponsor and a program manager. In the program management literature, the PMI (2008) acknowledges the authorization of a program through a steering committee or a different organizational body, whereas the Cabinet Office (2011) stresses the involvement of the senior responsible owners (sponsoring group, key stakeholder) early, at appropriate milestones and throughout the program. This view is consistent with the ERP literature: Al Mashari et al. (2003) stress the extension of top management support until the end of the implementation. Thus, we conclude that securing top management support is of major importance during all phases of the program life cycle.

2.5.3 Definition of Stakeholder- & Communication Management Strategy

The program management and the ERP literature agree on the necessity of an early definition of an appropriate stakeholder- and communication management strategy. This includes the identification of all relevant stakeholders, including their requirements (PMI, 2008) and figuring out where potential benefits might be realized (Cabinet Office, 2011). Furthermore, the definition of a communication plan is warranted as different stages in the program involve different groups of people (Markus and Tanis, 2000). The ongoing stakeholder engagement and the management of expectations is necessary throughout the program to mitigate potential conflicts and diverging requirements, and the communication plan might be adapted when stakeholder change (PMI, 2008). The high impact of effective communications to all key players, and the use of a communication plan, is also emphasized in the account of Somers and Nelson (2004), from initiation to the system acceptance. They summarize this as interdepartmental communication and also emphasise the interdepartmental cooperation and cross-functional involvement of people. Their view is consistent with Zhang et al. (2005) who stress the company wide commitment of key players across functional departments. To sum up, it seems that this CSF plays an important role in all stages of the program, and particularly in the early stages, including the implementation(s).

2.5.4 Securing Change Management

One of the most prominent CSFs, which is evident in the current ERP literature, is how an organization deals with the level of business changes associated with the ERP program. The change impact is also a distinguishing point between projects and programs or as Seidel (2009) puts it, "While ERP projects are focused on outputs (a functioning ERP system), ERP programmes are focused on outcomes (a change in how the organisation operates)" (Seidel, 2009, p. 18). Norms, underpinned by the stakeholders´ values and

beliefs, are violated, since the state of the world is changed through the implementation of the ERP system. This is the source of most ERP implementation problems (Krumbholz and Maiden, 2001), and increases considerably the risk and the costs (Markus and Tanis, 2000).

The major business change, which comes along with the introduction of an ERP system and global process harmonizations as a response to mergers and integration initiatives (Accenture, 2011), needs to be addressed properly. In the program management literature, the Cabinet Office (2011) distinguishes between three phases dealing with the change. In the *pre-transition phase,* the impact of the change on the stakeholders is estimated and the "as is" state is opposed to the intended future state during the development of a blueprint. New operations will be introduced with the transitions, while old ones will still be in place. During the *transition phase* single projects are taken into operations (in the simplest case in only one business unit) after the readiness of the change is ensured (project go-live). In the *post-transition phase,* the transition management continues until the new operations are fully embedded and self-supporting, "a change that sticks" (Cabinet Office, 2011, p. 117). The PMI (2008) speaks about component approvals as one of the last steps (gate reviews), when the component has achieved its objectives in relation to the overall program. Also within the ERP literature (e.g. Markus and Tanis, 2000; Somers and Nelson, 2004; Umble et al. 2003) it seems that there is a general consensus about the necessity of change management accompanying the ERP initiative along its life cycle.

A second aspect of change management is to ensure that the target business environment meets the requirements of the potential new business model. This includes the organization of training and education of end users (e.g. Al Mashari et al., 2003; Somers and Nelson, 2004), and ensuring appropriate resources (Markus et al., 2000b; PMI, 2008). Activities in that direction need to be started early in the program and the human resources aspect continues to play an important role until the changed operations are fully lived in daily business.

2.5.5 Establishment of a Company-Specific ERP Strategy

Previous ERP literature differentiates between different approaches how to implement an ERP system (Parr and Shanks, 2000; Sullivan, 2014). Davenport (2000) lists different options of how to implement an ERP system. He mentions the two extremes of the incremental and the big bang approach, with a phased rollout in the middle. An incremental approach implements the system and associated business change in small

pieces, a big bang approach implements everything at once. Phasing can be undertaken in different dimensions: a) geographical phasing, b) process phasing and c) business unit phasing. The necessity to integrate the ERP with legacy applications is a major risk factor (Sumner, 2000), and needs to be considered as well as the question to what extent the system will be integrated including its own applications but also intercompany-integration (Markus and Tanis, 2000). Decisions in regard to the degree of integration and innovation, which processes to implement, and in how many sites add to the associated risk. As such, they are determinants of the implementation complexity (Ribbers and Schoo, 2002). A phased approach, with several smaller and implementation projects, can help to reduce these risks (Parr and Shanks, 2000), in multisite implementations sites can learn from each other (Umble et al. 2003; van Fenema et al. 2007).

The size of the company and the number of distributed systems are major determinants for which strategy to use. Establishing standards and the harmonization of business processes have a profound, often positive, competitive impact, and can be rolled out via templates. This includes common customizing and master data (Huber et al., 2000). Whether standard processes offered by the ERP systems are used (plain-vanilla) or the system is heavily customized, depends on the question whether a tailored system might support the competitive advantage of the company. The higher costs must be compared with additional benefits (Davenport, 2000). The degree of process standardization has an impact on the implementation and the maintenance effort. The maintenance and support strategy also needs to be defined and can range from regional teams with direct user contact to central support structures, including time-zone bases difficulties (Seidel, 2009). This includes the question of whether IT services will be primarily provided in-house or will be predominantly outsourced (Markus and Tanis, 2000).

An important aspect is also the instance strategy, and the question of how many clients might be used in the ERP system. The usage of only one instance facilitates better data exchange, whereas multiple instances are technically easy to implement (Seidel, 2009). The technical monitoring and infrastructure is part of the responsibilities of the support center as well as the need for a system upkeep through release management, and the up-to-date documentation (Sullivan, 2014). As a consequence of all the tasks which are part of the ERP strategy, we conclude that this area is comprehensive and warrants major attention throughout the life cycle, although early decisions will constrain later options.

2.5.6 Establishment of a Program Governance Structure

ERP implementations often consist of related projects which are coordinated through some sort of overarching program (Seddon et al., 2010). In the ERP context a program is a portfolio of projects, defining a set of related IT and business activities that have defined goals and benefits and need to be controlled as a whole (Ribbers and Schoo, 2002). A program consists of components, which are in most cases projects themselves. Another component is the program itself, which is the management effort and infrastructure to manage the program and its components (PMI, 2008). Sullivan (2014) stresses that large-scale implementations, with multiple locations often require additional financial resources known as programs and a program management office (PMO). Depending on the size, the PMO functions can be performed by single or multiple individuals. The functions involve integration management, financial control, risk management, resource management, scheduling and tracking (Sullivan, 2014). The program manager coordinates efforts between the projects, but does not directly manage the project themselves (PMI, 2008). As such, program management is not micromanagement of individual projects, which is the independent domain of project managers given certain tolerances set by program management. The program management must create mechanisms to assess the performance of its processes and projects (Cabinet Office, 2011) within these tolerances. “The effective use of tolerances can directly enable the efficient execution of a program” (PMI, 2008, p. 82).

A program should include the following roles: program manager, steering committee, program sponsor, user representatives, global process owners across projects, a coordinator with external suppliers, site implementation manager (project managers), and external quality assurance (Ribbers and Schoo, 2002). Below the level of the project managers, functional processes are typically introduced via workstreams, and are led by a company expert in the specific processes, referred to as functional workstream leads (Sullivan, 2014). Workstreams are often referenced by a three letter acronym as depicted in Table 2-5. The establishment of a stringent governance model is also emphasized by Seidel for ERP programs (Seidel, 2009). Having said that, we conclude that a governance structure for programs is particularly complicated, and includes at least one level more than a traditional project setup. However, exactly this additional level seems to safeguard the proper management of project interdependencies, interfaces and efficient resource allocations.

Functional Workstream (Acronym)	Description
Contract-to-pay (CTP)	Procurement process, from supplier contracting, to payment of services
Human capital management (HCM)	Human resources process, from hiring to discharge
Order-to-cash (OTC)	Order fulfilment process, from order processing to funds receipt for invoice
Plan-to-report (PTR)	Financial process, from planning to reporting
Plan-to-schedule (PTS)	Production planning to master scheduling
Plan-to-stock (PTS)	Production planning to warehouse stocking
Procure-to-pay (PTP)	Procurement process, from purchasing to payment
Procure-to-demand (PTD)	Production of product to factory shipment
Record-to-report (RTR)	Financial process, from recording of financial transactions to reporting of company results
Recruit-to-retire (RTR)	Human resources process, from hiring to discharge

Table 2-5 Acronyms Typically Used for Functional Workstreams and Descriptions (Sullivan, 2014)

2.5.7 Business Process Reengineering

ERP systems are built on best practices and the costs and benefits of reengineering the existing business processes to the ERP model could be very high, particularly when the system is rolled out worldwide (Bingi et al., 1999). In order to realize the full range of business benefits an ERP implementation must be accompanied by business process redesign. Figure 2-2 (Accenture, 2011, p. 7) illustrates this proposition and puts the implementation complexity in relation to the expected business benefits. It seems that the higher the level of business process redesign (associated changes), the higher the implementation complexity (implementation challenge).

The definition and the adoption of new business processes, the establishment of key information entities, and the settlement of reporting and information aggregation structures are time consuming proceedings (Davenport, 2000). Furthermore, it is important to decide if the business processes are implemented as offered by the ERP system and the company adopts the best practices, or the system is adapted to the company needs (Bingi et al., 1999).

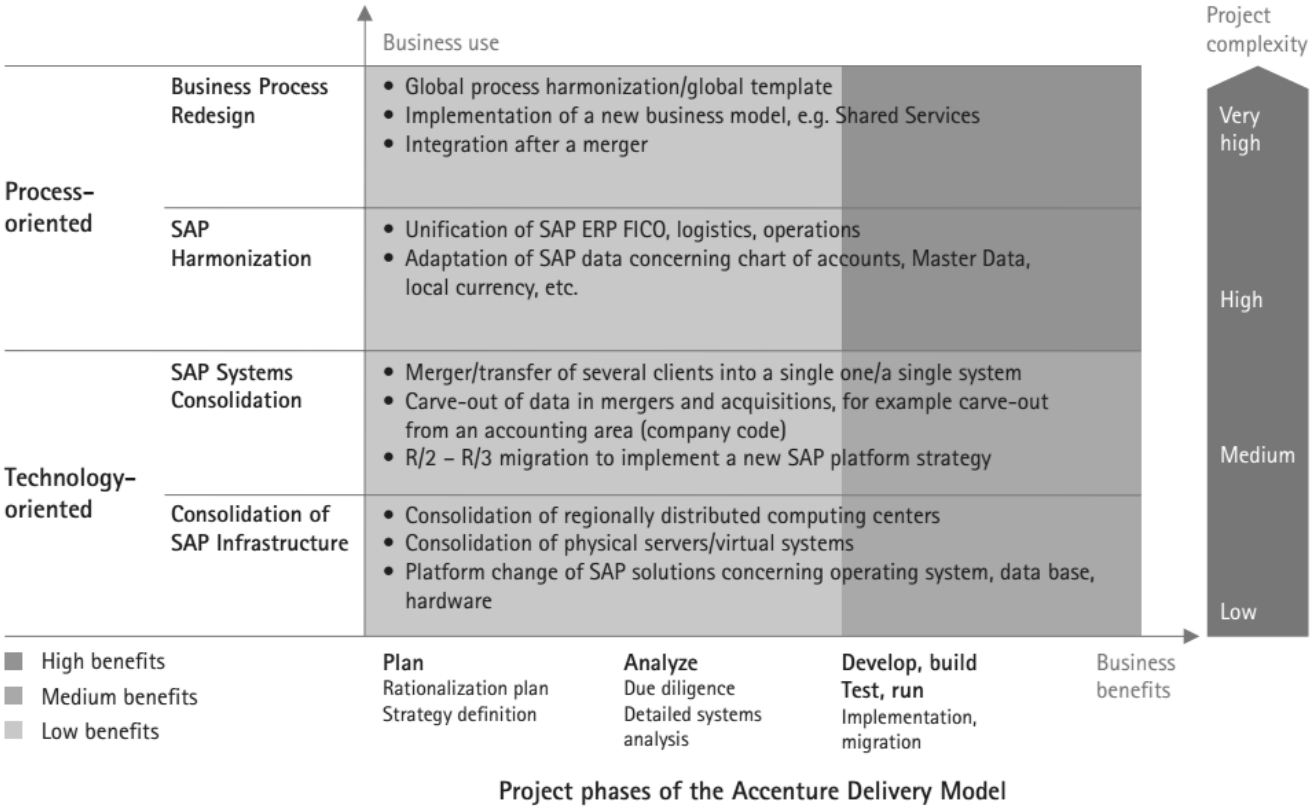


Figure 2-2 Growing Added Value Versus Increasing Complexity in an SAP Consolidation. Business Benefit in Comparison to the Degree of SAP Rationalization (Accenture, 2011, p. 7).

The question how to adopt best practices offered by the ERP system can become even more difficult when more business units or sites are involved (Gattiker and Goodhue, 2005; Huber et al., 2000). Subunits with a high dependency on other subunits may benefit substantially, whereas subunits which with a high degree of differentiation (suboptimal business processes) may incur costs (Gattiker and Goodhue, 2005). A common agreement about future business processes between central management and local sites needs to be built, which is sometimes more difficult when the subunits are independent and strong (Gulla and Mollan, 1999). This agreement is even more difficult to achieve regarding the end-to-end view of business processes (Sullivan, 2014).

Table 2-5 gives us an impression of the integrative nature of end-to-end business processes, and their reflection in workstreams, as part of the governance-structure. The integrative nature of end-to-end business processes also warrants regular meetings between the streams, led by the stream owning the specific processes (Sullivan, 2014). Consequently, the design and reengineering of business processes play

an important role in the earlier and implementation stages of the ERP program (Al Mashari et al., 2003; Somers and Nelson, 2004).

2.5.8 Appropriateness of the ERP Vendor

It is important that the characteristic of an ERP system match the overall business strategy of a company and that the software is chosen which has the best fit with the current business procedures, and can be well integrated with existing software applications (Al Mashari et al. 2003). The software needs to effectively support the required business functions, functional areas, as well as the overall company vision (Umble et al., 2003), and business requirements (Zhang et al., 2005). Thus, an ERP system is in the majority of cases, when all potential benefits should be employed, a determinant how a company is going to conduct its future business and therefore strategic at its best.

Furthermore, it needs to be considered that an ERP implementation is an expensive endeavor, sometimes costing tens to hundreds of millions of dollars, considering systems Integrator staff, software licenses and hardware (Sullivan, 2014). The price of ERP software is often a major factor, but should not be the only criterion, as the ongoing vendor support, flexibility and ease of implementation, as well as tangible and intangible benefits associated with the software application also play a role (Umble et al., 2003). Moreover, the opportunity of receiving continuous maintenance and upgrade support is crucial (Bingi et al., 1999). The priorities also depend on the size of the companies and smaller organizations spend less money on the selection process and the overall price is more important than internationality and organizational flexibility (Bernroider and Koch, 2001). Pre-built packages, which are associated with less risk, might be a suitable alternative for small and medium-sized businesses, and constructed to solve a specific business problem and greatly ease the implementation process (Sullivan, 2014). The partnership with the ERP vendor is particularly important in the early stages of the implementation (Somers and Nelson, 2004), but as a strategic decision the future vision of the vendor needs to be considered too (Zhang et al., 2005). As a consequence, we conclude that choosing the right ERP vendor and software is of major importance, given the fact that this decision will have major impacts on how the company conducts its future business, future upgrade projects (Sullivan, 2014), and the long-lasting relationship which can be expected with the ERP vendor and the chosen package.

2.5.9 Risk- and Issue Management

There is a general consensus that business process changes add considerably to the expense and risk of ERP implementations (Markus and Tanis, 2000). In the early phases of the implementation certain decisions

contribute considerably to the risk of the implementation, as rollout approaches, either phased or big bang (Davenport, 2000). Scope, business process complexity, user base, geographies and languages, and the degree of system integration are further factors increasing the risk (Sullivan, 2014). The risks need to be considered and resolved in one phase: Otherwise they are inherited and become a starting condition for the next phase (Markus and Tanis, 2000).

The program management office is responsible for risk management, and tracks the risks over the program life cycle in a risk register. Impact and probability are part of the risk register, as well as the impacted deliverables, mitigation actions, cause and the owner (Sullivan, 2014). Sometimes, proximity is tracked to inform the management about the likelihood that a risk will occur at a particular time and its impending urgency (Cabinet Office, 2011). Program risk management includes its planning, identification, analysis, risk responses and the monitoring of it (PMI, 2008). The PMI differentiates between positive and negative risks, commonly referred to as opportunities and threats (PMI, 2013a). The program risk management body of knowledge is still evolving whereas project risk management is relatively mature (Aritua et al., 2011). Small risks in a project might accumulate with other risks in adjacent projects, and could significantly impact the program. Thus, the risks need to be evaluated across the program and projects (Cabinet Office, 2008).

Issue and incident management is closely related to risk management. It is likewise tracked during diverse phases of the implementation (Cabinet Office, 2011). This includes issues cropping up during testing and the resolution of incidents after go-live in the hypercare[6] phase (Sullivan, 2014). Suitable tools might drive the efficiency (Seidel, 2009). Consequently, we conclude that efficient risk- and issue management throughout the program life cycle and across the program and projects will contribute to the success of the implementation.

2.5.10 Definition of an Integration Management Strategy

In most companies, data are not kept in a single repository, but rather dozens or even hundreds of separate computer systems serve individual functions (Al Mashari et al., 2003). A good number of those systems might be replaced by the ERP system, but necessary interfaces will remain, which can be integrated via middleware or, when middleware focus only on technical aspects, company-specific interfaces must be built to integrate end-to-end processes (Al Mashari et al., 2003). Those end-to-end processes can include different modules, different internal systems or even interfaces to external systems from business partners (Davenport, 2000;

[6] The "hypercare" phase is a common term within ERP implementations. It refers to the increased attention in relation to incidents that are expected to appear directly after go-live (Sullivan, 2014).

Sullivan, 2014), or as Ribbers and Schoo (2002) put it, organizational integration which spans organizational boundaries. The exchange of documents with business partners can be facilitated via the EDI (Electronic Data Interchange) standard (Davenport, 2000; Sullivan, 2014), but each customer and vendor needs to be treated individually (Sullivan, 2014). As such, integration is a predictor for a program's complexity. High integration complexity warrants complete alignment mechanisms (reviews, steering committees, release control) and coordination with external partners. In certain cases, the integration can be associated with a complete new architecture (Ribbers and Schoo, 2002). As a consequence, we conclude that the high integrative nature of ERP systems warrants a company-specific integration strategy.

From a program management perspective, the importance of integration management is stressed likewise (Cabinet Office, 2011; PMI, 2008). Integration includes unification, consolidation, articulation, and integrative actions that are crucial for completing the program, managing stakeholder expectations and delivering program benefits. The program deliverables should be integrated, either with ongoing operations of the performing or the customer´s organization and with consideration of long-term strategic-planning (PMI, 2008). Existing projects might be adopted and integrated into the design of the blueprint and the program plan (Cabinet Office, 2011). In the same way, Thiry (2004) stresses that the emphasis on the interdependability of projects ensures strategic alignment. “The expected outcome of the programme can be a change of the business by replacing the existing systems and processes versus a change of the business by modifying/improving the existing systems and processes” (Vereeke et al., 2003, p. 1281). As a consequence, existing projects at the program start and the degree of change need to be considered (Vereecke et al., 2003). Thus, we conclude that from a program management perspective the integrative nature of programs is well considered and a program is a good means to achieve that integration.

2.5.11 Time, Scope and Financial Management

Time- and scope management is rarely considered as a separate CSF in the current ERP literature, and rather subsumed under the general term project management. As such, a proper schedule and scope is acknowledged (e.g. Markus and Tanis, 2000). The program management literature provides a more explicit picture regarding time and scope management, and addresses special techniques to manage time and scope adequately at the program level. According to the PMI (2008), the program management plan includes all program and component (project) plans, milestones, deliverables, and dependencies. A program roadmap is created early in the program and subject to regular updates and refinements. Lastly, a program transition plan considers the movement to an operational stable state (Cabinet Office, 2011). The scope is initially

defined and is particular important in programs due to the increased complexity. Scope changes must be approved by a change control board (PMI, 2008).

The Cabinet Office (2011) stresses regular health checks throughout the program which includes, amongst other issues, time, scope and costs. Regular updates and the iterations of the blueprint and business case are emphasized as the consequence of being a learning organization (Cabinet Office, 2011). Seidel (2009) emphasizes securing of appropriate funds (funding model) as a CSFs to be considered at the program level.

Scope, budget and a change control budget are considered in the accounts of Ribbers and Schoo (2002) and Lycett et al. (2004). The latter account emphasizes the need of a dynamic and flexible view of the program life cycle, confirming the views of standard works (Cabinet Office, 2001; PMI, 2008). As a consequence, we assume that the appropriate consideration of time, scope and funding is in a program environment even more important than in a traditional project environment, due to the more complex nature of programs.

2.5.12 Definition of a Program Methodology

For ERP programs the selection and execution of a company-specific methodology, and the consistent application through design, deployment and localization is emphasized by Seidel (2009). For SAP implementations the ASAP-methodology for implementation (Accelerated SAP); consisting of Phase (1)-Project Preparation, Phase (2)-Blueprint, Phase (3)-Realization, Phase (4)-Final Preparation, Phase (5)-GoLive Support, Phase (6)-Operate; is very popular and applied frequently (SAP AG, 2016; Sullivan 2014). Apart from that product-specific methodology, program management (PMI, 2008) and project management (PMI, 2013a) guidelines published by the Program Management Institute are very popular, as well as the guidelines from the Cabinet Office for program management (Cabinet Office, 2011).

According to Sullivan (2014), the ASAP-methodology fits both program management guidelines. Due to the alignment with project- and program management guidelines, what is also recognized by the SAP AG (2016), the applicability of ASAP is widespread. Thus, we can easily map the ASAP phases (italic) to other approaches as depicted in Table 2-6. This is a further indication that ASAP can complement (or perhaps replace in some cases, presumably in environments with low complexity) company-specific methods.

Ferns (1991)	Preparatory	Establishment		Program Management				
Pellegrinelli (1997)	Initiation	Definition & planning		Delivery			Renewal	Dissolution
Thiry (2004)	Formulation	Organization		Deployment				Dissolution
PMI (2008)	Pre-program preparation	Program initiation	Program setup	Delivery of benefits				Closure
Cabinet Office (2011)	Identifying	Defining		Managing the tranches & delivering the capability			Closing	Realizing the benefits
ERP program life cycle	Preparation & chartering phase			Implementation & project phase			Operations phase	
ASAP (SAP, 2016)	*Preparation*			*Business blueprint*	*Realization*	*Final Preparation*	*Go-Live and support*	

Table 2-6 ASAP Phases (Italic) Mapped to Other Approaches

Table 2-7 provides an overview per phase. Regardless which methodology is used, it will contain many (if not all) of these deliverables. It is obvious from Table 2-7 that even when the methodology might be adapted to meet company-specific purposes, the deliverables per phase are massive. These deliverables per phase have to be delivered according to the predefined schedule, and quality gates have to be passed in order to proceed to the next phase (Sullivan, 2014). These quality gates are formal reviews and provide the sponsors with targeted understanding of the program performance. This has the advantage that any significant issues are captured early in the life cycle. When the sponsors decide to move to the next phase they admit to understanding the risks well (Sullivan, 2014). Thus, a company-specific method (regardless if ASAP is used complementary, exclusively, or not at all) should be applied continuously and rigidly to contribute to a successful program. Consequently, the associated risks are also mitigated.

ASAP – Phase	**Deliverables**
Project Preparation	Creating a project charter, defining and staffing of the project team, installing sandbox-systems, identifying risks and critical success factors, setting initial milestones, blueprint plan, conducting project team training, planning of the project infrastructure, holding kick-off meeting
Business Blueprint	Conducting design workshops, defining system requirements, identifying custom objects and preparing gap documents, completing design documentation, holding prototyping sessions, setting change impacts, defining the realization plan, installing development-systems

Realization	Building final configuration, defining custom object functional and technical specifications, designing and coding of custom objects and testing them afterwards, assigning security authorizations and roles, planning and conducting system testing, developing user training materials, conducting data- reviews and loads, installing quality and production systems
Final preparation	Developing the cutover-plan, conducting dry-runs, managing production data load and verification, building the production environment, assigning final end use roles mapping, Issuing User-IDs, promotion of configuration and development to the production system, conducting end-user training, preparing super users for support roles, creating the hypercare-plan, approval for go-live
Go Live & Support	Tracking service level performance, monitoring incidents, assessing business ramp-up status, transferring support responsibility to operations ream, conducting hypercare-close review, shifting the team to new assignments

Table 2-7 ASAP-Methodology. Phases and its Deliverables (Sullivan, 2014)

The ASAP methodology can be used for implementation, enhancements or upgrade of SAP solutions and supports cost effective and speedy implementation of the SAP solutions, in different environments. It provides a proven, comprehensive, repeatable and rich implementation methodology to streamline projects and programs and helps to achieve lower total costs of implementation. ASAP supports project and program teams with templates, tools, questionnaires, and checklists, including guidebooks and accelerators (SAP AG, 2016). Some further benefits are listed in Table 2-8.

ASAP can not only be used for the SAP ERP package but covers the entire solution portfolio of the SAP AG. As such, it is suitable for projects and programs likewise. The roadmap is structured into logical work streams and can support multisite projects (SAP AG, 2016).

Markus and Tanis (2000) stress the importance of a company linking its plans to its starting conditions and goals as there is no single methodology which guarantees success. This company-specific plans need a good execution (Markus and Tanis, 2000; Seidel 2009). While there is agreement that no general method is appropriate in all settings, ASAP is one of the group of SDLC (Software Development Life Cycle) methodologies and has a similar purpose to comparable frameworks from system integrators like Accenture or IBM (Sullivan, 2014). As such, SDLC methodologies can help to make a program successful, but particularly for programs the methodology should be tailored to meet the company´s requirements. Thus, methodologies for programs, which typically have a larger size, should be company-specific (Seidel, 2009).

Benefits of ASAP (Accelerated SAP)
• Transparent proven approach using the experiences of other successful projects and programs • Leverages the experience of the software vendor in implementation of its solutions • Extends across all aspects of the solution life cycle, including strategic reviews and analysis, design, implementation, training and post project support • Scalable method that can be tailored to the implementation requirements • Supports different implementation types (e.g. single-site, multisite, template rollout) • ASAP has been developed over many years (current version ASAP 8) to deliver cost-effective and successful implementations

Table 2-8 Benefits of ASAP (SAP AG, 2016)

2.5.13 Proper Use of Consultants

For an ERP implementation it is important to find the consultants with proper functional, technical and interpersonal skills (Bingi et al., 1999; Somers and Nelson, 2004; Zhang et al., 2005), and keeping them throughout the implementation (Bingi et al., 1999) or even the complete life cycle. Furthermore, it is of major importance how the consultants of external companies are managed (Bingi et al., 1999; Somers and Nelson, 2004). Consultants can help to overcome insufficient internal expertise, and a good mix of consultants (Parr and Shanks, 2000; Robey et al., 2002; Sumner, 2000) and internal staff enables the internal to grow (Sumner, 2000).

Choosing the right consultancy is a decision of major importance, and is also reflected in associated costs. The respondents of the 2015 ERP report reported that 61-75 percent of their project budget was used for consulting fees (Panorama Consulting Solutions, 2015). This depends on the industry the implementing company is doing business in, as well as on the size of the implementation and whether it is global or local. A new integrator also needs successful on-boarding, including history and rationale for the project (Sullivan, 2014).

Somers and Nelson (2004) provide empirical support that consultants are particularly important in the early stages of the life cycle but unexpectedly again during the infusion stage. When the consultants leave the implementing company it is important that the support organization has the capability to solve incidents. This knowledge transfer of the project team is referred to as transition, is usually done in the hypercare phase in the months after go-live and ends with the transfer of responsibility for resolving incidents to the support organization (Sullivan, 2014). To summarize, previous research indicates that consultants are a

major determinant for a successful implementation, and the relationship with the consultants, as well as with external consultancies is very important throughout the life cycle.

2.5.14 Ensuring of Data Migration Accuracy & Management

A major topic in every company implementing and using an ERP system is the appropriate handling of data. To ensure that the new business processes use correct data deliverables during all phases of the life cycle are necessary. This starts with a data migration strategy (Markus and Tanis, 2000). The data migration strategy includes decisions about which data will be migrated in which granularity. The data needs to be incorporated from legacy systems, warranting mapping rules, data conversion, and data cleansing according to the new system's needs (Markus and Tanis, 2000, Sullivan, 2014). This is usually done during iterations and repeating data loads during the implementation phase (Sullivan, 2014). After the production data load, the data is verified (Somers and Nelson, 2004; Sullivan 2014) and data input errors might be corrected (Markus and Tanis, 2000).

Somers and Nelson (2004) emphasize the high importance of data analysis and conversion during the early stages of the system life cycle, and its moderate importance during the operations phase. This might be caused because they only focus on the implementation and verification of data, and not on its actual usage (Somers and Nelson, 2004). Umble et al. (2003) stress the correct training of employees and the necessity that data is entered accurately due to the integrated nature of an ERP system. Data integrity and information quality is also emphasized by Zhang et al. (2005). Some companies have their own data governance rules particularly for master data to ensure the accuracy of data. As a consequence, master data objects are governed by data owners (Sullivan, 2014). At the program level, Seidel (2009) emphasizes data conversion and master data as part of the common CSF "technical aspects"; that is, the consideration across sites. To sum up, when all aspects of data (strategy, migration, accuracy, governance) are considered its appropriate consideration is highly important during all phases of the ERP system life cycle, and should be considered across sites at the program level.

2.5.15 Readiness of Organizational Culture

An ERP implementation impacts the way business is done in organizations according to the best practice processes encapsulated in the ERP package, and thus affects organizational cultures. Krumbholz and Maiden (2001) examine the influence of national and organizational cultures on the success of ERP implementations. They find some support that cultural differences impact the success of an ERP implementation, as well as norms, values and beliefs. Lastly, they find some indications that the business processes embedded in the

ERP package reflect to a certain extent the ERP vendor's country culture. In the same way, Zhang et al. (2005) investigate possible implementation problems attributed to culture in China and propose some CSFs in different stages to overcome resistance. Open organizational cultures, with a strong corporate identity and shared values and beliefs are more likely to succeed in ERP implementations. Thus, corporate communication, training, education and support should be encouraged to leverage organizational cultures (Nah et al., 2001).

Krumbholz and Maiden (2001) emphasize the role of national cultures, impacting organizational cultures in multinational companies and thus leading to implementation problems. Language problems and even the log-on language can lead to problems in multinational organizations, and local training resources should be used (Gulla and Mollan, 1999). The readiness of organizational business cultures, the consideration of intercultural aspects and a suitable business model of a site are amongst the site-specific success factors for the ERP program (Seidel, 2009). In many accounts, culture (Umble et al., 2003) and resistance (e.g. Somers and Nelson, 2004) are emphasized under the CSF "change management", and play an important role throughout the life cycle. The category could be effectively considered a subcategory of change management, given the number of citations that dealt specifically with the issue of cultural change, it was decided to consider it as a separate CSF in the account of Finney and Corbett (2007). It seems that organizational and national cultures are critical for an ERP implementation. Furthermore, we assume that this factor will be even more important in a program where multiple cultures and sites are more likely to subject to the implementation than in traditional project setups.

2.5.16 Realization of Benefits

For the success of an ERP program, and to ensure a return on investments, the performance evaluation and measurement is essential. This requires a holistic perspective which comprises financial aspects, technical aspects and synergy through integration (Al Mashari et al., 2003). The CSF realization of benefits corresponds to the CSF establish a vision and business case which is eminent in earlier stages, as the intended goals are quantitatively and qualitatively evaluated and the company and employees are continuously encouraged to use and improve the system (Umble et al., 2003). Reviewing planned versus actual benefits are also strongly emphasized in the program management literature, as well as ongoing business support, and securing effective operations and further change initiatives (PMI, 2008; Cabinet Office, 2011). Although supporting documents, e.g. benefits realization plan (PMI, 2008), benefits registers (Cabinet Office, 2011) are prepared in the early stages the main emphasis of this CSF is within the operations phase when the benefits accrue.

Furthermore, not only expected benefits might be realized but also unexpected benefits should be realized and valued (Cabinet Office, 2011; Markus and Tanis, 2000).

2.6 Success in the Context of ERP Implementations and Programs

One of the most enduring topics in IS research is related to information system success and the search for the dependent variable (Markus et al. 2000b). Significant research effort has been undertaken in relation to IS systems in general (e.g. Lyytinen and Hirschheim, 1987; DeLone and McLean, 1992; DeLone and McLean, 2003) and in relation specifically to ERP systems (e.g. Markus et al. 2000b; Al Mashari et al. 2003; Bernroider, 2008). All of these accounts consider the importance of stakeholder views as a measure for information systems success. The views are complemented by traditional measures as time and cost (e.g. Lyytinen and Hirschheim, 1987; Markus et al., 2000b). In the same direction, for ERP programs, Seidel (2009) differentiates between project success (time and costs) and program objectives (directly or indirectly quantifiable). Similarly, Ribbers and Schoo (2002) differentiate between successful programs on the dimensions of project success (implementation process; that is, time and costs) and product success (results).

A further important point is the question when the success is to be evaluated, as the entire scope of success will only materialize at later stages during use (Bernroider, 2008; Uwizeyemungu and Raymond, 2010). Moreover, how do business benefits evolve during the post-implementation period (Poston and Grabski, 2001; Staehr et al., 2012)? Markus et al. (2000b) emphasize that an early success can turn into a failure, thus proposing the need of measuring success at different stages (Markus et al, 2000b; Velcu, 2010). The importance of a dynamic view is also emphasized by Lyytinen and Newman (2015), and previous research focused on static antecedents for success in the form of critical success factors (CSFs). In our research, we considered the dynamics of critical success factors and took into consideration the dynamic and phase specific nature of critical success factors in our literature review. For example, we considered a CSF, which is typically of importance after go-live, such is the “realization of benefits”.

For our research, we mainly followed the same method as Lyytinen and Newman (2015), who take the stakeholder view as a measure of success in relation to an ERP implementation. As a consequence, we asked all interview partners (consisting of different stakeholder groups) about their perceived success of the program. Similarly, Uwizeyemungu and Raymond (2010) use the perspective to what extent organizational performance indicators are changed by the ERP system, as perceived by managers.

During data collection, we considered the time perspective, in asking for details of successful outcomes in different phases. When possible, we complemented the perceived success with performance indicators, such as meeting the business case targets, number of incidents, ease of adopting new releases. Metrics, which are partially suggested by Markus et al. (2000b) for different phases, and consistent with the approaches used specifically for ERP programs (Ribbers and Schoo, 2002; Seidel, 2009).

This view is also consistent with program management literature, as empirically exemplified by Shao and Müller (2011). Business results and stakeholder satisfaction are the most mentioned program success criteria in their study (Shao and Müller, 2011) and are deductively tested as having significant impacts in a further study (Shao et al., 2012). A similar view on stakeholder satisfaction in program management research is taken by Thiry (2001; 2002). Meeting the stakeholders´ needs and expectations and a shared understanding about anticipated benefits (sensemaking) is necessary to meet the business objectives (Thiry, 2001; 2002). Thus, the stakeholders´ views are directly related to the strategic business objectives of a program, and we conclude that they are appropriate means to measure the success of a program in conjunction with relevant metrics. Thus, we define in the ERP program context:

Success in the ERP program context is how success is perceived by relevant stakeholders in conjunction with relevant metrics for the specific case.

2.7 Summary

In this section we presented the theoretical background guiding our research. We started with characteristics of ERP systems, followed by the typical challenges of large scale ERP implementation and the dynamic nature of ERP systems. Then we elaborated on programs, highlighted what we know about ERP programs and possible benefits. Next, we discussed previous research on CSFs and the resulting seed concepts. Finally, we defined our understanding of success relevant for this study. In the next chapter, we elaborate on the research method.

3 Research Method

In the next chapter we present our research method. First, we elaborate on our interpretive philosophical stance. Second, we present our research approach, which is based on the grounded theory method (Strauss and Corbin, 1998) and we highlight some main elements of this method. Next, we present how we assure quality and increase the plausibility of the story (Myers, 2009). Then, we elaborate the criteria for how we selected our cases, before we highlight the preparation of the data collection and the collection itself. Then, we present our coding procedure which follows an adapted grounded theory approach (Sarker et al., 2001) of the "Straussian" grounded theory method (Strauss and Corbin, 1998). Finally, we summarize this chapter.

3.1 Philosophical Stance

The famous theoretical physicist, well known for his seminal work in the area of quantum physics, John Archibald Wheeler asserts "it is a participatory universe" (1990, p. 311), which basically means that the observer-participant generates information. In interpreting Wheeler´s work Davies states "an observation involves the acquisition and recording of information. On the other hand, an observer, at least of the living variety, is an information processing and replicating system. In both cases it is not information per se that is crucial, but semantic information" (Barrow et al., 2004, p. 22). To put it in Wheeler's words regarding the meaning circuit "the communicators and the communications between them generate meaning" (Wheeler, 1986, p. 25). Although this view is taken in the tradition of quantum physics, the necessity to interpret information is also very much evident for social phenomena and IS. The interpretive process of generating meaning is described in the seminal work "Truth and Method" of Gadamer (1975; 1994). Interpreting and generating meaning is an approximative process, during which fore-conceptions based on expectations are replaced by more suitable ones (hermeneutic circle). Thus, the meaning is generated after several revisions in which the unity of meaning becomes clearer (Gadamer, 1994).

In the context of interpretive fieldwork in IS, the hermeneutic circle is fundamental for Klein and Myers (1999), who describe the potential of interpretative research "to produce deep insights into information systems phenomena, including the management of information systems and information systems development" (Klein and Myers, 1999, p. 67). As a consequence, the author of this thesis generates meaning in taking an interpretative philosophical stance, which is deemed as appropriate in this research context.

An interpretive philosophical stance is particularly useful for our purposes as it best captures complex, dynamic, context- and time-dependent social phenomena (Orlikowski and Baroudi, 1991) and to access the subjective and inter-subjective meanings of individuals as they interact with the world around them (Kaplan

and Duchon, 1988; Klein and Myers, 1999). This well-accepted approach is not new and was used for IS implementations and framework generations in the past. Orlikowski (1993) presents a theoretical framework of the implementation of CASE (Computer Aided Software Engineering) tools, which is developed through an interpretive grounded theory approach. She emphasizes the importance of the social context, the intentions and actions of key players and the implementation process. In a recent interpretive case study from Berente and Yoo (2012), a similar approach was taken where they identify four generalizable forms of loose couplings grounded in data of a single ERP implementation. Yet, the validity of a theory in a different setting would remain an open question (Lee and Baskerville, 2003). The author of this thesis generally does not want to generate universal laws or ensure quality in terms of validity and reliability as proposed by positivist researchers (Benbasat et al., 1987; Eisenhardt, 1989; Paré, 2004; Yin, 2003) - or using rigid positivist case study approaches as exemplified in Lee (1989). The author rather wants to inform other settings (Orlikowski and Baroudi, 1991) and secure quality in terms of plausibility of the story and the argument (Myers, 2009).

Although we propose an interpretive philosophical stance for our study, we do not necessarily believe that interpretivism and positivism are in contradiction. We subscribe to the weak view of constructionism, according to which "interpretive research is understood to complement positivist research, that is, by generating hypotheses for further investigation, and by filling in knowledge gaps that positivist research cannot attend to, such as the contextual exigencies, the meaning systems, and the interaction of various components of a system" (Orlikowski and Baroudi, 1991, p. 15). According to the strong constructionist view, the second primary variant of interpretivism, it does not make sense to accommodate positivistic beliefs with an interpretive perspective. Interpretive research is thought to replace positivist research (Orlikowski and Baroudi, 1991). Researchers cannot merely describe the actors´ views, since they are relying on their propositions and with their personal world views they construct the form and the nature of the phenomenon (Orlikowski and Baroudi, 1991). The author primarily chooses the interpretive approach since this stance is appropriate for the purposes of this research and to answer the research questions. Certainly, also positivist research can and should build on the results in the future, as well as mixed methods which employ elements of both paradigms (Kaplan and Duchon, 1988; Lee, 1991; Mingers, 2001).

Grounded theory is independent from the underlying philosophical assumptions and has been variously described and applied in interpretive, positivist and critical[7] studies (Urquhart et al., 2010). Grounded theory belongs to the realm of qualitative empiricism (Urquhart et al., 2010) and is a qualitative research method for data gathering and data analyzing (Myers, 1997). The accounts of Berente and Yoo (2012), Boudreau and Robey (2005) and Orlikowski (1993) are three typical examples, where the grounded theory was applied in studies with underlying interpretive philosophical assumptions. Myers (1997, p. 9) emphasizes that the grounded theory "method is extremely useful in developing context-based, process-oriented descriptions and explanations of the phenomenon." Therefore, we conclude that our stance is well accepted for the intentions of our research, and the application of the grounded theory method is particularly useful for answering our research questions.

3.2 Grounded Theory Method

Grounded theory approaches are increasingly used in IS research (Myers, 1997), for theory generation, mixed-methods approaches and data analysis (Matavire and Brown, 2013). One of its key advantages - and challenges - is that it is applicable to research domains that are new or emergent and may yet lack substantive theory (Recker, 2013). The grounded theory method (GTM) was introduced by Glaser and Strauss (1967) in their book "The Discovery of Grounded Theory", with the goal to systematically derive theories of human behavior from empirical data (Urquhart et al, 2010; Urquhart, 2012). One of the inventors of the original grounded theory method, Strauss, together with Corbin (Strauss and Corbin, 1990; 1998), introduced a coding technique, named the "paradigm", which explicitly differentiates between conditions, actions/interactions and consequences. The paradigm was often seen as too rigid (Seidel and Urquhart, 2013) and in their later works, it is no longer seen as mandatory by the inventors themselves (Corbin and Strauss, 2008).

The debate about the paradigm triggered a split between the founders of grounded theory Glaser and Strauss (Seidel and Urquhart, 2013), and led to different strands of grounded theory. The "classical "and the "evolved" approaches are distinguished. They are also often referred to as the "Glaserian" and the "Straussian" approach (Urquhart et al, 2010; Matavire and Brown, 2013), after the founders of the original method. The coding stages in the "Glaserian approach" are open coding – selective coding – theoretical coding, whereas the "Straussian" approach employs open coding – axial coding – selective coding (Urquhart

[7] We do not discuss critical research in this dissertation. For further reading we suggest Myers and Klein (2011). According to them, "critical research in information systems is concerned with social issues such as freedom, power, social control, and values with respect to the development, use, and impact of information technology" (Myers and Klein, 2011, p. 17).

et al, 2010). Charmaz (2003; 2006) developed a further prominent approach (Flick, 2009). A good overview of the grounded theory method can be found in the account of Flick (2009) and in more detail in Urquhart (2012).

In this research a variant of the "Straussian" approach (Strauss and Corbin, 1998) is employed, which is arguably the most influential strand of the grounded theory method and mostly used in the IS discipline (Seidel and Urquhart, 2013; Urquhart, 2010). We use primarily integrative memos, as proposed by Sarker et al. (2001), instead of the paradigm, or, as Seidel and Urquhart (2013) put it, a more flexible use of axial coding. This was an important decision, as axial coding refers to the process of defining the relationships between the concepts, which is critical for theory generation (Urquhart, 2001). Furthermore, we feel more familiar with the "Straussian" approach, as it is more flexible in the use of a priori theory and the role of an initial literature review in the substantive area of study (Strauss and Corbin, 1998; Matavire and Brown, 2013), and therefore consistent with the research approach which derived and conceptualized seed concepts from existing literature. The compatibility of doing a literature review in combination with the grounded theory method is also stressed by Urquhart (2012).

In the account of Sarker et al. (2001), "Using an Adapted Grounded Theory Approach for Inductive Approach for Inductive Theory Building", two different research approaches to studying new organizational forms (in their case virtual teams) are distinguished. First, a deductive approach that is tested in the new context (in our case the ERP program) "of existing theories on related aspects of traditional organizational form synthesized with the researcher´s intuitive understanding of the new forms or what is known from exploratory studies regarding these new forms". Second, the inductive approach, "developing a theoretical understanding of the new forms that is grounded in the experiences of human subjects who are/have been members of such forms" (Sarker et al., 2001, p.38). They emphasize that the second approach is more useful when the new organizational forms are novel, as this is the case for ERP programs. Following the essence of the grounded theory method, which is building "theory that was derived from the data, systematically gathered and analyzed through the research process" (Strauss and Corbin, 1998, p. 12), we took the latter inductive approach for researching ERP programs, and used the grounded theory approach in a similar way as Sarker et al. (2001) exemplified in their paper for virtual teams. In their account, they also stress that an inductive approach should not ignore existing literature and the personal experiences of the researchers (Sarker et al. 2001), but the researchers need to constantly conduct self-examination regarding assumptions, biases and motivations and let the concepts evolve from theory (Sarker et al., 2001; Trauth, 1997).

Boudreau and Robey (2005) conduct an interpretive case study of an ERP system after its implementation. They explicitly mention the potential to use prior literature, theory, personal and professional experiences to guide the data analysis. As they progressed with the analysis they consulted different concepts to provide insight in the empirical observations. Boudreau and Robey (2005) did not specify a priori theory, as done within an interpretive case study about the introduction of electronic trading in the London insurance market (Barrett and Walsham, 1999). They use concepts of Giddens social transformation theory and follow an approach similar to a "Straussian" adaptation of grounded theory (Boudreau and Robey, 2005).

Different grounded theory approaches are employed in IS research, often following the "Straussian" or the "Glaserian" variant of the grounded theory method. Nevertheless, which approach is used mainly depends on the purpose of the intended research, and although they have their differing points, e.g. in terms of when and how literature is to be used, the different approaches share certain commonalities.

In the following, we want to present some main elements of the grounded theory method, which we deemed important for our research. For structuring those elements, we use the guidelines for conducting grounded theory studies in information systems of Urquhart et al. (2010), an account which bears many general recommendations and basic principles inherent to the original variant (Glaser and Strauss, 1967), and consider also the subtleties of the more specific approach (Sarker et al., 2001) which we finally employed. Whereas the first three guidelines deal with the degree of conceptualization necessary for good theory building, the final two guidelines compare the outcome of the first three guidelines with existing theories with the aim of theoretical integration (Urquhart et al., 2010).

Figure 3-1 represents how we achieve our final target of theoretical integration. First, we increase the degree of conceptualization through applying the three coding steps (Strauss and Corbin, 1998; Sarker et al., 2001) of the "Straussian" approach (open coding, axial coding, selective coding). Second, we raise the theory scope, and the generalizability, by comparing it to other (substantive and broader) theories in the field, thus achieving the goal of theoretical integration (Urquhart et al., 2010).

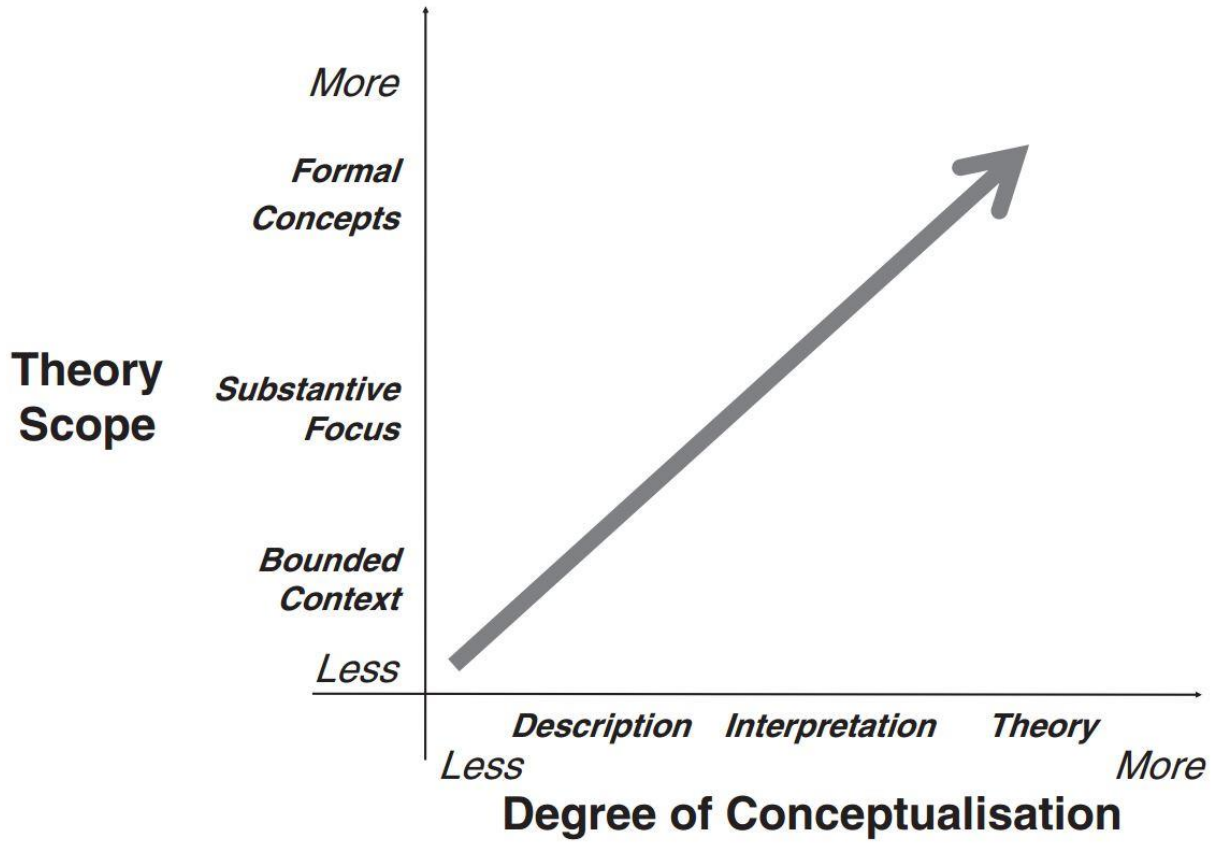


Figure 3-1 A Framework for Analyzing Grounded Theory Studies (Urquhart et al., 2010).

3.2.1 Constant Comparison

Continuous comparison is arguably the most important guideline and the heart of grounded theory. This enlightening rule of thumb assists the researcher to understand the process of analysis (Urquhart, 2001), and enables rigorous scrutiny (Urquhart et al., 2010). "Constant comparison is the process of constantly comparing instances of data that you have labelled as a particular category with other instances of data, to see if these categories fit and are workable" (Urquhart, 2001, p. 7). Depending on the phenomena investigated the researcher decides if coding at the word and sentence (low-level) is appropriate. The insights of low-level must not be underestimated, and as such the grounded theory methods provides a chain of evidence superior to other approaches, and every category has dozens of instances (Urquhart et al., 2010). Yet, even the investigated phenomenon and the level of analysis needs to be considered.

3.2.2 Iterative Conceptualization

This guideline refers to the relationships between the categories and the iterative fashion of building theory (Urquhart et al., 2010). It is the stage where the paradigm (Strauss and Corbin, 1998) comes into play. The application of the paradigm was often seen as difficult (Urquhart, 2001), emphasizing that the process of theory building is essentially creative, and cannot be achieved following rigid procedures alone. Through iterative conceptualization in relating the categories to each other the level of abstraction is increased, codes become inferential and explanatory, and the theory gains depth, explaining "what" and "why" (Urquhart et al., 2010). In our research this process is accompanied by using integrative memos (Sarker et al., 2001). The role of (theoretical) memos is also stressed by Urquhart et al. (2010). It is not of major importance which coding stages are used and that procedures are mechanistically applied, the key thing that all these stages are followed, intuitively and iteratively, to allow adequate conceptualizations as basis of the grounded theory (Urquhart et al., 2010).

3.2.3 Theoretical Sampling

Theoretical sampling means that the data gathering is driven by existing concepts, to go to places, people or events to discover variation of the concepts, and to densify categories (Strauss and Corbin, 1998), or, as Urquhart et al. (2010) put it, more from the same until saturation is achieved. This principle is strongly intertwined with "constant comparison" with additional data (Urquhart, 2001; Strauss and Corbin, 1998), achieving a theory that is well-grounded in data (Urquhart et al, 2010). The sampling of data should not only be limited to a specific research with a cohesive theoretical construct, therefore increasing the "fit" of a theory by keeping it up-to-date with changing circumstances and extending its scope over the theory´s substantive limits (Urquhart et al., 2010).

Sampling, according to Strauss and Corbin (1998), starts at the beginning of the research project when a site is chosen. Furthermore, a decision for which types of data to be used must be made, how long an area should be studied and finally how many sites should be observed and how many interviews should be conducted. To avoid endlessness of theoretical sampling, Flick suggests balancing what was found, and build a list of priorities. In his view, the criterion of theoretical sampling leaves it up to the researcher and the theory selected to make decisions about selection and ending (Flick, 2009). These considerations depend mainly on the research goals and the available resources, but might be subject to modification. Sampling is directed by logic and aim, and the sensitivity the researcher develops to the emerging concepts. Usually this sensitivity grows and enables the researcher to decide where he or she might find additional instances. Sampling also

refers to returning to the data themselves, and the reorganization, according to theoretically relevant concepts, until all categories are saturated (Strauss and Corbin, 1998). Thus, theoretical sampling accompanies the research project from the beginning to the end, but leaves it up to the researcher to decide when saturation is reached.

3.2.4 Scaling Up

Scaling up relates to the process of grouping higher-level categories into broader themes, which are then related to competing theories. As such, scaling up contributes to the generalizability of the theory (Urquhart et al., 2010). The integration of concepts is achieved through relating the main concepts to the core category and saturate poorly developed categories by theoretical sampling (Strauss and Corbin, 1998). The resulting theoretical scheme could contain explanatory statements, relationships (Strauss and Corbin, 1998) as well as propositions (Urquhart et al., 2010). It is important that the resulting abstraction fits the raw data. This could either be achieved by comparing the resulting theoretical scheme with the raw data or present it to the interviewees and see if they perceive the scheme reasonable and find themselves in the story being told (Strauss and Corbin, 1998). The definition of the core category is used to scale up the substantive theory (Urquhart et al., 2010), and represents the central idea (Strauss and Corbin, 1998), how the story is being told.

3.2.5 Theoretical Integration

The grounded theory needs to be put into relation and the context of other existing theories (Urquhart et al., 2010). According to Strauss and Corbin (1998) integration is the process of moving from description to conceptualization. That is, identifying the central idea, the definition of the core category and integration of the concepts. The definition of the core category and developing the storyline is sometimes difficult, and researchers might turn to the literature “to look for a unifying concept that might fit their data” (Strauss and Corbin, 1998, p. 155). Urquhart et al. (2010) stress the role of meta-theories as useful guides for integration and viewing the emergent theory through a certain lens, like actor-network theory or structuration theory. Likewise, Sarker et al. (2001) use a meta-theory for selecting the core category, creating the storyline, and integrating their grounded theory. In our research, we deemed the use of meta-theories for these reasons as particularly useful.

In this section we elaborated on the grounded theory method. We highlighted different approaches, the “Straussian” approach (Strauss and Corbin, 1998) on top, and provided a clear rationale (Seidel and Urquhart, 2013) why we used a Sarker´s variant of it (Sarker et al., 2001). Finally, we exemplified guidelines

for how to use the grounded theory method in IS. In the next section, we will have a deeper look into what role those guidelines played in relation to quality assurance in interpretive research.

3.3 Quality Assurance – Principles of Interpretive Research (Klein and Myers, 1999) Applied to the Grounded Theory Method

Interpretive research does not use the traditional quality criteria as we know from positivism. Whereas proponents of positivist case study research suggest ensuring quality in terms of validity and reliability (Eisenhardt, 1989; Paré, 2004; Yin, 2003), these criteria are not appropriate for interpretive research (Klein and Myers, 1999). Interpretive case studies define quality in terms of plausibility of the story and the argument (Myers, 2009). Different leading interpretive researchers, such as Klein and Myers (1999) and Walsham (1995; 2006) provide guidelines for how to conduct fieldwork in interpretive research. We conclude that a consistent, shared view, how to conduct interpretive research - in particular, interpretive case studies - exists, and we tried to adhere to these standards. For example, in the ERP context the principles of Klein and Myers were applied in the accounts of van Fenema et al. (2007) or Silver and Fulk (2012).

In particular, we adhered to the principles of Klein and Myers (1999), who suggest seven principles to conduct interpretive research of hermeneutic nature. According to them, the application of the principles requires considerable creative thought, and their use is not mandatory: It depends on the research project and the judgement and discretion of the research whether, how, and which of the principles should be applied. In our research the principles of Klein and Myers (1999) played a major role and we want to show how they were applied in our research using the grounded theory method, and how they correspond with the grounded theory guidelines (e.g. Sarker et al., 2001; Urquhart et al., 2010).

3.3.1 The Fundamental Principle of the Hermeneutic Circle

Expanding on the philosophical tradition of Hermeneutics; (Gadamer, 1975; 1976a; 1976b) Klein and Myers (1999) define this principle as the meta-principle for interpretive work of hermeneutic nature, upon which the other six principles build. "The idea of the hermeneutic circle suggests that we come to understand a complex whole from preconceptions about the meanings of its parts and their interrelationships" (Klein and Myers, 1999, p. 71). The parts can be the historical context applying the principle of contextualization and alternatively, the interactions between the interpretive researchers and the participants, and their preliminary understanding of each other and the parts, applying the principle of interaction between the researchers and the subjects. During several iterations of the hermeneutic circle, the suggested principles

can be applied iteratively, forming a complex web of interpretations, and a shared understanding of the whole emerges (Klein and Myers, 1999).

In our research the concepts emerged from data and there is a continuous interplay between data collection and analysis, referred to as constant comparison (Urquhart et al., 2010). That means that all codes and concepts resulting from the initial coding steps had a preliminary nature, and were continuously compared with new data, new insights stemming from existing theories and literature. We sampled events and incidents and looked for variation within the data (Strauss and Corbin, 1998). In our research this does not mean that we necessarily had to add new cases to our sample, but we searched in the interview transcripts, and other data for variations, constantly changing and refining the initial codes and concept. This procedure continues until no more instances of the same concept were found in the data and no new concepts emerged - that is, they are saturated, referred to as theoretical sampling (Urquhart et al., 2010). In later steps of the coding process, hierarchical network views of the main categories were built, integrative memos were written to interpret the data through integrating as many concepts as possible into a memo (Sarker et al., 2001) and to relate the concepts iteratively (Urquhart et al., 2010). For our research, that means that we constantly jumped between the grounded theory coding steps open, axial and selective coding. We refined them until a complex and plausible whole emerged, and the storyline was created (Sarker et al., 2001; Strauss and Corbin, 1998). As a consequence, we conclude that we met the targets of the fundamental principle of the hermeneutic circle.

3.3.2 The Principle of Contextualization

This principle requires that the researchers highlight the historical and social context in which the subject matter is embedded, particularly for the target audience, to understand how the researched situation emerged. In contrast to positivist researchers, interpretivists argue observable organizational patterns are constantly changing (Orlikowski and Baroudi, 1991; Klein and Myers, 1999). The relationships between people, organizations and technology are not static and interpretive research seeks to understand a moving target. Thus, each research situation is a unique historical occurrence and therefore ideographic, which does not mean that interpretive research cannot generalize (Klein and Myers, 1999), as Lee and Baskerville (2003) exemplified. The research is not only influenced by the historical context, but becomes part of the organization's future, and people are not only products, but producers of history (Klein and Myers, 1999).

Although the paradigm of Strauss and Corbin (1998) considers conditions for the consideration of context, we did not apply a specific grounded theory guideline. Conditions in the Straussian grounded theory

approach are defined as “sets of events or happenings that create the situations, issues, and problems pertaining to a phenomenon and, to a certain extent, explain why and how persons or groups respond in certain ways. Conditions might arise out of time, place culture, rules, regulations, beliefs, economics, or gender factors as well as the social worlds, organizations and institutions in which we find ourselves along with our personal motivations and biographies” (Strauss and Corbin, 1998, p. 130). We did not apply the paradigm of Strauss and Corbin, but employed the adapted grounded theory version of Sarker et al. (2001), where the components of the paradigm (including conditions) are considered in integrative memos. However, the consideration of the context was rather a result of our interpretive philosophical stance, and not a consequence of applying a specific method. Moreover, we did not find any grounded theory specific guideline in the IS field which met these targets. Urquhart et al. (2010) use the terminology “bounded context” for concepts resulting from limited, exploratory fieldwork, but also in their account the consideration of context is very limited. As a consequence, and under consideration that the grounded theory is neither an interpretivist nor a positivist approach, we conclude that the rich description of the underlying organizational contexts is mainly determined by the philosophical stance which the researcher(s) take.

3.3.3 The Principle of Interaction Between the Researchers and the Subjects

The researcher is required to place himself and the subject into a historical perspective. The results of the research need to be critically reflected, as they are a socially constructed product of the interaction between the researcher and the research participants. Both of them are interpreters and analysts. Participants may alter their horizons as a result of the concepts which are used by the researcher and other parties. This effect may be lessened when the researcher relies, for example, on secondary data and does not interact with the participants, but still the researcher´s preconceptions will affect the construction of data (Klein and Myers, 1999).

The influencing role of the interacting researcher is particularly evident in qualitative research when interviews are employed, as the researcher inevitably influences the interpretation of the people who are being researched (Walsham, 1995). A researcher cannot be removed from the context (Trauth, 1997), and even a neutral researcher is biased by way of background, knowledge and prejudices, interpreting things in certain ways (Walsham, 2006). Trauth (1997) gives an answer how to address these problems and, although her account cannot be particularly attributed to grounded theory literature, which grounded theory guideline to use.

"I believe the answer is not for the researcher to remain apart from the context but rather to embrace it. At the same time, however, the researcher should constantly be conducting self-examination with respect to assumptions, biases and motivations being used to interpret data; should make use of multiple perspectives and sources of data - and be open as to their source. […] Collecting and analyzing the data in this way speaks to the need for an iterative rather than a linear approach to the conduct of the research" (Trauth, 1997, p. 238). As such the "Principle of Interaction Between the Researchers and the Subjects" can be addressed through constant comparison and iterative conceptualization (Urquhart et al., 2010), together with triangulation to corroborate the findings. Consequently, as we employed all of these techniques, we conclude that we considered this principle adequately.

3.3.4 The Principle of Abstraction and Generalization

Although interpretive research states that the human affairs are not governed by natural laws that are culturally independent, there is a philosophical basis for abstraction and generalization. Interpretive research is the attempt to relate particular context bounded concepts (principle of contextualization) to abstract categories, and relating unique ideas that apply to multiple situations. Those generalizations should be carefully related to the field study details, so that readers can follow their theoretical insights. Theories are used as sensitizing device viewing the world in a certain way (Klein and Myers, 1999).

For meeting this principle, we applied three guidelines. First, we scaled up the codes to rise above the detail, considering the big picture (Urquhart et al., 2010). The target of abstraction is also tackled by multiple rounds of coding, building higher level categories and relating them to competing theories (Sarker et al., 2001; Strauss and Corbin, 1998; Urquhart et al., 2010). Second, we employed integrative memos as proposed by Sarker et al. (2001) to integrate concepts and relate concepts to its sub-concepts or, as Urquhart et al. (2010) put it, to increase the level of abstraction through iterative conceptualization. Third, theoretical integration (Urquhart et al., 2010) we achieved in applying different meta-theories when we chose the core category to which the other concepts were related to (Sarker et al., 2001), or like Urquhart et al. (2010) argue putting the grounded theory into the context of other theories in the field.

3.3.5 Principle of Dialogical Reasoning

The initial preconceptions of the researcher, which guided the research design, need to be confronted with the data which emerged from the research process. This requires making the historical, intellectual basis

manifested in the philosophical assumptions transparent to the readers, and relating the strengths and weaknesses to the purpose of the work. In contrast to positivist research which propose a value-free position, hermeneutics recognizes prejudices and preconceptions as necessary starting points for our understanding. During several applications in the hermeneutic circle and improved understanding one stage becomes the prejudice (preconception) for the next iteration (Klein and Myers, 1999).

As for the fundamental principle of the hermeneutic circle, the principle of dialogical reasoning was tackled through the continuous interplay between data collection and analysis, referred to as constant comparison (Urquhart et al., 2010). Our seed concepts are used as a sensitizing device as a starting point for understanding, but at the same time we were cautious that our concepts emerge from the data (Strauss and Corbin, 1998; Trauth, 1997).

3.3.6 The Principle of Multiple Interpretations

This principle requires that the influence of social context (power, economics, values) has on the actions under study. This might lead to multiple viewpoints in the stories and different narratives of the same sequence of events. The researcher should confront the multiple interpretations of the participants with each other and revise his or her preconceptions and understanding accordingly. Even when no contradictions are found this leads to “probing beneath the surface” (Klein and Myers, 1999, p. 77).

Again, constant comparison (Urquhart et al., 2010) plays an important role in meeting the targets of this principle. During data collection, and particularly during conducting interviews, we selectively posed questions which were related to the viewpoints of previous interviewees or questions which cropped up during the document analysis. The social context was considered as much as possible, yet this is sometimes hard to attain. Thus, we conclude that we could partially meet the target of this principle as full consideration would have been impossible given the means and time available for our research.

3.3.7 The Principle of Suspicion

This principle requires the researcher(s) to be sensitive to possible biases and systematic distortions in the narratives of the participants, and false preconceptions. This principle seems to be one of the least developed in the IS research literature, and would require the researcher “to 'read' the social world behind the words of the actors, a social world that is characterized by power structures, vested interests, and limited resources to meet the goals of various actors who construct and enact this social world” (Klein and Myers, 1999, p. 78). As many interpretive field studies appear to be influenced by critical theorists, and considerable

disagreement between its application exists, Klein and Myers (1999) explicitly leave the possibility open of not following the principle of suspicion in interpretive works.

As suggested by Klein and Myers (1999) we did not explicitly follow the principle of suspicion. However, we did not have a reason to believe that narratives were distorted and participants biased, and as we employed multiple sources (e.g. interviews and documents) of evidence (triangulation) we could increase the plausibility of the narratives. Furthermore, the interview guide was regularly adapted so that we could deductively test previously analyzed data, following the guideline of constant comparison (Sarker et al., 2001; Urquhart et al., 2010) suggesting a continuous interplay between data collection and analysis. Lastly, for one case, we employed the Social Identity Theory (SIT) (Tajfel and Turner, 1986) and dealt with different stakeholder groups and perceptions, but this was rather a means to analyze the data than to follow the principle of suspicion. Nevertheless, we believe that, although not explicitly intended, we could meet the targets of this principle to a certain extent.

Principles for Conducting Interpretive Field Studies in IS (Klein and Myers, 1999)	**Grounded Theory Guidelines in IS (e.g. Sarker et al., 2001; Urquhart et al., 2010)**
1) The Fundamental Principle of the Hermeneutic Circle	Constant Comparison & Theoretical Sampling & Iterative Conceptualization
2) The Principle of Contextualization	No specific guideline for grounded theory in IS (considered through interpretive philosophical stance, and rich description)
3) The Principle of Interaction Between the Researchers and the Subjects	Constant Comparison & Iterative Conceptualization
4) The Principle of Abstraction and Generalization	Scaling up & Iterative Conceptualization & Theoretical Integration
5) Principle of Dialogical Reasoning	Constant Comparison
6) The Principle of Multiple Interpretations	Constant Comparison
7) The Principle of Suspicion	Constant Comparison & Theoretical Integration

Table 3-1 Principles of Interpretive Field Studies & Grounded Theory Guidelines / Means to assure quality

Table 3-1 summarizes how we adhered to the principles of Klein and Myers (1999) in combination with grounded theory guidelines (e.g. Sarker et al., 2001; Urquhart et al., 2010), thus assuring the plausibility and quality of our interpretive case studies.

3.4 Field Access and Sampling

The field access to appropriate research partners was one of the main challenges of this dissertation project. Qualitative researchers usually work with small sample sizes, nested in their context and studied in depth, whereas for quantitative researchers the context is not so important and statistical significance is sought through large sample sizes (Miles and Huberman, 1994). Even though the sample size is small, we had to consider that ERP programs are usually only in place within large companies. Furthermore, program managers and those in the position to grant researchers the access to study the features of an ERP program are usually located at higher organizational levels. In most cases, such people are often unavailable and it is hard to gain access to them. Moreover, companies might be reserved towards the research project, since ERP programs are of a strategic nature and are therefore often seen as strictly confidential. Further reservations might exist towards the expected time investment and the benefits for the company. All the possible reservations are understandable, and we tried to address them early in the research project. We primarily contacted persons where linkages via personal relations exist to establish initial trust. Walsham (2006) describes how to gain and maintain access to the field.

The cases had to meet predefined criteria (Table 3-2). The criteria should help to identify exploratory cases, which tell us something new and serve as vehicles for exploring a new subject area (Myers, 2009). First (1), a case company had to have undergone an ERP implementation consisting of multiple, related projects, which were connected via an overarching governance entity. Second (2), through the implementation the way the company conducts business must have been impacted; thus, a change in processes was subject to the implementation. This could have included an ERP system with all modules, but also an additional module or the implementation of an industrial solution. Furthermore, reporting systems (data warehousing) might have been involved. Third (3), to investigate the CSFs in all relevant phases of the ERP program only full-life cycle implementations were considered. Fourth (4), the implementation must have been conducted recently to better access the interpretations of the interviewees. Fifth (5), only cases were considered as suitable where the contact person agreed with the frequent visits of the site over an extended period of time (Walsham, 1995), including the opportunities (a) to interview knowledgeable key players (Myers, 2009) in sufficient detail, as well as (b) to conduct an exhaustive analysis of relevant documents, which proved to be

important for the ERP program. Only cases where all six criteria were met were deemed as suitable to address our research questions. We will portray in detail how our cases met these criteria in the relevant chapters.

No	Criteria	Definition
1	Program involved	A group of related projects was coordinated through a form of overarching program (e.g. PMI, 2008), which clearly demarcated the implementation from a traditional project setup with an individual project as subject to the implementation.
2	Processes affected	The way the business conduct was affected. ERP systems are involved at the core and additional ES (enterprise systems, e.g. data warehouse) might be involved. ERP programs focus on outcome; that is, a change in how the organization operates. Contrarily ERP projects focus on outputs; that is, a functioning ERP system (Seidel, 2009).
3	Full life cycle	The ERP program was subject to a full life cycle implementation, including the different phases (e.g. design, implementation, operations) to address the process perspective of CSFs and to evaluate them over the program life cycle. In the case of a multisite ERP program a significant number of sites needed to be in the operations phase.
4	Time perspective	An appropriate case recently executed an ERP program or the case has been in and advanced phase of the ERP program life cycle. This prerequisite was relevant to better grasp the interpretations of the interviewees about relevant actions and events.
5a	Data perspective (Interviews)	It was possible to conduct a sufficient number of interviews (>5) in sufficient detail (60-90 minutes), with key informants who know most about the program (Myers, 2009). Interviews are the primary source of evidence as they allow best to gather interpretations of the participants (Walsham, 1995)
5b	Data perspective (Documents, informal talks)	As additional data source, a suitable case site needed to provide the opportunity to analyze official program documents, or as Walsham (2006) proposes that in an interpretive case study the interviews should be supplemented by other forms of field data. Apart from internal documents this includes public media, press, and informal talks.

Table 3-2 Criteria to Identify Suitable Cases

With a lot of effort and the right strategy, it was possible to identify appropriate cases and to convince the contacted key persons of the value of their participations and to receive access to the field. Furthermore,

we offered a form of feedback (Find in Appendix A a letter of invitation and an info paper) in order to give something of value back to the participating sites (Walsham, 2006).

3.5 Preparation and Application of the Interview Guide

Based on the seed concepts which we synthesized during the literature review and earlier research on ERP and program management, we developed our initial interview guide (Find one version of the interview guide in Appendix A). An initial theoretical framework taking into account previous knowledge is useful in the early stages of interpretive case studies to create a sensible theoretical basis and to inform the topics and approach of the early empirical work (Walsham, 1995). Our approach is therefore in line with interpretivist research, but also with the "Straussian" variant of the grounded theory method.

Strauss and Corbin (1998) stress how literature can be used to enhance and not to constrain theory development, as well as to increase sensitivity. They emphasize that concepts, if they also appear in the data and not only in the literature, might indeed be significant. It is important that these concepts are truly emergent and are not only seen in the data because the researchers are so familiar with them. As a next step the researchers can compare how the emerging concepts are different from those in the literature (Strauss and Corbin, 1998). As a consequence, we included as many seed concepts as possible in our initial interview guide, for the purpose of enhancing theory development.

The interview guide was a helpful instrument when we performed our semi-structured interviews, but was never applied mechanically. The questions were posed selectively, particularly in the later stages of the fieldwork. If questions are too tightly controlled by the researcher, the data will lose much of the richness of interpretation and therefore raw material (Walsham, 1995). Moreover, the interview was subject to permanent adaptions depending on the outcome of previous interviews (and document analyses), which is referred to as permanent interplay between data collection and analysis (Strauss and Corbin, 1998). This approach is also useful to enable researchers to step back and examine the interpretations of other interviewees in sufficient detail (Strauss and Corbin, 1998; Walsham, 1995). Thus, we were able to sharpen emerging concepts regardless of whether they were part of the literature review and the seed concepts or appeared the first time in the data.

3.6 Data Collection - Multiple Sources of Evidence

The primary sources of evidence are interviews, which best allow access to the interpretations of the participants regarding the actions and events (Walsham, 1995). In particular, we conducted semi-structured

interviews with a special focus on open questions, but also on the context, program design and demographic information. We selected the interviewees after consultation with, who was our single point of contact with the intention to gain rich insights. Furthermore, the interviewed persons represent different groups within the program, and therefore different perspectives. As suggested for interpretive studies, we supplemented the interviews with data from other sources (Walsham, 2006). In our research, we used informal talks, public media and a magnitude of official program documents as additional sources. Thus, the results are grounded in data and built upon multiple sources of evidence (data triangulation).

3.7 Data Analysis

As proposed by Strauss and Corbin (1998), we used the three-step coding procedure, including open coding, axial coding and selective coding. The usage of this original three-step coding procedure has been criticized for being too rigid, for forcing of data, and for hindering emergence (mainly in combination with their coding paradigm). Seidel and Urquhart (2013) showed that while grounded theory is adapted frequently, the usage of the scheme can be varied and depends on the studied phenomena and the intent of research (Seidel and Urquhart, 2013). One approach to modify the paradigm is well exemplified by Sarker et al. (2001), who related categories hierarchically to their subcategories (concepts). Furthermore, they wrote integrative memos on each major category, including as many subcategories as possible, to accomplish the goals of axial coding. For selective coding, Sarker et al. (2001) used two meta-theories to develop the storyline, and to relate the core (central) category to the other categories.

We also used parts of this adapted approach, which can be seen as being less rigid as the paradigm of Strauss and Corbin (1998), but is still based on the basic principles of the "Straussian" grounded theory method. In particular, we started with open coding, where we labeled data chunks with open codes, referred to as a concept. A concept is a labeled phenomenon; that is, an abstract representation of an event, object, action or interaction that a researcher identifies as being significant in the data. When they are similar the researchers group them under a common heading or classification; that is, the concept (Strauss and Corbin, 1998). Thus, the result of open coding is to reduce the complexity of the data to be investigated, making the data more tangible in relation to researched phenomenon. If too many concepts are the result of open coding the level of abstraction could be increased by grouping concept into categories, therefore increasing the analytic power (with the ability to predict and explain) by looking into what the concepts share in common. According to Urquhart (2001) it is not of major importance how chunks of data are labeled, either code, concept or category. Similarly, in our research, it was also our goal to group concepts to receive a

reasonable amount we can work with and reducing complexity, but we did not clearly distinguish between the naming of the data chunks and their order.

The order was instead achieved in step 1 of axial coding, where we grouped the concepts into categories and related them hierarchically to their subcategories (that is we created network views reflecting the relations). In step 2, of axial coding, integrative memos were written, detailing the relations of step 1, to meet the targets of axial coding. This is exactly the coding stage where we clearly deviated from the original approach of Strauss and Corbin (1990) and replaced the coding paradigm through integrative memos and network views as described in the adapted grounded theory approach.

Importantly, as already stated, the role of paradigm as a coding device is subsequently weakened and is only optional (Corbin and Strauss, 2008). Furthermore, in their earlier works they mentioned memos in relation to axial coding: "Because the purpose of axial coding is to relate categories and to continue to developing them in terms of their properties and dimensions, the memos written during axial coding will reflect this purpose. They present answers to the questions what, when, where, with whom, how and with what consequences" (Strauss and Corbin, 1998, p. 230). Let us recall the role of the paradigm, with its basic components conditions (causal/intervening), actions/interactions and consequences, and observe how the inventors described it: "In actuality, the paradigm is nothing more than a perspective taken toward data, another analytic stance that helps to systematically gather and order data in such a way that structure and process are integrated" (Strauss and Corbin, 1998, p. 128). When we look at the definitions above we conclude that the data can also be integrated with integrative memos and network views, as suggested by Sarker et al. (2001) in their adapted version of the grounded theory approach, as they saw the paradigm as too mechanistic, constraining and forcing. As a consequence, we followed this specific variant[8].

Third, during selective coding and further iterations in the continuously ongoing data analysis process, we chose a meta-theory for interpreting the data and for creating the storyline (Sarker et al., 2001), and to interpret the results gained through open and axial coding. In this step we chose a category as our core category and related the other categories to it. In order to accomplish this, we did further iterations and went back to open and axial coding with a particular consideration on the core category, followed by a new round of selective coding. Klein and Myers (1999), in their set of principles of interpretive field studies, name this process of iterating and considering the interdependent meaning of the parts and the whole, "the

[8] Please find examples of all coding steps, for both cases, in Appendix B and Appendix C.

fundamental principle of the hermeneutic circle". All three steps of the coding process were discussed and aligned during several sessions between the authors.

The computer program ATLAS.ti7 (www.atlasti.com) was used to assist the data analysis and was also our repository for the transcripts and documents. Each case had his own repository, a case database (Yin, 2003), an approach which is used in positivist (Yin, 2003) and interpretivist studies (Berente and Yoo, 2012).

3.8 Summary

In this chapter we presented our research method. We started with the philosophical stance, followed by characteristics of the grounded theory method. Next, we showed how we assured the quality of our interpretive case studies. Then we elaborated on the site selection process, the preparation of data collection, the actual data collection and its analysis. In the next chapter, we present our first case of an ERP program at A1/TA (A1 Telekom Austria).

4 The Case at A1/TA – The Salient Group IS Success (SGISS)-Model of Different Perceptions

In this section we present our first case study at A1/TA (A1 Telekom Austria). We start with elaborating how A1/TA met the predefined criteria relevant to the case selection. Second, we present the research objectives of this specific chapter, which is a model to explain the dynamics of CSFs over the entire program life cycle. Next, we highlight the data collection. We continue with the data analysis and the coding steps. As SIT (Social Identity Theory) played a crucial role in interpreting the data we briefly elaborate on SIT and what we know about the interplay of CSFs and perceptions. Then, we present the results of our case on the basis of the derived "Salient Group IS Success Model (SGISS) of Different Perceptions". Finally, we discuss the results, suggest how a generalized SGISS-model of different perceptions can be applied, and provide implications for research and practice before we close with the conclusion.

4.1 Case Selection

According to our predefined criteria, we present in Table 4-1 how the case at A1/TA met these prerequisites. Already the initial contact, which was established during a professional event where the program was presented, was very promising. The researchers therefore continued to find out more about the program and concluded that all the necessary criteria of a suitable case are met.

No	Criteria	Definition
1	Program involved	A group of related projects was coordinated through a form of overarching program (e.g. PMI, 2008), which clearly demarcated the implementation from a traditional project setup with an individual project as subject to the implementation.
		The program "ASAP" at A1/TA consisted of five different projects, which were related in terms of scope (merger of systems), time (big bang) and strategy.
2	Processes affected	The way the business conducts was affected. ERP systems are involved at the core and additional ES (enterprise systems, e.g. data warehouse) might be involved. ERP programs focus on outcome; that is, a change in how the organization operates. Contrarily ERP projects focus on outputs; that is, a functioning ERP system (Seidel, 2009).
		The program was subject to business- and IT strategy. While on the business side either processes were harmonized or consolidated, on the IT-side the TCO (Total Cost of Ownership) should have been reduced. As such, two ERP systems were merged, as well as two reporting systems consisting of a BI and a data warehouse component. To prepare business persons and the different stakeholder groups for the changes, a change project was

		established, assessing the change impact, conducting necessary training and providing guidance and communication over the life cycle of the program.
3	Full life cycle	The ERP program was subject to a full life cycle implementation, including the different phases (e.g. design, implementation, operations) to address the process perspective of CSFs and to evaluate them over the program life cycle. In the case of a multisite ERP program a significant number of sites needed to be in the operations phase.
		The program followed the ASAP-methodology for implementation (Accelerated SAP) consisting of Phase 1-Project Preparation, Phase 2- Blueprint, Phase 3-Realization, Phase 4-Final Preparation, Phase 5-GoLive Support, Phase 6-Operate (SAP AG, 2016; Sullivan 2014).
4	Time perspective	An appropriate case recently executed an ERP program, or the case has been in an advanced phase of the ERP program life cycle. This prerequisite was relevant to better grasp the interpretations of the interviewees about relevant actions and events.
		When we started our interviews in July 2013, the program was in the operations phase (Phase 6 ASAP-methodology), following the hypercare phase (Phase 5 ASAP-methodology), which ended in April 2013. The total duration of the program was from October 2010 to April 2013, whereas we conducted our interviews between July 2013 and April 2014.
5a	Data perspective (Interviews)	It was possible to conduct a sufficient number of interviews (>5) in sufficient detail (60-90 minutes), with key informants who know most about the program (Myers, 2009). Interviews are the primary source of evidence as they allow best to gather interpretations of the participants (Walsham, 1995)
		We had the opportunity to conduct 12 interviews (average duration 60 minutes) with 11 key players, who were identified by our single point of contact the program manager. This led to a total number of 230 fully transcribed interview pages.
5b	Data perspective (Documents, informal talks)	As additional data source, a suitable case site needed to provide the opportunity to analyze official program documents, or as Walsham (2006) proposes that in an interpretive case study the interviews should be supplemented by other forms of field data. Apart from internal documents, this includes public media, press, and informal talks.
		As documents, we had the opportunity to sight and code: 23 meeting minutes of the periodic program steering meetings, which provided a good overview of the progress over the course of the rollouts. Other documents as risk register, program plan, program concepts, kick-off presentation, buy-in meeting minutes and some public documents (including websites and documents in pdf-format)

		The comprehensive minutes of the lessons-learned workshop at the program end, which reflected the views of various stakeholder groups Additionally, we had the opportunity to conduct 8 informal talks where we could discuss our findings: 1 informal interview **before** the "official data collection phase" with the Head of Corporate Process- & Project Management, Head of Project Management Office. Initial contact during his program presentation, hosted by the Austrian interest group for Process Management, "Gesellschaft für Prozessmanagement". 4 informal interview were conducted **during** the "official data collection phase" ending with the last "formal" interview 1 BPM Manager, 3 Consultants 3 informal interview **after** the "official data collection phase" 1 Consultant, 2 business experts

Table 4-1 Suitable Cases: How the Program at A1/TA Met the Predefined Criteria

In this section we elaborated how A1/TA met the predefined criteria relevant to the case selection. In the next section we present research objectives of this specific chapter.

4.2 Research Objectives of this Chapter

The main objective of this chapter is to build a theoretical model that helps to clarify how stakeholder perceptions and critical success factors (CSFs) are interrelated and have evolved throughout the life cycle of a large ERP program. We find that different perceptions are particularly important within the studied program. Therefore, we use Social Identity Theory (SIT) as a meta-theory for interpretation. Our result is a deviation model, which (1) considers the different perceptions of salient groups (2) at different points in time (phases) and (3) proposes that a low fit of perceptions with regards to the underlying CSF contributes to program failure as opposed to (4) a high positive fit of perceptions with regards to the underlying CSF contributes to program success. The resulting model we label the "Salient Group IS Success (SGISS) Model of Different Perceptions".

The SGISS-model of different perceptions is a general and a parsimonious deviation model to explain the change of success probability throughout the course of an ERP program. The model that we describe shares characteristics with the "fit as matching" concept as discussed by Venkatraman (1989) and Hoehle and Huff (2012); we also rely on an interpretive case study of a large ERP program and consider explicitly the

multiplicity of involved groups and their potentially changing perceptions along the program course. Our case is a large ERP program, which took place between 2010 and 2013 at the leading Austrian Telecommunication Provider A1 Telekom Austria (A1/TA), and the challenges that emerged throughout its course. We associate these challenges with critical success factors (CSFs), which we henceforth evaluated over the entire ERP program life cycle. This helps us to explain the dynamics of CSFs over the program life cycle in the case at A1/TA and to answer one of our central research questions posed in the initial chapters:

Central research question 2: How can the dynamics of CSFs be considered in a general, parsimonious phase model?

When using a grounded theory approach, the context in which a program is embedded is particularly important. The aim of our research account is the creation of a theoretical empirically grounded in data (Urquhart et al., 2010). We specifically found that perceptions regarding CSFs and informal group affiliations changed during the course of the implementation. These perceptions formed salient groups and had a strong impact on the successful outcome of the different program phases. We interpret our findings from a Social Identity Theory (SIT) (Tajfel and Turner, 1986) perspective and relate the perceptions of salient groups to the underlying CSFs. The model for our case, which we term the "Salient Group IS Success Model of Different Perceptions (SGISS-Model of Different Perceptions)" has implications for research and practice. It calls for research into the definition of measurement items of perceptions and salient groups at different phases of an ERP program. It also sharpens the view of program managers regarding the fit at a particular state of their implementation and the measures that need to be taken to arrive at positive fitting perceptions.

In this section we presented the research objectives of this specific chapter, which is a model to explain the dynamics of CSFs over the entire program life cycle. Next, we present the results of our case study and discuss the most relevant CSFs within the frame of our "Salient Group IS Success Model of Different Perceptions".

4.3 Data Collection

As interpretive researchers, we attempted to access other people's interpretations regarding actions and events which took place during the ERP program at A1/TA and their views and aspirations of themselves and other participants. Consequently, interviews were the primary data source (Walsham, 1995). A(n) (interpretive) case study is particularly useful in identifying how perceptions and actions of stakeholders are changing over time, and to understand why they act in the way they do (Boonstra, 2006). Table 4-2 depicts

the interview schedule and the roles of the interviewees within the ERP program at A1/TA. We conducted 12 semi-structured interviews (beside internal conversations, and eight informal interviews) with an average duration of one hour. Our single point of contact was the program manager with whom we conducted our first and last interview. He proposed other representative participants for the program from different stakeholder groups. The concepts emerged through a continuous interplay between data collection and analysis, referred to as "constant comparison" (Strauss and Corbin, 1998; Urquhart et al., 2010). As the concepts emerged continuously, the interview questions were posed flexibly and the original guideline served primarily as an orientation device (find one version in the appendix). All interviews were fully transcribed and added to a hermeneutic unit of the computer program ATLAS.ti7, which we used for our qualitative data analysis. The interview data were supplemented with other sources as meeting protocols, presentations, risk registers, diagrams and public data as proposed by Walsham (2006).

Role within the Program	**Time of the Interview**
Program manager (2 interviews)	July 2013, April 2014
Technical coordinator (BSAP, Reporting)	September 2013
Work package owner, member of IT-core team	September 2013
Member of IT-core team, member of program management office	September 2013
Stream lead, stream 1, functional area 1	September 2013
Director, functional area 2	October 2013
Project manager (CSAP, Change Management)	October 2013
Director, functional area 3	November 2013
Technical coordinator program, project manager (ASAP, ERP Core)	December 2013
Consultant (ASAP, ERP Core)	February 2014
Consultant (BSAP, Reporting)	March 2014

Table 4-2 Program Roles of Interviewees and Interview Schedule

4.4 Data Analysis and Coding Procedure

In line with the intent of our study, we use a less rigid, more interpretive approach as exemplified by Sarker et al. (2001), which still uses many elements of the three Straussian coding steps (Strauss and Corbin, 1998) but uses integrative memos for relationships instead of the coding paradigm. First, we begin with open coding and label data chunks referred to as open coding. Second, during axial coding we build major categories by bundling the data chunks of step 1 into categories and relate them to each other through a) a

hierarchical, graphical representation of the concepts and b) describing their relationships in integrative memos. Third, during selective coding and further iterations in the continuously ongoing data analysis process, we identified that perceptions played an important role in the case and we chose the Social Identity Theory (SIT) (Tajfel and Turner, 1986) as a meta-theory for interpreting the data and for creating the storyline (Sarker et al., 2001). Finally, we chose the category "stakeholder- and communication management" as our core category, as this category mainly impacts the perceptions of different stakeholder groups. Thus, we related the other categories to "stakeholder- and communication management" and checked how the perceptions of stakeholders changed (or remained constant) over the course of the program, thus shaping the CSFs. In order to accomplish this, we did further iterations and went back to open and axial coding with a particular consideration on perceptions. We looked in relation to which CSFs the perceptions changed and how and why this happened. This was followed by a new round of selective coding (See further details on the coding steps in Appendix B). All three steps of the coding process were discussed and aligned during several sessions between the researchers. In the next section we elaborate on SIT (Social Identity theory) and the interplay between CSFs and perceptions.

4.5 SIT (Social Identity Theory), Interplay between CSFs and Perceptions

During the 3rd step in our coding procedure, selective coding, we realized that in relation to particular concepts, representing CSFS, different perceptions were evident. As these perceptions were typically shared by different individuals, the usage of Social Identity Theory (SIT) (Tajfel and Turner, 1986) was particularly useful to interpret our findings and for choosing the core category "stakeholder- and communication management" during selective coding. Group perceptions are shaping the outcome of a CSF and we defined the core category "stakeholder- and communication management" to explain how and why these perceptions changed.

Based on SIT, a group is a collection of individuals who perceive themselves (and are perceived by others) as members of the same social category (a group). The members share some emotional involvement and a social consensus in relation to the evaluation of their group exists. As members of social groups, the individuals achieve an identification of themselves in social terms, their social identities (Tajfel and Turner, 1986). "One's identity is an amalgam of loosely coupled identities" and one person might define him- or herself in terms of a most salient social identity (Ashfort and Mael, 1989, p. 30). This is what we refer to as in-group, and it seems that this most salient social identity was responsible for comparisons and different perceptions between in-groups and out-groups. Thus, a salient group in our case is defined by the most

salient identity (or perceptions) in relation to a particular CSF and do not necessarily reflect a formal group within the organization. Salient groups are formed according to three main principles of SIT (Tajfel and Turner, 1986, p.16):

1. Individuals strive to achieve or to maintain a positive social identity.

2. Positive social identity is based to a large extent on favorable comparisons that can be made between the in-group and some relevant out-groups; the in-group must be perceived as positively differentiated or distinct from the relevant out-groups.

3. When social identity is unsatisfactory, individuals will strive either to leave their existing group and join some more positively distinct group and/or to make their existing group more positively distinct.

We used SIT as a lens to interpret the different perceptions of in-groups in comparison to out-groups and their effects on particular CSFs. In the following, we present relevant CSFs, which were particularly important for our case, and show how the perceptions in relation to a particular CSF changed within the different phases of the ERP program. As a consequence, not only the CSFs are shaped, but also the salient groups themselves, since they are a product of the underlying perceptions. The study of Schwarz and Watson (2005) is the only study we know in the ERP context which explains intergroup relationships with SIT. They investigate the role of perceptions on IT-enabled change, and how affiliations to salient groups alter as the situation changes, but do not investigate explicitly CSFs. Their focus is rather on how salient groups constitute, how members of a salient group positively affiliate with other members, and how affiliations are reframed when the situation alters. Boonstra (2006), based on stakeholder salience theory[9] (Mitchell et al., 1997), investigates the change of perceived problems and interests of different stakeholder groups in relation to an ERP implementation. He finds empirical support for how these views change over time. The latter study focuses rather on dynamic power relations between stakeholder groups and not on CSFs.

Lyytinen and Newman (2015) emphasize the critical influence that divergent actions of different stakeholder groups might have on the implementation process and outcomes. This view is consistent with the views of other authors (Bernroider, 2013; Besson and Rowe, 2002; Grainger et al., 2009; Markus et al., 2000b) who stress the importance of stakeholder actions and perceptions for a successful implementation. Sarkis and

[9] Stakeholder salience theory is not related to SIT. Mitchell et al. (1997, p.854) define stakeholder salience as "the degree to which managers give priority to different stakeholder claims"; thus it is more related to interests and power relations, and not social identities.

Sundarraj (2003) emphasize the necessity to appropriately manage user expectations and satisfaction for a large-scale ERP implementation.

However, it seems, regardless of the variety of different program settings and specifics, that the number of different stakeholder groups and the probability of different perceptions in a program is typically considerably higher than the number in a project setting. Therefore, we posit that stakeholder groups and perceptions are of particular importance for programs.

ERP research has looked at the consideration of stakeholder perceptions in relation to CSFs, but are mainly limited to single stakeholder groups. Mostly perceptions of managers are investigated as this is the case in the account of Nah et al. (2003) for 11 CSFs, when they asked about the associated perceptions of CIOs. Only a few accounts deal with perceptions of different stakeholder groups. A prominent account in that direction is from Amoako-Gyampah (2004), who tried to add to the (according to him) limited knowledge base on differences in the perceptions of decision makers and end-users[10] on implementation factors. He investigates seven factors for potential differences in perceptions. The largest differences in perceptions exist with regard to *shared beliefs* and a shared sense about the project, whether the ERP system is better than the legacy system it is replacing (User *satisfaction with technology*), and project *communications*. Understanding differences in these perceptions are necessary to develop appropriate intervention mechanisms (e.g. training and communications which are perceived sufficiently by both stakeholder groups) leading to a successful implementation (Amoako-Gyampah, 2004). This lack of stakeholder perspectives was also emphasized in the work of Finney and Corbett (2007). Later, the study of Amoako-Gyampah (2004) was replicated and the results were confirmed for China (Lin and Rohm, 2009).

Finney (2011) focuses particularly on communications and the perceptions of four stakeholder groups (managers, users, IT staff, consultants), thus responding to the prevalence of managerially focused studies. She claims that without engagement and acceptance by stakeholders, it is unlikely that any change associated with an ERP introduction will deliver the potential benefits promised. Furthermore, she concludes that particularly the communication strategy requires a tailored approach to meet the stakeholder needs (Finney, 2011). The empirical results of Nandhakumar et al. (2005) indicate that the understanding and perceptions of the ERP system by different stakeholder groups influence the malleability of the system and its technological components. While understanding the possible contextual forces and the triggers and

[10] The importance of opposing perceptions in relation to ERP implementations is also emphasized in teaching cases (e.g. Avital and Vandenbosch, 2002; Grainger and McKay, 2014)

consequences of technology drift associated with an ERP system is not directly related to the ERP success, it influences the project trajectory (Nandhakumar et al., 2005).

Although these accounts pay attention to the high importance of stakeholder perceptions in relations to CSFs and ERP implementations they are limited in three dimensions. They either (1) focus only on a limited amount of stakeholder groups (e.g. managerial perceptions), or (2) a limited number of critical success factors, and (3), most important, they neglect the probability that within a stakeholder group the views are not consistent and might be different.

We are approaching this gap with the salient group concept taken from SIT, as the most salient identity (or perception) in relation to a CSF constitutes a salient group. We thus consider the likelihood of a higher number of stakeholder groups, and the potential of an increased number of salient groups in our model. With regard to the identified program characteristics, we provide novel insights, emerging from a rich interpretative analysis of the perceptions of the involved stakeholder groups. Such analysis considers the dynamics of CSFs through a view spanning the entire program life cycle. Furthermore, we consider the potential of different views within one stakeholder group. Thus, our approach and model is useful to answer the third central research question, which deals with the consideration of the dynamics of CSFs in a general, parsimonious phase model during all phases of the ERP life cycle (central research question 2 of the dissertation).

In this section we provided an overview about SIT, as the meta-theory used, how salient groups are constituted and the current status of ERP research regarding perceptions of stakeholder groups in relation to CSFs. Next, we will turn to our case study at A1/TA.

4.6 The Case at A1/TA - The Salient Group IS Success (SGISS) Model of Different Perceptions

In the next section we present the results of our interpretive case study. We start with contextual information before we elaborate on the social groups involved in the program, their social identities. Finally, we present different phases that were marked by different perceptions in relation to certain CSFs. During the pre-crisis phase, Implementation Attempt 1, was characterized by different perceptions leading to more than one salient group. After a consolidation (crisis) the perceptions in relation to the CSFs converged, and led to shared perceptions during Implementation Attempt 1 (post-crisis). We establish our model for the

case which helps to explain how the different perceptions converged during Implementation Attempt 2. Lastly, we relate our model to general ideas and concept and present the general SGISS-model of different perceptions.

4.6.1 Contextual Information

We conducted our interpretive case study between July 2013 and April 2014 within A1 Telekom Austria (A1/TA), the Austrian subsidiary of the leading telecommunications provider in Central and Eastern Europe Telekom Austria Group. The group operates in eight countries, with almost 23 million customers, 16,000 employees, and revenues of approximately 4 billion Euro in 2014 (Telekom Austria Group, 2015). The largest market operated by A1/TA has 5.4 million customers for mobile services and 2.3 million customers for landline services, 8,600 employees and revenues of about EUR 2.5 billion in 2014 (A1 Telekom Austria AG, 2015). The industry is highly competitive and was marked by consolidations in the previous years. A1/TA was founded in 2010 as a full service provider when the previously independent sister company Mobilkom Austria AG (mobile services) was merged into Telekom Austria (landline services). A1/TA is solely responsible for the Austrian market and is a subsidiary of the Telekom Austria Group. The ERP program at A1/TA also served as a high priority post-merger integration initiative, sponsored by the board, since the two different organizational cultures of the merged companies were extremely visible.

The ERP program at A1/TA encompassed several related projects (Table 4-3) and spanned a period of two and a half years. In total, 600 persons (including testing staff and 100 external consultants) were involved in the program. The ERP and reporting systems were intended to serve 5000 users with more than 700 interfaces to other systems. The main goal was the development of a new ERP system where the processes of the legacy systems where either harmonized (e.g., in the functional area Financials, the total number of processes were reduced by 50%, from 1200 to 600) or technically consolidated (e.g., Logistics). The same procedure was intended in the reporting area with a new common user interface. A further harmonization was planned for later system releases, yet the conception of future releases was already part of the ERP program. The projects were accompanied by a separate change-management project and eventually a documentation project was also affiliated within the program. The numbers reflect how great the challenge of establishing a successful program was for A1/TA.

Project	Description	Goals
ERP Project ASAP (Core SAP ERP System)	Two legacy systems were merged into one new system with nearly all modules. The new system includes partially new processes. Depending on the functional area, legacy processes were either harmonized or technically consolidated. The project was subdivided into streams.	Harmonized and consolidated processes were implemented, tested, approved and ready-to-use, data cleaned, and migration completed, back to standard processes, IT training, documentation, securing operations and support.
Reporting Project BSAP (Business Intelligence & Data Warehouse Reporting)	Two legacy reporting systems were merged into one new reporting system (BI/BW). Additionally, a data warehouse is part of the reporting infrastructure. The project was subdivided into slots.	Running across all reporting requirements, appropriate reporting architecture under consideration of future requirements, avoiding redundant data.
Project CSAP (Change & Communication)	Since processes are affected, a change management project was created.	Stakeholder engagement, communication, change enablement, end user training.
Project ASAP+ (Release 2: ASAP & BSAP)	A conception project for a 2nd release for topics which were not in included in the projects ASAP and BSAP.	Further harmonization, cover functional gaps and change requests.
Project Pro-SAP (Documentation)	This documentation project was eventually included in the plan. Mainly included financial processes.	Complete documentation, meeting the requirements of auditors.

Table 4-3 The Program Structure at A1/TA

4.6.2 Social Identities and Groups Shaping the ERP program

Figure 4-1 depicts a hierarchical view of the formal groups in the ERP program at A1/TA. It shows a simplified view of the different formal groups involved in the program and assigned to a level; note that an individual is always part of different formal groups. Nevertheless, it is important to stress that a formal group may contain individuals sharing the same perceptions, but this is not necessarily the case. Salient groups in our model are characterized by the shared perceptions of individuals (representing their most salient social identities) in relation to a CSF. As we will see, these perceptions of the different groups allow us to explain how the perceptions shaped the concepts (CSFs) and the salient groups themselves.

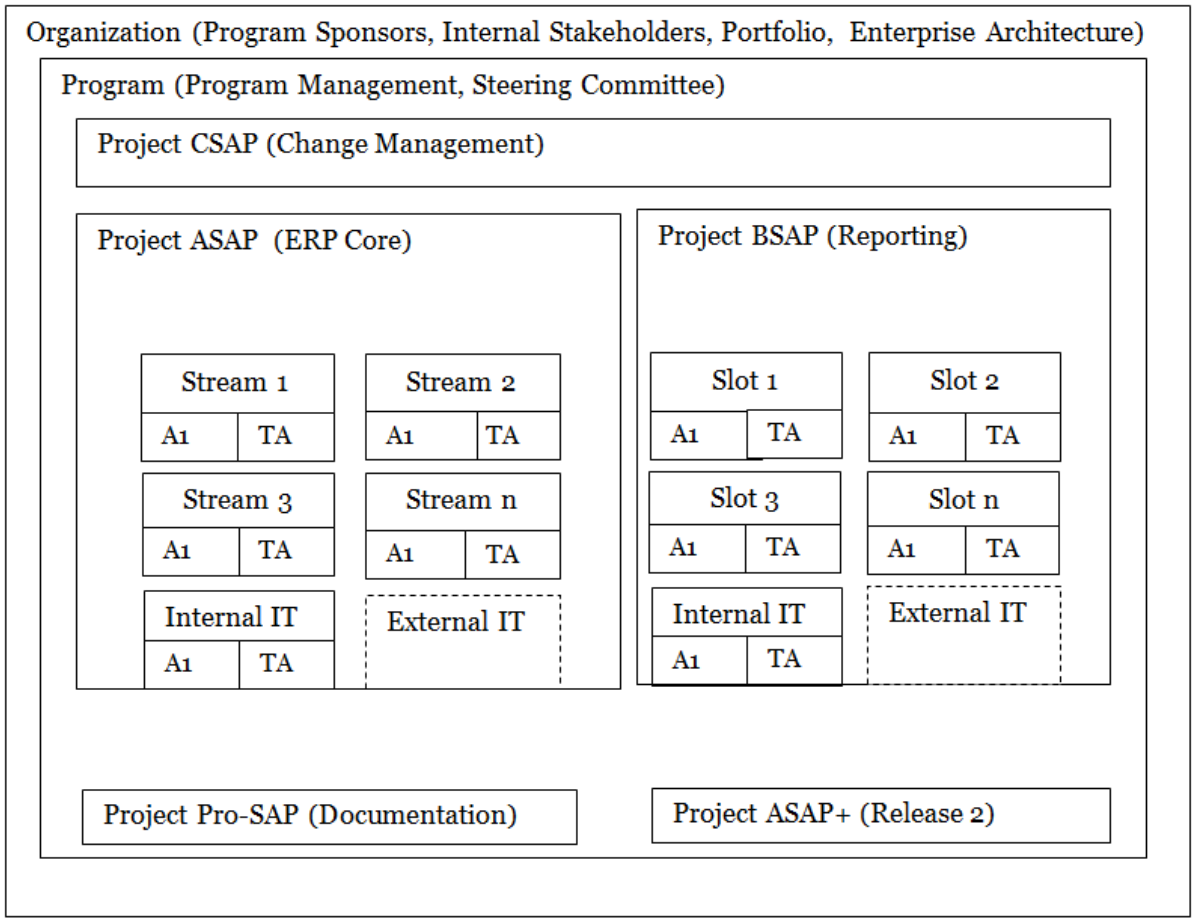


Figure 4-1 Formal Groups within the ERP Program at A1/TA

We now want to describe the different levels, or formal groups, of Figure 4-1. The highest level of the internal view[11] is considered at the organizational level, where internal stakeholder groups, e.g. groups defining the strategy and enterprise architecture, the portfolio group, and the program sponsors have an impact on the program. On the next level, we have the program itself, including the program management group (at A1/TA it includes, among a dedicated program team, the project managers) and the steering committee. Next, there is the project level, which consists of different streams/slots (depending on the functional area), the internal and external IT. Furthermore, due to the post-merger phase the organizational cultures of A1 and TA still played a role, mainly on the stream level. We also want to mention here that not all groups can be clearly assigned to one level, e.g. "External IT" (depicted as dotted box) is on the one hand part of the

[11] Principally, the environmental level (external view), which has an influence on the entire organization and the ERP program could also be considered. Different groups, including shareholders, customers, competitors, implementation partners or the public (appearance and reputation) could play an important role.

project/program, but on the other hand not part of the environment, or the program sponsors which interface the program and the organizational level.

To illustrate the difference between formal groups and salient groups we use one example: The salient group "Basis", consisting of the stream, internal and external IT shared certain perceptions regarding the CSF "Realistic Planning of Time Schedule". Thus, a salient group could consist of different stakeholder groups sharing the same perceptions in relation to a CSF. Furthermore, when different perceptions exist within one stakeholder group, the members of the stakeholder group could belong to different salient groups. Thus, the concept of salient groups considers the shortcomings of previous research in that area, as it considers all possible perceptions (regardless of the stakeholder group) and could be applied to all CSFs. This is exactly what we did in our study.

T	Time	(Sub)-Phase	Phase/Marked by
↓	Oct/2010	Blueprint (Conception)	A) Pre-Crisis: Low fit of Perceptions
	Jun/2011	Implementation Attempt 1	
	Feb/2012 - Jun/2012	Re-planning of Implementation, Different Migration Concepts, Corrective Actions	B) Crisis & Reflection
	Jul/2012 - Dec/2012	Implementation Attempt 2	C) Post-Crisis: High Positive Fit of Perceptions
	Jan/2013 - Apr/2013	Post Go-live	

Table 4-4 The Timeline of the ERP Program at A1/TA

Table 4-4 shows the timeline of the ERP program at A1/TA. The program started in Fall 2010 with the blueprint phase followed by the first implementation phase. During our analysis we found that these phases were marked by a low fit of perceptions of salient groups with their relevant out-groups; we will illustrate the significant impact of these low fit of perceptions and relate them to several critical success factors (CSFs), particularly in those dimensions where we deemed the low fit of perceptions critically.

We propose that a CSF is shaped by the underlying perceptions of the salient groups (in Table 4-5 the columns with the headers "Salient Group 1" and "Salient Group 2", although more than two groups are theoretically possible, as exemplified in Dimensions D 2, D 3) and the positive fit between the perceptions defines the overall success contribution of the particular CSF. Our model was inspired by Hoehle and Huff (2012) who discuss possible models for their Task-Channel Fit conceptualization based on the work

of Venkatmaran (1989) and finally conceptualize the perceived Task-Channel Fit as the deviation scores between the two variables. Similarly, we have different perceptions of salient groups in relation to a CSF in our deviation model, which were related to each other during selective coding. Our fit concept therefore is the level or extent of deviation between perceptions for a CSF over all salient groups and employs n fit-dimensions for n CSFs.

The investigated CSFs and the mainly low fit of perceptions of the salient groups (apart from Dimension 4) led finally to the cancellation of Implementation Attempt 1. During the extensive reflection phase, which included detailed re-planning and corrective actions, the path was paved for a successful Implementation Attempt 2. This new implementation attempt was marked by a high positive fit of perceptions and we will illustrate these changing perceptions for the same dimensions and CSFs as for Attempt 1.

4.6.3 Pre-Crisis: Implementation Attempt 1 – The Pre-Crisis Phase Marked by a Low Fit of Perceptions

In this section we present different CSFs marked by a low fit of perceptions in the pre-crisis phase. We use our model to relate the perceptions of salient groups to a particular CSF and identify the overall fit for this phase, which finally led to the failed Implementation Attempt 1.

D	CSF	Salient Group 1	Perception 1	Salient Group 2	Perception 2	Fit
1	CSF Ensure Realistic Planning of Time Schedule	Believers	Realistic	Skeptics	Unrealistic	(-) Low Fit
2	Alignment on Harmonized/Consolidated Business Processes	Mobile Phones (A1 Division)	Our view is right	Landline (TA Divison)	Our view is right	(-) Low Fit
		Stream X	Your Accountability	Stream Y	Your Accountability	
3	CSF Ensure Data Migration/Accuracy	Internal	Mature tools	External	Tools to be sharpened	(-) Low Fit
		Business	More data	IT	Less data	
4	CSF Flexibility of Program Components	BSAP Reporting Project	We do it right	Remaining Program Groups	They do it right	(+) High Positive Fit

Table 4-5 The Salient Group IS Success (SGISS) Model of Different Perceptions, Pre-Crisis

4.6.3.1 Low Fit of Perceptions - Dimension 1 - CSF Ensure Realistic Planning of Time Schedule

The intended goal of this CSF was the definition of an ambitious but realistic time schedule. It is not important to evaluate if the time schedule was in fact realistic, but rather we want to highlight the low fit of perceptions with regards to this CSF, which finally led to a low fit of perceptions for this dimension in the SGISS-model. Thus, the target of this CSF was not met during this phase.

After the legal merger of the previously independent companies Mobilkom and Telekom to A1/TA in 2010 the new company consisted of two different organizational cultures with two different ERP systems still in place. In this context the ERP program was, beside the technical aspects, a high priority post-merger integration initiative in which the program sponsors tried to define an ambitious but realistic time schedule. The program management and the project managers perceived this plan as doable and therefore committed to this goal, building the coalition of believers with a common perception regarding the time schedule, as Quotation 1 (Q1) indicates.

Q1: The initial go-live date was defined strictly by the board, CTO and I think also CFO for the 1st of May 2012. The program manager and I committed to this date, as well as the project managers. (Technical coordinator program, project manager ASAP, 206 ff.)

The perception of the management coalition with respect to the feasibility of the time schedule was certainly not shared by all the other groups. The project implementation teams and stream leads (Skeptics) had serious doubts concerning the go-live date as the following statement by an ASAP stream leader reflects:

Q2: But the original go-live date in May, which was initially planned...when I saw the plan the first time I thought anyway, this not realistic…. The [initial] go-live date was specified by the program sponsors, and the program manager tried to stick to this date. (Stream leader, stream 1, functional area 1, 1322 ff.)

Similar perceptions obviously existed within the project BSAP and within the functional areas of the line organization, but, as the following statement indicates, the go-live date directed by the management coalition was tacitly accepted:

Q3: The line management was too weak, right from the start...nobody could resist the unrealistic time schedule. The CTO wanted an unrealistic time schedule, that's why he got one.... Because nobody could say clearly: 'this is not feasible what you want.' (Technical coordinator of BSAP, 1095 ff.)

Retrospectively, the management coalition (Believers) recognized the different perceptions of the different groups within the ERP program as seen in the citations below. During the pre-crisis phase of the program life cycle this was not as evident as it turned out ex post.

Q4: Well, it was certainly ambitious, and in large projects it will be always like that, that not everyone is convinced at all times about the feasibility of the time schedule. Eventually, it turned out that it [the plan] was not doable, after all it was not wrong.... One has to draw on a planned assumption, and it was, according to a project plan and also the target of the sponsors. (Program manager, interview 2, 20 ff.)

Q5: The basis [stream leaders and implementation teams, that is the skeptics] did not believe that this date is feasible right from the start. With basis, I mean stream leaders, work package owners and project staff. I mean you need to convey this plausibly to the basis, otherwise the date won't be accepted. And we did not manage to transport this properly. Therefore, we lost the basis for a certain time. That was one reason why we had to skip the first go-live date. (Technical coordinator program, project manager ASAP, 210 ff.)

Additionally, the negative perceptions of the Skeptics regarding the feasibility of the envisioned time schedule had a negative impact on the commitment of the relevant groups as the following statement of the change manager affirms:

Q6: It is for sure negative.... When one loses trustworthiness. I mean, if you pick plans on the wall, and nobody believes that they are feasible...in the pre-crisis the [project] staff looked at the plans and they thought, 'nice plan, nobody believes that, we cannot do it, absolutely not realistic.' ...[T]hen this has an impact on the motivation and the output...and the output declined before the crisis, the cancellation, significantly. (Project manager CSAP, 47:12 ff.)

Furthermore, the line management also recognizes the negative effects of a time schedule, which is seen unrealistically by certain groups, on the program outcome.

Q7: I believe it is a major mistake to make unrealistic time schedules…also in regard to the staff perspectives, and their motivation. If I say I will never make it, then I have a different engagement or non-engagement. I mean unrealistic time schedules are very serious sources of failure. (Director, functional area 2, 794 ff.)

4.6.3.2 Low Fit of Perceptions - Dimension 2 - Alignment on Harmonized/Consolidated Business Processes

One major goal of the ERP program was the definition of harmonized and technically consolidated business processes. Since the approach was to build a new greenfield system, the intended alignment was even more difficult to achieve. Also, in this regard, the perceptions of the salient groups (A1 and TA) with regards to this CSF resulted in a low positive fit of perceptions for this dimension. Thus, seen together with its perceptions, the target of this CSF was not met during this phase.

From the management perspective it was still evident that within the program two different worlds still existed after the merger. Instead of the new post-merger group A1/TA, the pre-merger groups Mobilkom (A1) and Telekom (TA) were clearly dominant in many minds and thus the most salient groups. The strategy from an SIT perspective to positively differentiate the in-group from the out-group was a social competition (Tajfel and Turner, 1986), which made process agreements more difficult. Such a retention of pre-merger identities and the maintenance of their values and practices were also stressed by Drori et al. (2013). Consequently, the perceptions were not compatible with each other and the future to-be processes.

Q8: Indeed, two worlds collide, two worlds which are different also from their processes, but also different from the mindset of the people,...and those two mindsets one recognizes how they collide.... ...[A]ll [both] present their positions, all [both] are right, this is exactly the dilemma, all [both] are right, all [both] had good reasons in history to develop their processes in that way, and until they find themselves again in the new process, find themselves together, this is an effort one must not underestimate. (Technical coordinator of BSAP, 182 ff.)

Of course the situation for A1/TA was extremely context specific and by far not all companies would have faced similar problems in that intensity. Retrospectively, more effort should have been dedicated to this special situation as the statement of the change manager below illustrates. The roles of the pre-merger identities (Mobilkom A1 vs. Telekom TA) in the new post-merger identity and their reflections into the new system (Functional areas vs. IT) were not clear in the beginning.

Q9: However, I believe that certain things would have been necessary earlier...bringing together functional areas and IT right from the start...you see? Because misunderstandings persisted for a long time...classic themes like 'I don´t understand what you are telling me' and the other way around...also cultural themes, directly after the merger...in summer 2010...not technical and functional [themes], but 'what is your world,

what is the Telekom world, what is the Mobilkom world, how do your processes work, how do my processes work'...this cost us an incredible amount of time...we should have invested more in this common understanding. (Project manager, CSAP (Change-project), 2:8)

The challenge to align on new common processes were was made more difficult because of a missing process ownership. As an integrated system this impacted harmonized and consolidated processes likewise, considering the end-to-end view (which can comprise harmonized and consolidated processes).

Q10: Topics across Streams! This is related to process accountability, who is responsible, where does it [my accountability] start and where does it [my accountability] end? [……] In regard to process governance.... there is not really something defined, who is the process owner and mainly responsible? (E.g. in relation to the ANY-END-TO-END-PROCESS). Thus, we had nobody who really checked the [entire end-to-end] process. We had functional areas like WILLNOTMENTION1 and WILLNOTMENTION2, they checked everything [unit tests], but that the entire process across streams works...there we certainly had trouble. This was one of the main challenges. (Member of IT-core team, member of program management office 137 ff.)

Thus, we conclude that this lack of a common understanding (in relation to the merger and the accountability) and the low positive fit of perceptions with regards to the harmonization and consolidation of business processes had negative effects on the program's success.

4.6.3.3 Low Fit of Perceptions - Dimension 3 – CSF Ensure Data Migration/Accuracy

The major goal of the data migration was to provide a common database for A1/TA. Only necessary data (e.g. open items) should have been migrated so that harmonized and consolidated processes could run properly in the new system. This included the merging of master data including a new chart of account, data cleansing and a reduction of master data. A lot of conversion rules, interfaces and custom developments needed to be considered. For this CSF we also recognized the low fit of perceptions, which negatively impacted the ambitious goal and led to a low fit of perceptions for this dimension of our model. Thus, the target of this CSF was not met during this phase.

The complex data migration was a huge challenge for the program team and it turned out very quickly that different perceptions regarding the data migration worsened the situation. During the first data migration test cycles, these different views had already manifested into a significant backlog. The migration tools which were expected to be technically mature did not bring the planned results. Furthermore, the process views

could not be sufficiently considered with the available data quality and the intended migration scenario. Thus, the functional areas were very insecure regarding the workability of the envisioned system setup.

Q11: We were always one data migration test cycle behind. The vendor expected a technical migration, we expected already a first test migration...these two perceptions did not fit each other...we expected that they provide technically mature migration tools, which was not the case.... The functional areas realized that not all the data will be migrated...and they asked themselves: 'how can I work with that data?' (Technical coordinator program, project manager ASAP)

Three months before the go-live was planned the situation did not change for the better. Again the ongoing data migration problems were stressed.[12]

Q12: The expectations for Mock1 [Data Migration Cycle 1] were not met. The major reason for the thus far resulting delays in the data delivery, are attributed to not realized migration rules within the migration tools of Vendor 2. (Management meeting, minutes of 03-Feb-2012)

Furthermore, it turned out that the amount of data intended to be migrated, was not sufficient to serve the business needs. The functional areas expected more data than the ERP groups initially intended to migrate into the new system. These two contrary positions of the two groups did not reconcile and contributed strongly to the problems regarding the data migration.

Q13: The data migration, originally with only compulsorily needed data for the new fiscal year, respectively master data, we needed to extend it since more historical data was necessary to keep existing processes alive.... …[T]his was also the crux why we needed the postponement. We saw that the migration as required in the specification was not sufficient, and would have led to major problems. (Technical Coordinator of the program, project manager ASAP, 109 ff.)

4.6.3.4 High Fit of Perceptions – Dimension 4 - CSF Flexibility of Program Components

As seen in Table 4-5, not all dimensions during the pre-crisis phase were characterized by a low fit of perceptions. During our interpretive case study, we identified "Flexibility of Program Components" as a new program-specific CSF, which would not be applicable to a more traditional project level setup. In particular, it relates to separate methodological requirements for different projects as exemplified in this study. The

[12] After the ERP program at A1/TA, the vendor published a public document about the implementation which again highlighted the data migration as one of the key challenges (CSFs) and the necessary postponement of the go-live date. This document corroborates the insights gained from the interviews and the official program documentation.

project BSAP performed well from the beginning, and the program management granted BSAP certain tolerances as the statements below indicate:

Q14: We have people who push things forward.... …[T]hat's why we said we make our own documents...but we remained lean.... This was only possible because we have been our own project...and the program management was happy with our performance right from the start. (Technical coordinator-BSAP, 610 ff.)

Q15: Well for BSAP I don't know...this I did not track in that way…. ...[I]t was rather a little separated. They acted, I put it that way, more freely. Because it was a topic which was rather detached. The BI-side [Reporting Project, Business Intelligence] one can regard a little bit separated, they managed it by themselves. (Member of IT-core team, member of program management office, 108 ff.)

The flexibility of program components illustrates that perceptions in relation to a CSF must not necessarily change over the program life cycle. Certainly this was also the case at A1/TA and the salient groups in relation to this CSF were formed through a tacit in-group/out-group relationship rather than through different perceptions as exemplified for the other dimensions. We could therefore see the perceptions of the different groups as "mutually supportive perceptions" as a special manifestation of a high positive fit of perceptions.

4.6.4 Crisis and Reflection

Due to the problems appearing in the Implementation Attempt 1, the originally intended go-live date in May 2012 had to be cancelled. During an extensive re-planning and reflection phase several corrective actions took place. The data migration was seen as the main challenge and therefore the migration team was reinforced with additional team members and an external migration manager. Furthermore, quality gates for the data migration test cycles were established. An issue-tracking tool was introduced and program rooms were established. All these actions should have improved the collaboration between the groups and the communication flow. Different data migration and cut-over scenarios were prepared and presented during a large buy-in meeting with 26 relevant stakeholders (CFO, CTO, the program management and the project managers, directors of functional areas and stream leaders). The common alignment resulted in a strengthened commitment, converging perceptions and paved the path for a successful Implementation Attempt 2 marked by a high fit of perceptions.

Q16: The crisis had a positive effect on the complete program. We used the time to reflect what went wrong, what do we need to improve, where do we need to change the structure, how must we change our collaboration.... A new quality of collaboration.... The team found together…. (Project manager CSAP, 6:1)

Actions	**Description**	**CSFs influenced**
Buy-in Meeting	Securing the commitment of stakeholders. Decisions made on data migration and deployment scenarios (including new go-live date)	Top Management Support, Establish Commitment of Key Players, Ensure Data Migration/ Accuracy, Define Program Methodology, Realistic Timeframe
Reinforcement of Data Migration Team	The data migration team was reinforced with additional workforce, most notably at the management level. The program management realized that the collaboration between functional areas, IT, and the implementation partner needed to be improved.	Ensure Data Migration/ Accuracy
Quality Gates introduced	For data migration, end-to-end tests, Integration Tests Percentage of executed test cases, percentage of priority 1 errors.	Define Program Methodology
Issue Tracking Tool	An issue management tool was introduced to prioritize tickets and generate reports.	Secure Issue Management, Defining Stakeholder & Communication Management
Alignment on a Common Communication Strategy	Convey management decisions to all stakeholders, (decisions made in decision workshop). Ensure commitment of all stakeholder groups (e.g. in relation to the new go-live date)	Secure Change Management, Define Stakeholder & Communication Management, Realistic Timeframe
Project Rooms established	Separate project rooms were provided to strengthen the communication and collaboration, and to improve decision making.	Establish Collaboration and Decision Making, Ensure Business Process Management, Realistic Timeframe

Table 4-6 Most Important Corrective Actions During the Crisis

Table 4-6 depicts the corrective actions, which we deemed most important during the crisis. These actions influenced certain CSFs, as we show in column 3.

4.6.5 Post-Crisis: Implementation Attempt 2 – The Post-Crisis Phase Marked by a High Positive Fit of Perceptions

In this section we present different CSFs that were marked by a high positive fit of perceptions in the post-crisis phase. We use our model to relate the perceptions of salient groups to a particular CSF, which finally led to high-fit scores and a successful go-live. We use the same dimensions (CSFs) as we did for Implementation Attempt 1 and illustrate the changing perceptions and salient groups (Table 4-7).

D	CSF	Salient Group 1	Perception 1	Salient Group 2	Perception 2	Fit
1	CSF Ensure Realistic Planning of Time Schedule	Believers	Realistic	N/A	N/A	(+) High Positive Fit
2	Alignment on Harmonized/Consolidated Business Processes	Mobile phones (Division A1) & Landline (Division TA), Stream X….Y	One future system reflecting A1/TA , Our accountability	N/A	N/A	(+) High Positive Fit
3	CSF Ensure Data Migration/Accuracy	Internal & Business & External & Business	Complexity targeted, sufficient data	N/A	N/A	(+) High Positive Fit
4	CSF Flexibility of Program Components	BSAP Reporting Project	We do it right	Remaining program groups	They do it right	(+) High Positive Fit

Table 4-7 The Salient Group IS Success (SGISS) Model of Different Perceptions at A1/TA, Post-Crisis

4.6.5.1 High Positive Fit of Perceptions - Dimension 1 - CSF Ensure Realistic Planning of Time Schedule

Implementation Attempt 2 was also very ambitious. Compared to Implementation Attempt 1, this implementation attempt was generally seen as realistic by all program groups. As the following statements illustrate, the perceptions regarding the feasibility of the time plan converged and led to a high positive fit of perceptions for this dimension in our model, blurring the borders between the two formerly salient

groups. Thus, the targets with regards to this CSF were met in the post-crisis phase (Implementation Attempt 2).

Q17: And it was clear that we have another chance, we have a new go live date but this time we must not fail.... …[O]ne aligned on a new go-live date, a date to which we really stuck to, and we were really convinced that we will make it. We really did everything that we could make it. (Project manager CSAP, 16:41,2)

It seems also that the common goal, and the feasibility of the time schedule strongly impacted the commitment of all program-groups, as the following two statements indicate. This lack of engagement and motivation (commitment) was strongly emphasized as a factor of failure during Implementation Attempt 1. Thus, the perceptions regarding the time-schedule (which was seen as ambitious but realistic) contributed to converging perceptions in relation to other CSFs[13], which all together contributed to the ERP program success.

Q18: I believe in the last two or three months we were in a phase where we said: 'Yes, we know that we can make it, we know it might be difficult and some things will not work.' But we were absolutely committed to the new go live date. 'We will make it, we will,' and I have to say from the peoples' perspectives, who spent nights and holidays in the office, it was really great.... (Director, functional area 2, 1029 ff.)

Q19: And the [second go live] 7th of January, 2013 was a date nobody wanted to shift back or put into question. 7th of January, 2013 was in all heads, we need to make it...also this Big Bang, that everyone has a common goal was one responsible factor for the success…when everyone says: 'I support it, I fight for it, it needs to be accomplished.' (Technical coordinator of BSAP, 402 ff.)

4.6.5.2 High Positive Fit of Perceptions - Dimension 2 - CSF Alignment on Harmonized/Consolidated Business Processes

The time factor also played an important role in the definition of harmonized and consolidated processes, as the first of the following two statements indicates. Certain areas, such as finance processes, were reduced significantly from 1200 to 600, a new chart of account was defined and master data were cleaned. In other areas, such as logistics, a consolidation of processes was intended in this phase since a further harmonization was planned within the second release of the program. Whereas it seems that for harmonized processes the pressure led to converging perceptions and concessions between the functional areas A1 and TA (Q20), for

[13] Due to space constraints and for reasons of readability we do not cover each CSF separately in this chapter. In the comparative analysis (Chapter 6) we treat every observed CSF of the case at A1/TA.

consolidated processes the reconciliation was mainly between functional areas and their ERP counterparts, followed by a reconciliation of the ERP consultants as the second statement (Q21) indicates. Yet, during Implementation Attempt 2 the perceptions regarding this CSF converged and led to a high positive fit of perceptions for this dimension in our model. Thus, seen together with its perceptions, the target of this CSF was clearly met during this phase.

Q20: Only when the pressure was so high, and they had no other choices, all of a sudden it worked at the touch of a button. And I mean simply from the time factor we underestimated it. One needs the time factor, exemplary said, this friction energy.... This get-together and generating of friction which results in such high pressure, then the accruing heat effects that the two melt into each other. And precisely this time, as stated...needs them, [the two salient groups] to be given.... One can try to increase the pressure, but both need to be willing to accept this friction point. (Technical Coordinator of the program, project manager ASAP 769 ff.)

Q21: I know the green [Telekom, TA] functional area well and we came to common agreements. WILLNOTMENTION [consultant]...knows the black [Mobilkom, A1] functional area very well and coordinated with them. And then WILLNOTMENTION and I agreed on the lowest common denominator. But for discussions between the functional areas in a large round, for that, I have to admit honestly, the time was too short. (Consultant ASAP, logistics, 426 ff.)

As the program was also a post-merger initiative, we see some indications for converging perceptions of the different groups. However, we cannot say if these effects were mainly caused by concessions due to the enormous time pressure (likely this was the case for consolidated processes, since reconciliations in larger rounds were not really necessary) or if the pre-merger identities Telekom and Mobilkom began to build a new post-merger identity A1/TA, as intended in the initiative and the change project, and therefore the perceptions converged. It seems that all of these variables had an impact on the perceptions of the different groups and led to the high positive fit of perceptions for this dimension. Furthermore, the establishment of project rooms, and the empowerment of smaller teams contributed to collaboration and decision making, also in regard to the alignment on business processes.

4.6.5.3 High Positive Fit of Perceptions - Dimension 3 - CSF Ensure Data Migration/Accuracy

It was extremely beneficial that all stakeholder groups were involved in the buy-in meeting as the next statement indicates. The clear approach contributed strongly to converging perceptions and led to a high

positive fit of perceptions for this dimension in our model. Thus, the target of this CSF was clearly met during this phase.

Q22: Absolutely yes, it was an important audience, in particular with all directors of the impacted areas...in principle migration variants were presented with the alignment on one...and it was in this respect an essential topic, since also the postponing was mainly situated in the migration...to create the awareness, that one reduces the migration risk, if one takes with him less data.... …[A]nd to find the balance...that also the processes work.... It was an essential meeting and also a key to the subsequent successful outcome of the project, since one could show it to the sponsors, stakeholders, directors and to create again certainty...that it was a very clear approach and very well planned...that we could present and reconcile there. (Program manager, interview 2, 345ff)

The common awareness, alignment on a common approach and recreation of certainty was very helpful for the subsequent migration cycles, as they were still far away from the final state for which they wished. The following statement from a consultant, in replying to a question regarding the atmosphere before the final go-live, illustrates this point:

Q22: In the meantime, it [the atmosphere] was once again tense for the migration didn't work as well as expected...it was the second and third migration which also didn't look so good. In reality, just the last migration, where one only should have validated the data, it was the first time that one could allege, 'ok, with that, we can get it, to go live.' (Consultant Project ASAP, 668 ff.)

4.6.5.4 High Fit of Perceptions – Dimension 4 - CSF Flexibility of Program Components

Also, during post-crisis phase the perceptions regarding the flexibility of the project BSAP were mutually supportive and marked by a high positive fit. The program component BSAP flourished largely independent from the program. Thus, this CSF contributed to the overall success of the program during all phases.

4.6.6 SGISS Model of Different Perceptions

To summarize the results of the three phases we depict the results in Figure 4-2 with three main propositions. In each of the phases the salient groups were defined through the perceptions with regards to the particular CSFs, which were the main drivers for the program success. The groups were dynamic, based on the fit of perceptions and were only partially impacted by formal program groups as we exemplified for Dimension 4 and mutually supportive perceptions.

In the pre-crisis phase, the perceptions of the salient groups with regards to the CSFs were marked by mainly low fit of perceptions, which arguably led to the failure in Implementation Attempt 1. This we exemplified for three dimensions where the low fit of perceptions with regards to each CSF formed salient groups. If there is a large extent of deviation (low fit of perceptions for each CSF), this indicates potential failure and calls for a consolidation phase (condition is the low fit of perceptions). At the consolidation phase (crisis and reflection), corrective actions are taken to stimulate converging perceptions, dissolvement and the redefinition of salient groups.

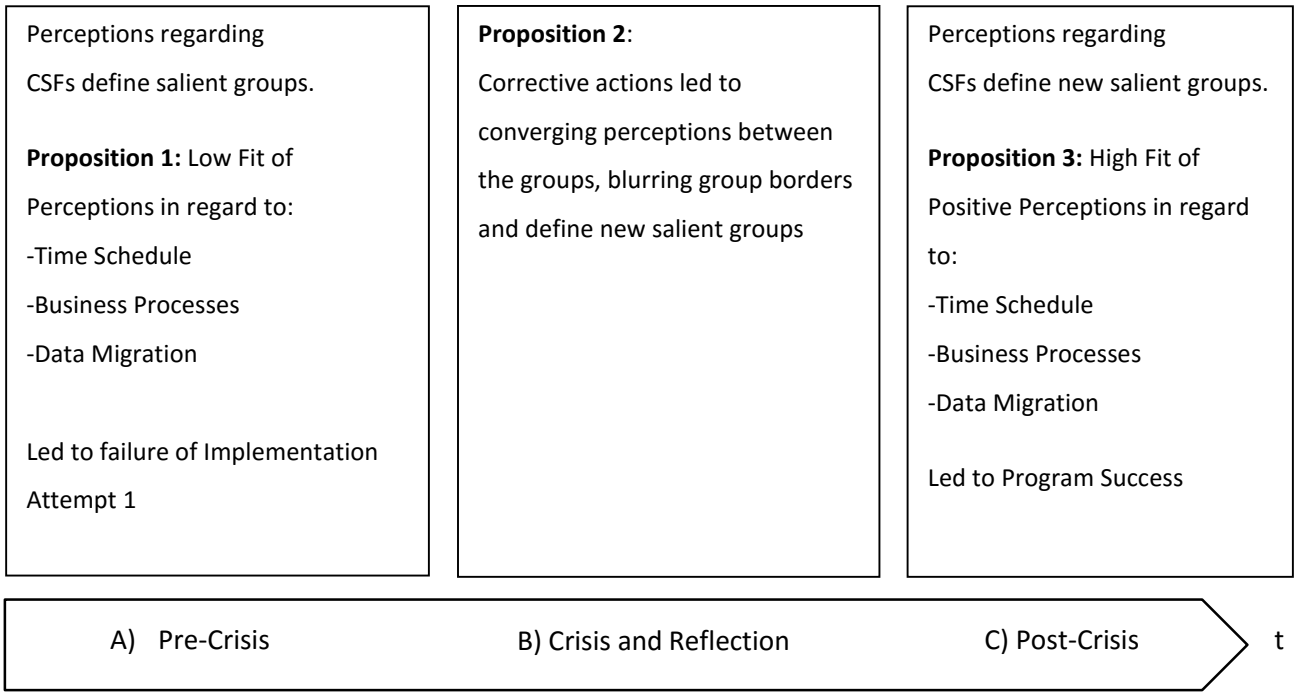


Figure 4-2 The SGISS-Model of Different Perceptions at A1/TA

Efficient stakeholder- and communication management was arguably (among others, Table 4-6) the most important CSF in relation to converging perception, thus we defined it as core category. Regarding the timeframe an ambitious timeframe was approved by all stakeholder groups and appropriately communicated. Regarding data migration. different scenarios were presented, and aligned. Thus, the business people knew which data to expect and the IT shared these perceptions regarding to the timeframe. In relation to data migration tools, the issues were clearly communicated to the external integrator. Actions were aligned and the data migration team enhances. Thus, all stakeholder groups shared perception with regard to the data migration. Regarding business processes, 20 core processes were communicated and project rooms established. Thus, the two divisions A1 and TA, the functional areas, and the consultants could

improve their collaboration and align on common business processes. These business processes were implemented and finally end-to-end tested. Regarding the flexibility of program components, the communication was sufficient throughout the three phases, as BSAP performed well right from the start. Thus, the new salient groups in the post-crisis phase were marked by a high positive fit of perceptions, which led arguably to a success of Implementation Attempt 2.

As a last step, we apply the principle of abstraction and generalization, which is the abstraction of categories; unique instances (A1/TA context, the principle of contextualization) are related to ideas and concepts that apply to multiple situations (Klein and Myers, 1999). Thus, we increase the theory scope through integration of the substantive theory in a more formal theory (Urquhart et al., 2010).

We propose that beside the CSFs the underlying perceptions are influencing the dependent (success) variable in our model. Our model (Figures 4-3, 4-4, 4-5) was inspired by Hoehle and Huff (2012) who discuss possible models for their Task-Channel Fit (TTF) conceptualization based on the work of Venkatmaran (1989). In particular, Hoehle and Huff (2012) want to conceptualize the user's perceived fit of a particular electronic banking channel (internet banking) to support a particular banking task (account inquiries vs. loan application). Finally, they choose the "fit as matching"-option[14] which is characterized by no reference to a criterion variable and they conceptualize the perceived Task-Cannel Fit as the deviation scores between the two variables.

The number of phases, CSFs and salient groups is defined by the context and the underlying perceptions with regards to the CSFs (*n* fit-dimensions for *n* CSFs). In this way, the model can be adapted beyond the case at A1/TA. Figures 4-3 to Figure 4-5 present the abstracted SGISS-model of different perceptions with two steps and two possible scenarios in step 2. Note that this model has to be applied regularly during all phases of the ERP program and for each CSF separately. As such, it could be a valuable tool to accompany an ERP implementation and additionally an interesting new avenue for action research.

At this stage, we want to recall our definition of CSFs, and the conceptualization of our fit concept, and state that the SGISS-model of different perceptions is a valuable tool to regularly assess the CSFs.

[14]This is a major departure from other options, as e.g. "fit as mediator" (Hoehle and Huff, 2012; Venkatmaran, 1989), where a relationship to the criterion exists. Similarly, in our deviation model we have two parallel variables which were related to each other during selective coding (perceptions of the salient groups in relation to a CSF).

Definition: CSFs in the ERP program context are the underlying guiding principles and activities, in certain key areas, that must be regarded by managers to reach the goals of the ERP program. To ensure that CSFs are proceeding sufficiently well in each area, CSFs are continually assessed during all phases of the ERP program life cycle.

Definition: The applied fit concept is the level or extent of deviation between perceptions in relation to a CSF over all salient groups (1….m)[15], and employs n fit-dimensions for n CSFs.

Step 1) The first step (Figure 4-3) is always to assess if different perceptions in relation to a CSF exist or not. Thus, it must be defined if only 1 salient group or different salient groups (2-n) exist.

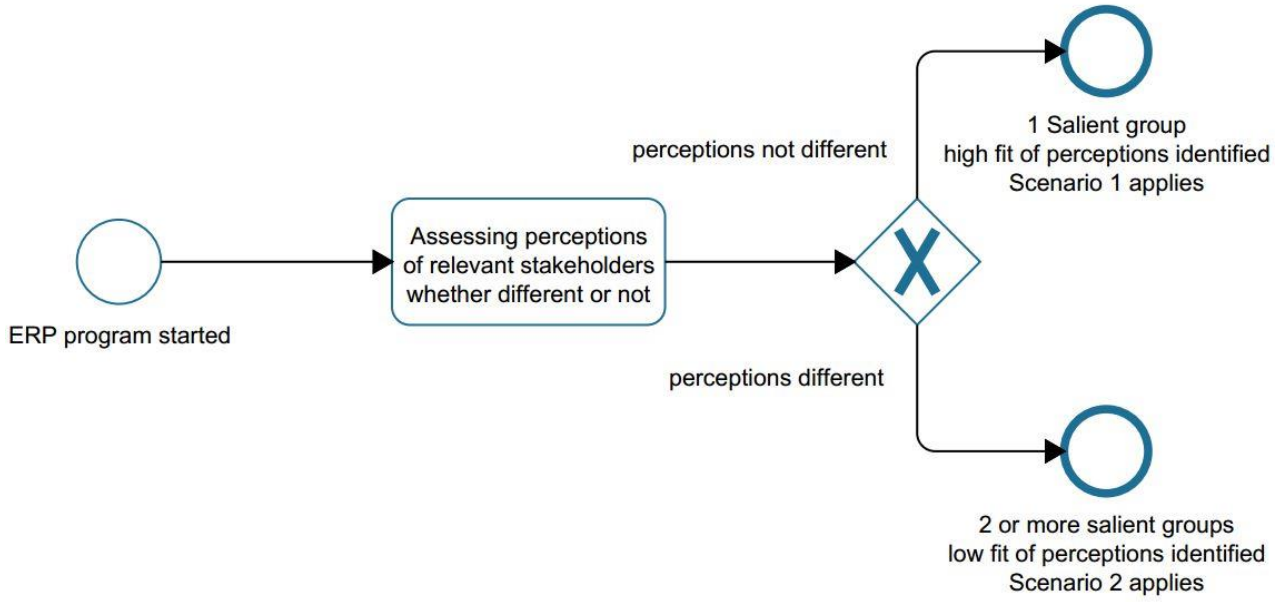


Figure 4-3 SGISS-Model Step 1. Assessing Perceptions in Relation to CSF.

[15] For every CSF (n possible) any number of salient groups can exist (1….m).

Step 2) Consisting of two different scenarios, based on the outcome of step 1.

In scenario 1 (Figure 4-3) only one salient group is identified, meaning that in relation to a CSF the same perceptions existed for all stakeholders. Now it is important to assess whether the result is a positive fit (scenario 1a, CSF met) or negative (scenario 1b, CSF not met). In 1b corrective actions towards the CSF must be set.

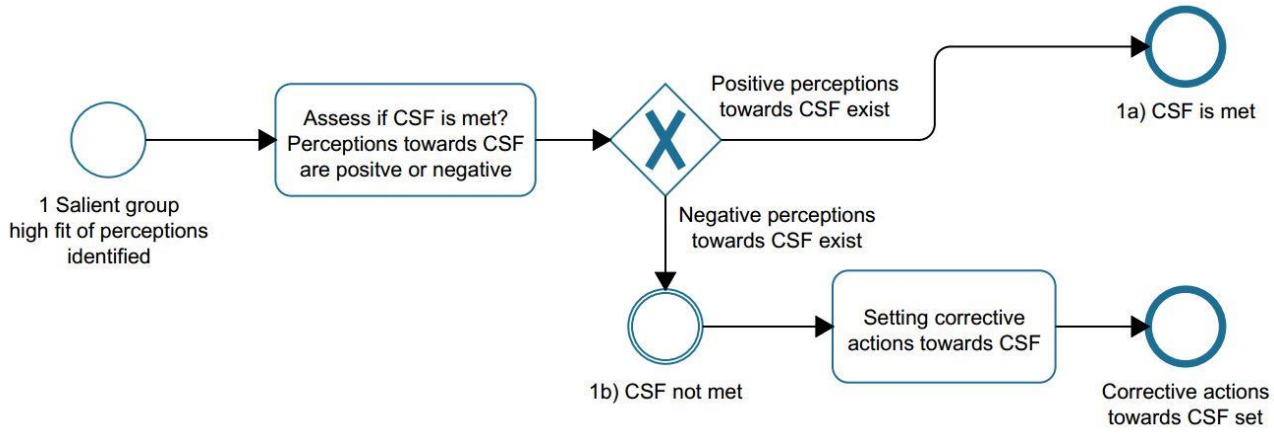


Figure 4-4 SGISS-Model Step 2. Scenario 1 with 1 Salient Group

In scenario 2 (Figure 4-5) different salient groups are identified (at least 2 but theoretically any number greater than 1 possible), meaning that different perceptions existed for different stakeholders during step 1 constituting different salient groups. Thus, it is necessary to set corrective actions towards the CSF.

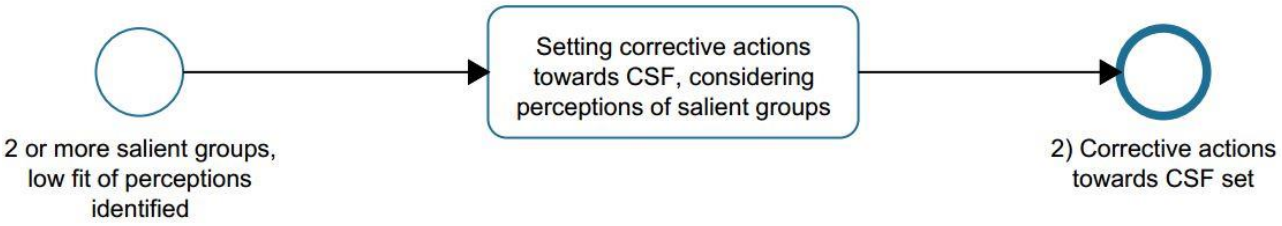


Figure 4-5 SGISS-Model Step 2. Scenario 2 with Different (2 or More) Salient Groups

Considering our model, we propose for each Scenario of step 2:

1a) If only one salient group exists and the targets of the CSFs are met (positive perception of a salient group towards CSF exist) the CSF contributes to the ERP program success.

1b) If only 1 salient group exists and the targets of the CSFs are not met (negative perceptions of a salient group towards CSF exist), the CSF contributes to ERP program failure (corrective actions towards the CSF are necessary).

2) If different (2 or more) salient groups exist, the CSF contributes to ERP program failure (corrective actions towards the CSF, considering perceptions of salient groups, are necessary).

We want to close the result section with a quotation which perfectly illustrates that the managerial perceptions are not always determining if a CSF is successful. This quotation underlines the need to consider the perceptions of all salient groups, as the perceptions of a non-dominant subgroup (in our case "the basis" can push the program into failure, even when the dominant group (in our case the "management" has an opposing view.

Q23: The estimation that one has a problem popped up earlier in the basis [workstream-leads and implementation team] than in the management [team], but also the other way around. The perception that the project success is feasible and that the go-live will work, popped up earlier in the basis than in the management. Apparently, a realistic estimation about the project success, is earlier available for the basis than for the management team. (Program Manager, Interview 2, 267 ff.)

In this section we presented the results of our case study. We started with contextual information about A1/TA and the case. Then, we highlighted the ERP program over its life cycle. We presented the pre-crisis which was characterized by a low fit of perceptions which led to the cancellation of Implementation Attempt 1, followed by the crisis with corrective actions, and lastly the post-crisis (Implementation Attempt 2) which was characterized by a high fit of perceptions leading to a successful ERP program. Finally, we presented the SGISS-model of different perceptions, for the specific instance at A1/TA as well as the generalized, abstracted model which is applicable to other contexts.

4.7 Discussion

We emphasized that it is important to view an implementation over the complete program life cycle and to investigate the process events (Lyytinen and Newman, 2015; Markus and Robey, 1988). Moreover, Grainger

et al. (2009) stress the importance of *when* an implementation is judged to be a success or failure. If our observation had stopped after Implementation Attempt 1 the ERP program could have been classified as a failure. As we can see in our case study, the CSFs and the corresponding perceptions changed in Implementation Attempt 2 and in the end the ERP program was certainly a success and perceived as such by all key stakeholders. This is in line with Grainger et al. (2009) who present consistent results. As a consequence, we conclude that the pure capturing of the antecedents and static elements (Lyytinen and Newman, 2015; Markus and Robey, 1988) is not sufficient to get a complete picture of the ERP program and the dynamic process of stakeholder changing perceptions (Boonstra, 2006). Thus, the investigation of the complete life cycle is warranted.

As many stakeholder groups are involved in an ERP implementation, and particularly programs, the perceptions are of major importance since they form salient groups that are not necessarily identical with the formal program groups. We illustrated that those perceptions could change over the program life cycle, impacting the fit in relation to a particular CSF. The importance of perceptions was stressed by several authors in the past: in the ERP context (e.g., Besson and Rowe, 2001; Bernroider, 2013; Drori et al., 2013), in relation to mergers (Schwarz and Watson, 2005), and as a relevant factor for success and failure of an ERP implementation (Grainger et al., 2009).

Previous research, explicitly dealing with CSFs and the different perceptions of stakeholder groups (Amoako-Gyampah, 2004; Finney, 2011; Lin and Rohm, 2009) failed to consider (1) all relevant stakeholder groups (2) considered only a limited number of CSFs and (3) they neglect the case that within a stakeholder group the views are not consistent and might be different. The SGISS-model of different perceptions closes these gaps. First, it considers all relevant stakeholder groups through consideration of different perceptions towards a CSF. This is important as in previous CSF research mostly managerial views were considered (e.g. Nah et al. 2003), not considering that opposing views (of only one salient group) towards a CSF can lead to an implementation failure. Amoako-Gyampah (2004) mentioned communication as one example where the views of managers and end-users strongly differed. Finney (2011) further elaborated on the importance of communication. Second, the SGISS-model calls for regular application for all CSFs, thus paying attention to the dynamic nature of CSFs within ERP programs. Third, salient groups are constituted through different perceptions, as such considering different views within a stakeholder group, and provides an avenue for dealing with it (Step 2 /Scenario 2). We pay attention to the prominent view in previous accounts (e.g. Amoako-Gyampah, 2004; Finney, 2011) that stakeholder- and communication management is particularly

important. As such, and under consideration of SIT, we defined stakeholder- and communication management as core category as the major CSF impacting perceptions in relation to other CSFs.

Recalling our second central research question "How can the dynamics of CSFs be considered in a general, parsimonious phase model", the SGISS-model exactly provides and answer to this question. This was not done in previous studies in the ERP program context which emphasized the importance of perceptions, e.g. in the account of Chang et al. (2014) for goal commitment and in the account of Jiang et al. (2014) dealing with conflict management. The lack of a model considering the dynamics of CSFs over the implementation life cycle is also evident in the studies dealing with different perceptions in relation to CSFs (Amoako-Gyampah, 2004; Finney; 2011; Lin and Rohm, 2009), and in CSF studies in the ERP program context (Ribbers and Schoo, 2002; Seidel, 2009). We developed a deviation model which is grounded in data, and can be applied to other contexts (Klein and Myers, 1999), as we theoretically integrated as proposed by Urquhart et al. 2010) following the "fit as matching" option developed in previous accounts (Hoehle and Huff, 2012; Venkatraman, 1989).

It was not our intention to judge if, for example, the time schedule was indeed too ambitious. It is much more important that a low fit of perceptions in relation to this CSF existed (abstracted SGISS-model, scenario 2), and that those perceptions converged (following corrective actions) over the course of the program leading to a high positive fit during Implementation Attempt 2 (abstracted SGISS-model, Scenario 1a. Our SGISS-model of different perceptions emphasizes the interrelations between the CSFs and the fit of perceptions of the salient groups in the best case blurring the borders between groups in relation to their perceptions leading to a high positive fit (abstracted SGISS-model, Scenario 1a), as opposed to a high negative fit (abstracted SGISS-model, Scenario 1b), which warrants further corrective actions.

The example of the CSF "Flexibility of Program Components" illustrates the context in our model. In our case the in-group BSAP has a positive perception regarding their flexibility and independence compared to other program components and the applied methodology. Since the out-groups (in regard to the salient group BSAP) have mutually supportive perceptions and accept the special status of the program component BSAP, this CSF contributes to the overall program success. The effective use of tolerances is also stressed in the program management literature (e.g., Cabinet Office, 2011; PMI, 2008). In a different context, i.e., different program settings, it could easily be the case that different groups have a low fit of perceptions with regards to the flexibility of certain program components. In that case this CSF might not contribute to the overall program success and, in the worst case, could even be a failure factor. As a consequence, we can see that

perceptions are not only a shaping variable for the underlying CSFs, but also consider the context in our model.

As we follow the interpretive tradition, we did not intend to generate universal laws (e.g., Orlikowski and Baroudi, 1991; Lee and Baskerville, 2003), but we believe that our model is general and parsimonious enough to serve as a general reference model. As such, it could be extended to other settings (Lee and Baskerville, 2003). Lee (1991) proposes a model in which interpretive and positivist research supplement each other, including different studies and different researchers; perhaps our model could also be extended in this direction. This view is in line with Orlikowski and Baroudi (1991) as they describe interpretive research in the viewpoint of the weak constructionism as a means to generate hypotheses for further positivist investigation. Consequently, although we believe that the context is particularly important and a good way to measure context and perceptions is case study research, we see a variety of usages and possible extensions of our model, not necessarily limited to interpretive research. Positivist researchers, for example, could conceptualize the model as illustrated by Hoehle and Huff (2012) and test it with the deviation score analysis, but within one context. By successive refinement and testing, a theory could emerge that is generalizable across these different settings, but again, not beyond those cases (Lee, 1991).

4.8 Implications

Gregor (2006) distinguishes between five types of theories depending on four intended goals. In this phase the goal of our theoretical model is to explain how, why, and when the occurrences happened and therefore promote greater insight into our phenomena of interest, in Gregor´s terms a Type II Theory for explanation. Following the interpretive paradigm, it was not our aim to develop a predictive or deterministic theory (Gregor, 2006), but we see our theory as a 'sensitizing device' to view the world, in our case ERP (IS) implementations, in a certain way (Klein and Myers, 1999). As such, our theoretical model has implications for researchers and practitioners alike. On the one hand it can inform other real-life settings and on the other it can be extended and adapted to these settings, serving as a Type IV Theory for explanation and prediction or even a Type V Theory for design and action (Gregor, 2006).

For research, our study provides a perspective to integrate the group and perception concept into an IS success deviation model which considers the perceptions of salient groups in relation to critical success factors over the implementation life cycle. The few, previous accounts in relation to perceptions within ERP implementations were limited to (1) certain stakeholder groups (mostly managerial), (2) a limited number of CSFs, and (3) did not consider that perceptions can differ within a stakeholder group. The salient group

concept inherent in the model closes all those gaps, and is and easily applicable. Although it was developed in a specific context, the abstracted model is grounded in data, and can inform other settings and be adapted and used according to the needs of these settings (e.g. other ERP and IS programs). The model could be used for predictions and explanations during different points in time. For example, through an application-reflection cycle, perhaps with shared responsibilities during action research (Robey et al. 2000), practitioners' problems could be solved and at the same time the theory refined (Lee and Baskerville, 2003). Fourth (4), the SGISS-model was developed particularly within the ERP program context. In a program the number of salient groups is potentially higher, since typically more stakeholder groups are involved than in a traditional project setup. Furthermore, the interdependence of projects and the competition could worsen contribution to a larger number of salient groups. Thus, the potential implications for ERP programs are particularly high. The SGISS-model could help to mitigate these potential tensions. Fifth (5), we assume that the SGISS-model could be used in larger ERP projects (which are not established as programs) too, as well as in IS programs beyond the ERP context. We encourage other researchers to investigate this assumption. Lastly (6), we provide an instance of a rarely observed phenomenon in previous SIT accounts (Augoustinos and Walker, 1995). They claim that tensions "are only likely to diminish or disappear when the dimensions and outcomes of intergroup comparisons are judged, especially by the unfavoured group, to be legitimate" (Augoustinos and Walker, 1995, p.117), and the dominant outgroup will be resistant to attempts of the negatively valued in-group to alter its status. "A group does not relinquish its favoured position easily or voluntarily - for political reasons as well as reasons of maintaining a favourable social identity" (Augoustinos and Walker, 1995, p.117). In our case, after the cancellation of Implementation Attempt 1, the dominant group "Believers" became "Skeptics", thus altering their social identity and salient group. SIT could build on that observation and further elaborate in which cases the leaving of a dominant subgroup (or allying with the unfavoured group, with a lower status) is likely. At this moment we provided the first general deviation model which addresses different stakeholder perceptions (salient groups) in relation to CSFs over the entire life cycle, providing hints for possible extension- and operationalization variants.

The implications for practice are potentially great; the SGISS-model could, and probably should, be used during different (potentially all) phases of the ERP implementation life cycle. For practitioners, our model could help to increase the likelihood of ERP success and mitigate risk of failure over the complete life cycle. Active participation, indifference or resistance regarding the ERP system can be caused by group interests and ERP implementation managers should be aware of this dimension to manage these perceptions

(Boonstra, 2006). Our model can help to manage exactly those potential different salient group perceptions in relation to specific CSFs.

4.9 Conclusion

Programs are contemporary phenomena and more and more used for large-scale ERP implementations in a rapidly changing global economy. The emergence of the program phenomenon leads to more stakeholder groups being involved in the implementation process. As these groups, their expectations, interactions and perceptions have an increasing impact on the successful outcome of an ERP implementation, and particularly on programs, a new fresh look has to be taken on this phenomenon. The SGISS-model of different perceptions does exactly that. It pays attention to the potentially high number of different perceptions of salient (program) groups, thus providing a new solution for dealing with the dynamics of CSFs in ERP programs. In this section we presented our case at A1/TA. Next we turn to a case in multisite environment, the ERP program at Pantheon.

5. The Case at Pantheon – An Organizational Learning Model in the ERP Program Context

In this section we present our second case study at Pantheon (a pseudonym). We start with elaborating how Pantheon met the predefined criteria relevant to the case selection. Second, we present the research objectives of this specific chapter, which is a model to explain the dynamics of CSFs over the entire program life cycle. Next, we highlight the data collection. We continue with the data analysis and the coding steps. As organizational learning played a crucial role in interpreting the data we briefly elaborate on organizational learning in the ERP context, and what we know about multisite ERP implementations. Then, we present the results of our case on the basis of the derived "Organizational Learning Model in the ERP Program Context", which is based on the organizational learning interpretation model of Daft and Weick (1984). Finally, we discuss the results and provide implications for research and practice, before we close with the conclusion.

5.1 Case Selection

We established the primary contact with the leader of the SAP Competence Center Jupiter via a professional contact, and conducted our interview. Pantheon met all the predefined criteria and we deemed it as a suitable case (Table 5-1). Furthermore, the multisite perspective and the phased approach were predicted to bring further insights into the program phenomenon, and the interrelations between sites with specific underlying laws were particularly interesting.

No	Criteria	Definition
1	Program involved	A group of related projects was coordinated through a form of overarching program (e.g. PMI, 2008), which clearly demarcated the implementation from a traditional project setup with an individual project as subject to the implementation.
		Subject to the subprogram was the implementation of an ERP system. The subprogram Saturn-Jupiter (program cluster), as part of the larger program Saturn at Pantheon consisted of one development project and nine rollout projects rolled out at the different sites. All rollout projects used the common template, which was developed in the development project, and were hosted on the same technical platform. The common platform effected the sharing of resources and the necessity to consider performance issues as the number of users grew over the course of the rollouts. Many links existed to other software applications, what was considered in the larger program.
2	Processes affected	The way the business conducts was affected. ERP systems are involved at the core and additional ES (enterprise systems, e.g. data warehouse) might be involved. ERP programs

		focus on outcome, that is a change in how the organization operates. Contrarily ERP projects focus on outputs; that is, a functioning ERP system (Seidel, 2009).
		The ERP system implementation covered three different settlement areas for the different partner groups. Only one site had a legacy SAP system in place, only covering one settlement area, reflecting the local law which was relevant for this site. The two other settlement areas were built from scratch as a replacement for legacy host systems. As such the processes, at least the reflection in SAP, were mostly new for the majority of stakeholder groups. This includes the business people at the local sites, but also the SAP competence center. The (virtual) competence center consisted of three internal IT groups, and only the largest group had previous SAP experience as it was the service provider for the site which had the legacy SAP instance in Settlement Area 1 in place.
3	Full life cycle	The ERP program was subject to a full life cycle implementation, including the different phases (e.g. design, implementation, operations) to address the process perspective of CSFs and to evaluate them over the program life cycle. In the case of a multisite ERP program a significant number of sites needed to be in the operations phase.
		The program cluster followed the ASAP-methodology for implementation (Accelerated SAP) consisting of Phase 1-Project Preparation, Phase 2-Blueprint, Phase 3-Realization, Phase 4- Final Preparation, Phase 5-GoLive Support, Phase 6-Operate (SAP AG, 2016; Sullivan 2014). The ASAP methodology was mainly applied to the development project, and to a certain extent (beside other company-specific methodologies) to the rollout projects. Nevertheless, all projects of the program cluster spanned the full life cycle.
4	Time perspective	An appropriate case recently executed an ERP program or the case has been in and advanced phase of the ERP program life cycle. This prerequisite was relevant to better grasp the interpretations of the interviewees about relevant actions and events.
		When we started our interviews in July 2013, eight sites of the subprogram (program cluster) were already in the operations phase (Phase 6 ASAP-methodology) and used the ERP system. The last site was in the preparation phase. The last interviews we conducted in November 2014, just after a common major release, including the ERP system and software applications in its environment, which were part of the larger program.
5a	Data perspective (Interviews)	It was possible to conduct a sufficient number of interviews (>5) in sufficient detail (60-90 minutes), with key informants who know most about the program (Myers, 2009). Interviews are the primary source of evidence as they allow best to gather interpretations of the participants (Walsham, 1995)

		We had the opportunity to conduct 6 interviews (average duration 90 minutes) with 6 key players, who were identified by our single point of contact leader of the SAP competence center for the ERP system. The interviewees included key players at the product- (ERP system) and the program level. This led to a total number of 180 fully transcribed interview-pages.
5b	Data perspective (Documents, informal talks)	As additional data source, a suitable case site needed to provide the opportunity to analyze official program documents, or as Walsham (2006) proposes that in an interpretive case study the interviews should be supplemented by other forms of field data. Apart from internal documents this includes public media, press, and informal talks.
		As documents we had the opportunity to sight and code a magnitude of documents: - Minutes of kick-off meeting, specifications of the software, concepts, description of roles and responsibilities. - Several status reports (at least 1 per year), results from the program steering committee which included milestones, risk evaluations, issues - Separate time schedules for the program cluster and the larger program, illustrating dependencies, milestones, status - Documents about the used methodology, company-specific, and the change request process, templates, common release management, testing - A document concerning the nomination for an SAP quality award. The company won 3rd place in the category “business transformation”, including a very detailed questionnaire developed by SAP. - Public documents The number of documents was very high and the content was very comprehensive. Overall, the documents consisted of more than 700 pages. Thus, given the high granularity of documents, they were a major source of evidence strongly corroborating the interview results.

Table 5-1 Suitable Cases: How the Program at Pantheon Met the Predefined Criteria

In this section we elaborated how Pantheon met the predefined criteria relevant to the case selection. In the next section we present research objectives of this chapter, and how it can help to answer one of the central research questions of our research.

5.2 Research Objectives of this Chapter

The main objective of this chapter is to build a theoretical model that helps to clarify how organizational learning and critical success factors (CSFs) are interrelated and have evolved throughout the life cycle of a large multisite ERP program. We conduct an interpretive case study of a multisite ERP implementation,

which was embedded in a program, to understand how the program facilitated organizational learning and helped to overcome a crisis situation. We interpret the role of the program as an organizational knowledge base that is continuously enriched through constant interpretation of action-outcome relationships. In this way, it preserves valuable learning for leveraging the critical success factors of ongoing projects. Our perspective extends prior work with a dynamic perspective on the success factors of multisite implementation programs, which is grounded in organizational learning theory.

Special conditions of multisite ERP implementations emphasize the need for an overarching entity like a program. Multisite ERP implementations typically include several interrelated projects. Often a variety of partially independent stakeholder groups is involved in pursuing interdependent goals (Chang et al., 2014, Jiang et al., 2014). Also, ERP implementations at multisite environments have to involve multiple organizational levels (Van Fenema et al., 2007).

Recent research has expanded on the investigation of ERP programs (Chang et al., 2014; Jiang et al., 2014; Seidel, 2009) and their implementation success with a perspective on process events (Lyytinen and Newman, 2015) and organizational learning (Van Fenema et al., 2007). With respect to CSFs, Bullen and Rockart (1981, p. 3) emphasize that managers need to "determine whether events are proceeding sufficiently well in each area." With reference to such a dynamic perspective, Lyytinen and Newman (2015) find evidence that the often believed success factor of participation appears to be less critical than assumed before. Their two case studies focused on a single university for each case – a setting arguably less complex than a multisite implementation requiring cross-site communication and coordination (Van Fenema et al., 2007).

We believe that organizational learning could be of specific importance for understanding the success of a program that supports the ERP implementation in a multisite environment. First, as Robey et al. (2002) argue, an incremental program approach could help with learning from one implementation site for the subsequent one. As Sullivan (2014, p. 172) puts it: "mistakes made in one wave become lessons learned for any following waves." Second, several cases have been reported where ERP programs have run into a crisis situation (Grainger et al., 2009; Mueller et al., 2014) and eventually turned into a success. Those cases have in common that decisions had been taken on the program level that helped to re-plan and reschedule the ERP implementation appropriately. Third, multiple sites are isolated with their implementation projects if an overarching program entity is missing. This bears the risk that mistakes that occurred at one site are repeated at another (PMI, 2008). The program defines governance structures that hinder such repetition of mistakes. Fourth, ERP implementations are complex and require specialized knowledge of the ERP package

and the business processes it is meant to support (Somers and Nelson, 2004). We know from research on expertise in system analysis that such specific knowledge is built up by experience (Vitalari, 1985). Then, defining persons on the program level who are involved with the ERP implementation at multiple sites appears to be more effective to build up specialized knowledge than letting isolated teams handle their site implementation alone.

Against this background, the research objective of this chapter is to investigate the dynamics of CSFs throughout the course of a multisite ERP implementation that is managed by a program. We conducted an interpretive and in-depth case study of a complex multisite ERP program, which consisted of one development project that was followed by nine rollout projects. The program used an incremental approach and was structured in waves with an overall duration of seven years. We conducted interviews and used the grounded theory method with organizational learning as a meta-theory. To this end, we chose the prominent organizational learning interpretation model by Daft and Weick (1984). For our case, we found that the phased approach facilitated organizational learning through the program, such that acquired knowledge was applied in subsequent implementation waves. This was achieved by each implementing organization after each wave added to the knowledge base of the program by interpretation of action-outcome relationships. In this way, our case highlights the role of ERP programs as a facilitator of organizational learning in relation to various critical success factors, thus answering (for the case at Pantheon) one of our central research questions posed in the initial chapters:

Central research question 2: How can the dynamics of CSFs be considered in a general, parsimonious phase model?

In this section we presented the research objectives of this specific chapter, which is a model to explain the dynamics of CSFs over the entire program life cycle, particularly in relation to organizational learning. In the next section we elaborate on the data collection.

5.3 Data Collection

We collected our data at different points in time over a period of 16 months. After eight of nine rollouts were completed, we conducted the initial interview with the leader of the Jupiter Competence Center, who was our single point of contact. After this first semi-structured interview, which lasted two hours, he sent us a magnitude of documents (over 700 pages in total), including meeting minutes at the program level, methodology documents, and the program charter. Furthermore, he proposed other candidates for

additional interviews, including two program managers (program level – shaded rows in Table 5-2), and key players (e.g., rollout project leaders) from the ERP competence center (at both product and project level). We immersed ourselves in the data to prepare questions. We had sufficient time to pose all our questions. On average, the interviewees were available for 90 minutes, which was highly effective. We collected a thorough case database on the observed phenomenon via these interviews. The final interviews were conducted when all sites were live and shortly after a major release package went live successfully. The results of the interviews were strongly corroborated through the high number of documents.

Interview Partners and Responsibilities
Lead of ERP Jupiter Competence Center
Rollout (ERP Jupiter project) leader for several rollouts
Senior program manager, responsible for the program cluster implementing the ERP system Jupiter
ERP expert, work-package responsible, participated in all rollouts
External senior consultant, Rollout (ERP project) leader for several rollouts
Junior program manager, for the program cluster implementing the ERP system Jupiter

Table 5-2 Interview Partners at the Program (shaded) and Product Level

In analyzing the data, we followed a grounded theory approach, with a continuous interplay between data collection and analysis. All interviews were fully transcribed leading to 180 pages of interview transcripts, and together with a magnitude of documents (including periodic meeting minutes, schedules and milestones, program, program and project documents, methodological and public documents) they formed our case database (hermeneutic unit) in ATLAS.ti7.

5.4 Data Analysis and Coding Procedure

The accounts of Berente and Yoo (2012), Boudreau and Robey (2005), and Orlikowski (1993) are three typical examples in which the grounded theory method was applied in studies with underlying interpretive philosophical assumptions. Seidel and Urquhart (2013) stress that the grounded theory approach has been interpreted in idiosyncratic ways and flexibly deployed. One variant is exemplified by Sarker et al. (2001), which follows the same coding steps (open-axial-selective) as the Straussian approach (Strauss and Corbin, 1998). For axial coding they propose two steps, which we used for our purposes. In the first step, we built a

hierarchical network view (see Appendix C) reflecting the relations between the concepts. Next we detailed these relations by writing integrative memos (see Appendix C), including as many concepts as possible. Finally, we performed selective coding (Sarker et al. 2001; Strauss and Corbin; 1998) which is the relation of categories, resulting from axial and open coding to the core category (in our case "Lessons Learned - Continuous Improvement", see Appendix C).

The selection of the proper core category is particularly important for building the storyline over the course of the ERP program life cycle (Strauss and Corbin, 1998; Sarker et al., 2001). The main categories of axial coding reflect CSFs in many cases. Relating them to the proper core category "Lessons Learned - Continuous Improvement" helps us to answer how the program approach facilitates organizational learning over the course of the ERP implementation and shaped the CSFs. This was accomplished through several iterations in which we investigated how the CSFs changed as a consequence of the learning program. Furthermore, as interpretive researchers, we put particular consideration on the context of our multisite ERP implementation and followed an interpretive, but rigid procedure to analyze our data, in which the coding process was discussed regularly between the researchers. In the next section we elaborate on existing research and the challenges of multisite ERP implementation environments and what we know about organizational learning in this context.

5.5 Multisite Environments & Organizational Learning in the ERP Context

The immanent levels of uncertainty and risk (Reiss and Paul, 2013) need emphasis and require a dynamic learning capacity of programs. Thus, while the development of programs can be grounded in strategic development concepts, their delivery is linked into organizational learning concepts (Thiry, 2004). ERP implementations at large multisite environments in many ways reflect the above requirements of programs. A multisite ERP implementation has the potential to integrate data, systems, and processes across geographic locations and business units (Markus et al., 2000a). Establishing standards and process harmonization were seen to provide a profound positive competitive impact, e.g., by supporting rollouts in a standardized way via templates (Huber et al., 2000). These multisite rollouts, however, are often exposed to unexpected problems as local sites may resist the new system or insist on local adaptations (Gulla and Mollan, 1999; van Fenema et al., 2007), or need to fulfill different statutory and regulatory requirements (Sullivan, 2014). This would threaten the integrative nature of an ERP system (van Fenema et al., 2007) and the ability to coordinate and monitor their performance in real-time over geographic boundaries (Rajagopal, 2002). Multisite implementations, therefore, require significantly more preparation, flexibility, and

coordination than smaller scale or single-site implementations, e.g., in regard to business strategy, software configurations, and applied rollout strategies, either big bang- or phased rollout (Markus et al., 2000a; Umble et al., 2003).

Multisite ERP implementations are especially challenging, uncertain, and complex (Markus et al., 2000a). Sullivan (2014) stresses that such large-scale implementations, especially across multiple locations, often require additional financial resources implemented through a centralized program management office (PMO). Depending on the size the PMO, its functions can be performed by one or several individuals. The functions may involve integration management, financial control, risk management, resource management, scheduling, and tracking (Sullivan, 2014). According to Blick et al. (2000), the organization of a PMO in a public sector ERP project is difficult and should include small business teams to effectively address the actual business process requirements. Such insights, however, are largely restricted to the public sector, where governments demand PMOs for awarding the contract and managing the ERP implementation (Wagner and Antonucci, 2009).

ERP implementations can last several years and involve investments of tens or hundreds of millions of dollars (Sullivan, 2014). Consequently, research has devoted a lot of effort to investigate its CSFs. Many accounts present taxonomies (e.g., Bingi et al., 1999; Holland and Light, 1999; Sumner, 2000), assigning them to multiple phases (e.g., Al-Mashari et al., 2003; Markus and Tanis, 2000; Parr and Shanks, 2000; Somers and Nelson, 2004; Umble et al., 2003) or summarizing the concepts of such taxonomies (e.g., Finney and Corbett, 2007; Nah et al., 2001). While presenting a lot of CSFs and the consideration of phases, the multisite perspective of ERP implementations is missing in these accounts (van Fenema et al., 2007). One of the rare exceptions is the account of Umble et al. (2003) who present multisite issues as one of their CSFs. In this account, they stress the proper definition of the degree of autonomy, additional communication and coordination demands, and learning-curve benefits as relevant issues for multisite ERP implementations. Particularly, in relation to learning-curve benefits, they emphasize the superiority of a phased rollout compared to a big bang approach (Umble et al., 2003). Nevertheless, possible strategies (as programs) to meet these challenges and issues were not clearly defined in those early accounts. Furthermore, we see multisite issues as more of a contextual condition than as a CSF.

Learning effects, as a result of strategic learning, were also reported by Grainger et al. (2009) and Robey et al. (2002). They are consistent with program management goals (Cabinet Office, 2011; PMI, 2008). The Cabinet Office (2011) stresses that a program is a learning temporary organization that increases its

performance during its life based on experience. Lessons learned that focus on identifying project and program successes and failures are stored through the life cycle to improve the performance of future programs and projects (PMI, 2008). Robey et al. (2002) highlight knowledge barriers of two types associated either with the configuration of the ERP package or those associated with the assimilation of new work processes. It is a strength of multisite implementations or phased approaches that they facilitate organizational learning (Davenport, 2000; Robey et al., 2002; Newell et al., 2006; van Fenema et al., 2007; Sullivan, 2014). Although widely recognized, the storage of this knowledge and its application in the ERP context is insufficiently considered in the existing literature (Ebrahimi, 2012).

The above discussion has shown that ERP implementations can be conceptualized as programs, which help to control and deliver the usually interrelated projects, particularly in complex multisite environments and may also provide effective mechanisms for adaptations and learning. Furthermore, insufficient accounting of the changing or different conditions in the environment has been repeatedly identified as a major problem in ERP implementations (e.g. Krumbholz and Maiden, 2001; Hong and Kim, 2002). The extant literature on CSFs has paid considerably less attention to the dynamic and context-specific nature of CSFs (Boonstra, 2006; Lyytinen and Newman, 2015; Markus and Robey, 1988). Taken together, there is hardly any conceptual and even less empirical work that considers multisite ERP implementations as programs and the dynamic role of CSFs in this regard. As programs allow for learning, program management has to consider different CSFs according to the accumulated learning experiences.

We lack an understanding of how to achieve program management goals and learning based on experience (Cabinet Office, 2011), and how this learning experiences are stored for application in future programs and projects (PMI, 2008; Ebrahimi, 2012). We further lack understanding of the aforementioned proposition that phased approaches facilitate organizational learning in multisite environments (Umble et al., 2003). In particular, we need to better understand how the utilization of an ERP program can lead to a more effective knowledge transfer (Lycett et al., 2004) in multisite-environments.

The analysis within this chapter seeks to address this research gap. In investigating a multisite ERP implementation, embedded in a large-scale program environment, we create a parsimonious model of organizational learning in the ERP program context (based on the organizational learning interpretation model of Daft and Weick, 1984[16]). Thus, our approach and model is useful to answer the central research

[16] For the sake of better readability, we come back to the organizational learning interpretation model of Daft and Weick (1984) later in this chapter.

question, which deals with the consideration of the dynamics of CSFs in a general, parsimonious phase model during all phases of the ERP life cycle (central research question 2 of the dissertation).

In this section we provided an overview about existing research and challenges in multisite ERP implementations. Additionally, we provided an overview about organizational learning in the ERP program context. Next, we will turn to our case study at Pantheon.

5.6 The Case at Pantheon

This section presents the findings of our case study at Pantheon (a pseudonym). We start with contextual information as the settings of the case are particularly important for an interpretive study. Next, we illustrate the different projects of the ERP implementation, which were structured in a program and rolled out in waves (phased or incremental approach). We present some typical reference quotations, which illustrate the process of open and axial coding, and the typical problems that arose during the different phases. We illustrate how organizational learning took place throughout the course of the program by applying an interpretation model originating from organizational learning theory. Finally, we will present a list of CSFs grounded in data, based on observed action-outcome relationships, and a general model of organizational learning in the program context.

5.6.1 Contextual Information and Governance Structures

Pantheon is a European company operating in the insurance sector. Pantheon consists of nine subsidiaries that conduct business autonomously within their markets. Their business processes were partially similar but differed significantly in certain areas (henceforth, Settlement Area 1, 2 and 3) complying with different laws. Each subsidiary had its own IT department and a custom-made legacy host system to execute the settlements and disbursements for its business partners. The maintenance of the old fashioned legacy systems was very costly and not very efficient. The stakeholders of Pantheon had a strong interest that the company operates efficiently. Therefore, Pantheon is subject to ongoing discussions and efficiency initiatives. Due to the suboptimal situation with regard to their legacy settlement/disbursement systems, Pantheon decided to introduce an SAP ERP system called Jupiter. At the final stage of the Jupiter implementation, it included around 15 million master data records. Moreover, more than 10000 business partners started their settlements and received their payments via this product. For example, in Settlement Area 1, 8.5 million settlements, 40 million line items, and a volume of 450 million Euro are settled quarterly via this ERP system. Thus, the Jupiter initiative was of major importance for Pantheon.

The ERP system implementation was only one of various improvement initiatives. Besides 25 standard products (products which need to be implemented by all subsidiaries (sites) within a given period of time), the Pantheon runs around 200-250 different applications in its central data processing service center. New releases and products are continuously rolled out. As a consequence, the ERP system initiative had to consider a multitude of implications due to related projects and products, leading Pantheon to decide to embed the rollout series into the program Saturn. As quotation Q1 indicates, this was a very good decision.

Q1: As part of my history with other SAP tools, I was looking forward to being part of a program, since for PRODUCT1 and PRODUCT2 [standard products] these negotiations, when do we deploy which release, which components in which intervals [...] were always bilateral conversations....17 different projects and every time I had to find an alignment about something with the finance, logistics or personnel director....and during the Jupiter implementation it was clear to me, that it doesn´t work only as Jupiter alone, Jupiter depends on the STANDARDPRODUCT4711..... STANDARDPRODUCT4712 needed to be deployed for the subsidiary, and it was clear to me that all these bilateral reconciliations, at least those I don´t need anymore.....and the program management monitors the dependencies to other standard products, data processing service center projects, consolidation projects....in the master-plan of Saturn one sees also,....where am I on the critical path,.....when I postpone one Jupiter rollout, what other projects and products are negatively impacted. After all, this was really a very, very good support. (Lead of ERP Jupiter Competence Center, 1509 ff.)

Open codes: Dependencies to other products/projects visible; no bilateral reconciliations necessary anymore.

Axial Code: Reasons for the usage of programs

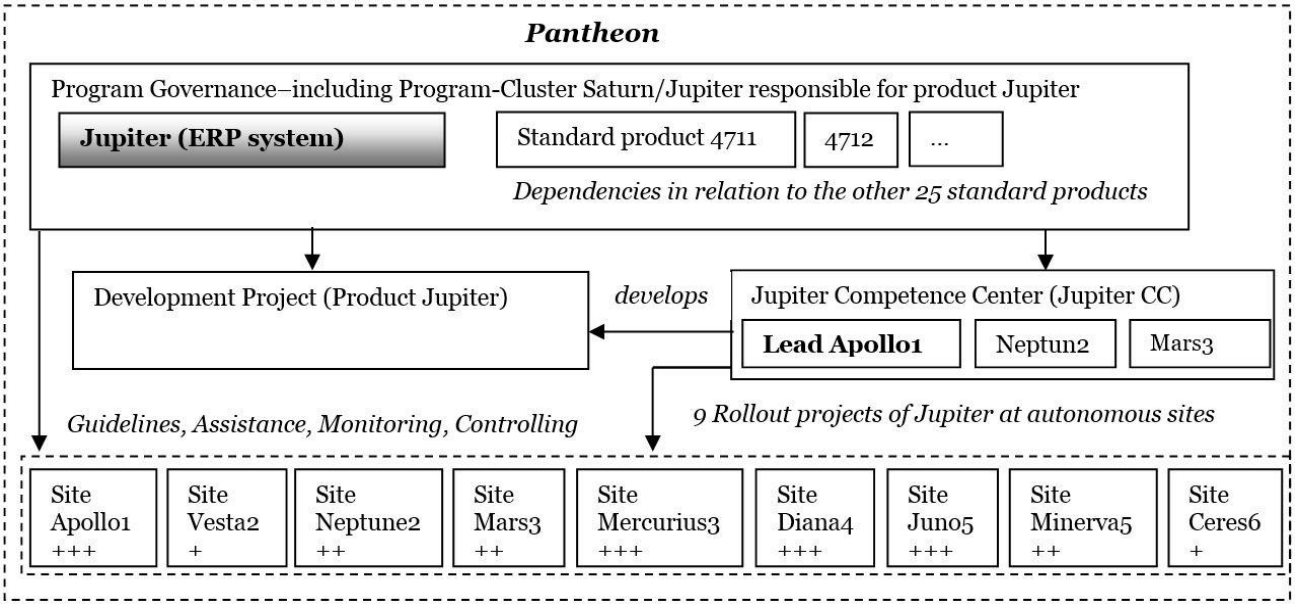


Figure 5-1 The Program Structure "Saturn" at "Pantheon"

We labeled the various stages of our program structure based upon ancient Roman mythology. The Pantheon (Figure 5-1) in ancient Rome was blessed to all gods. Jupiter was the king of the gods and is equated in our case study with the standard product, the ERP system Jupiter (shaded), which was subject to the implementation at Pantheon.

Saturn was the father of Jupiter and represents the implementation program governance structure, including the product Jupiter and other standard products. The connotation Saturn/Jupiter represents the program cluster (subprogram), which is the cluster relevant for the rollouts of product Jupiter (ERP system). The program cluster Saturn/Jupiter provided assistance and guidelines and reported to the program steering committee of the program Saturn (consisting of the IT directors of all sites, central representatives of Saturn, and from the standard products). Although the relevant committee at Pantheon was the program sponsor and the sites had to implement the product Jupiter within a certain time, neither the program cluster nor the Jupiter Competence Center had the authority for directives regarding the rollout projects.

The Jupiter Competence Center was responsible for the product development and standard product owner of Jupiter and consisted of teams located within three different sites, including Apollo1 as a lead. As the general service provider, the Jupiter Competence Center implemented the product at the sites with support from the program cluster Saturn/Jupiter.

The nine sites are represented by other Roman gods and the number of the wave in which they were implemented. Lastly, the box contains the size information of a site in + (small), ++ (medium), +++ (large), which were not a predictor for the implementation success, as we will see. All sites have on the one hand their own duties and are autonomous, but on the other hand are connected through the Pantheon. Figure 5-1 illustrates the autonomy of the sites. The rollout projects had their own governance structures according to the needs of each site. As Figure 5-1 illustrates, the governance structure was extremely complex, but it was exactly this structure that helped to secure the unity and the success of the ERP implementation.

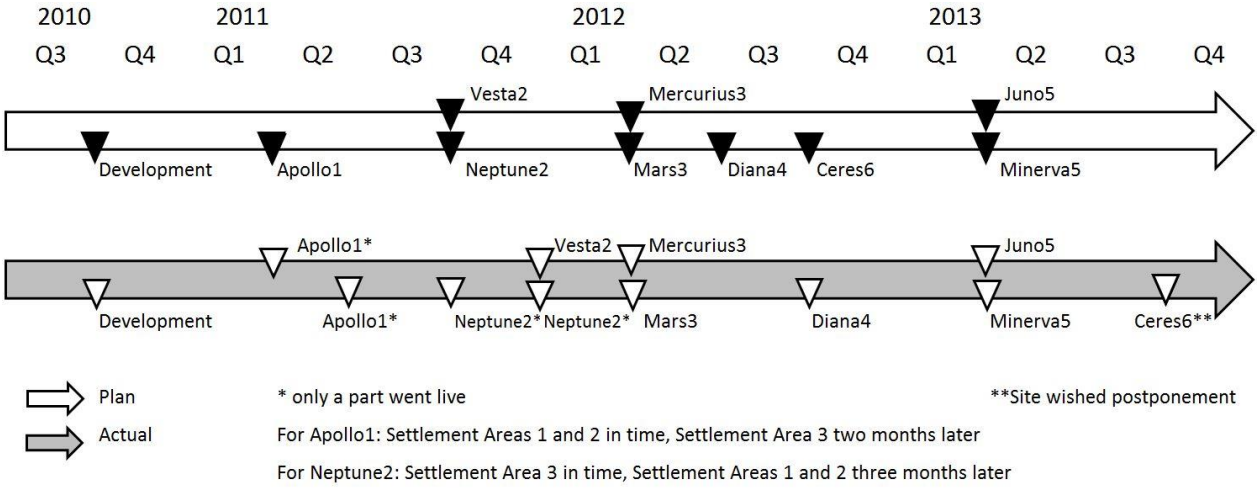


Figure 5-2 Plan vs. Actual Go-Live Dates

Figure 5-2 depicts the time schedule (go-live milestones) of the Jupiter development and rollout projects. The schedule was embedded into the overall master plan of Saturn, considering dependencies to projects and products and their relevant sub-schedules in the Jupiter environment. The overall master plan and its sub-schedules were subject to permanent adaptations, either due to overall requirements or reasons stemming from its parts. The rollout projects of Jupiter were integrated into the program cluster Saturn/Jupiter, which was also the case for other products within Saturn. The master plan depicted the interdependencies of projects within a cluster, but also in relation to the products, projects, and other clusters within the overall program. To illustrate the dynamic nature of the schedule of Jupiter, Figure 5-2 depicts the planned go-live dates at the beginning of the rollout series (11/2010) compared to the actual go-live dates. As two rollout projects were mostly implemented at the same time, we subdivide the rollout projects into waves, which is common terminology for a phased or an incremental approach (Sullivan, 2014).

5.6.2 A Model of Interpretation

As an incremental approach allows us to draw on experiences from previous waves (e.g., Robey et al., 2002; van Fenema et al., 2007), we present a model (Daft and Weick, 1984) on how a program could facilitate organizational learning (Figure 5-3). We will use this model as a lens for interpreting our data. Therefore, organizational learning theory acts as a meta-theory, constituting "Lessons Learned - Continuous Improvement" as the core category in our grounded theory approach (Sarker et al., 2001).

We define organizational learning as the process by which knowledge about action-outcome relationships[17] between the organization (in our case, the program) and the environment (in our case, the changed context, which experiences major changes through the start of new rollout projects at new sites) is developed (Duncan and Weiss, 1979).

Daft and Weick (1984) distinguish between three stages:

1. Scanning is the process of monitoring the environment and includes data collection.

2. Interpretation: Data are associated with meaning, by the human mind, cognitive maps are constructed, and perceptions are shared. This process of translating events leads to shared understanding and conceptual schemes.

3. Learning: This stage includes the action taken based upon interpretation by applying the developed knowledge to the new environmental conditions. This means that new action-outcome relationships are developed based upon the learning experience.

All three stages are interconnected in a feedback loop. The feedback of the action-outcome relationship in stage 3 generates new data (knowledge base) for interpretation, followed by choosing a new action (Figure 5-3).

[17] We are well aware that many definitions and views regarding organizational learning exist (e.g. Huber, 1991; Levitt and March, 1988). A good overview of organizational learning in the IT context can be found in Robey et al. (2000). They posit that the process of organizational learning provides direction for organizational actions, thus increasing its repertoire for actions. For our purposes the consideration of action-outcomes relationships fits best (Duncan and Weiss, 1979). This view is consistent with learning from experience (e.g. Huber, 1991; Levitt and March, 1988) or the application of previous knowledge gained from earlier projects to subsequent projects (Robey et al., 2000). For a more complete picture we refer to these accounts.

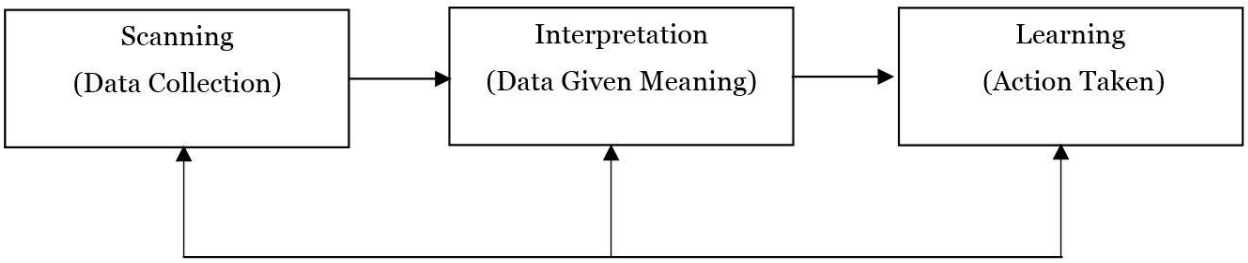


Figure 5-3 Relationships Between Organizational Scanning, Interpretation, and Learning (Daft and Weick, 1984)

In our case, we will apply this model to the implementation waves, as this breakdown better enables us to trace the process of organizational learning between the stages (although we admit that the process is iterative and learning also takes place within the waves). During each wave, the program (through its actors) applies data from its knowledge base, interprets it, and chooses a new action-outcome relation. By remembering and assessing the outcomes of each wave, the program adds to the knowledge base through interpretation, which can be applied during the next wave by the program cluster and the Jupiter Competence Center. This view is consistent with definitions of organizational memory in organizational learning theory: “Rules, procedures, technologies, beliefs, and cultures are conserved through systems of socialization and control. They are retrieved through mechanisms of attention within a memory structure. Such organizational instruments not only record history but shape its future path” (Levitt and March, 1988, p. 326). In this paper we use the term knowledge base. They furthermore emphasize that inferences can be drawn from experience and are recorded, e.g., in documents, files, standard operating procedures, rule books, and shared perceptions. Those means are readily available in a program, as a temporary organization (Cabinet Office, 2011; Turner and Müller, 2003), thus enabling the program organizational learning.

In the following sections, we exemplify our three-step coding procedure on the basis of reference quotations for each wave. We start with labeling data chunks referred to as open coding, followed by axial coding, which leads to our main categories. Finally, we use our interpretation model of organizational learning as a lens to relate the main concepts to the core category “Lessons Learned - Continuous Improvement.”

5.6.3 The Development Project and the First Rollout (Wave 1) at Apollo1 (2007-2011)

The development project was started in 2007, and the gathering of user requirements and the writing of a comprehensive blueprint document were the first phases. For that reason, the Jupiter Competence Center

visited all nine sites to define common processes as a basis for the development phase. Table 5-3 depicts the main difficulties within those phases. The root cause of these difficulties stems from the different laws that underlie the settlement areas and the multitude of legacy applications that were used by the different sites. Consequently, the blueprint and the development project needed to consider significant changes in all settlement areas.

Settlement Area - SA	**Contracts based on**	**Legacy applications**	**Jupiter challenge**
SA 1	Nine local laws	Apollo1 already used a SAP application. All other sites used different host applications.	Rebuilding and enhancing the legacy application. Meeting the fundamentally different process requirements.
SA 2	One common law	Different host applications	Building the new area from scratch, representing minor process variations.
SA 3	One common law – different local settlement rates	Different host applications	

Table 5-3 The Development Project and its Challenges

Over a period of four years (2007-2010) the Jupiter Competence Center spent a lot of time meeting the requirements of the blueprint and a first development project which was planned to be rolled out at Apollo1. Apollo1 was chosen since it was the only site that already had a legacy SAP implementation in place (for Settlement Area 1). Also, the SAP department of Apollo1 was the standard product owner of Jupiter and leading the Jupiter Competence Center. Furthermore, the business experts at Apollo1 were the only ones who had SAP experience and could articulate their processes and requirements sufficiently, whereas this was significantly harder for the business experts of other sites who were used to their custom-made host applications. Therefore, although it should have been a comprehensive and general document, the blueprint also strongly reflected the processes of Apollo1 as Q2 illustrates.

Q2: Apollo1 was the site which was most straightforward...as there was greatest understanding of the content [of the blueprint].....We wrote the blueprint over a long time and sent it to quality assurance....then someone was sitting opposite me who had no idea about SAP, sometimes not even from IT, since they are administrative staff. And now he needs to check out if all his wishes were considered. And I am sure that from

9 sites, 6 said 'Yes!', only since they didn´t know it better....and here Apollo1 had of course an advantage.....since we used a language which they knew already... A) they scrutinized it better and B) the blueprint was weighted heavily towards Apollo1...since we of course had only the experiences of Apollo1, that´s why a lot of processes reflected the processes of Apollo1....therefore it [the blueprint] was ok for Apollo1, at least in the SA1 (settlement area 1). (Rollout (ERP system project) leader for several rollouts, 437 ff.)

Open codes: Blueprint weighted towards Apollo1; phases of the development project; different perceptions regarding blueprint and template

Axial codes: Business process management; perceptions; methodology

For Settlement Area 1 the rollout for Apollo1 went smoothly. But the development of Settlement Areas 2 and 3 were major challenges for the project team. This was mainly because the ERP representation of the settlement areas had to be developed from scratch since the legacy systems were different custom-made host applications. Nevertheless, the rollout team managed to get Settlement Area 2 live according to the date specified in the initial time schedule, whereas the go-live date for Settlement Area 3 had to be postponed (see quotation Q3). Yet, this was the only time when the go-live of Settlement Area 3 had to be postponed. We conclude that the Apollo1 rollout had difficulties, but was completed successfully.

Q3: It was the only time when Settlement Area 3 was problematic, and was also postponed….. As it was a new process, not running on SAP before. And as it was a general process [based on 1 law] it was sufficient that Apollo1 1 said that it is ok, after long discussions. All the others, apart from a few settings or deviations...., run in principle the process the same way. Indeed, Apollo1 1 was a pioneer.... with two settlement areas tackled the first time, and accordingly it was relatively exhausting and also time-consuming. (Rollout (ERP Jupiter project) leader for several rollouts, 471 ff.)

Interpretation of Wave 1: No significant actions (adaptions of the original plan) were taken for the preparation of the rollouts in Wave 2 because the outcomes of Wave 1 were interpreted positively. The difficulties and the postponement of the go-live in Settlement Area 3 were attributed to the newly introduced processes in the SAP ERP system. Nevertheless, the knowledge base was increased and the product quality improved.

5.6.4 Wave 2: Vesta2 and Neptune2 – The Watermelons (2011-2012)

The first rollouts after Apollo1 were turning points in the program. Vesta2 was a small site with project management issues and had some exclusive processes in place. Neptune2 was also facing project management issues and was, therefore, supported by members of the program cluster and external experts. Quotation 4 illustrates the major project management issues at Neptune2 and the escalation procedure followed by the program cluster.

Q4: Well, time and time again there was the necessity for an escalation. For example, at Neptune2 where we realized that with the existing project leader and project team it does not work. .... together [with people from Neptune2] we made an investigation about the current situation of the project, ...and we could suggest, that it will not work that way, and that one has to exchange the project management and the project leader, and then we organized a [new] project leader for Neptune2, and presented it to the program steering committee. This was a hefty escalation. (Senior program manager, 615 ff.)

Open codes: Escalation level for hot topics; Neptune2

Axial codes: Program governance

Quotation 5 underlines the major project management problems that contributed to missing deliverables, missed deadlines, a lack of overall direction, and a crisis.

Q5: They [Vesta2, Neptune2] were partially called watermelons, since the projects looked so green and as we cut them, sliced them and looked into them, we realized that they are deep red and essential deliverables were simply missing, not there.....typically for a project which is in danger of facinga crisis. It was not clear which direction one should take, plans were missing, the test management was also not clear.....well, this was indeed a critical phase, where one had the first no-go decisions or delays, and where one need to reschedule the whole program, also postponing the rollouts of other sites. (Junior program manager, 1:10)

Open codes: Missing deliverables lead to more involvement of the program cluster; rollout plan of program cluster needs to be adapted

Axial codes: Project governance; program governance; time management, Vesta2, Neptune2

The schedules had to be adapted by significantly extending the envisioned implementation times for the remaining rollouts. At Neptune2, Settlement Areas 1 and 2 went live at a later stage, whereas Settlement Area 3, which caused major problems at Apollo1 during Wave 1, went live as initially planned, likely because

of the major improvements in Settlement Area 3 within Wave 1 (quotation Q3 illustrates this). At Vesta2, the go-lives for all settlement areas were entirely shifted by one quarter.

Furthermore, during Wave 2, the implementation team realized that the blueprint and product Jupiter were not matching the requirements of Vesta2 and Neptune2. This was particularly true for Settlement Area 1 where the contracts with business partners were based on different laws. During the blueprint-phase of the development project, the business experts at Vesta2 and Neptune2 (presumably also the other sites apart from Apollo1) could not articulate their process needs sufficiently, as they did not have SAP know-how. Consequently, the blueprint and the product met only the requirements of Apollo1. Additionally, there was a considerable time-gap of more than three years between the start of the blueprint and the envisioned rollout project, which could have led to "moving targets." As quotation Q6 indicates the mismatch between blueprint/product Jupiter and the requirements was a major reason for the delays.

Q6: Vesta2 postponed the entire Jupiter go-live by one quarter, and this confounded the entire rollout-schedule and the maintenance- and the rollout-team, as the next rollouts Mars3, Mercurius3 [3rd wave]… the rollout-phases already started, the planning [phase was started]. Initially, the rollout-phases were six months, but one [steering committee of the program] extended the rollouts-schedules slightly, and for Juno5, Minerva5 [5th wave]... [the timeframe of] the rollout project was 15 months. After all, one recognized very early, during the rollouts of Apollo1, Neptune2, Vesta2 that the [envisioned] rollout-time 6 months was too short termed, and that the sites need considerably longer for the rollout, or need considerably more time, since the sites were asked in the business blueprint what they want.....but only during employment of the [test] system we recognized that the sites understood the blue print differently as we understood what we should develop, and indeed the product was tailored to the need of one site only during the rollout. (Lead of ERP Jupiter Competence Center, 1044 ff.)

Open codes: Different perceptions regarding the blueprint and the template; different perceptions; rollout plan of program cluster needs to be adapted

Axial codes: Business process management; perceptions; time management, Apollo1, Vesta2, Neptune2, Mars3, Mercurius3, Juno5, Minerva5

Minutes, Steering committee, 10-Aug-2011 – Tasks of the Program cluster Saturn/Jupiter
Conducting of project reviews at Neptune2 and enhancing of the rollout project at Neptune2, together with Jupiter CC and external co-workers to assure the go-live date Creation of a detailed template-plan together with Jupiter CC to support the rollout projects, Analysis of breakdown scenarios in Jupiter environment (currently interrupted because of Neptune2 rollout), Coordination and support of integration projects, ongoing coordination and reconciliation concerning critical topics (data center, data quality of central business partners...) Supporting Jupiter CC in regard to install change request management Execution, coordination of the bi-weekly conference call (regular rollout meeting for all sites) as the central information and communication platform for all Jupiter rollout projects Updating environmental architecture, with central release-calendar, integrated planning, support of sites to meet entry-criteria [central methodology], Jupiter-process architecture Providing central program cluster documents within the Jupiter portal, issue info regarding integrated product-architecture

Table 5-4 Minutes, Steering Committee, 10-Aug-2011, Tasks, Program Cluster (shortened)

Table 5-4 depicts task and responsibilities of the program cluster Saturn/Jupiter as they were recorded in the meeting minutes of the steering committee in August 2011. At that time, it was still not clear that the go-live dates of Neptune2 and Jupiter2 would be shifted (although already likely) by one quarter, but the strong involvement of the program cluster in the rollout projects indicates that this possibility already existed. In the same document, the traffic-light status of the rollout projects was partially red. Furthermore, the tasks indicate the integration functions of the program cluster, including cross-project responsibilities for the Jupiter rollouts and with the environment of Jupiter. Additionally, the responsibility for creating best-practices templates and methods, which were stored in the Jupiter portal, enlarging the knowledge base for the remaining rollout projects.

Open Codes: Program cluster as coordinating; leading force in relation to other standard products; rigid change request process; dynamic lessons learned; best practice list program cluster; synergy effects through common release management

Axial Codes: Lessons learned - continuous improvement; solution architecture-integration management; methodology; scope management

Interpretation of Wave 2: The extension of the time-frames reflected better the project needs and the needs stemming from the mismatch between the blueprint/product and site requirements. Project Management issues were tackled. Best practice methods of the program were enhanced, as well as the test management, and tests could subsequently be better monitored. Consequently, the rollouts at Vesta2 and Neptune2 had impacts on the remaining rollouts within the program cluster Saturn/Jupiter and on the larger program Saturn.

5.6.5 Wave 3 – First Rollouts with Complete Scope – Performance Problems (2012)

The difficulties with rollout projects at Vesta2 and Neptune2 led to actions regarding the time schedule, project management issues, and methods of best practice. These provided significant improvements in Wave 3. Generally, the project management performance was judged positively by the senior program manager, although an additional resource was needed at Mercurius3 in order to back up the part-time project manager. The improved best-practice methods and the extended time-frame allowed a better coverage of the site-specific requirements, as well as the improvement of the product quality of Jupiter. At Mars3 a serious complication was tackled shortly before go-live (quotation Q7). Consequently, the rollout projects at Mars3 and Mercurius3 were the first that went live on time and with the complete scope.

Q7: At Mars3 we had real problems with various topics...which could be repaired, shortly before go-live we had a big problem, which did not work properly, which, thankfully, could be solved. And the director of Mars3 is a very, very straightforward thinking guy, who took the problems seriously and pushed them through and escalated and so on. Well, this was stressful at this level. I also have to emphasize that it is better to discuss and solve the problems before go-live than afterwards, and major problems suddenly pop up in the stabilization phase (Senior program manager, 800 ff.)

Open Code: Mars3

Axial Code: Mars3

However, this wave was also characterized by major performance problems, leading to long processing times for the settlement scenarios, although the calculation was correct. These shortcomings required actions on behalf of the program cluster, which initiated a performance task force.

Q8: Performance issues, that settlements for certain business partners ran several days, which usually take less than a day...[...]comparing data, with several other systems, this took substantial time. And here Jupiter

did some actions to increase the performance. Some [custom] coding was not optimized, but finally solved....and we did certain actions in the data center, with the database and similar things to reduce the time. (Senior program manager, 809 ff.)

Open Codes: Consideration of environment has positive effect; program cluster as coordinating and leading force

Axial Codes: Solution architecture - integration management; program governance; reasons for usage of programs

Interpretation of Wave 3: This wave resulted in a further enhancement of product quality as a response to existing functional problems. Upcoming optimization requirements regarding performance issues were identified and addressed by the program steering committee. Furthermore, mitigation actions started through the creation of a performance task force.

5.6.6 Wave 4 – First Go-live Without Functional Problems – Ongoing Performance Problems

Eventually, Diana4 became the first rollout project without any functional problems reported, as quotation 9 illustrates. The senior program manager emphasized the degree of product maturity, as a consequence of the requirements and actions in previous waves, and the collaboration at Diana4. From the perspective of products in the environment, the program cluster managed certain data-warehouse requirements, which were an important but a unique requirement of Diana4. The performance problems were still evident, such that they were added to the risk register as high-priority risk and expected to get worse, because the remaining Jupiter rollout projects would increase the size of the common database. For Diana4, as a large site with a high data volume, the problems were intended to be solved before the next large settlement scenario took place one month later. From a functional perspective, the rollout project at Diana4 was very successful and the persisting performance problems were addressed.

Q9: And then three months later [after Mars3, Mercurius3] we went live at Diana4, and this was the first rollout where everything worked perfectly, with complete scope and also the user knew their stuff, it was wonderful and it worked. (Lead of ERP Jupiter Competence Center 1074 ff.)

Open Codes: Increasing learning curve over the course of the rollouts; Diana4

Axial Codes: Lessons learned - continuous improvement; Diana4

Interpretation of Wave 4: No actions regarding the functional requirements of the ERP system were needed anymore, apart from the specific requirements of products in the environment. The performance problems became a topic on the agenda of the steering committee meeting in August 2012; the program cluster was intended to lead further investigations with the inclusion of external support.

5.6.7 Wave 5 – Continuous Improvement, High Product Quality (2012, 2013)

The actions in relation to the performance issues significantly improved the situation and cycle-times of the settlements. However, the performance topic was still on the agenda of the steering committees and subject to regular monitoring and improvement. Apart from the mitigated and improved performance issues and some transparency issues reported from the Jupiter Competence Center for Juno5, the rollout projects at Juno5 and Minerva5 were excellent examples of smooth implementations. The teams at the sites seemed to be well prepared, and so was the project management as quotation Q10 shows.

Q10: Certain sites, for example Minerva....they really did an excellent job regarding test management. They had a test team, sitting in a separate room during the rollout, and recorded all the test cases, they tested everything, really in all the different variations, and monitored everything. The reporting was excellent. They did it in their own interest, they realized it and then the test management was supported and the conditions created, to assure it. (External senior consultant, 406 ff.)

Open Codes: Different perceptions regarding the necessity of testing; Minerva5

Axial Codes: Testing; Minerva5

At this stage, we want to address the product quality over the course of the rollouts, as this was a main consequence of organizational learning and emphasized in relation to these rollout projects as compared to Apollo1 (see quotation Q11). At the start the product quality of the ERP system was not very high. For the Apollo1 rollout, however, this was somehow manageable since they already had a legacy SAP implementation in place and, therefore, experienced SAP users. Additionally, the blueprint and the development project were tailored towards Apollo1 as they had SAP experience. Their SAP department was the lead of Jupiter, and they were intended to be the first rollout. Nevertheless, the product quality also led to certain problems during the rollout of Apollo1, but which only became evident to the full extent during the rollouts of Vesta2 and Neptune2. This turned out to be a huge challenge, particularly for the Jupiter Competence Center, but, with the extension of the rollout implementation cycles and the increasing

experience, the situation changed for the better. In the end, the ERP system Jupiter was a very mature and flexible product as the quotations Q11 and Q12 indicate.

Q11: At that time, when we went live in Apollo1, the product was certainly full with errors. Errors, which you simply don't realize [during development and testing], but which you realize when the system is productive....The system,...during the rollouts of Juno5 and Minerva5 was certainly much more stable and containing fewer errors than the one we implemented when we went live with Apollo1. Definitely! (ERP expert, work-package responsible, participated in all rollout, 894 ff.)

Open Code: Product quality increases over the course of the rollouts; Apollo1, Juno5; Minerva5

Axial Code: Increasing product quality; Apollo1, Juno5; Minerva5

Q12: *Basically, we have one process. But I mean that the single processes are flexible enough, that everyone [functional experts at the different sites] can live with it. Partially flexible enough, since the standard solution of SAP is already flexible enough, and that, what we wrote [developed/coded] ourselves is flexible enough too....So many customizing options and such flexibility. And eventually we realized that it can work with SAP, and that´s why it is working! ...Of course it can happen that a site makes new contract....then we just add this new thing. But I simply believe, that we have a magnitude, a huge pool of options which we can offer, that we can deal with it flexibly. And if not, then we have the change request process.* (ERP expert, work-package responsible, participated in all rollouts, 1271 ff.)

Open codes: Flexibility although standard packaged software; established change request process: perceptions

Axial codes: Increasing product quality, methodology, perceptions

Interpretation of Wave 5: Very smooth rollout projects, acknowledged in all interviews and minutes of the steering committee. No actions in relation to functional requirements were required because of the very mature and flexible product. Ongoing performance optimizations were reported in the steering committee meeting minutes in August 2013 although to a lesser degree compared to previous waves. Partially, it was reported as a risk mitigation in response to the growing number of users of the shared database. In the same document, the program cluster was intended to support the last rollout project as Ceres6 due to a lack of (project management) resources at this small site.

5.6.8 Wave 6 – Sourcing Out of External Consultants

Apart from small issues, the rollout project at Ceres6 was very successful. The program cluster supported the site in project management- and test management issues and the general impression of all stakeholders was positive. Also at this stage, there was not a negative note with regards to performance issues. However, performance issues seemed to be a topic in the larger program, which is consistent with performance dips frequently reported in the ERP literature (e.g., Hitt et al., 2002).

At the start of the development project, a kind of 'duality' was established as a strategic decision. When it was decided to use SAP, the internal Jupiter Competence Center staff were not yet proficient with the software. This was particularly the case for locations Neptune2 and Mars3, where there was no SAP experience, which were assigned to develop Settlement Areas 2 and 3 of the Jupiter product within the Jupiter Competence Center. Beside external SAP trainings for the internal staff (including Apollo1 as the standard product owner), all work packages were supported by an internal and external owner. As Q13 shows, this duality helped to secure transfers of knowledge and allowed the stepwise reduction of external team members. Finally, at Ceres6 the rollout could be managed largely with internal experts as intended in the initial plan and considered in the business case.

Q13: The mix was always an external and internal work-package owner [acted together].... the reduction of the externals actually works only now, after the rollouts, since simply the quantity of staff members was necessary. During the development we needed EXTPARTNER1, since the internals didn't have the skills and the know-how. During the rollouts, after the 2nd rollout, parts of the maintenance already could be done by internals. But EXTPARTNER1 still supported the rollouts and only now during the 8th rollout, and the 9th starts soon, I mean with the 1st of October the 9th site, the 9th rollout will be the only rollout where we will get along almost without any external support. (Lead of ERP Jupiter Competence Center, 662 ff.)

Open codes: Continuous learning curve over the course of the rollouts; defined duality between externals and internals with know-how transfer; Ceres6

Axial codes: Lessons learned - continuous improvement; human capital management; implementation partner; Ceres6

Interpretation of Wave 6: This wave was characterized by a mature project team, a mature product, and a smooth go-live. The program cluster assisted during project setup and realization for Ceres6. The operations phase was well prepared, ongoing actions in relation to a common release management and a rigid change

request process were subject to this wave. This resulted in a successful major release in November 2014 of Jupiter (and products in its environment), although heavily customized (different as reported previously in ERP literature, e.g., Parr and Shanks, 2000).

5.6.9 Critical Success Factors in Relation to Organizational Learning- Selective Coding

In the previous sections, we provided an overview of the ERP implementation and illustrated organizational learning based on the model of Daft and Weick (1984). We presented several instances during several waves as the level of analysis where organizational learning took place through continuously interpreting current environments and action-outcome relationships (feedback loop), leading to an increased knowledge base. The results suggest that the program served as a knowledge base and a means for organizational learning, therefore influencing CSFs over the course of the implementation life cycle. Whereas a number of CSFs (and sites) were presented on a descriptive level as axial codes, we now present the CSFs as more abstract categories and relate them to more general ideas and concepts to apply to multiple situations (Klein and Myers, 1999). Please note that we ran all concepts through our interpretation model. They are grounded in data and have to be seen in the context of organizational learning as a dynamic process, based on action-outcome relationships. Table 5-5 depicts the CSFs related to the core category ("lessons learned-continuous improvement") during selective coding. During each wave actions were taken, based on the interpretation of outcomes of a previous wave. The program continuously increased its knowledge base, thus meeting increasingly the CSFs as underlying guiding principles. As a consequence, the later waves could benefit significantly as more and more CSFs were met.

CSF in Organizational Learning Context	**Anticipated Outcomes**	**Actions**
Program Governance & Project Governance	Up-to-date program governance structure with the ability to govern time schedules, dependencies of all products/projects in the larger program, a group of projects on product level is represented via a program cluster (subprogram), program should have the ability to issue directives to single rollout projects on site-level (questionable how to do that best in a matrix organization)	Adapting governance structures and decision-making structures and processes (PMI, 2008) on all levels (program, product, project) in accordance of current environments and as a result of previous experiences, issue directives when necessary

Top Management Support	Support on all levels (program, product and site), sponsorship secured over the program (product) life cycle, commitment, awareness and visibility	Engaging top management, involving with decisions, considering in stakeholder- and communication structure, establishing escalation levels
Comprehensive Stakeholder- & Communication Management	Stakeholder- and communication management is meeting current requirements of the program, updated stakeholder register, communications plan, meeting schedule, engagement until single rollout level, consideration of task force meetings resulting from contingencies	Adapting stakeholder register, communications plan, meeting schedule permanently in accordance with current problems and challenges
Comprehensive Time Management	Up-to-date version of the time schedule of all rollouts at product level, considering the requirements, dependencies, schedules of the projects/products in the environment, therefore fitting into the overall schedule of the program, ambitious but realistic time schedule for the single rollout project	Adapting time schedule permanently considering changing environments, defining ambitious and realistic time schedules for single rollout project.
Financial Management	Financial funds secured over the course of the rollouts, including products in the environment, performing within budget, reducing cost/site because of learning and meeting business cases	Permanent controlling of actual costs versus targets, using resources efficiently over the course of the rollouts
Scope Management	Optimal alignment of process varieties and efficient implementation in the system under consideration of existing processes, efficient change request process with thresholds	Using existing (implemented) processes or standard processes, implementing and developing new processes as flexible as possible to meet new requirements, optimize change request process, securing learning curve over the course of the rollouts
Comprehensive Risk Management	Permanent adapted version of overlapping risk-management (e.g. risk matrix with the dimensions' impact/probability), including	Reinterpreting the risks of particular products in relation to the projects/products in the environment,

	the products/projects in the environment; mitigation of risks for the program through treatment at senior management level (committee) with the option to escalate it to the board, groups of projects are represented by members of the program cluster	adapting versions of overlapping risk management, risk matrices at all levels (projects/products, program cluster, larger program)
Business Process Redesign	Blueprint consists of valid requirements, new business processes developed in the system match with site requirements and show (continuously growing) high fit	Facilitating understanding (training, test-system, prototyping), ensure proper timing of requirement evaluation and flexible adaption of blueprint and system
ERP Strategy within IT Strategy	The same software package for each site with a common interface, harmonize processes as much as possible in accordance with local laws, common support structure for ERP with mainly internal experts, efficient interplay between ERP systems and other products, synergy effects through common release management with other products, efficient change request process with different rules for different thresholds	Developing a high quality ERP system, in accordance with Solution Architecture with processes which allow flexible reaction to new requirements, creating common support structure, release management and change request process
Solution Architecture, Integration Management	Consideration of overall architecture of products in the larger program, consideration of project and product dependencies, group of projects are program clusters for appropriate integration management and conversations with other program clusters in the environment, new releases rolled out together and governed by a common release management	Tracking and maintaining dependencies in overall-document and meeting minutes, adapting product architectures to fit in the overall program, adapting time schedules, introducing & optimizing common release management
Data Management	Effective and accurate migration of data and interplay with (central) interfaces under consideration of system performance.	Improving data entry procedures and system performances, building the right task forces, optimizing interfaces,

		reacting with aligned workarounds where appropriate and necessary
Methodology	Permanent usage of existing tool-supported methodologies (product specific e.g. ASAP, from associations e.g. PMI, IMPA, Cabinet Office, or company-specific), usage of best-practices templates, which are readily available	Continuously developing and optimizing best-practice templates, making the latest version available on company platforms, conveying information to stakeholders, choosing and implementing appropriate tools (e.g., SAP Solution Manager, Tosca etc.)
Implementation Partner	A sufficient (but not more than needed) number of skilled external senior consultants who secure rollouts, system adaptions, incident (issue) management, and allow the know-how transfer to internal experts, usage of the same consultants for several rollouts to maintain and increase the knowledge-base	Contracting a sufficient number of external experts (if possible for several rollouts, assigning them efficiently to tasks (sites), reducing the number after successful know-how transfer
Human Skills & Competencies	Skilled implementation teams with emphasis on know-how transfer of internal experts, skilled key-users and business people, skills match current and changing requirements of the product and its closer environments	Securing know-how transfer from external consultants to internal experts, facilitating cross-site communication, ongoing training on all levels, staffing and training of new members (IT and business)
Training	Adequate training plan and training documents covering general system-topics, special processes and project preparation, training paths for IT and business people, skilled trainers	Planning of trainings, building of training capabilities, keeping documents and records up-to-date
Collaboration	Efficient collaboration between central and local teams (at site) with sufficient degree of transparency, and consideration of responsibilities and roles	Assigning and respecting responsibilities and roles, standardizing of work processes (link to methodology) with efficient usage of tools (e.g., SAP

		Solution Manager), facilitating exchange of information on all levels (meetings, social events)
Commitment	Ongoing commitment and positive association with assigned roles and product/project, informal exchange of information multiplies positive associations and commitment	Presenting the possibilities of learning something new and to grow personally (job enrichment), showing opportunities to participate during the re-definition of business processes in relation to new systems, actively disseminating relevant information and facilitating informal information exchange, training the staff
End-to-End Testing	Overlapping, up-to-date testing, which encompasses the products in the environment, the testing process is standardized (templates) and documented, later in operations phases a common release management allows end-to-end testing, therefore minimizing integration- and regression testing efforts	Supporting and facilitating testing through a dedicated test manager, adapting the testing process permanently to current needs (methodology) with the adoption of best-practices templates, integrating the test management of projects and products in common release management

Table 5-5 Selective Coding, Concepts Related to "Lessons Learned-Continuous Improvement"

During selective coding we dropped the concept "organizational vision," which comprises the business strategy, as suggested by Strauss and Corbin (1998). Thus, the concept is not part of Table 5-5. The concept hardly appeared in the data or overlapped with other concepts like "ERP strategy within IT strategy." Furthermore, there was little evidence that this concept was subject to organizational learning. This could either be a consequence of the organizational form, which is a matrix organization, or because we did not interview the business people at the local sites, who were also responsible for change management. In other settings, "organizational vision" might be the subject of organizational learning, therefore we mention it for the sake of completeness and to make our coding process as transparent as possible.

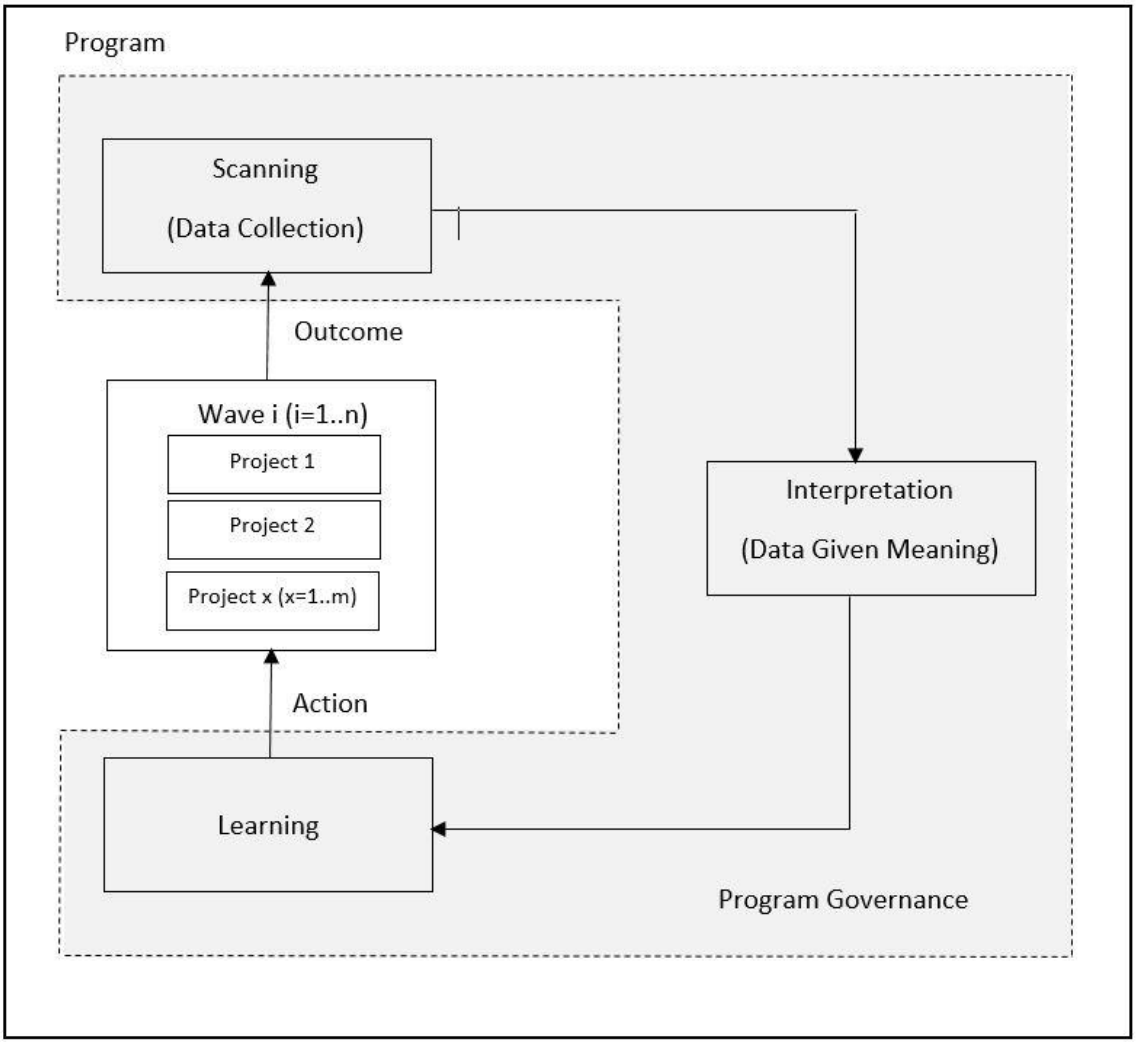


Figure 5-4 Organizational Learning - Continuous Improvement in the Program Context

In Figure 5-4, we present a general model grounded in our data that is consistent with the model of Daft and Weick (1984) and organizational learning theory. As such, it can be applied to other settings following a phased or incremental program approach, foremost, but not necessarily exclusively, in the ERP context. The program scans all the data available from previous waves and interprets it. Through its dedicated governance structure (dotted shaded box), the actions are applied to a wave and its projects based upon experience of previous waves, and stored in the programs knowledge base as temporary organization. Through feedback manifested in outcomes, the program adds to its knowledge base through each wave, facilitating continuous organizational learning. Please note that the projects within a wave are part of the program, but have their own governance structures as well; thus they are not part of the dotted box, illustrating the program

governance. Nevertheless, the individual projects of a wave are subject to the program governance through the application of constantly improved actions repeated for n waves. Every wave could contain any number (x=1..m) of projects.

In this section, we presented the findings of our case study, including contextual information, followed by a sequence of the projects structured in waves. On the basis of reference quotations, we illustrated the first two steps of our coding process (open, axial) and created, in a third coding step (selective coding) the storyline by applying the interpretation model of Daft and Weick (1984) to the concepts, illustrating the organizational learning process over the course of the rollout projects. Finally, we presented a summary of all CSFs, evident in the program, in relation to the core category "Lessons Learned - Continuous Improvement," thus applying the interpretation model again during selective coding. Next, we will discuss our findings to answer our second central research question and highlight the implications for research and practice.

5.7 Discussion

In this chapter, the case study at Pantheon investigates the beneficial impact of a program structure for a complex ERP implementation with an overall duration of seven years. The complex enterprise structure and the relatedness of the various projects and products within Pantheon led to the decision to include the rollout series for the ERP implementation in a larger program called Saturn. Saturn included a program cluster dedicated to the specific ERP solution (Jupiter). The steering committee of the program comprised representatives of all sites in order to be able to make critical decisions with impact on all sites, such as adaptions of time schedules. This constellation only partially mitigated (e.g., via escalations) the missing directive power over the rollout projects, which has been observed for matrix organizations in the past (Daft, 2007). The missing directive authority of the Jupiter Competence Center and the program cluster appeared to be challenging and made the implementation difficult. This is an example of the importance of contextual conditions, in our case the challenges of a matrix organization, which were addressed in the governance structure of the program and beneficial for the rollout of the ERP system Jupiter.

During the three-step coding process (Strauss and Corbin, 1998; Sarker et al., 2001), we identified concepts in the first two steps (open and axial coding) and realized that the program structure facilitated organizational learning, a goal mentioned in the program management literature by, e.g., Lycett et al. (2004). Therefore, we decided to apply an interpretation model of organizational learning (Daft and Weick, 1984) to all waves of the implementation life cycle. We illustrated the program construct as a means to leverage

the CSFs through organizational learning. This view is consistent with the view of van Fenema et al. (2007), who found that standardization and experience from sites implementing the technology in an initial phase of a global project became relevant to sites that implemented the same ERP package at later stages. Similarly, Newell et al. (2006) stress, in relation to ERP systems, that knowledge integrated at one stage affords the integration of knowledge at later stages. Thus, the organizational learning process can guide organizational action and the acquired knowledge increases its repertoire of actions (Robey et al., 2000). Therefore, these actions led more and more to successful outcomes, providing feedback to the program, and leading to an increased knowledge base for further implementations.

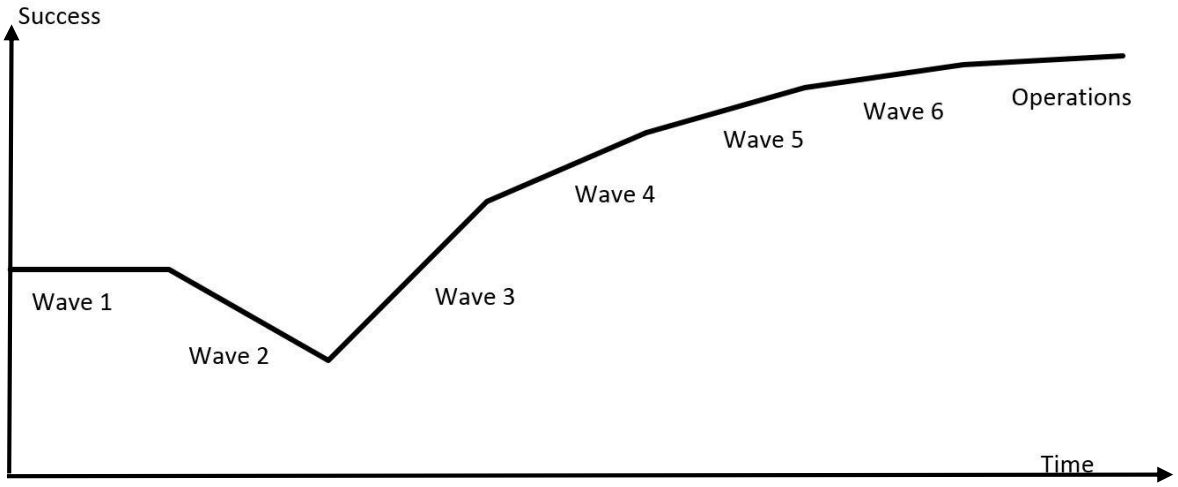


Figure 5-5 Implementation Success Increased at Later Stages Through Organizational Learning

Figure 5-5 illustrates the life cycle of the ERP implementation and the increased success, which is in our case associated with the dynamics of CSFs, facilitated through a learning program and the improved product quality. The program cluster consisted of one development project and nine subsequent rollouts (referred to as waves, as they were partially implemented in pairs), which improved continuously after Wave 2. The first two waves were only partially successful. With certain corrective actions (based upon anticipated outcomes, Table 5-5) the consideration of CSFs also changed and the program continuously increased its knowledge base, thus meeting the CSFs as underlying guiding principles. The subsequent waves benefited from this increased knowledge base, as well as daily operations. This change in importance is what we refer to as dynamics and its relevance is emphasized by our case as complementing the dynamic process perspective of (Lyytinen and Newman, 2015; Markus and Robey, 1988). Our case also suggests a connection between progress and certain CSFs (Bullen and Rockart, 1981), while static elements or design components

(Ribbers and Schoo, 2002; Seidel 2009) alone appear to draw an incomplete picture of success of an ERP program. This implies that research on ERP implementation programs should explicitly account for temporal dependencies, as e.g., suggested by (Grainger et al., 2009).

Organizational learning processes, such as in our case, are difficult to be investigated with a static view on CSFs. Indeed, Robey et al. (2000) emphasize organizational learning as a process that enables the intentional and unintentional acquisition of, access to, and revision of knowledge, which becomes embedded as organizational memory. It is the merit of our case to extend this point of Robey et al. (2000) towards organizational learning theory according to the action-outcome links of Duncan and Weiss (1979). Considering the nature of a program as a temporary organization (Cabinet Office, 2011; Turner and Müller, 2003), the interpretation model of Daft and Weick (1984) highlights the organizational learning process in the ERP program context in a plausible way. This view has implications for research and practice, which we present in the next section.

5.8 Implications

The implications for research are manifold. First (1), our study extends prior research (e.g., van Fenema et al., 2007; Lyytinen and Newman, 2015), with a dynamic perspective by emphasizing the organizational learning processes for multisite implementations. This perspective emphasizes the program concept as a powerful tool to manage interdependencies between projects and products over the complete life cycle of a large multisite ERP implementation. Second (2), we adopted a model taken from the field of organizational theory (Daft and Weick, 1984) and exemplified its particular strength for understanding the dynamic perspective of the program concept. From this perspective, programs can be regarded as a temporary organization that is adding to its knowledge base through interpreting action-outcome relationships in a permanent feedback loop. This facilitates learning, which becomes applicable to other sites scheduled at later stages (e.g., Robey et al., 2002; van Fenema et al., 2007). Third (3), we provide a set of CSFs as a result of these action-outcome relationships and organizational learning manifested in a temporary organization, the learning program. All CSFs are grounded in data, with corresponding action-outcome relationships in the program context. The CSFs are dynamic with a fluctuating importance and leveraged by organizational learning. As a consequence, this perspective also emphasizes the need to take a process view over the complete life cycle, particularly in the program and multisite context. Considering the limitations that arise from a single site case study, we observe the need for quantitative future research in (a) program management, particularly, but not exclusively, in the ERP and multisite context. That research should

consider (b) the dynamic nature of ERP implementations and its CSFs with an emphasis on (c) the integrative nature of programs and its relation to organizational learning. Furthermore, it seems promising to investigate (d) possible forms of program structures, including power relations and integration needs. Lastly (e), action research (Robey et al., 2000) might be one possible research avenue which could provide valuable insights.

For practitioners it is important to realize the benefits a program structure offers in certain contexts (e.g., multisite and integration needs), and to utilize its dynamic leveraging functions for CSFs, particularly the learning perspective, which determine the implementation success in the long run. It is important to provide implementation structures that facilitate learning considering the *bonding* perspective, that is, knowledge sharing and collaboration with implementation team members, but also the external *bridging* perspective and information sharing with other stakeholders (Newell et al., 2006). By paying attention to the dynamics of CSFs, its underlying action-outcome relationships, and the leveraging effect of organizational learning, facilitated through a program structure, an organization can increase the probability to obtain the desired outcomes. This helps to efficiently use resources and prepares the capabilities and capacity for further change programs.

5.9 Conclusion

In this chapter, we reported on an interpretive case study of a complex multisite ERP program with a dedicated program cluster supporting the implementation. We adopted the adapted grounded theory approach by Sarker et al. (2001), which has its roots in Strauss and Corbin (1998). For selective coding, we took our inspiration from organizational learning theory and employed an interpretation model developed by Daft and Weick (1984). The case emphasizes the function of the program as a catalyst for organizational learning by means of interpreting action-outcome relationships. These benefits would not have been expected with a traditional project structure. Thus, we believe that the establishment of this program structure was essential for the successful multisite rollout of Jupiter. The case also highlights the evolution of CSFs over the course of the rollouts and the benefits of considering a dynamic perspective for investigating programs. In the next chapter we conduct a cross-case analysis and discuss our cases according to several dimensions.

6 Cross-Case Analysis and Discussion

In this section we want to compare the two cases and will use several dimensions to do that, in the context of our initial posed research questions. First (1), as interpretive researchers, we start with some important parameters of the two cases and we highlight in brief the contextual characteristics of the two ERP programs. Second (2), we list the critical success factors of the two ERP programs, and put them in relation to our seed concepts in the literature review. Third (3), we put our definition of the dependent variable success in relation to our two ERP programs. Fourth (4), we apply the outcomes of our first case at A1/TA, and the resulting *"SGISS-Model of Different Perceptions"*, to our second case at Pantheon. Fifth (5), we apply the outcomes of our second case at Pantheon, and the resulting *"Organizational Learning Model in the ERP Program Context",* to our second case at A1/TA. Thus, we perform a first "test" if the models could have been applied to the second context as well. Sixth (6), we compare the results of our case study in relation to *the categorization of program management goals and benefits* (Lycett et al., 2004). Consequently, we highlight if the expected goals and benefits could be generated. Finally, we close this chapter with a summary.

6.1 Comparison of Contextual Characteristics of the Programs

In Table 6-1 we highlight the most important characteristics of the two ERP programs. Although they differ in terms of number of sites, and implementation approach, they share characteristics as high integration complexity, various projects in parallel, shared resources and a change in business processes. These shared characteristics are the determinants that a program approach is beneficial (PMI, 2008; Cabinet Office, 2011). The implementation complexity is very high in both cases, which warrants a program approach, according to Ribbers and Schoo (2002). In the terms of Seidel (2009), an ERP program is a change how the business operates. Thus, from a theoretical perspective a program made sense in both cases: Later in this chapter, we will turn to the concrete benefits of the program approach in the ERP context at A1/TA and Pantheon (Lycett et al., 2004).

Company	**A1/TA**	**Pantheon**
Industry:	Telecommunications	Insurance
Scope:	5 projects: - New ERP system replacing two legacy ERP-stems	- 1 Development project followed by 9 rollout projects:

	- New reporting system with new user interface replacing legacy reporting systems - Change project accompanies the projects - Preparation and conception of a second release - Documentation project for auditors	- New ERP system replaces various host-legacy systems. The system includes three settlement areas, with partially different underlying laws. Two settlement areas need to build from scratch.
Number of sites	1	9
Integration of projects with program	Program board, strong program manager, project managers reported to program manager	Program board and project boards, sites (projects) independent in different terms (e.g. limited directives from program, change management in site-responsibility)
Implementation approach	Big bang	Phased (waves)
Duration	>2,5 Years	4 years development project, 3 years rollout projects
Level of integration, business processes	Highly integrated, >700 interfaces. Business processes spanning different functional areas. Business processes harmonized in certain areas in certain areas consolidated. Further harmonization in release 2.	Highly integrated with other products and projects, partially rolled out in parallel. Consideration of milestones and dependencies. Business processes redesigned within the new software package. Common future release strategy.
Shared resources	Mostly shared human resources. Separate IS experts for the reporting project and for the change project. ERP program as high priority initiative in relation to other initiatives in the portfolio.	The same implementation teams used for development, all rollouts and maintenance. Other competing initiatives needed to be considered (larger program).
Further characteristics	Existing ERP knowledge within business and IT. Different legacy processes reflecting pre-merger states of the company. New central sourcing strategy and new implementation partner.	No existing ERP knowledge in 8 of 9 sites. ERP knowledge only in 1 of 3 sites forming the ERP Competence Center. Large initial dependency on external consultants. High initial training efforts within business and IT.

Table 6-1 Characteristics of Programs as Determinants for Integration Complexity

6.2 Comparison of CSFs and Relation to Seed Concepts

In this section we compare the critical success factors of our two cases over the program life cycles, similarly to Parr and Shanks (2000). Next, we relate them to the seed concepts of the literature review. This is basically a new round of selective coding for each case, as we put the CSFs, gained during axial coding, in relation to the program concept. In Table 6-2 we start (in the second column) with the A1/TA case, followed by the Pantheon case; then we try to link the CSFs to the seed concepts, where possible. Some CSFs could not be linked, and other CSFs appeared the first time in our cases and thus have no corresponding seed concept (shaded in Table 6-2). The sequence (starting with the CSFs and linking them to the seed concepts, and not the other way around) reflect the grounded theory principles in our coding process. First (1), it reflects that all the concepts are grounded in data, and second (2), it means that no coding scheme guided our coding process. As such, the seed concepts were used to create sensitivity and to make comparisons with the concepts (Strauss and Corbin, 1998).

Additionally, we follow the principle of contextualization (Klein and Myers, 1999) and relate unique instances to ideas and concepts that apply to multiple situations. After comparing the instances of CSFs with the seed concepts we build propositions, thus we theoretically abstract and generalize the concept. Based on the insights of this chapter we use new refined labels of each CSF[18], which are at the same time depicting the headlines of the subsections. This is done by carefully maintaining the chain of evidence, and readers can follow how we arrived at our theoretical insights (Klein and Myers, 1999).

Our approach principally could lead to different outcomes. First (1), when the axial codes can be directly linked to a seed concept, the expected outcomes (from the literature review) are principally confirmed. Furthermore, the labels need refinement, based on the insights. Second (2), when we cannot link the axial codes to a seed concept, this means that new CSFs in the ERP program context are identified. Third (3), when an axial code cannot be linked directly to a seed concept, then the axial code can (a) either be a sub-category and linked to a meaningful higher-level category; or (b) the seed concept can be integrated into a meaningful higher-level category. Lastly, if no axial code and no open codes can be identified for a specific seed concept, the relevant seed concept need to be dropped for our contexts. In the following, we further elaborate on this.

[18] The new refined labels can differ from the labels used for the seed concepts.

#	CSF A1/TA	CSF Pantheon	Associated Seed Concept - Literature Rev.	Description of Seed Concept
1	Top management support	Top Management Support	A) Securing top management support	Securing sponsorship and commitment during the whole program, appointing program/project champion who promotes the program/projects actively
2	Vision	Organizational vision	B) Establishment of a business case and a vision	Comparing additional costs for managing the change within a program against the additional benefits, defining the intended future state, communicating vision, defining and updating regularly program and project business cases
3	Stakeholder- & communication management	Comprehensive Stakeholder- & Communication Management	C) Definition of Stakeholder- /Communication-management Strategy	Identification and categorization of all stakeholders affected by the program, deciding how and when information will be distributed, ensuring ongoing commitment from all relevant stakeholders
4	Change management	Training	D) Securing change management	Ensuring that target business environment meets requirements of the new business model, organizing training and education, ensuring appropriate resources, managing transition into operations
5	ERP strategy	ERP Strategy within IT Strategy	E) Establishment of a company-specific ERP strategy	Defining the ERP strategy (minimum customization, phased implementation approach vs. big bang strategy, rolling out a template, release and upgrade strategy), aligning the program goals with strategic goals
6	Governance structure	Program Governance & Project Governance	F) Establishment of a program-governance structure	Defining management structure, establishing program office, defining decision making, reporting requirements, roles, responsibilities, interfaces and communication to project representatives, formal closure
7	Business process harmonization/consolidation	Business Process Redesign	G) Business process reengineering	Redesigning business processes in accordance with the ERP strategy and envisioned target business environment
8	Risk and issue management (Tracking and Tools)	Comprehensive Risk Management	I) Risk and issue management	Identifying and tracking of risks and defining the risk strategy, ensuring that actions taken succeed
9	Integration management	Solution Architecture, Integration Management	J) Definition of an integration management strategy	Identifying interdependencies and interrelations and defining how to manage them, considering shared processes, managing transition into operations, providing customer support

10	Realistic timeframe, scope management	Comprehensive Time Management, Scope Management, Financial Management,	K) Time and scope & financial management	Including scope management (defining what is inside the program, managing change requests), time management (program schedule, planned duration and sequencing projects, analyzing performance against the plans, milestones) and financial management (cost estimation and budgeting, performing within budget, early paybacks, ensuring funds)
11	Methodology, Testing (SC-Methodology)	Methodology, End-to-End Testing (SC-Methodology)	L) Definition of a program-methodology	Securing all quality aspects, regression testing, end-to-end testing, ensuring that the results meet expectations, planning and conducting of audits and reviews, securing knowledge management
12	ERP implementation partner	Implementation Partner	M) Proper use of consultants	Choosing consultants, managing them, building stable relations
13	Data migration	Data Management	N) Ensuring data migration/ Accuracy & management	Ensuring that data is migrated accurately to the ERP system, establishing appropriate data entry procedures, data governance
14	Collaboration and decision making	Collaboration	N/A (no seed concept)	N/A (no seed concept)
15	Human capital management	Human Skills & Competencies	N/A (no seed concept)	N/A (no seed concept)
16	Flexibility of program components	N/A (not identified in case)	N/A (no seed concept)	N/A (no seed concept)
17	Commitment key players and team	Commitment	C) Definition of Stakeholder-/Communication-management Strategy	Identification and categorization of all stakeholders affected by the program, deciding how and when information will be distributed, ensuring ongoing commitment from all relevant stakeholders
18	Reflected in axial code: Change Management	N/A, no separate axial code, open codes	O) Readiness of organizational culture	Considering organizational culture, readiness of sites, national cultures and legal requirements
19	N/A (not identified in case as axial code)	N/A (not identified in case axial code)	P) Realization of benefits	Identifying and realizing key benefits, ensuring that key benefits meet objectives, reviewing benefits with stakeholders
20	N/A (not identified in case)	N/A, no separate axial code, open codes	H) Appropriateness of the ERP vendor	Choosing the appropriate ERP vendor and package, ensuring ongoing vendor support

Table 6-2 Cross-case Comparison of CSFs, Linkage to Seed Concepts

6.2.1 Top Management Support

A1/TA (Top management support):

The program was supported throughout the life cycle by the program sponsors. Officially, the CFO was the sponsor, but it was a joint effort, and perceived as such by all stakeholder groups, between CFO and CTO. The program structure should emphasize the management attention of the board. Sometimes, the importance and the increased management attention were not perceived as such, during Implementation Attempt 1. After the crisis and the buy-in meeting, top management support was more visible. This was reflected through regular attendance of the sponsors at the steering committees, blocking of other endeavors, and support in terms of resources. For example, program members worked full-time and the business case was dynamically adapted. Through the program structure, the program manager was empowered to make certain decisions, like prioritization of projects, what was backed up by the program sponsors. The steering committee (in a less strict form, and sometimes managers tended to send their deputies) was still in existence at the time we conducted our interviews, which underlines its proven appropriateness and importance during the implementation.

Pantheon (Top management support):

The program steering committee backed up the introduction of the ERP system. The program steering committee consisted of the IT directors of the sites, who backed up the central service providers (competence center and program cluster). However, the central service providers still had no authorization for directives, and the implementation responsibility remained at the sites. The need for top management support at local sites was already emphasized in the initial program cluster concept. Thus, the IT directors and the central service providers needed to rely on the good-will of the sites.

The program cluster acted as a mediating 3rd party, and was seen as being more neutral by the sites. An escalation procedure existed to report missing deliverables and necessary actions to the program steering committee. This cost more time and was less powerful than a direct authorization for directives would have been. This autonomy of the sites remained a challenge throughout the life cycle of the program cluster, and perceived as such by all members of the central service providers.

Relation to seed concept (Top management support):

In both contexts, the need for continuous top management support is clearly evident. The contribution to the program success manifested in the increased perceived top management support at A1/TA during Implementation Attempt 2. At Pantheon the challenge of the limited top management support, due to the local autonomy of sites, strongly supports the need of top management support at the program level.

As a seed concept, top management support was emphasized and we could directly link the axial coded of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P1: In the ERP program context, top management support throughout the entire life cycle contributes to program success.

6.2.2 Establishment of a Vision, a Dynamic Business Case and Associated Benefits

Vision (A1/TA):

The vision for the program was defined initially. This included system mergers, process harmonizations in certain areas, in the best case using the standard process of the package. The definition of further harmonizations was treated in a further release, in areas where processes were initially consolidated. Furthermore, a new sourcing-model for vendors, a detailed documentation, sensitizing of stakeholder through the program and the change-project as a post-merger initiative, and the maintenance of positive public appearance were part of the vision at A1/TA.

The associated costs and the payoff were depicted in a dynamic business case, as a consequence of efficiency gains. During the program, certain adaptations had to be made. This included adaptations of the initial vision and the prioritization of targets. Furthermore, adjustments within the dynamic business case were made. As a consequence, the most important targets were achieved and the program was also rated successfully in relation to the (dynamic) vision.

Organizational vision (Pantheon):

For both, the program cluster (ERP system) and the larger program, the vision and the targets were clearly defined in the beginning and pursued throughout the life cycle(s). The coordinated definition of targets within the larger program was beneficial in regard to the implementation of the vision and targets within the IT-strategy. The coherent treatment of the different products (program, program clusters) illustrates the

integrative nature of the ERP system beyond its borders, and the necessity of viewing the entire picture to meet the initially defined vision and its associated targets.

The ERP system should replace legacy host systems used at nine different sites with three different settlement areas. The processes should be harmonized to the highest degree possible, and maintained centrally from the ERP system competence center. New developments should be treated in common releases (together with other products of the larger program) to save costs on regression- and integration testing. Lastly, the ERP system should sensitize sites in regards to future contract negotiations. All those targets were highlighted initially in a (dynamic) business case and a TCO (Total Cost of Ownership) calculation and consistently adapted. The vision and the targets could be met efficiently through the bundling of projects in program clusters and the larger program.

Relation to seed concept (Establishment of a business case and a vision):

In both contexts, the need to define and initial vision with associated targets, and a business case is clearly evident. A1/TA and Pantheon, both contexts show strong interrelations of the project visions which can be managed efficiently via an overarching entity; that is, the program. Furthermore, adjustments in a dynamic business case are visible.

As a seed concept, the establishment of a business case and a vision were emphasized and we could directly link the axial codes of the cases to our seed concept.

Thus, when we interpret the results of our two cases we propose:

P2: In the ERP program context, the establishment of a vision, a dynamic business case and the pursuing of associated benefits contribute to program success.

6.2.3 Stakeholder- & Communication Management

Stakeholder- & communication management (A1/TA):

In the beginning not all stakeholder groups were sufficiently identified and involved. The functional areas, apart from the functional areas Financials and Controlling, thought that they are only impacted to a minor extent. Furthermore, the implementation was perceived as an IT endeavor. At a later stage, after the program and the project got more experience in relation to proper communication, the change impact, expected issues were communicated via different communication channels (e.g. meetings, newsletter, roadshow). Furthermore, during the buy-in meeting during the crisis, the communication strategy included

conveying necessary information from managers to co-workers. The expectations of users toward the users were sharpened, through user involvement. This included the proper communication of the system design and change impacts, the approval of the design and the migration scenarios and the introduction of small task-groups. The task groups worked closely together and were empowered to make decisions. Other parties, such as the portfolio management and the software architecture group were involved too. As a consequence, the program and its associated change-project, succeeded in identifying all relevant stakeholder groups and to facilitate proper communication.

Comprehensive stakeholder- & communication management (Pantheon):

The program cluster could use and benefit from the established communication structures of the larger program. At the beginning, all roles and responsibilities, and meetings were described in a general document, to generate a common understanding. Different periodic meetings were established (e.g. program steering committee, regular telephone conferences, including the central service providers and the site rollout leaders, project steering committees). A key-user concept was established, and these key-users were the single point of contact for 1st level support and interface with the support organization. Furthermore, they trained users at the local sites. The stakeholder management at the local sites remained in the responsibility of the sites. At the program level, the sites significantly benefitted from each other through information exchange, facilitated through the learning program. Organizational learning was mostly visible at sites implementing during later implementation waves. It was also beneficial that the program clusters reported issues to the larger program, thus representing all sites and the ERP system standard product in relation to other projects/products within the larger program**.**

Relation to seed concept (Definition of stakeholder- & communication- management strategy):

In both contexts, the need to identify all stakeholder groups and the definition of a proper communication strategy is clearly evident. The contribution to the program success manifested in the improved stakeholder- and communication management at A1/TA during Implementation Attempt 2. At Pantheon the early definition of all roles and responsibilities and a very complicated but well elaborated communication structure contributed to the successful rollouts. Moreover, organizational learning through the learning program was facilitated and the program cluster benefited from the larger program. Also, in terms of integration management with projects/products in the larger program this structure was beneficial.

As a seed concept, top management support was emphasized and we could directly link the axial codes of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P3: In the ERP program context, efficient stakeholder- and communication management, including the early identification of all relevant stakeholder groups and the definition of a communication strategy, contribute to program success.

6.2.4 Securing Change Management

Change management (A1/TA):

In the beginning, during Implementation Attempt 1, the change management efforts were not well perceived by the stakeholders. They had instead the impression that the change management project focuses on training and not so much on identifying relevant stakeholder groups, the change impacts and managing expectations and resistance. Some functional areas, therefore, were not aware what the new ERP systems means for them and how their daily work is impacted. These shortcomings, and a delayed start of change management actions (at the end of the blueprint-phase) were also admitted by the project leader of the change project. The pre-merger groups should have been better prepared for the project, which was not easy given the resource constraints of the change project.

The change management and communication were perceived to be working more efficiently after the crisis, and contributed to a successful go-live. This was achieved through the buy-in meeting and the actions in regard to the communication strategy, creating smaller teams, and co-locating team members. The training started very late. It was partially automated, and created and conducted by external training consultants. The training was further institutionalized after go-live and issues associated with the go-live were communicated. Although, the workstreams conducted certain change management efforts by themselves, and the reporting project (BSAP) largely seemed to be flexible on that matter, the creation of a separate change project within the program was seen as important.

Training (Pantheon):

Training efforts within Pantheon were exhaustive. This included training for the central service providers (in relation to SAP), product-, end-to-end process trainings, including products in the environment of Jupiter (part of the larger program), for the business experts of the sites. Lastly, training as preparation for the projects was conducted, which made business experts fit to perform project tasks, as the majority had never

worked on a project before. From a program cluster perspective, it was beneficial that certain trainings were bundled, including participants from different sites, and that the learning effect with respect to this CSF was transferred from one site to another. Training for rollouts in later stages (waves), could be adapted based on the experience of earlier rollouts and through regular information exchange, e.g. during the periodic telephone conference. As such, training at all levels remained very important over the entire life cycle. The change management at the local sites, remained in their responsibility, and differentiated in terms of transparency.

Relation to seed concept (Securing change management):

In both contexts, the necessity of preparing the staff for operations is clearly evident, but is limited to training in the second case, which can be seen as a subcategory of change management, and is in line with the view of Nah and Delgado (2006). At A1/TA change management was perceived that it worked better after the crisis situation and contributed as such to the program success. Additionally, change management actions started too late.

At Pantheon, the change management remained in the responsibility of the sites, so we could only identify the CSF training in that context. However, the importance of the exhaustive training efforts was traceable. Although in the second case only the seed concept´s subcategory training could be identified in the data, we could directly link the instances to the seed concept. As a consequence, we propose:

P4: In the ERP program context, securing change management throughout the entire life cycle contributes to program success.

6.2.5 Establishment of a Company-Specific ERP Strategy

ERP strategy (A1/TA):

A1/TA wanted to merge the systems due to the legal mergers of two previously independent companies. This endeavor structured in a program, included the ERP but also the Reporting Systems. The implementation strategy followed a big bang approach. The ERP project, with all its streams, was intended to go live at the same time, as well as the most important reports. Some reports with lower priority could go live one or two months later. Additionally, not all areas were harmonized in Release 1, so a second release was intended to bring those improvements. The designs for the second release were part of the program,

as well as a documentation project for auditors. All projects within the program were accompanied by a change project.

The ERP system was built from scratch, not merging one system into another. The reporting systems included a BI-system, a data warehouse, and the introduction of a new user interface. All systems should make the life easier at A1/TA, streamline processes, and remove redundancies in certain areas. Over 700 interfaces needed to be considered. The program was sponsored by the CFO, so it was officially a business project. Nevertheless, it was a joint effort with IT as CFO and CTO acted together, and the business case was calculated including efficiency gains, and saving costs in both areas. This included a sourcing model focusing on one central vendor and the reduction of maintenance costs. At this stage, a group rollout was not planned.

During the life cycle of the program plans needed to be adapted. First, all projects of the program were postponed, after cancellation of Implementation Attempt 1. Later, during Implementation Attempt 2, the conception-project for the second release was postponed for the sake of meeting the main project deadlines. Thus, from the program perspective, it was surely beneficial to comprise the projects in a program, which allowed to account for interrelations, prioritize and allocate competing resources.

ERP strategy within IT strategy (Pantheon):

Subject of Jupiter was the development and implementation at nine sites of Pantheon. Jupiter as an ERP system should replace existing legacy host applications and Pantheon should benefit from harmonized processes. Harmonized, to the highest possible extent, as the processes needed to comply with laws, which were partially different. SAP was chosen, also because of its exhaustive product portfolio.

Pantheon followed a phased rollout approach, with an initial development project, followed by nine rollouts which were partially started as pairs (waves). The rollouts included the implementation of the template. The template comprised three settlement areas. Settlement Area 1 needed to cover nine different laws, whereas Settlement Areas 2 and 3 were built from scratch. The template did not fit the requirements of all sites so a need for improving the template was identified early in the project.

The ERP system included a lot of interfaces with other products in the larger program. This was one reason why a common release management was set up. This should reduce testing efforts for future releases, and proved to be successful. A high degree of customization did not have negative effects of the new release. It

was beneficial that the projects were comprised in a program, as the projects were closely related to each other, and for the products within the program, program clusters (subprograms) were introduced. That was also the case for the ERP system Jupiter.

The know-how transfer from external consultants to internal project members were one part of the strategy and reflected in the business case. The maintenance of the system should be done mainly by internal experts in one central (virtual) competence center, thus following a central support strategy. As a consequence, maintenance costs, compared to the maintenance of the legacy host-applications, should be reduced.

Relation to seed concept (ERP strategy):

In both contexts, the necessity of an appropriate ERP strategy is clearly evident. At A1/TA a big bang strategy was chosen, surely also caused by the single-site implementation and the urgent need. At Pantheon, in a multisite-setting, a phased approach was chosen, which contributed to organizational learning and continuously improved the product quality. In both contexts, the importance of considering systems in the environment, and their integration with the ERP system, (which is already integrated by itself) is clearly visible.

As a seed concept, ERP strategy was identified in the literature review and we could directly link the axial codes of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P5: In the ERP program context, an appropriate ERP strategy within the IT strategy throughout the entire life cycle contributes to program success.

6.2.6 Establishment of a Governance Structure

Governance structure (A1/TA):

The program consisted of five projects which were led by the project managers. The program manager had the overall responsibility in terms of time, scope, and quality of the program and aligned himself with project managers and a representative of the implementation partner, forming the program management. The program management office assisted the program manager in relation to central topics like planning of schedules, resources, and change requests.

For questions which were not solvable at the program management level the program manager reported to the steering committee, which consisted of the board members and board representatives of the group, and a representative of the implementation partner. Important decisions, such as the cancellation of

Implementation Attempt 1, the approval of the go-live date and the approval of the cut-over scenario of Implementation Attempt 2 were taken there.

Below the projects, the ERP project consisted of streams, the reporting project of slots, which represented functional areas. Those entities were led by a stream(slot)-leader. At all levels (program, project, stream, slot), the business leader was assisted by a technical coordinator, which is common within A1/TA. Furthermore, the integrator had a representative at each level. This constellation was seen very positively, as every manager had assigned counterparts and they could supplement each other.

The reporting project acted slightly separated, and the streams had certain flexibilities. They needed to deliver certain deliverables but could act freely within their streams. This situation led to additional structures within the streams. Although certain flexibilities existed, the program was responsible for an overall integrity. Changes of personnel happened at all levels (board, project, stream, slot) over the long life cycle of the program. No negative impacts caused by changes of role owners were perceived by the interviewed stakeholders. The line managers were more strongly involved within Implementation Attempt 2, as their input and support was more extensively needed. As a consequence, they were invited to the buy-in meeting during the crisis and regular meetings afterwards.

Governance structure (Pantheon):

The ERP system was one standard product of a larger program. Exactly as most of the other products, the rollout of the ERP system comprised multiple projects. Thus, program clusters were introduced to bundle the related projects. The representatives of the program clusters represented the interests of their products in relation to other products. Furthermore, the program cluster provided assistance, guidelines and reported to the program steering committee (consisting of the IT directors of all sites, central representatives of Saturn and from the standard products).

The competence center of the ERP system got the order to develop and implement the ERP system. The competence center worked closely together with the program cluster and reported to the program steering committee. Although the relevant committee at Pantheon was the program sponsor and the sites had to implement the product Jupiter within a certain time, neither the program cluster nor the competence center Jupiter had the authority for directives regarding the rollout projects.

The sites have on the one hand their own duties and are autonomous, but on the other hand are connected through Pantheon. The rollout projects themselves had their own governance structures according to the needs of each site. The governance structure was extremely complex, but well elaborated and served the purposes of the program. Roles were defined early in the program, and well described.

However, the nonexistent authority for directives was sometimes perceived (by the competence center and the program cluster) as an obstacle which made the successful rollouts more difficult. A defined escalation procedure, escalating to the program steering committee could only partially mitigate this situation, and had impacts on the time schedule. Finally, the program cluster was a mediating force between the competence center and the sites, but also the program cluster depended on the goodwill of the sites.

Relation to seed concept (Establishment of a program-governance structure):

In both contexts, the high importance of the program governance structures is visible. At A1/TA, the ERP program as a post-merger endeavor had high priority. The awareness and the importance were visible during Implementation Attempt 2. Further resources and commitment could be generated, and the program management could prioritize projects and block other changes. At Pantheon, from the perspective of its context a proper program structure is difficult to achieve. Pantheon did the best possible under the given constraints. Nevertheless, this missing authority for directives was difficult to manage for the central service providers (program cluster and competence center). A sponsor which is hierarchically above the participating organization with complete authority over them is stressed by Yu and Kittler (2012) for an ERP program, as an example for centralized program management. Our results suggest that, in the case of Pantheon, this structure would have been beneficial, yet difficult to achieve.

We could directly link the axial codes to our seed concept and propose:

P6a: In the ERP program context, a well-defined governance structure throughout the entire life cycle contributes to program success.

P6b: The authorization to give direct directives increases the actionability of a governance structure.

6.2.7 Business Process Redesign

Business process harmonization/consolidation (A1/TA):

The post-merger phase of A1/TA was a difficult starting condition for A1/TA. In the blueprint phase, not all future processes were sufficiently defined. The program moved to the next phase, and it was difficult to

achieve a common understanding regarding future end-to-end processes, particularly in areas where processes should be harmonized. The missing process governance partially worsened the situation, and business processes were only unit-tested during implementation Attempt 1, without the integrated end-to-end view. Furthermore, it was difficult to grasp the business processes as sufficient data was missing, due to the poor results of the data-migration test-cycles. During Implementation Attempt 2 the establishment of project rooms, to locate small teams for fast decision making contributed to an alignment and shared perceptions regarding business process harmonization. Moreover, this led to an increased commitment and a better data quality. Certain goals, such as bringing custom-business processes back to the standard could not be achieved due to time constraints. 20 core processes were end-to-end tested successfully before go-live and passed the user acceptance tests. The majority of users had positive perceptions towards the new business processes after go-live. They made life easier, particularly in the harmonized areas. For accounting, business processes could be reduced from 1200 to 600, and a common chart of account created. Consolidated areas were planned to be further improved with the "Release 2"-program.

Business process redesign (Pantheon):

The general business blueprint and the development of the template were not met sufficiently and weighted towards Apollo1. Afterwards, the blueprint was improved within the flexible blueprint phases during each rollout. In general, it was a huge challenge to develop a comprehensive template which covers all envisioned consolidated and harmonized business processes in sufficient detail. Particularly, when too much time passes between the blueprint and the rollout, and the requirements and surroundings change ("moving targets"). The results suggest that a blueprint phase with a fit-gap analysis should be done at the start of every rollout-project, which details the outcome of the general blueprint. Furthermore, it seems that the more the business processes differentiate (e.g. more local laws) the longer this flexible blueprint phase will last. Of course, this proposition needs further investigation and we see here a potential for further research. For Pantheon, it might have been one reason that the scheduled rollout implementation times had to be extended.

Overall, the program contributed to an effective business process redesign, although the missing directive power made process harmonizations more difficult. First, the global blueprint and the integrated view with respect to other products paved the path for increased awareness (also for future contract negotiations) at the site-level. Second, although the blueprint could not meet the envisioned targets, the case at Pantheon illustrates the dynamics of a learning program. This includes the products and best practice lists issued by

the program cluster and the competence center. Third, a strict change process prevents the development of unnecessary process varieties. Fourth, the development of a common release management (with inclusion of Jupiter and other products) secures common and integrated end-to-end processes. For all those reasons, this CSF was strongly leveraged by the program.

Relation to seed concept (Business process reengineering):

In both contexts, the importance of an efficient business process redesign is clearly evident. At A1/TA the missing process ownership made agreements and shared perceptions more difficult. The necessity to initially define process owners with appropriate power and responsibility is emphasized from Žabjek et al. (2009). Furthermore, the post-merger phase was a difficult starting condition. At Pantheon, it seems that a comprehensive blueprint and template are very difficult to develop, when so many different laws need to be considered, and requirements are changing. The results suggest that a blueprint phase with a fit-gap analysis should be done at the start of every rollout-project, which details the outcome of the general blueprint. Both cases illustrate the need to sufficiently define the processes before the implementation phase (realization in the system) is started.

As a seed concept, business process redesign was emphasized and we could directly link the axial codes of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P7: In the ERP program context, an efficient business process redesign strategy over the entire life cycle contributes to program success.

6.2.8 Risk and Issue Management (Tracking and Tools)

Risk and issue management (tracking and tools), (A1/TA):

At A1/TA risks and issues were tracked in sufficient detail. The risk tracking consisted of an impact/probability matrix including a traffic-light system and response strategies. Scope adjustments and various approaches were evaluated with regards to the associated risk. Before go-live mitigation actions and workarounds were planned to reduce the risk and the probability of a negative public appearance.

Issues were tracked and prioritized according to business impact. The issue tracking was supported via a dedicated tool during Implementation Attempt 2, already in use for the test- and quality systems, which made the issue tracking process more efficient. Certain target values were defined, which needed to be achieved to enter the next phase. Issue tracking and the efficient status communication after-go-live were

included in the cut-over plan. The detailed process and the tool-support helped to reduce issues during the implementation and after-go-live quickly (partially for high priority issues with promotion to production at the same day) and the issue tracking and the whole process was rated very efficiently.

Particularly during Implementation Attempt 2 supporting tools were used heavily. Most, but not all (e.g. testing tool), strongly supported the methodology and made the process more transparent. This was primarily the case for the ERP project within the program. The reporting project was more flexible in that regards and could partially manage issues more easily due to their leaner structures, lower gravity of the issues and shorter communication channels. Some tools had to be used mandatorily also for the reporting project. Overall, the tool support fostered the efficiency and transparency of the risk- and issue management process.

Risk management (Pantheon):

Pantheon's risk management process was set up at the level of the larger program and across all projects. Additionally, separate program clusters, as the ERP system, central business partner, were highlighted in a separate section. A risk matrix, with traffic light system, depicting the impact and the probability was used. Accordingly, risks were allocated to the proper category in the risk register. General risks were described early in the life cycle. The exhaustive tracking of risks, within a cluster (product) and across projects and products reflects the integrative aspect of the ERP system also beyond product borders. Major actions in response to major risks could be approved directly at the program level.

The issue tracking process for the ERP system was initially not very transparent. The different groups within the virtual ERP competence center treated their issues differently (e.g. no formal ticket for minor issues). Early, after the first rollout, a tool was introduced which standardized this process. Additionally, the tool-support increased the efficiency and transparency of the issue-tracking process, likewise for new rollout and for operations.

Relation to seed concept (Risk and issue management):

In both contexts, the necessity of risk- and issue management were evident. Both concepts can be treated as one CSF as they are closely intertwined with each other with strong linkages to the used methodology. A risk could become an issue and vice versa, thus risk- and issue management is often treated together as emphasized by the Cabinet Office (2011). At A1/TA and Pantheon risks and issues were addressed and

tracked properly across projects and supported by tools. The tracking of risks on program- and project level was empirically emphasized from Pelegrinelli et al. (2007), opposed to predominant treatment in the past on single project risk management.

As a seed concept, risk and issue management were emphasized and we could directly link the axial codes of the cases to our seed concept. Thus, we propose:

P8a: In the ERP program context, efficient risk- and issue management over the entire life cycle contribute to program success.

P8b: In the ERP program context, appropriate tools foster efficient and transparent risk- and issue management.

6.2.9 Integration Management

Integration management (A1/TA):

Overall, at A1/TA with a multitude of systems, different departments are involved in product/system changes, e.g. the project management office, portfolio management, or the software architecture group. The ERP program had many integration points, and environments were depicted early in the life cycle, which comprised systems and products and stakeholders (internal/external). Partially, legacy systems were replaced by the ERP system. A greater challenge was the integration of more than 700 interfaces.

Within the ERP system, reflecting the nature of this kind of systems, the degree of integration was very high and processes impacted different modules. This was particularly challenging when integration tests with an end-to-end view needed to be conducted. This situation was worsened due to no clear assignment of process ownerships. Furthermore, functional areas do not exactly overlap with SAP modules. Harmonized processes had also an impact on consolidated processes as they had interfaces due to the highly integrated nature of the ERP-System. Also the reporting project was not limited to SAP, but needed to integrate other products as well, yet not encompassing such high degree of integration as the ERP system. ERP and Reporting needed a coordinated approach as well, with a design fitting to each other (ERP in the lead).

Integration points were considered throughout the program, and particularly during the cut-over period. This included partially “freeze-periods” which means a development stop (respectively only necessary developments) of integrated systems. For integration tests 3rd party systems needed to be interfaced with the SAP-systems which partially included shutdowns.

During Implementation Attempt 1 integrative end-to-end tests were not conducted sufficiently. This bore a high risk and was one reason for the cancellation of Implementation attempt 1. Also during Implementation Attempt 2 the integration testing, in certain areas, was conducted very late. One focused on 20 core end-to-end processes which needed to be tested to mitigate the risk of the go-live.

Integration management – software architecture (Pantheon):

The ERP system was integrated with a variety of interdependent products. These interrelations were reflected in the introduction of the larger program. The ERP system was a standard product within the program and needed to be implemented within a certain time-frame, considering the interdependencies to the other products. For the ERP system a program cluster (subprogram) was introduced. The program cluster represented the interests of the ERP system and the implementing sites towards other products (with their own program clusters) and projects.

Initially, for the ERP system a software architect was occupied to meet the overall programming guidelines, quality aspects and the software architecture. This role was cut at a later stage due to cost restrictions. However, the integrated nature of the ERP system with the variety of interfaces was extremely visible throughout the program life cycle. The interrelations were recorded in the meeting minutes of the steering committee and a common risk management across all products and programs was introduced, as well as an IT-map encompassing all interfaces. The integrated nature was extremely visible in relation to the interface to retrieving master records of business partners and the ongoing performance issues. This situation changed for the better over the course of the rollouts. Yet, in the end interfaces and performance were mentioned as points which could have worked better.

For future releases a common release management was introduced. As a consequence, the testing efforts for integration- and regression tests should be minimized. During the time of our interviews the first common major releases went successfully live, thus warranting a common release management. The common release management could be seen as an extension of the larger program, which was definitely beneficial due to the highly integrated natures of the product.

Relation to seed concept (Definition of an integration management strategy):

In both contexts, the importance of an efficient integration management strategy is clearly evident. At A1/TA, the ERP system was highly integrated. This included processes across functional areas and various

interfaces to other products. The missing process ownership made contributed to difficulties during the integration testing of end-to-end processes. At Pantheon, a larger program comprised the highly integrated products, the products were represented through program clusters. Afterwards, a common release management was introduced. This constellation perfectly illustrated the beneficial impact of a program in integrated environments encompassing related projects.

As a seed concept, integration management was emphasized as an important CSF and we could directly link the axial codes of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P9: In the ERP program context, an efficient, and well elaborated, integration management strategy over the entire life cycle contributes to program success.

6.2.10 Time and Scope & Financial Management

Realistic timeframe and scope management (A1/TA):

The initial go-live date was defined by the CFO in collaboration with the CTO and approved by program management. Early during Implementation Attempt 1 certain stakeholder groups (implementation teams, line management) put the feasibility of the go-live date in question. These doubts had an impact on the engagement, commitment and motivation of these stakeholder groups. It turned out that the envisioned time schedule could not be met and implementation Attempt 1 had to be abandoned. During the crisis Implementation Attempt 2 was planned. Different options were discussed and approved by all stakeholder groups during the buy-in meeting. The new schedule was ambitious but realistic. All stakeholder groups strongly committed themselves to the new go-live date. Finally, although tightly and under pressure, the new schedule could be met.

The scope was initially defined, but not broken down sufficiently within the blueprint phase. Thus, the exact scope was not always clear during the implementation phase. The scope needed partial adjustments or was postponed. A change request process tracked scope adjustments and its financial impacts. The results suggest that although the scope was initially defined the ambitious timeframe caused some trade-offs. Thus, regular scope adjustments secured the successful go-live.

Comprehensive time management, scope management, financial management (Pantheon):

The development project of the ERP system and the subsequent rollout projects were initially defined in relation to other milestones and dependencies to other products and projects within the larger program. The program steering committee decided about adjustments of the time schedule and the impacts on other products and projects were considered. This was also the case as adjustments in relation to the ERP system needed to be done. As a consequence, the time schedules of single projects were fitting into the overall schedule and all program stakeholders were on one page.

Originally, the entire scope of the ERP system should have been defined in a common blueprint for all sites. As it turned out that not all requirements could have been grasped (due to different underlying laws, processes and changing regulations), scope adjustments were necessary. A change request process was established, but it was not always easy to differentiate between original requirements (original scope) and changes (scope adjustments). Nevertheless, the clear, strict and tool-supported change request process was very important in relation to scope changes. As a consequence, the targets of scope management were partially met, although the complex context could have been partially mitigated with e.g. flexible blueprints.

The original budgets were confirmed and approved by the highest committee of Pantheon, consisting of the chairmen of all sites. This included internal development costs, external consulting costs, license fees, maintenance and compensations for initial product developments performed within Apollo1. These costs were allocated to all sites. Apart from these development costs, additional funds e.g. covering program or site costs was secured. Costs versus benefits were highlighted in a dynamic business case and in a TCO (Total Cost of Ownership) calculation. Possible adjustments were considered in the initial funding plan. Adjustments and prioritization, how to allocate human resources, were subject to the program, particularly in the beginning when the rollout projects did not perform as expected and time schedules needed to be stretched. As a consequence, it seems that the funds were secured over the entire life cycle and the program could allocate them properly.

Relation to seed concept (time and scope & financial management):

In both contexts, the importance of efficient time and scope and financial management is clearly evident. As all three concepts are interrelated and directly impact each other we treat all three together as one major concept. Adjustments needed to be done in both contexts, at A1/TA and Pantheon, reflecting the views of program management literature (Cabinet Office, 2011; PMI, 2008), emphasizing the dynamic and flexible

view of the program life cycle. As such, we could directly link the axial coded of the cases to our original seed concept. Thus we propose:

P10: In the ERP program context, the initial definition of a strategy and the dynamic and flexible treatments of time, scope-, and financial management over the entire life cycle contribute to program success.

6.2.11 Methodology

Methodology (A1/TA):

A concrete methodology was used during the program. Nevertheless, particularly for Implementation Attempt 1 it was problematic that one continued with the implementation, although the blueprint phase was not sufficiently finished. This contributed to the problem, that the users did not know what process with what data to expect. From a conceptual perspective, this was improved during Implementation Attempt 2, as during the buy-in meeting (during the crisis phase) different, concepts (particularly for the data migration and cut-over were presented) and approved.

A general risk register at a program level existed, as well as the tracking of issues with tool support. The reporting project was a little bit autonomous from methodological requirements, as it performed well. For Implementation Attempt 2 a detailed, continuously refined, cut-over scenario and a planning of the hypercare phase existed. Also in that direction the program improved compared to Implementation Attempt 1. A shortage of the program was that not all the developments were documented as initially planned. From a program perspective, it was beneficial that the program could flexibly react to the changing environment during the life cycle of the program, granting tolerances to projects but securing integrity at the same time.

Testing (Subcategory methodology - A1/TA):

Different tests were part of the methodology. Development and unit tests, end-to-end testing (including interfaces), user acceptance tests. During Implementation Attempt 1, the unit tests were in many cases completed successfully, but without an integrated end-to-end view, bearing a high risk. During Implementation Attempt 2, the end-to-end testing was conducted successfully, but could only be sufficiently tested after the last test migration test-cycle. Here, the program management put the priority on 20 “core” end-to-end processes. The testing was regularly tracked, partially automated with tools, and included quality

gates. For important and urgent tests of the reporting project the program released sufficient resources. Thus, from the prioritization perspective testing benefitted from the program approach.

Methodology (Pantheon):

Within Pantheon an appropriate methodology was used extensively at the level of the program cluster, as well as for the ERP implementation itself. The Jupiter Competence Center used a well-established method developed by the ERP vendor. Moreover, the methodology was adapted and improved over the course of the rollouts. Furthermore, also a rigid change process and a common release management strategy secures the integrity of the ERP system over all sites and with respect to other products. Certainly it helped that quite a few members of the program cluster and from the competence center have been experienced and certified users. One shortage of the ERP system implementation was that not all developments were appropriately documented as initially planned. This shortage was planned to be improved during the operations phase. All in all, we conclude that the use of appropriate methodologies contributed to the overall success.

Testing (Subcategory of methodology) – (Pantheon):

Early in the implementation phase, for the 2nd and 3rd rollout (wave 2) the central service providers realized that deliverables in regard to testing are missing. Thus, the program reacted and the program cluster had the responsibility to get more involved in testing. The new role was a staff position, and should support the test manager staffed from the local sites (with two exceptions due to resource constraints where the staff position solely filled the role of the test manager). The program cluster assisted in the definition of test-cases (targets/non targets), status of testing, what resulted in best-practice lists for usage within later waves. However, for unit testing, and user acceptance testing the program-character had no significant influence.

Due to the missing authorization for direct directives towards the sites, the central service providers had to rely on the goodwill of the sites. For integration- and regression testing (also later for common releases) a certain pressure existed for local sites, as a delay would have had negative effects on the entire program and other sites. The testing was supported through continuous increase in the usage of tools. Nevertheless, testing remained a challenge and the degree of cooperation differed between the sites. Consequently, the testing phase was perceived as the worst phase for some member of the central service providers.

Relation to seed concept (definition of a program-methodology):

In both contexts, the importance of an appropriate methodology throughout the whole life cycle is clearly evident. At A1/TA it seems that particularly the decision to go into one phase without finishing the previous phase caused problems, as stressed by Markus and Tanis (2000). At Pantheon, all aspects of an appropriate methodology were considered, although transparency was partially missing from the perspective of the central service provider regarding the sites.

As a seed concept, appropriate methodology (including testing) was emphasized and we were able to directly link the axial codes of the cases to our seed concept. Thus, when we interpret the results of our two cases we propose:

P11: In the ERP program context, the usage of an appropriate methodology (including testing) over the entire life cycle contributes to program success.

6.2.12 ERP Implementation Partner

ERP implementation partner (A1/TA):

At A1/TA a new strategic sourcing concept was implemented. This included the replacement of existing partners against a new central partner. This decision was not regarded as popular by all stakeholder groups or parts of it (e.g. certain perceptions in the local IT group), but supported by the program management also with regard to implement “new” processes. After the conception phase the new central partner was replaced (an invitation to tender was initially planned), due to cultural, methodological, technical and communicative reasons, and a more appropriate offer of a competitor.

A new central implementation partner took over the responsibilities with the premise to bring the historic vendors on-board. This change was generally perceived positively. However, it was not so easy for the new implementation partner to make himself familiar with the business processes (often custom-made) within a short time, and without extension of the initial schedule. In regard to the migration processes different perceptions between the implementation partner and A1/TA existed. Particularly in relation to migration the performance increased during Implementation Attempt 2. After all, the cooperation with the new central implementation partner was perceived positively. The onboarding of historic vendors might have leveraged these perceptions.

Implementation partner (Pantheon):

As the ERP systems was an implementation of a rather new package not so much internal know-how existed and also the pool of external resource was not that high. Pantheon hired a lot of very experienced senior consultants from SAP, and from SAP partners at a later stage when the program needed more resources. Furthermore, some project management experts were hired.

All roles were staffed with an internal and an external project member, to secure know-how transfer. During the initial rollouts many resources were bounded, what was an enormous cost factor. Due to program nature the resources could be allocated efficiently. At the end of the implementation many external consultants could be sourced out, and internal project members took over more tasks, after the successful know-how transfer. Nevertheless, it seems that external consultants played an important role during the entire life cycle. This fact was partially leveraged through the novelty of the ERP system package.

Relation to seed concept (Proper use of consultants):

In both contexts, the importance of the ERP implementation partner throughout the whole life cycle is clearly evident. At A1/TA it seems that the knowledge of historic partners must not be underestimated, and that a strategic change should be executed smoothly (Sullivan, 2014). This warrants the premise of building stable relations (e.g. Somers and Nelson, 2004). At Pantheon the “pioneer” know-how of the consultants, particularly in relation to a new software package, plays an important role. Furthermore, the know-how transfers to internals and the efficient management of the external partner(s), including the allocation to sites, is an important factor too.

As a seed concept, the proper use of consultants was emphasized and we could directly link the axial codes of the cases to our seed concept. We adopt the label to “ERP implementation partner”, to attribute better for the implementing company to assure the system reliability (Soja, 2010). Thus, when we interpret the results of our two cases we propose:

P12: In the ERP program context, the efficient cooperation with an ERP implementation partner over the entire life cycle contributes to program success.

6.2.13 Ensuring Data Migration/ Accuracy & Management

Data migration (A1/TA):

Data migration was a main challenge for A1/TA and thus a major CSF within the program. The scope included the consideration of more than 3800, partially comprehensive, custom developed objects and more than 700 interfaces. A new chart of account was introduced which included a reduction of accounts by 80%. Additionally, vendor and customer accounts were reduced by 70% and only 10% of transactional data was migrated. Many mapping and conversion rules had to be followed and it turned out that the new processes need to be regarded together with the data. As this CSF was particularly not met during Implementation Attempt 1, this mismatch strongly contributed to the abandonment of the initial envisioned go-live date.

Certain issues needed to be improved in regards to data migration before Implementation Attempt 2 started. The migration tools did not work as expected, and the amount of data which could be expected in the new system was not clearly communicated to the stakeholders. The big bang approach worsened the situation, and end-to-end processes could not be tested. During the crisis different migration approaches were prepared, and presented to the stakeholders during the buy-in meeting in the crisis situation. The migration scope was slightly enlarged and approved by all stakeholders. Additionally, a high-level data migration manager was appointed, and the migration team restructured. Very late in the project, during the last data migration test cycle, the end-to-end processes could be tested sufficiently. Partially, data were migrated directly to the reporting-system, and replaced the migration to the ERP system. Thus, the ERP migration could benefit from another project within the program. The improvements during Implementation Attempt 2 led finally to a successful go-live.

Data management (Pantheon):

Early in the definition of the to-be-state of the ERP system, central targets were listed. This included a central business partner repository, standardized interfaces to other standard products within the program and an improved data quality. It turned out that these ambitious targets needed more time than originally scheduled. Data cleansing was not finished in time during the first rollouts and workarounds were established to meet the targets of the central business partner repository. Furthermore, the extraction of legacy data in an appropriate format remained an issue. As a consequence, time schedules were stretched and data cleansing started earlier in the preparation phases of the single rollout projects. Interfaces to standard products could be improved over the course of the rollouts, as well as the different interfaces to

sites´ legacy applications and the central business partner repository. The positive results, as a consequence of organizational learning, were strongly driven through the central consideration of the issues by the program cluster responsible for the ERP system. Thus, the initial defined targets could be met successfully.

Relation to seed concept (Ensuring data migration/ accuracy & management):

In both contexts, the importance of data management, including the definition of proper formats, data cleansing, mapping and the integrative aspects of interfaces are clearly evident. The relevant definitions should be made early in the implementation and consistently followed throughout the whole life cycle to accurately meet all the targets of data management. A1/TA, as well as Pantheon, needed to sharpen their strategies over the life cycle although they were initially defined. Additionally, the results suggest that the integrative aspects of data management across projects and products is stronger in an ERP program context than in a traditional project setup.

As a seed concept, the ensuring of data migration, its accuracy and management was emphasized and we could directly link the axial codes to our seed concept. Thus, when we interpret the results of our two cases we propose:

P13: In the ERP program context, the early definition and the adherence to a data management strategy (including migration and accuracy) over the entire life cycle contribute to program success.

6.3 New CSFs – No Coverage in Seed Concepts

In this section we present new CSFs that were not identified during the literature review as seed concepts. As such, they are new in the ERP program context.

6.3.1 Collaboration and Decision Making

Establish collaboration and decision making (A1/TA):

Another CSF, which unfolded over the different ERP program phases at A1/TA is collaboration and decision making. During Implementation Attempt 1 too many people participated in diverse meetings, hindering effective collaboration and decision making. Some of them were only involved to a minor extent. The many salient groups which existed worsened the situation due to different perceptions. Furthermore, it is not that easy that perceptions converge when a large audience is involved. This CSF significantly improved in the post-crisis phase, also through the corrective actions (e.g. separate project rooms introduced, alignment of the new communication strategy) taken during the crisis. The corrective actions in later phases had been

necessary, since the outcomes of earlier phases became starting conditions for the next phase, and thereby either increased or decreased the likelihood of success (Markus and Tanis, 2000). The role of different groups of people is also partially tackled by Markus and Tanis (2000), and they mention the communication difficulties that accompany the "handoffs" between phases. During Implementation Attempt 2, smaller, empowered teams were located together, enabling collaboration and decision making. Furthermore, perceptions converged and group borders blurred. Lastly, the introduction of tools (e.g. issue tracking) supported efficient collaboration.

Collaboration (Pantheon):

In the three teams at different sites were building the ERP competence center. Each team initially had to establish and maintain their areas of competence, their tasks and responsibilities. Regular meetings, telephone conferences, mutual respect, and informal meetings positively contributed to efficient collaboration. The introduction of tools supported efficient and standardized collaboration regarding incident handling and the support improved over the program life cycle. Generally, the collaboration between the three teams building the competence center was perceived positively by the stakeholders, better than expected, contributing to the program success.

The collaboration with project members from local sites differed. At some sites the collaboration was perceived as a positive and transparent one, at other sites the competence center was sometimes confronted with unexpected circumstances. The program cluster tried to act as a neutral force and to mediate between the two parties.

The collaboration between the sites seemed to work properly, as the information exchange through regular telephone conferences, and physical meetings was facilitated. Thus, sites implementing at a later stage could consider the experiences from sites implementing at earlier stages, as stressed by van Fenema et al. (2007).

Relation to seed concept:

No seed concept identified.

Although no seed concept was identified during the literature review, both contexts clearly show the importance of efficient collaboration, therefore warranting that this concept is indeed a CSF in the program context. At A1/TA collaboration and decision making continuously improved, leading to common perceptions and the blurring of group borders. At Pantheon efficient collaboration was evident almost

everywhere. At some sites an improvement of collaboration would have been beneficial. The PMI values the importance of decision making as they state in their "PULSE of the Profession" report that successful organizations are "embedding a culture that enables an effective decision-making process and supports the people making the decisions" (PMI, 2015, p. 6). Furthermore, they add that in projects and programs the right support, information and a transparent process are needed to support effective-decision making. Teams with members having different perspectives and experiences will increase the richness and security of decision-making (PMI, 2015). We thus believe that in an ERP program where many salient groups are involved, it is of major importance to establish an environment, where effective "Collaboration and Decision Making" can take place and propose:

P14: In the ERP program context, efficient collaboration and decision making over the entire life cycle contribute to program success.

6.3.2 Human Capital Management

Human capital management (A1/TA):

Within A1/TA all roles at all levels were covered by two persons, one person with an IT background and the other with a business background. The sourcing of the team members was in the responsibility of stream-leads and the relevant technical coordinators. The project and line managers' bilateral negotiations secured the availability for the project beside operational work. During Implementation Attempt 2 the emphasis shifted into direction of the project, and additionally workloads were compensated after alignment with the HR (Human Resources) departments. Particularly during implementation Attempt 2, roles were clearly defined and empowered, resulting in small, fast and empowered teams. The program management could prioritize the allocation of resources, which helped to achieve the most important targets. Nevertheless, some key players had a strong workload and were not always backed up, which bore certain risks. The need for a sufficient amount of key resources was also emphasized within the lessons-learned workshop at the end of the program. The results strongly support the need for efficient human capital management, as well as the beneficial impact of a program in regard to allocating the resources efficiently to the projects.

Human skills & competencies (Pantheon):

The right mixture of human skills was seen as a CSF within Pantheon. Two out of the three sites forming the virtual ERP system competence center, had initially no SAP experience. Additionally, at these sites new employees were hired. All employees within the ERP system competence center were trained with relevant

ERP system and process knowledge. Furthermore, external consultants were assigned to internal employees, which should secure efficient knowledge transfer. This transfer was visible over the course of the rollouts. Additionally, the business experts at the local sites were trained in relation to the product and in relation to project work. The business experts were involved early in the life cycle, were able to contribute to the solution design and benefitted from information exchange with other sites. One rollout was postponed as the site wished so, due to limited resources during the initially planned rollout period. This illustrates the need for appropriate resources also at the site-level. External project management resources were hired, as well as some central roles covering solution architecture, quality, performance and general issues. Early in the life cycle all roles and responsibilities were clearly defined. As a consequence, the ERP system implementation team, the business experts at local sites and central roles were well staffed over the entire life cycle and the paths for organizational learning and job enrichment were paved.

The program character of the rollouts allowed the efficient allocation of resources from the competence center. Furthermore, the program cluster represented the ERP system in relation to other products. During the program central resources, as the ERP system competence center, were built which can cover future maintenance and enhancement issues as a central service provider. Thus, the program fostered the efficiency of the ERP system implementation in relation to human skills and competencies.

Relation to seed concept:

No seed concept identified.

Although no seed concept was identified during the literature review, both contexts clearly show the importance of efficient human capital management, therefore warranting that this concept is indeed a CSF in the program context. Although similar CSFs, as “project team” (e.g. Somers and Nelson, 2004) can be found in the ERP literature, human capital management focuses less on external resources and more on the management of internal resources. This includes the early definition of roles and responsibilities, efficient sourcing and training, as well as the employee’s opportunity to grow. The PMI emphasizes the necessity to align talent management with organizational strategy and the increasing need of project management resources. They stress the need to develop high performance teams, selection, career progression and the collaboration with contractors (PMI, 2013b). However, whereas they seem to focus rather on project managers, our CSFs puts a stronger focus on all employees participating in the projects and programs. This includes a certain understanding of project work, as emphasized within Pantheon. The selection of the right

internal employees as we could observe at A1/TA reflects the view of Bingi et al. (1999), who also stress the possibility that functional departments are often unwilling to sacrifice their best resources toward the ERP implementation needs. Thus, the availability of key players and the right resources has to be considered early in the life cycle (Nah and Delgado, 2006). Ideally, as Parr and Shanks (2000, p. 295) put it "the best people full-time". This CSF encompasses also the knowledge transfer of consultants to internal resources to learn independently maintain the system, as observed at Pantheon, and stressed by Ko et al. (2005). Lastly, both contexts show us the beneficial impact of a program in relation to resource allocation, which Lycett et al. (2004) summarized as more effective resource utilization. For all those reasons, we propose:

P15: In the ERP program context, efficient human capital management over the entire life cycle contributes to program success.

6.3.3 Flexibility of Program Components

Flexibility of program components (A1/TA):

We identified "Flexibility of Program Components" as a new CSF, which is clearly program-specific and would not be applicable to a more traditional project level setup. In particular, it relates to separate methodological requirements for different projects as exemplified at A1/TA. The reporting project performed well from the beginning, and the program management granted the reporting project certain tolerances. Presumably, the ability to account for specific setups and requirements contributed strongly to the final success of the ERP program. This finding is of particular importance for practitioners, but also future ERP research should build more on this insight and its placement within the program management literature. The CSF also refers to exercising program management not by the micromanagement of individual projects, which is the independent domain of project managers given certain tolerances set by program management. The program management must create mechanisms to assess the performance of its processes and projects (Cabinet Office, 2011) within these tolerances. "The effective use of tolerances can directly enable the efficient execution of a program" (PMI, 2008, p. 82). Thus, we conclude that this finding is congruent with well accepted standards of program management.

Flexibility of program components (Pantheon):

We did not find any relevant data within the case database of Pantheon, and we would rather suggest that the central service providers would have preferred as many similarities as possible between the rollout projects (components). However, as the sites were autonomous, they were more flexible as the competence

center and the program cluster would have liked to be. In the case at Pantheon the flexibility of program components was certainly not wished for, but could only be avoided to a certain extent.

Relation to seed concept:

No seed concept identified.

At A1/TA the flexibility of program components was an advantage, whereas at Pantheon it needed to be "tolerated". This illustrates that a CSF always depends on the context in which a concept is used, a main strength of case studies and interpretive research. It seems that is of importance whether the flexibility is preferable as within A1/TA or not preferable as in Pantheon. Thus, we propose two propositions which should be investigated by future ERP research:

P16a: In the ERP program context, the flexibility of program components over the entire life cycle contributes to program success if this flexibility is favored by the program management.

P16b: In the ERP program context, the flexibility of program components over the entire life cycle negatively affects program success when the flexibility is not wanted by program management but needs to be tolerated.

6.4 Axial Codes Without Direct (1:1) Reflection Within Seed Concepts

In this section we present axial codes, which were not considered as separate CSFs. They were considered as a subcategory of another CSF or dropped.

6.4.1 Commitment of Key Players and Team (Considered in Stakeholder- & Communication Management)

Commitment of key players and team (A1/TA):

Keeping up the commitment of all relevant stakeholders over the entire life cycle was a big challenge at A1/TA. This requires the proper identification of all stakeholder groups, including the line management. This was certainly not sufficiently met during Implementation Attempt 1 but improved within Implementation Attempt 2, as different go-live variants and migration scenarios were presented and approved during a buy-in meeting. The commitment of line management is essential as a response to unavoidable trade-offs between project- and operative goals. Social activities, compensation for additional workloads, opportunities for employees to grow with the implementation, sufficient involvement and empowerment,

as well as proper communication contribute to ensure the commitment of key players and the team over the entire life cycle. This commitment appeared to be higher within Implementation Attempt 2 at A1/TA**.**

Commitment (Pantheon):

At Pantheon the commitment of the employees at the different sites differed. One prerequisite was the proper communication of changes, which was a joint effort between the central service providers (competence center and program cluster) and the site rollout manager. Changes needed to be conveyed properly and business experts needed to feel involved and not disempowered. Certain channels were used, such as the intranet, newsletter, roadshows and informal meetings. Employees could take on new challenges and roles, and could also benefit from the monetary perspective. One limitation of our study is that we did not directly measure the commitment of business experts at the different sites, only indirectly as perceived by the central service providers. The commitment of the central service providers seemed to be present over the entire life cycle.

Relation to seed concept (Stakeholder- & Communication Management):

In both contexts the importance of ensuring commitment of the key players and the team was clearly evident. Similar actions such as communication, involvement, remunerations and empowerment increase the commitment within both cases. However, after double-checking the descriptions of a relevant seed concept (stakeholder and communication management), which included "ensuring ongoing commitment from all relevant stakeholders", we came to the conclusion that, although reflected as axial codes in both cases, the commitment of the key players and the team is in fact a subcategory. As such, it can be treated as a property of stakeholder- and communication management.

6.4.2 Readiness of Organizational Culture (Considered in Change Management)

Within A1/TA, which went through a post-merger phase, organizational culture was a prominent topic, and pre-merger identities still existed within the company. However, this topic was mainly covered within the change management project, therefore indicating that it could be treated as a subcategory of the CSF change management. Also within Pantheon, organizational culture played a role, and the sites were certainly different in that direction. We assume that this topic was covered within change management, but as change management was in the responsibility of each site we have no direct reflections within axial codes. We propose further investigation in that direction, as organizational culture certainly plays a crucial role in ERP implementations, and particularly within programs. Examples in the ERP context can be found in relation to

post-merger integration (Drori et al., 2013), country issues (Xue et al., 2005), accruing benefits in the post-implementation phase (Zhu et al., 2010) and mandating all systems in a specific language, e.g. English (Sarkis and Sundarraj, 2003). For the moment we treat readiness of organizational culture as a subcategory of change management.

6.4.3 Realization of Benefits (Considered in Establishment of a Vision and a Dynamic Business Case)

Although the realization of benefits was originally intended as a separate CSF, which is particularly relevant after go-live, we have to adapt this view at this phase. We suggest that the realization of benefits is a subcategory of "Establishment of a Vision and a Dynamic Business Case".

Anticipated benefits are defined early in the program, together with the vision and business case and they are irrevocably connected with each other. As a consequence, they are tracked in program documents throughout the entire life cycle and even in the operations phase after go-live (PMI, 2008), or as Bernroider (2008) puts it: "ERP success criteria defined in the early phases will not capture the entire scope of ERP related success during use and later periods". It is not always possible that a program continues until the end of the benefit measurement period, and operational managers take over the responsibility to complete those measures (Cabinet Office, 2011). Thus, key performance indicators defined early in the program, will be tracked together with the business case and vision throughout the ERP life cycle.

We could observe the tracking of the business case, the realization of the vision and the anticipated benefits within both cases. Given the timing of our interviews, certainly not all benefits were realized in this phase. Nevertheless, both case companies treated the initial defined success criteria dynamically and were still monitoring their realization. As a consequence, we treat the realization of benefits together with the vision and business case and change the label to "Establishment of a Vision, a Dynamic Business Case and Associated Benefits".

6.4.4 Appropriateness of the ERP Vendor (Dropped for our Contexts)

Neither within the case at A1/TA, nor within the case at Pantheon, did the question which ERP vendor and software package to choose crop up as an axial code. We found slight indications of possible reasons, but not enough to constitute a CSF. This might have been the case as the companies already had chosen the ERP vendor and the packages, perhaps also in conjunction with existing relationships. Thus, we skip this concept from our taxonomy for CSFs of ERP programs, but suggest further research within different contexts in that direction.

In this section we compared the CSFs in the ERP program context derived from our case studies. We related them to the seed concepts (of the initial literature review, when possible. We discussed some CSFs, which are new in the ERP program context and re-categorized others. Next, we focus on the dependent variable perceived success, and relate it to our case

6.5 Perceived Success and Benefits (Dependent Variable)

We now want to elaborate on how the relevant stakeholders at A1/TA and Pantheon evaluated their ERP programs. In order to achieve this, we recall our initial definition that we derived from the literature review. Thus, we compare how a case was perceived by relevant stakeholders in conjunction with relevant metrics for this specific case.

At A1/TA all stakeholders perceived the program as a success. However, most stakeholders admitted that not all initial targets had been achieved and the vision and the business case needed to be adapted. Nevertheless, the vision and targets were consistently re-evaluated and the business case adapted. In that sense, the most important targets associated with the adapted vision could be achieved, as well as the dynamic business case and the associated benefits. The program view, allowed the efficient allocation and prioritization of resources to projects. The customers of A1/TA did not recognize the system merger, which was one main premise. The number of issues after go-live could be reduced quickly. Thus, the program at A1/TA could be rated, consistently with the stakeholder views, entirely as a success.

At Pantheon, the stakeholders (to whom we talked) perceived the program likewise as a success. The product quality increased over the course of the rollouts. In the beginning the blueprint and the product were developed into direction Apollo1; in the end the product was perceived as very stable, flexible and almost without errors. Furthermore, the ERP was successfully integrated into the product portfolio, a common release strategy was developed and the adapted time schedule was met. The integration in an overarching program was perceived as a major contributor for the successful rollouts of the ERP system. The successful rollout was also honored with a quality award in the category “business transformation”, awarded by the software vendor.

We recall our initial definition of ERP program success:

Success in the ERP program context is how success is perceived by relevant stakeholders in conjunction with relevant metrics for the specific case.

Our cases strongly indicate that both implementations were a success. All stakeholders at A1/TA perceived the ERP implementation as successful, although some initial targets needed to be adapted for the sake of targets with higher priorities. These results confirm the need to keep business cases viable and valid (Cabinet Office, 2011) over the entire life cycle. At Pantheon the increasing product quality was strongly emphasized by all stakeholders, reflecting the dynamic nature of the CSFs and the resulting success, as suggested by e.g. Lyytinen and Newman (2015). Both cases support the suitability of our initial success definition as perceived success (Lyytinen and Newman, 2015) in conjunction with appropriate metrics (Markus et al., 2000b). In the next section we apply the SGISS-model of different perceptions to the ERP program at Pantheon.

6.6 Application of SGISS-Model of Different Perceptions (A1/TA) within Pantheon

After deriving the SGISS-model of different perceptions from our results gained at A1/TA we claimed that our model is general and parsimonious enough to be extended to other settings (Lee and Baskerville, 2003). This is certainly also the case for the SGISS-model, but an important limitation exists. For the case at Pantheon, we chose a different core category for plausible reasons, as organizational learning appeared more suitable as an overarching theoretical scheme than the mechanistic application of a model (SGISS-model), for which the data was not collected.

The core category has analytical power and pulls the other categories together forming an explanatory whole. The theory is refined, reviewed for internal consistency, gaps in logic. Poorly developed categories are refined and validated (Strauss and Corbin, 1998). The application of a theory ex post bears the risk that not all categories can be fully developed, as some data points are simply missing. When the data collection was already finished, it is often difficult to refine poorly developed categories. Thus, we look primarily if we can find some data points within the Pantheon case which indicate that the SGISS-model could be applied in principle.

With regards to different stakeholder groups we found different data points in our data which indicate that different perceptions existed. According to the SGISS-model, those different perceptions in regard to each CSF form salient groups and a high positive fit of perceptions is a prerequisite for meeting the CSF. As the following two quotations indicate this was not the case at Pantheon and thus the different perceptions of salient groups could have been root causes for not meeting the targets of various CSFs.

QCCC1: Apollo1 was the site which was most straightforward...as there was greatest understanding of the content [of the blueprint].....We wrote the blueprint over a long time and sent it to quality assurance....then

someone was sitting opposite to me who had no idea about SAP, sometimes not even from IT, since they are administrative staff. And now he needs to check if all his wishes were considered. And I am sure that from 9 sites, 6 said 'Yes!', only since they didn´t know it better....and here Apollo1 had of course an advantage...since we used a language which they knew already... A) they scrutinized it better and B) the blueprint was weighted heavily towards Apollo1...since we of course had only the experiences of Apollo1, that´s why a lot of processes reflected the processes of Apollo1....therefore it [the blueprint] was okay for Apollo1, at least in the SA1 (settlement area 1). (Rollout (ERP Jupiter project) leader for several rollouts, 437 ff.)

The first quotation (QCCC1) indicates that different perceptions existed during the blueprint phase. Apollo1 and the central service providers (mainly ERP system competence center) had similar perceptions regarding business processes (CSF 1) and collaboration and decision-making (CSF 2). The other sites, with no SAP experience, formed another salient group with different perceptions. Consequently, the product and the business processes of the ERP system strongly reflected the requirements of Apollo1, leading to problems in the early rollouts.

QCCC2: We had two rollouts I really was really afraid of.... At [site] WILLNOTMENTION1 and [site] WILLNOTMENTION2 during the blueprint-phase...they were reserved and partially presented themselves very, very fiercely. 'We demand this and that and....'....After the blueprint phase, I had not too much contact with them, and I could not find out if something had changed in their minds. But it was true that I had the feeling they were [during the implementation-phase] set up properly, from the organizational perspective. Perhaps my initial fear was baseless, or my skepticism. But...perhaps something simply changed in the mind of the customers [sites]. Perhaps in the direction: 'Ok, it looks like that, we have no other choice than to use that thing [ERP system], so it is best we make friends and make the best of it.' (ERP system expert, work-package responsible, participated in all rollouts, 830ff.)

The second quotation (QCCC2) indicates that different perceptions probably existed during the blueprint phase and converged during the implementation phase. Salient group 1 (sites) and salient group 2 (central service providers, particularly the ERP system competence center) had different views regarding the scope (CSF 1) and business processes (CSF 2). Other CSFs could have been impacted too, e.g. in regard to data migration, how and which data should be migrated from the legacy systems. As implementation phases for the relevant sites were scheduled for a later phase within the life cycle (later wave), the product quality of the ERP system was already very high, so it is likely that certain requirements and business processes were already developed during earlier waves. This led to a high positive fit of perceptions in relation to the CSFs

“scope management” and “business process redesign” and the group borders of the initial salient groups blurred. In short, no reasons for different perceptions in relation to these CSFs existed anymore, in contrast to the blueprint-phase. It might also have been the case that the perceptions in relation to the CSF “collaboration and decision-making” changed.

Consequently, it seems that the SGISS-model of different perceptions could be used to describe the dynamics of CSFs at Pantheon as well, thus indicating the applicability of the model in different settings and beyond the case it was developed for, at A1/TA. Again, we want to recall the limitation that the model was applied ex post, so certain data points are missing. At least we found some indications and for the generalizability of the SGISS-model of different perceptions, which support the suggestion to apply the model to further settings.

Next, we apply the organizational learning model in the ERP program context, derived from the Pantheon case, to the A1/TA case.

6.7 Application of the Organizational Learning Model in the ERP Program Context (Pantheon) within A1/TA

We apply now the model of organizational learning in the program context to A1/TA. Again, the application of a theory ex post bears the risk that not all categories can be fully developed, as some data points are simply missing. Again, we look primarily to see if we can find some data points within the A1/TA case which indicate that the organization learning model in the ERP program context would be suitable.

First of all, we also need to consider the context of Pantheon. For Pantheon the model was developed for a multisite rollout and a phased approach; that is, a rollout in different waves. At A1/TA we did not have an implementation for multiple sites and a big bang approach. However, we can treat Implementation Attempt 1 and Implementation Attempt 2 as separate waves, and the re-planning phase in the middle as a loop of organizational learning (Figure 6-1).

During Implementation Attempt 1 certain actions in regard to CSFs did not lead to the anticipated outcomes. This feedback added to the programs knowledge base and could be considered during the re-planning phase. There, data were collected, interpreted and new actions for Implementation Attempt 2 were defined, which should lead to the anticipated outcomes. Certainly, also during each wave organizational learning can take place. Thus, the model derived from the case at Pantheon could also be applied to A1/TA and explain the happenings at A1/TA.

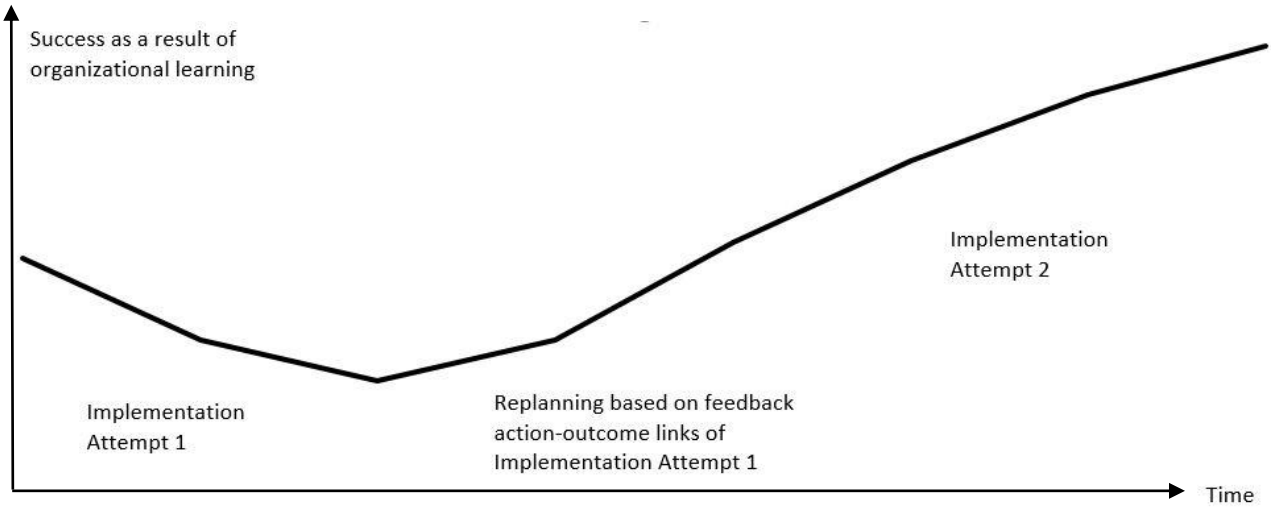


Figure 6-1 Success as a Result of Organizational Learning at A1/TA

Organizational learning within the program at A1/TA is also stressed in quotation QCCC3. Templates and structures could be interpreted as the knowledge base of the program or its organizational memory. Based on experience and recurrence, new action-outcome links could be chosen, as a response to requirements. The new actions applied within Implementation Attempt 2 led to improvements (anticipated outcomes) in relation to certain CSFs, as the program manager suggests in QCCC4. Thus, the program was successful as a result of organizational learning manifested in dynamically improved CSFs.

QCCC3: Good internal and external communication is also essential during a project, but I think even more important during a program. That involved people [stakeholders] getting informed via the program, that consistency and repetition are reflected [within the program]...that a template-requirement is reflected in certain structures. A human is driven from the learning perspective, what he already saw and what is recurring, is more reasonable transported to the head [mind]. And the program can communicate and transport those requirements better. (Technical coordinator of the program, project manager ASAP, 661 ff.)

QCCC4: The essential point was the increased professionalism in the migration team, we also had some changes in the team composition...collaboration and the interplay between development, test migrations, tests, integration-tests, end-to-end tests, data cleansing....were much better, and team collaboration much better. (Program manager, interview 2, 133 ff.)

Finally, the lessons learned from the program were highlighted during a closure workshop and can be used as an asset for future programs, as the program manager asserts in QCCC5.

QCCC5: In April we conducted a formal closure workshop, with the team, core-team, also with lessons learned. What was running well, what was not running well? That was very interesting. These results will be used within other programs. Since many topics are not [only] program-specific, but also specific to the company. What are the takeaways, that we do not make the same mistakes again? (Project manager CSAP (change project), 13:8)

At the time when we conducted our last interview, the new program (Release 2) was intended to start. When we treat the new program as new wave, using partially the same structures as the previous program (e.g. the steering committee was still in place, similarly human resources), this would be a further indication for the suitability of the organizational learning model in the A1/TA context.

6.8 Benefits and Goals of ERP Program Management

With respect to our third central research question "*What are the benefits for companies to structure their ERP-implementations in programs",* we take the categorization of Lycett et al. (2004) and relate it to our specific contexts in Table 6-3, on the next page. In column 2 we describe the observed benefits we identified in the ERP program at A1/TA. In column 4 we do the same for the ERP program at Pantheon. In both contexts, the expected benefits could be observed.

6.9 Summary

In this chapter, we compared our cases during a cross-case analysis. We compared the contextual characteristics of the selected ERP programs. Then we presented a general list of CSFs in the ERP program context, after relating them to the seed concepts of the literature review. Next, we highlighted our definition of ERP program success in relation to our programs. Then, we applied the two models of the case to the other setting. Lastly, we compared the benefits of the two ERP programs. In the next chapter, we present the overall discussion of the results. To this end, we come back to our three central research questions of Chapter 1 (Introduction), highlight the implications for research and practice, and present the limitations of our research.

Goal/Benefit	Description A1/TA	Observed	Description Pantheon	Observed
Improved coordination	The program ASAP comprised five projects which were strongly linked via the program structure and the common time schedule. The program management had the bird´s eye view of all projects, which improved coordination and integrity.	Yes	The program Saturn comprised a magnitude of standard products which were rolled out at different sites. The rollouts of the ERP system Jupiter significantly benefitted from the program structure and its related product clusters, e.g. in terms of time management, resource allocation and risk management. Previous experiences for similar implementations proved to be less successful as they were not associated with a program.	Yes
Improved dependency management	Dependencies and priorities could be managed more efficiently. For example, the main project ASAP was prioritized compared to the conception project release 2. Dependencies between ASAP and BSAP could be adequately considered. An integrated program view over all projects was secured.	Yes	The interfaces, the solution architecture and integration management could be sharpened over the course of the rollouts. The program secured an integrated view of all sites and products.	Yes
More effective resource utilization	Resource allocation could be prioritized easily. The program manager had the power to decide to which projects shared resources were allocated. This was visible for ASAP in relation to the conception project for release 2. Partially resources were assigned to BSAP when there was a strong need for it (e.g. urgently required testing resources).	Yes	During all rollouts of Jupiter, the same resources were utilized. This included external and internal resources, at all levels. The resources could be transferred more easily, and a know-how transfer happened over the course of the rollouts and from external to internal experts. In the beginning (wave 2) when some sites proved to be problematic more resources needed to be assigned to these rollout-projects. This could be	Yes

			considered at program level where this was explicitly mentioned in the meeting minutes and the time schedules.	
More effective knowledge transfer	Lessons learned could be applied during Implementation Attempt 2. Furthermore, they were conserved, highlighted during the closure workshop and are ready to use in future programs. The model of organizational learning in the program context can be applied to the case at A1/TA.	Yes	Lessons learned and knowledge management were continuously employed in the program, and key-persons of all sites were involved right from the start. This illustrated that a program structure has major benefits compared to a traditional project structure.	Yes
Greater management visibility	Greater awareness and management visibility were mentioned several times during the interviews, as benefit compared to a traditional project structure. This helped to prioritize the program as top priority initiative in relation to other initiatives in the company's portfolio. Strong management support was particularly visible during Implementation Attempt 2.	Yes	The common program governance structure allowed effective controlling and monitoring of budgets, time and quality on appropriate levels.	Yes
More coherent communication	The project managers of the single projects and the program management strongly communicated with each other. This might have been beneficial compared to traditional project structures, where each project is managed independently. Furthermore, the big bang approach and the common time-plan added to timely communication.	Yes	The program, as a temporary organization, already had a defined stakeholder- and communication management structure. The program cluster Saturn/Jupiter reported to the steering committee as well as the competence center Jupiter. Furthermore, reporting to other internal and external stakeholders benefitted from the comprehensive program view.	Yes

Improved project definition	All projects within the project were defined clearly, and in relation to each other. Thus, an integrated view about the overall program benefits and how to achieve them could be presented during the definition phase.	Yes	The program defined all the projects clearly and employed risk management, which was comprehensive and comprised all the different program clusters (bundles of projects) and products. As such also economics of scale could be realized as a consequence of shorter implementation cycles. The shorter implementation cycles were already planned in the definition phase of Jupiter.	Yes
Better alignment with business drivers, goals and strategy	As a strategic post-merger initiative ASAP was strongly linked to the company´s business strategy and the overall goals. These goals were considered in the blueprint and the technical solution architecture and accompanied by the change project.	Yes	The program provided the framework for the realization of strategic change, including a magnitude of standard products and business process changes, aligned them continuously with optimizing the solution architecture and integration management.	Yes

Table 6-3 Program Management Goals and Benefits (Lycett et al., 2004) in Relation to the Context of A1/TA and Pantheon.

7 Overall Discussion of Results

In this chapter we present the overall discussion of our results. We first elaborate on our central research questions. Then we present the implications for research and practice, based on these central research questions, and the limitations of our research.

7.1 Elaboration on Central Research Questions

Central research question 1: What are the CSFs of a successful ERP program and how do they dynamically evolve over the course of the program?

Table 7-1 depicts the final list of CSFs after conducting a cross-case comparison and relating the results of each case study to the seed concepts of the literature review. To get a better overview, we can summarize the results in categories. The first category (1-13) depicts CSFs were we could directly link the axial codes, to the seed concepts, thus basically confirming what we expected during our literature reviews. In the second category (14-16) we depict new CSFs in our program contexts, which were not evident in previous research and where we suggest further research in different ERP program settings. In the third category (17-20) we depict CSFs which were not considered as a separate CSF, but as a subcategory of another CSF (note that descriptions of those CSFs were adapted) or concept (17, 18, 19), or dropped entirely for our contexts (20). Note also that this list reflects the cross-case results of our settings, but could be different in other settings. As our unique instances were related to general ideas (seed concepts) they could apply to multiple situations, as suggested by Klein and Myers (1999). As a consequence, we suggest further research and the application of our concepts to other ERP program settings, particularly for the new CSFs with no direct reflections in the seed concepts.

This research examines the challenges and CSFs of ERP implementation, and the dynamics, which seem to unfold particularly in an ERP program environment, where multiple related projects and groups are involved. The results of our interpretive case studies may be interpreted in two different ways. On the one hand, the results are confirmatory in terms of some of our identified CSFs were already discussed in prior research. On the other hand, we provide findings which seem to be new, and therefore complementary, in this specific ERP program context. Table 7-1[19] summarizes these CSFs and in terms of our confirmatory findings provides extensive references to related literature.

[19] When comparing, consider the numbers (#) in the first column of the Tables 6-2 and 7-1 as a unique key.

#	CSF of ERP programs holding in both cases	Description of CSF	Proposition(s)	Literature in alphabetic order (program related first)
1	Top management support	Securing sponsorship and commitment during the whole program, appointing a steering committee	P1: In the ERP program context, top management support throughout the entire life cycle contributes to program success.	Cabinet Office (2011), Ferns (1991), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Bingi et al. (1999), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Umble et al. (2003), Zhang et al. (2005
2	Establishment of a vision, a dynamic business case and associated benefits	Defining the intended future state, communicating vision, comparing additional costs for managing the change within a program against the additional benefits, defining and updating regularly program and project business cases, defining and realizing benefits	P2: In the ERP program context, the establishment of a vision, a dynamic business case and the pursuing of associated benefits contribute to program success.	Ferns (1991), Cabinet Office (2011), Lycett et al (2004), Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Parr and Shanks (2000), Umble et al. (2003)
3	Stakeholder- & communication management	Identification and categorization of all stakeholders affected by the program, deciding how and when information will be distributed, ensuring ongoing commitment from all relevant stakeholders.	P3: In the ERP program context, efficient stakeholder- and communication management, including the early identification of all relevant stakeholder groups and the definition of a communication strategy, contribute to program success.	Ferns (1991), Cabinet Office (2011), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Akkermans and van Helden (2002), Al-Mashari et al. (2003), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Somers and Nelson (2004), Umble et al. (2003), Sumner (2000), Zhang et al. (2005)
4	Securing change management (including aspects of organizational culture)	Ensuring that target business environment meets requirements of the new business model, organizing trainings and education, ensuring appropriate resources, managing transition into operations, considering organizational culture, readiness of sites, national cultures and legal requirements	P4: In the ERP program context, securing change management throughout the entire life cycle contributes to program success.	Cabinet Office (2011), Lycett et al. (2004), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Vereecke et al. (2003), Al-Mashari et al. (2003), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Nah and Delgado (2006), Seidel (2009), Somers and Nelson (2004), Umble et al. (2003), Zhang et al. (2005)

5	Establishment of a company-specific ERP strategy	Defining a company-specific ERP strategy (minimum customization, phased implementation approach vs. big bang strategy rolling out a template, release and upgrade strategy), aligning the program goals with strategic goals	P5: In the ERP program context, an appropriate ERP strategy within the IT strategy throughout the entire life cycle contributes to program success.	Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Sullivan (2014), Thiry (2004), Bingi (1999), Finney and Corbett (2007), Holland and Light (1999), Markus and Tanis (2000), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Umble et al. (2003)
6	Establishment of a governance structure	Defining governance structure, establishing program office, defining decision making, reporting requirements, roles, responsibilities, interfaces and communication to project representatives, formal closure	P6a: In the ERP program context, a well-defined governance structure throughout the entire life cycle contributes to program success. P6b: The authorization to give direct directives increases the actionability of a governance structure.	Cabinet Office (2011), Ferns (1991), Lycett et al. (2004), Pellegrinelli (1997), PMI 2008, Ribbers and Schoo (2002), Seidel (2009), Sullivan (2014), Thiry (2004), Vereecke et al. (2003), Yu and Kittler (2012)
7	Business process redesign	Redesigning business processes in accordance with the ERP strategy and envisioned target business environment, creation of process ownerships across functional borders	P7: In the ERP program context, an efficient business process redesign strategy over the entire life cycle contributes to program success.	Al-Mashari et al. (2003), Bingi et al. (1999), Holland and Light (1999), Nah et al. (2001), Markus and Tanis (2000), Somers and Nelson (2004), Sumner (2000), Žabjek et al. (2009). Zhang et al. (2005)
8	Risk and issue management (Tracking and Tools)	Identifying and tracking of risks and defining the risk strategy, keeping risks at an acceptable level, ensuring that actions taken succeed, efficient usage of tool support	P8a: In the ERP program context, efficient risk- and issue management over the entire life cycle contribute to program success. P8b: In the ERP program context, appropriate tools foster efficient and transparent risk- and issue management.	(Aritua et al., 2011), Cabinet Office (2011), Ferns (1991), Lycett et al (2004), Pellegrinelli et al. (2007), PMI (2008), Sullivan (2014), Thiry (2004), Davenport (2000), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001)
9	Integration management	Identifying interdependencies and interrelations and defining how to manage them, considering shared processes, managing transition into operations, usage of synergies after go-live, providing customer support	P9: In the ERP program context, an efficient, and well elaborated, integration management strategy over the entire life cycle contributes to program success.	Cabinet Office (2011), Ferns (1991), Lycett et al (2004), Pellegrinelli (1997), PMI (2008), Ribbers and Schoo (2002), Sullivan (2014), Thiry (2004), Vereecke et al. (2003)

10	Time and scope & financial management	Including scope management (defining what is inside the program, managing change requests), time management (program schedule, planned duration and sequencing projects, analyzing performance against the plans, milestones) and financial management (cost estimation and budgeting, performing within budget, early paybacks, ensuring funds)	P10: In the ERP program context, the initial definition of a strategy and the dynamic and flexible treatments of time, scope-, and financial management over the entire life cycle contribute to program success.	Cabinet Office (2011), Ferns 1991, Lycett et al (2004), PMI (2008), Ribbers and Schoo (2002), Seidel (2009), Thiry (2004), Akkermans and van Helden (2002), Markus and Tanis (2000), Nah and Delgado (2006)
11	Definition of a program-methodology (including testing)	Securing all quality aspects, regression testing, end-to-end testing, ensuring that the results meet expectations, planning and conducting of audits and reviews, securing knowledge management	P11: In the ERP program context, the usage of an appropriate methodology (including testing) over the entire life cycle contributes to program success.	Cabinet Office (2011), Lycett et al. (2004), PMI (2008), Ribbers and Schoo (2002), Thiry (2004), Al-Mashari et al. (2003), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Seidel (2009), Sullivan (2014), Vereecke et al. (2003), Zhang et al. (2005)
12	ERP implementation partner	Choosing consultants, managing them, building stable relations	P12: In the ERP program context, the efficient cooperation with an ERP implementation partner over the entire life cycle contributes to program success.	Sullivan (2014), Akkermans and van Helden (2002), Bingi et al. (1999), Finney and Corbett (2007), Nah and Delgado (2006), Parr and Shanks (2000), Somers and Nelson (2004), Sumner (2000), Zhang et al. (2005)
13	Data migration/ accuracy & management	Ensuring that data is migrated accurately to the ERP system, establishing appropriate data entry procedures, data governance	P13: In the ERP program context, the early definition and the adherence to a data management strategy over the entire life cycle contribute to program success.	Sullivan (2014), Finney and Corbett (2007), Markus and Tanis (2000), Nah et al. (2001), Somers and Nelson (2004), Umble et al. (2003), Vosburg and Kumar (2001), Zhang et al. (2005)
14	New CSF: Collaboration and decision making	Empowered teams, appropriate size of teams, creating an infrastructure which facilitates information exchange and decision making	P14: In the ERP program context, efficient collaboration and decision making over the entire life cycle contribute to program success.	PMI (2015), Markus and Tanis (2000). New in the ERP program management context. Further research warranted.
15	New CSF: Human capital management	Management of internal resources, effective sourcing and training, selecting the right employees, availability of key players,	P15: In the ERP program context, efficient human capital management over the entire life cycle contributes to program success.	PMI (2013b). New in the ERP program management context. Further research warranted.

		new enriched tasks after program is finished		
16	New CSF: Flexibility of program components	Keeping integrity through program governance, despite different methodological requirements, effective use of tolerances (Cabinet Office, 2011; PMI, 2008)	P16a: In the ERP program context, the flexibility of program components over the entire life cycle contributes to program success, if this flexibility is favored by the program management. P16b: In the ERP program context, the flexibility of program components over the entire life cycle negatively affects program success when the flexibility is not wanted by program management but needs to be tolerated.	Cabinet Office (2011), PMI (2008). New in the ERP program management context. Further research warranted.
17	N/A Commitment key players and team	Considered in stakeholder-and communication- management)	See P3	N/A (see references in 3)
18	N/A, Readiness of organizational culture	Considered in change management	See P4	N/A (see references in 4)
19	N/A Realization of benefits	Considered in establishment of a vision and a dynamic business case and associated benefits	See P2	N/A
20	N/A, Appropriateness of the ERP vendor	Dropped for our contexts, further research in other settings suggested	N/A	N/A

Table 7-1 Final List of Critical Success Factors (CSFs) Meeting Our Program Contexts, After Cross-case Comparison of CSFs

Central research question 2: How can the dynamics of CSFs be considered in a general, parsimonious phase model?

We highlighted the two cases in relation to other competing theories (Urquhart et al., 2010), used for the second case. Although, the alternative theories could have been applied as well, we still think that the chosen core category and the meta-theory used for interpreting each case, suits the data best and provides the best explanation what was going on in the case, thus creating the storyline. Nevertheless, we believe that the discussion of the cases in relation to other theories enhances the generalizability of the substantive theories, and fulfilled the grounded theory guidelines for "scaling up" and "theoretical integration" (Urquhart et al., 2010). Both models are suited to explain the dynamics of CSFs over the life cycle of a program, as opposed to the predominant static treatment in existing accounts (Lyytinen and Newman, 2015; Markus and Robey, 1988). Furthermore, they can complement each other, attributing organizational learning and changing stakeholder-perceptions over the life cycle of a program.

Central research question 3: What are the benefits for companies of structuring their ERP-implementations in programs?

The results suggest that in both programs the anticipated benefits and goals for program management could be observed. Both contexts have differences and commonalities. On the one hand, they differed regarding the implementation strategy, big bang versus phased, and the number of involved sites (single site versus multisite approach). On the other hand, both programs implemented highly integrated products and projects, which were largely dependent on each other. A large number of business processes were impacted and many stakeholder groups involved. As a consequence, in the settings at A1/TA and Pantheon, both contexts were characterized by a high implementation complexity and many interrelations.

This view is consistent with Ribbers and Schoo (2002), and their three complexity variables for programs; that is *variety, variability and integration*. To recap: *Variety* reflects the interrelations in a system and will increase with the number of sites affected or the functions of an implemented package. *Variability* is related to dynamics over time and the interrelations between the elements of a system. Examples are scope changes, lack of resources, and dependencies on other implementations that are competing for resources. *Integration* refers to the planned changes which will be realized, the innovation in IT and business processes. In both of our ERP program contexts the implementation complexity was high, and resulted in observable goals and benefits. Thus, we conclude that in settings with a high implementation complexity as defined by

Ribbers and Schoo (2002), the employment of a program will lead to benefits (Lycett et al., 2004) which could not be realized when the projects are managed independently from each other (PMI, 2008).

Our results suggest that the number of sites adds to the implementation complexity as suggested by Ribbers and Schoo (2002). However, the number of sites is not the only criterion for warranting the creation of a program, as Evaristo and van Fenema (1999) suggested for multiple concurrent projects, all of them operationally co-located in a single geographical place. They coined this type co-located program with the need to negotiate priorities on resource allocation. This is exactly what we could observe at A1/TA, thus confirming that benefits realization through programs (Lycett al., 2004), superior to the benefits obtained when projects are managed individually (PMI, 2008) can be obtained in a single-site program. Benefits realization in a multisite context, a multiple co-located program (Evaristo and van Fenema, 1999), could be observed within the case at Pantheon. Thus, we conclude that the formation of a program is warranted in all contexts with a high degree of integration, dependencies and interrelations between the projects, where the resources need to be allocated and prioritized efficiently. These allocations and prioritization are done by an additionally entity; that is, the program management, to realize the benefits associated with the program.

7.2 Overall Implications for Research

Our research has several implications for research. First, our research is the first account (to the best of our knowledge), which presented a complete set of CSFs in the ERP program context, considering existing concepts of program management literature and the dynamic nature of ERP programs. We added to the common body of knowledge through integrating common program management concepts in the ERP context, which are grounded in empirical data. Previous work explicitly considering CSF in ERP programs (Ribbers and Schoo, 2002; Seidel, 2009) did not use the general concepts of established program management guidelines (Cabinet Office, 2011; PMI 2008). IT projects [and programs] have higher levels of uncertainty than projects [and programs] in other industries (Napier et al. 2009). Thus, it is relevant to find adequate support for using the same or similar concepts, as used in the traditional project- and program management literature, in the ERP program context. Likewise, we considered existing research on CSFs for ERP implementations, and found some new CSFs in the ERP program context. Consequently, our research provides the first set of CSFs in the ERP program context, considering ERP and program management perspectives, and the dynamics of ERP programs. Future research can build on these findings, and should elaborate on the CSFs in other research settings.

Second, we developed two parsimonious models which can explain the dynamics of CSFs over the entire life cycle of an ERP program. The need to consider the dynamics rather than the dominant static view in the past, were emphasized in previous prominent accounts (e.g. Markus and Robey, 1988; Lyytinen and Newman, 2015). Our research is the first account (to the best of our knowledge), which considers these dynamics grounded in rich case study data in the ERP program context. We applied the models to the second case and found indications about its applicability in other contexts. It seems that salient groups and the organizational learning perspective are dimensions that are highly important for successful ERP programs. Future research should build on these foundations and apply the models to other ERP program settings. Furthermore, action research (Robey et al. 2000) accompanying an ERP program over its life cycle would be an interesting research avenue.

Third, the investigated ERP programs delivered benefits which could not be realized in a traditional project setup (PMI, 2008). We discussed the cases in relation to the categorization of Lycett et al. (2004) and the complexity criteria of ERP programs suggested by Ribbers and Schoo (2002). The results suggest that a single- or multisite context is only one criterion to determine the complexity of a program (Evaristo and van Fenema, 1999). Additionally, the degree of integration, dependencies and interrelations between the projects need to be considered (Ribbers and Schoo, 2002). For future research, it would be interesting to evaluate which benefits could accrue in which program settings. Furthermore, we suggest operationalizing the complexity criteria, and to investigate different combinations of those criteria. This could strengthen our understanding in which settings a program setup is warranted. Lastly, we suggest developing a decision-making tool for practitioners. This tool should be continuously refined based on a feedback loop with practice.

7.3 Overall Implications for Practice

Our research has several implications for practice. First, and practitioners should consider our set of program-specific CSFs during the entire life cycle of their ERP programs. It is essential for the ERP program success to track the dynamics efficiently. Our program-specific CSFs are grounded in data. Thus, we provided (to the best of our knowledge) the first set of CSFs in the ERP program context, considering its dynamics. Although the set includes partially similar CSF as prior research identified, they were established in a program context. Furthermore, the set includes some new CSFs (collaboration and decision making, human capital management, flexibility of program component), that warrant particular consideration.

Second, for practitioners the models can be used for regular health-checks over the entire ERP program life cycle to increase the likelihood of a successful outcome of their ERP programs. For ERP programs the number of salient groups is potentially higher than in traditional project setups. This is simply due to its typically larger size and the number of impacted stakeholder groups. The SGISS-model of different perceptions is particularly useful to meet this challenge. On the other hand, the organizational learning model in the ERP context considers the potential of an increased knowledge base over the life cycle. Thus, this model is particular (but not solely) useful in multisite environments, or phased implementations. Both models can complement each other. As such, they are useful tools, considering the dynamic nature of ERP programs and CSFs, for application in real-life ERP program contexts.

Third, based on the complexity, it can be determined whether a program makes sense or not. These findings are useful for practitioners when they have to decide which setup is the most beneficial for their ERP implementations. We suggest that practitioners take into account the complexity criteria and the potential benefits, when they decide whether a program setup makes sense or not. Furthermore, we encourage practitioners to collaborate with research. The operationalization of complexity criteria should be continuously evaluated and refined. In this way, valuable tools could be created as a joint effort between research and practice.

7.4 Limitations

Our findings rely on two interpretive case studies, and are grounded in data. Although we emphasize the context, and strictly adhered to the grounded theory method and guidelines for interpretive research, additional research is necessary to broaden our understanding and to establish more foundations. Particularly, we suggest applying our findings to other settings. Furthermore, the models and CSFs in the ERP program context should be operationalized and tested quantitatively. Consequently, our theoretical models, grounded in data, could get further support and settings of applicability.

8 Conclusion

In our research we conducted two interpretive in-depth case studies, applying a grounded theory approach. We put a special focus on the contextual information. First, we investigated a complex post-merger ERP program, where a magnitude of salient groups was involved in the ERP program. Second, we investigated a program in a multisite environment with a dedicated program cluster (subprogram) dealing with the ERP system. For the interpretive case study, we followed well accepted guidelines of leading interpretive researchers (e.g. Klein and Myers 1999; Walsham; 1995; Walsham 2006), and we did the same for the coding part, where we used an adapted grounded theory approach (Sarker et al., 2001) which can be seen as being less rigid than the paradigm of Strauss and Corbin (1998), but is still based on the basic principles of the "Straussian" grounded theory method.

With respect to the first central research question, we uncovered a range of CSFs of ERP programs, which are partially not explicitly covered in the current body of ERP literature. Our analysis has a special focus on different phases, as we investigated the entire life cycle, and shows the dynamics of CSFs over its course. As a last step we made a cross-case analysis and refined them after relating them to the seed concepts from the literature review. As new CSFs in the ERP program context, we want to mention collaboration and decision making, human capital management, and the flexibility of program components. Apart from these new findings, we confirmed and refined existing CSFs, but took a fresh perspective. First, the CSFs are program-specific and grounded in rich data of complex ERP programs. Second, we took a dynamic perspective and investigated the CSFs over the life cycle, paying attention to process events and not only static elements (Lyytinen and Newman, 2015; Markus and Robey, 1988). Furthermore, considering the dynamic process of changing stakeholder perceptions and actions which is evident in ERP implementations (Boonstra, 2006). Thus, we believe that our account is unique in the ERP program context and provides valuable insights for research and practice.

With respect to the second central research question, we developed two theoretical, abstract and parsimonious models which explained the dynamics of CSFs in the context of each case. First, the "Salient Group IS Success (SGISS) Model of Different Perceptions", where we applied SIT (Tajfel and Turner, 1986) as a meta-theory (Sarker et al., 2001). Second, we presented the "Organizational Learning Model in the ERP Program Context", where we applied organizational learning theory (e.g. Daft and Weick, 1984; Duncan and Weiss, 1979; Levitt and March, 1988) as a meta-theory. In a cross-case application, we applied each model

to the context of the other case, and observed some indications that the model could also be used in other settings.

Finally, although the programs differed in the context (big bang vs. phased, single site vs multisite) both proved to be successful in generating benefits (Lycett et al. 2004) which would not have been possible in traditional project structure (PMI, 2008), thus giving an answer to the third central research question. As a consequence, we conclude that different variables, specifically the level of integration and the interdependencies define if a program is beneficial (Ribbers and Schoo, 2002), but can be generally generated in single-site and multisite contexts (Evaristo and van Fenema, 1999).

In our research, we highlighted what makes ERP programs successful. ERP programs are contemporary phenomena and a means for integration of dispersed systems. New technologies allow transactional and reporting systems to use the same data storage; that is, a single source of truth. Increasing integration across financial and operational processed provide strategic value and competitive advantage (Krüger, 2016). Thus, we believe that the importance of ERP programs will rise, and this study provides valuable insights to deal with this upcoming phenomenon.

9 References

Accenture 2011. Consolidation and process harmonization of SAP systems. Accessed: October 10, 2013. http://www.accenture.com/Microsites/it-optimization/SAP_Consolidation/en/Documents/pdf/Final_SAP_Brochure_English.pdf.

Akkermans, H., and van Helden, K. 2002. "Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors," *European Journal of Information Systems* (11:1), pp. 35-46.

Al-Mashari, M., Al-Mudimigh, A., and Zairi, M. 2003. "Enterprise resource planning: a taxonomy of critical factors," *European Journal of Operational Research* (146:2), pp. 352-364.

Amoako-Gyampah, K. 2004. "ERP Implementation Factors: a comparison of managerial and end-user perspectives," *Business Process Management Journal* (10:2), pp. 171-183.

Aritua, B., Smith, N.J., and Bower, D. 2011. "What risks are common to or amplified in programmes: evidence from UK public sector infrastructure scheme," *International Journal of Project Management* (29:3), pp. 303-312.

Artto, K., Martinsuo, M., Gemünden, H. G., and Murtoaro, J. 2009. "Foundations of program management: a bibliometric view," *International Journal of Project Management* (27:1), pp. 1-18.

Ashfort, B. E., and Mael, F. 1989. "Social identity theory and the organization*," Academy of Management Review* (14:1), pp. 20-39.

Augoustinos, M., and Walker, I. 1995. *Social Cognition. An Integrated Introduction*, London. Sage.

Avital, M., and Vandenbosch, B. 2000. "SAP implementation at Metalica: an organizational drama in two acts," *Journal of Information Technology* (15:3), pp. 183-194.

A1 Telekom Austria AG 2015. Last time accessed: April 10, 2015. http://www.a1.net.

Barrow, J. D., Davies, P. C. W., and Harper C. L. Jr. 2004. "John Archibald Wheeler and the Clash of Ideas in Science and Ultimate Reality" in *Quantum Theory, Cosmology, and Complexity*, Cambridge University Press.

Barrett, M., and Walsham, G. 1999. "Electronic trading and work transformation in the London insurance market," *Information Systems Research* (10:1), pp. 1-22.

Benbasat, I., Goldstein, D. K., and Mead, M. 1987. “The case research strategy in studies of information systems,” *MIS Quarterly* (11:3), pp. 369-386.

Berente, N., and Yoo, Y. 2012. “Institutional contradictions and loose coupling: postimplementation of NASA’s enterprise information system,” *Information Systems Research* (23:2), pp. 376-396.

Bernroider, E. W. N., and Koch, S. 2001. “ERP selection process in midsize and large organizations,” *Business Process Management Journal* (7:3), pp. 251-257.

Bernroider, E. W. N., and Hampel, A. 2005. “Enterprise Resource Planning and IT Governance in perspective: strategic planning and alignment, value delivery and controlling,” in *Proceedings of the 5th International Conference on Electronic Business (ICEB 2005),* Academic Publishers/World Publishing Corporation (eds.), Hong Kong, China, pp. 306-308.

Bernroider, E. W. N. 2008 “IT governance for enterprise resource planning supported by the DeLone–McLean model of information systems success,” *Information & Management* (45:5), pp. 257-269.

Bernroider, E. W. N. 2013. "Effective ERP adoption processes: the role of project activators and resource investments,” *European Journal of Information Systems* (22:2), pp. 232-250.

Besson, P., and Rowe, F. 2001. “ERP project dynamics and enacted dialogue: perceived understanding, perceived leeway, and the nature of task related conflicts,” *The Database for Advances in Information Systems* (32:4), pp. 47-66.

Blick, G., Gulledge, T., and Sommer, R. 2000 “Defining business process requirements for large scale public sector ERP implementations: a case study,” in *European Conference on Information Systems* (*ECIS) 2000 Proceedings*, Vienna, Austria.

Bingi, P., Sharma, M. K., and Godla, J. K. 1999. “Critical issues affecting an ERP Implementation,” *Information Systems Management* (16 :3), pp. 7-14.

Boonstra, A. 2006. “Interpreting an ERP-implementation project from a stakeholder perspective,” *International Journal of Project Management* (24:1), 38-52.

Boudreau, M. C., and Robey, D. 2005. “Enacting integrated Information Technology: a human agency perspective,” *Organization Science* (16:1), pp. 3-18.

Bullen, C. V., Rockart, J. F., 1981. *A Primer on Critical Success Factors*, Center for Information Systems Research, MIT, Cambridge, MA.

Cabinet Office. 2011. *Managing Successful Programmes. 2011 edition,* TSO, Norwich.

Caralli, R., Stevens, J. F., Willke, B. J., and Wilson, W. R. 2004. *The Critical Success Factor Method: Establishing a Foundation for Enterprise Security Management*, Carnegie Mellon Software Engineering Institute, Pittsburgh, Pennsylvania.

Chang, J. Y. T., Jiang, J. J., Klein, G., and Wang, E. T. G. 2014. "Do too many goals impede a program? A case study of enterprise system implementation with multiple interdependent projects," *Information & Management* (51:4), pp. 465-478.

Charmaz, K. 2003. "Grounded theory," in *Qualitative Psychology: A Practical Guide to Research Methods.* J.A. Smith (ed.), London. Sage.

Charmaz, K. 2006. *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*, Thousand Oaks, CA: Sage.

Corbin, J., and Strauss, A. L. 2008. *Basics of Qualitative Research*, Thousand Oaks, CA: Sage.

Daft, R. L., and Weick, K. E. 1984. "Toward a model of organizations as interpretation systems," *The Academy of Management Review* (9:2), pp. 284-295.

Daft, R. L. 2007. *Organization, Theory and Design, Ninth Edition*, Mason, Ohio, Thomson Higher Education.

Davenport, T. 1998. "Putting the enterprise into the enterprise system*," Harvard Business Review* (76:4), pp. 121-131.

Davenport T.H. 2000. *Mission Critical: Realizing the Promise of Enterprise Systems*, Boston, Massachusetts, Harvard Business School Press.

Davenport, T., Harris, J.G, and Cantrell, S. 2004. "Enterprise systems and ongoing process change," *Business Process Management Journal* (10:1), pp. 16-26.

DeLone, W. H., and McLean, E. R. 1992. "Information systems success: the quest for the dependent variable," *Information Systems Research* (3:1), pp. 60-95.

DeLone, W. H., and McLean, E. R. 2003. "The DeLone and McLean model of information systems success: a ten-year update," *Journal of Management Information Systems* (19:4), pp. 9-30.

De Reyck, B., Grushka-Cockayne, Y., Lockett, M., Calderini, S. R., Moura, M., and Sloper, A. 2005. "The impact of project portfolio management on information technology projects," *International Journal of Project Management* (23:7), pp.524-537.

Dezdar, S. and Sulaiman, A. 2009, "Successful enterprise resource planning implementation: taxonomy of critical factors", *Industrial Management & Data Systems*, (109: 8), pp. 1037 - 1052.

Drori, I., Wrzesniewski, A., and Ellis, S. 2013. "One out of many? Boundary negotiation and identity formation in postmerger integration," *Organization Science*, (24:6), pp. 1717-1741.

Dumas, M., La Rosa, M., Mendling, J., and Reijers, H. A. 2013. *Fundamentals of Business Process Management*, Berlin, Heidelberg, Springer.

Duncan, R. B., and Weiss, A. 1979. "Organizational Learning: Implications for Organizational Design," in *Research in Organizational Behavior (1),* B. Staw (Ed.), Greenwich, Conn.: JAI Press, pp. 75-123.

Ebrahimi, S. 2012. "Knowledge management for Enterprise Systems: a review of the literature," in *Proceedings of the 16th Pacific Asia Conference on Information (PACIS2012)*, Ho Chi Minh City, Vietnam.

Eisenhardt, K. 1989. "Building theories from case study research," *The Academy of Management Review* (14:4), pp. 532-550.

Evaristo, R., and van Fenema, P. C. 1999. "A typology of project management: emergence and the evolution of new forms," *International Journal of Project Management* (17:5), pp. 275-281.

Ferns, D. C. 1991. "Developments in programme management," *International Journal of Project Management* (9:3), pp. 148-156.

Finney, S., and Corbett, M. 2007. "ERP implementation: a compilation and analysis of critical success factors," *Business Process Management Journal* (13:3), pp. 329-347.

Finney, S. 2011. "Stakeholder perspective on internal marketing communication: an ERP implementation case study," *Business Process Management Journal* (17:2), pp. 311-331.

Flick, U. 2009. *An Introduction of Qualitative Research, Fourth edition*, London, Sage.

Gadamer, H-G. 1975. *Truth and Method*, New York, The Continuing Publishing Corporation.

Gadamer, H-G. 1976a *Philosophical Hermeneutics*, Berkeley, CA, University of California Press.

Gadamer, H-G. 1976b. The Historicity of Understanding," in *Critical Sociology, Selected Readings*, P. Connerton (ed.), Harmondsworth, UK, Penguin Books Ltd, pp.117-133.

Gadamer, H-G. 1994. *Truth and Method*, New York, The Continuing Publishing Corporation.

Gareis, R. 2010. "Changes of organizations by projects," *International Journal of Project Management* (28:4), pp. 314-327.

Gartner, Inc. and/or its Affiliates. 2014. Program & Portfolio Management. Accessed: April 30, 2014. http://www.gartner.com/technology/consulting/program-portfolio-management.jsp.

Gattiker, T. F., and Goodhue, D. L. 2005. "What happens after ERP Implementation: understanding the impact of interdependence and differentiation on plant-level outcomes," *MIS Quarterly* (29:3), pp. 559-585.

Glaser, B. G., and Strauss, A. L. 1967. "*The Discovery of Grounded Theory: Strategies for qualitative research*," Chicago, Aldine Publishing Company.

Grainger, N., McKay, J., and Marshall, P. 2009. "Learning from a strategic failure," in *Proceedings of the 20th Australasian Conference on Information Systems*, December 2-4, Melbourne, Australia.

Grainger, N., and McKay, J. 2014. "Enterprise system implementation failure: a strategic response?," in *Proceedings of the 35th International Conference on Information Systems (ICIS)*, Auckland 2014, New Zealand.

Gregor, S. 2006. "The nature of theory in information systems," *MIS Quarterly* (30:3), pp. 611-642.

Gulla, J., and Mollan, R. 1999. "Implementing SAP R/3 in a multi-cultural organization, in *Proceedings of the 1st International Workshop on Enterprise Management Resource and Planning Systems - EMRPS*, Venice, Italy, 127-134.

Hevner, A.R., March, S.T., and Ram, S. 2004. “Design science in information systems research,“ *MIS Quarterly* (28:1), pp. 75-105.

Holland, C. P., and Light, B. 1999. “A critical success factors model for ERP Implementation,” *Software, IEEE* (16:3), pp. 30-36.

Hitt, L., Wu, D., and Zhou, X. 2002. “Investment in enterprise resource planning: business impact and productivity measures,” *Journal of Management Information Systems* (19:1), pp. 71-98.

Hoehle, H., and Huff, S. 2012 “Advancing Task-Technology Fit Theory: A Formative Measurement Approach to Determining Task-Channel Fit for Electronic Banking Channels,” in *Information Systems Foundations: Theory Building in Information Systems,* D. N. Hart and S. Gregor (eds.), Canberra, AU, ANU E Press.

Hong, K., and Kim, Y. G. 2002. “The critical success factors of ERP implementation: an organizational fit perspective,” *Information & Management* (40:1), pp. 25-40.

Huber, T., Alt, R., and Österle, H. 2000. “Templates – instruments for standardizing ERP Systems,” in *Proceedings of the 33rd Hawaii International Conference on System Sciences*, Los Alamitos, California, pp. 1-18.

Huber, G. P. 1991. “Organizational learning: the contributing processes and the literatures,” *Organization Science* (2:1), pp. 88-115.

Jiang, J. J., Chang, J. Y. T., Chen, H.G., Wang, E. T. G., and Klein, G. 2014. “Achieving IT program goals with integrative conflict management,” *Journal of Management Information Systems*, (31:1), pp. 79-106.

Kaplan, B., and Duchon, D. 1988. “Combining qualitative and quantitative approaches in information systems research,” *MIS Quarterly* (12:4), pp.571-586.

Klaus, H., Rosemann, M., and Gable, G. G. 2000 “What is ERP?” *Information Systems Frontiers* (2:2), pp. 141-162.

Klein, H., and Myers, M.D. 1999. “A set of principles for conducting and evaluating interpretive field studies in Information Systems,” *MIS Quarterly* (23:1), pp. 67-93.

Ko, D-G., Kirsch, L. J., and King, W. R. 2005. “Antecedents of knowledge transfer from consultants to clients in enterprise system implementations,” *MIS Quarterly* (29:1), pp. 59-85.

Krumbholz, M., and Maiden, N. 2001. “The implementation of enterprise resource planning packages in different organisational and national cultures,” *Information Systems* (26:3), pp. 185-204.

Krüger, J. 2016. *SAP S/4HANA Finance, 2nd edition*, Boston (MA). SAP Press, Rheinwerk Publishing Inc.

Lee, A. S. 1989. “A scientific methodology for MIS case studies” *MIS Quarterly* (13:1), pp. 33-50.

Lee, A. S. 1991. “Integrating positivist and interpretivist approaches to organizational research,” *Organization Science* (2:4), 342-365.

Lee, A. S., and Baskerville, R. L. 2003. “Generalizing generalizability in information systems research,” *Information Systems Research* (14:3), pp. 221-243.

Lehtonen, P., and Martinsuo, M. 2008. “Change program initiation: defining and managing the program–organization boundary,” *International Journal of Project Management* (26:1), pp. 21-29.

Leonardi, P. M., 2011. “When flexible routines meet flexible technologies: affordance, constraint, and the imbrication of human and material agencies,” *MIS Quarterly* (35:1), pp. 147-167.

Levitt, B., and March, J. G. 1988. “Organizational learning,” *Annual Review of Sociology* (14), pp. 319-340.

Lin, F., and Rohm, C. E. T. 2009. “Managers’ and end-users’ concerns on innovation implementation: a case of an ERP implementation in China,” *Business Process Management Journal* (15:4), pp. 527-547.

Lycett, M., Rassau, A., and Danson, J., 2004. “Programme management: a critical review,” *International Journal of Project Management* (22:4), pp. 289-299.

Lyytinen, K., Hirschheim, R., 1987. “Information systems failures—a survey and classification of the empirical literature,” in *Oxford Surveys in Information Technology 4*, New York, Oxford University Press, Inc., pp. 257-309.

Lyytinen, K., and Newman, M. 2015. *“*A tale of two coalitions—marginalising the users while successfully implementing an enterprise resource planning system,” *Information Systems Journal*, (25:2), pp. 71-101.

Madapusi, A., and D´Souza, D. 2005. “Aligning ERP systems with international strategies,” *Information Systems Management* (22:1), pp. 7-17.

Malhotra, R., and Temponi, C. 2010. "Critical decisions for ERP integration: small business issues," *International Journal of Information Management* (30:1), pp. 28-37.

Markus, M. L., Tanis, C., and van Fenema, P. 2000a. "Enterprise resource planning: multisite ERP implementations," *Communications of the ACM* (43:4), pp. 42-46.

Markus, M., Axline, S., Petrie, D. and Tanis, C. 2000b. "Learning from adopters' experiences with ERP: problems encountered and success achieved," *Journal of Information Technology* (15:4), pp. 245-265

Markus, M. L., and Tanis, C. 2000. "The Enterprise Systems Experience from Adoption to Success," in *Framing the domains of IT management: Projecting the Future Through the Past*. R. W. Zmud (ed.), Ohio, Pinnaflex Educational Resources Inc., pp. 173-207.

Markus, M. L., and Robey, D. 1988. "Information technology and organizational change: causal structure in theory and research," *Management Science* (34:5), pp. 583-598.

Matavire, R. and Brown, I. 2013. "Profiling grounded theory approaches in information systems research†," *European Journal of Information Systems* (22:1), pp. 119-129.

Maylor, H., Brady, T., Cooke-Davies, T., and Hodgson, D. 2006. "From projectification to programmification," *International Journal of Project Management* (24:8), pp. 663-674.

Miles, M., and Huberman, A. M. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*, Thousand Oaks, California. SAGE Publications Inc.

Mingers, J. 2001. "Combining IS research methods: Towards a Pluralist Methodology," *Information Systems Research* (12:3), pp. 240-259.

Mintzberg, H. 1978. "Patterns in strategy formation," *Management Science* (24:9), pp. 934-948.

Mitchell, R. K., Agle, B. R., and Wood, D. J. 1997, "Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts," *Academy of Management Review* (22:4), pp. 853-886.

Mueller, S.K., Mendling, J., and Bernroider, E. W. N. 2014 "Converging perceptions after a crisis leading to successful change - dynamics of CSFs in a post-merger ERP Program," in *Proceedings of the 35th International Conference on Information Systems (ICIS),* Auckland 2014, New Zealand.

Myers, M. D. 1997. “Qualitative research in information systems,” *MIS Quarterly* (21:2), pp. 241-242.

Myers, M. D. 2009. *Qualitative Research in Business & Management*, Thousand Oaks, CA: Sage Publications Inc.

Myers, M. D., and Klein, H. K. 2011. “A set of principles for conducting and evaluating critical research in information systems,” *MIS Quarterly* (35:1), pp. 17-36.

Nah, F., Lau, J. L. S., and Kuang, J. 2001. “Critical factors for successful implementation of enterprise systems,” *Business Process Management Journal* (7:3), pp. 285-296.

Nah, F., Zuckweiler, K. M., and Lau, J. L. S 2003. “ERP implementation: chief information officers’ perceptions of critical success factors,” *International Journal of Human-Computer Interaction* (16:1), pp. 5-22.

Nah, F., and Delgado, S. 2006. “Critical success factors for enterprise resource planning implementation and upgrade,” *Journal of Computer Information Systems* Special Issue (46:5), pp.99-113.

Nandhakumar, J., Rossi, M., and Talvinen, J. 2005. “The dynamics of contextual forces of ERP implementation,” *Journal of Strategic Information Systems* (14:2), pp. 221-242.

Napier, N., Keil, M., and Tan, F.B. 2009. ”IT project managers' construction of successful project management practice: a repertory grid investigation,” *Information Systems Journal* (19:3), pp. 255-282.

Orlikowski, W., and Baroudi, J. J. 1991. “Studying information technology in organizations: research approaches and assumptions,” *Information Systems Research* (2:1), pp. 1-28.

Orlikowski, W. J. 1993. “CASE tools as organizational change: investigating incremental and radical changes in systems development,” *MIS Quarterly* (17:3), pp. 309-340.

Orlikowski, W. J. 2000. “Using technology and constituting structures: a practice lens for studying technology in organizations,” *Organization Science* (11:4), pp. 404-428.

Pan, G., Hackney, R., and Pan, S. L. 2008. “Information systems implementation failure: insights from prism,” *International Journal of Information Management* (28:4), pp. 259-269.

Panorama Consulting Solutions. 2014. ERP Report. Panorama Consulting Solutions, Denver. Accessed: April 28, 2014. http://Panorama-Consulting.com/resource-center/2014-erp-report/.

Panorama Consulting Solutions. 2015. 2015 ERP Report. Panorama Consulting Solutions, Denver. Accessed: March 01, 2016. http://panorama-consulting.com/resource-center/2015-erp-report/.

Paré, G. 2004. "Investigating information systems with positivist case study research," *Communications of the Association for Information Systems* 13, pp. 233-264.

Parolia, N., Jiang, J. J., Klein, G., and Sheu, T. S. 2011. "The contribution of resource interdependence to IT program performance: A social interdependence perspective," *International Journal of Project Management* (29:3), pp. 313-324.

Parr, A., and Shanks, G. 2000. "A model of ERP project implementation," *Journal of Information Technology* (15:4), pp. 289-303.

Partington, D., Pellegrinelli, S. and Young, M. 2005. "Attributes and levels of programme management competence: an interpretive study," *International Journal of Project Management* (23:2), pp.87-95.

Pellegrinelli, S., and Bowman, C. 1994. "Implementing strategy through projects," *Long Range Planning* (27:4), pp. 125-132.

Pellegrinelli, S. 1997. "Programme management: organising project-based change," *International Journal of Project Management* (15:3), pp. 141-149.

Pellegrinelli, S. 2002. "Shaping context: the role and challenge for programmes," *International Journal of Project Management* (20:3), pp. 229-233.

Pellegrinelli S., Partington, D., Hemingway, C., Mohdzain, Z., and Shah, M. 2007. "The importance of context in programme management: An empirical review of programme practices," *International Journal of Project Management* (25:1), pp. 41-55.

Pellegrinelli, S. 2011. "What's in a name: project or programme?," *International Journal of Project Management* (29:2), pp. 232-240.

Poston R., and Grabski, S. 2001. "Financial impacts of enterprise resource planning implementations," *International Journal of Accounting Information Systems* (2), pp.271-294.

Project Management Institute (PMI). 2006. *The Standard for Program Management, First Edition*, Project Management Institute, Inc., Newton Square, Pennsylvania.

Project Management Institute (PMI). 2008. *The Standard for Program Management, Second Edition*, Project Management Institute, Inc., Newton Square, Pennsylvania.

Project Management Institute (PMI). 2013a. *A Guide to the Project Management Body of Knowledge: PMBOK(R) Guide, 5th Edition*, Project Management Institute, Inc., Newton Square, Pennsylvania.

Project Management Institute (PMI). 2013b. *The Competitive Advantage of Effective Talent Management*, PMI´s Pulse of the Profession, Project Management Institute, Inc., Newton Square, Pennsylvania.

Project Management Institute (PMI). 2013c. *The Standard for Program Management, Third Edition*, Project Management Institute, Inc., Newton Square, Pennsylvania.

Project Management Institute (PMI). 2015. *Capturing the Value of Project Management Through Decision Making*, PMI´s Pulse of the Profession, Project Management Institute, Inc., Newton Square, Pennsylvania.

Rajagopal, P. 2002. "An innovation-diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model," *Information & Management* (40:2), pp. 87-114.

Recker, J. 2013. *Scientific Research in Information Systems*, Berlin, Heidelberg. Springer.

Reiss, G., and Paul, R. 2013. *Portfolio and Programme Management Demystified: Managing Multiple Projects Successfully*, Milton Park, Abingdon, Oxon. Routledge.

Ribbers, P. M. A., and Schoo, K. C. 2002. "Program management and complexity of ERP implementations," *Engineering Management Journal* (14:2), pp. 45-52.

Ritson, G., Johansen, E., and Osborne, A. 2012. "Successful programs wanted: exploring the impact of alignment," *Project Management Journal* (43:1), pp. 21-36.

Robey, D., Boudreau, M.C., and Rose, G.M. 2000. "Information technology and organizational learning: a review and assessment of research. *Accounting, Management and Information Technologies*," (10:2), pp. 125–155.

Robey, D., Ross, J. W., and Boudreau, M. C. 2002. "Learning to implement enterprise systems: an exploratory study of the dialectics of change," *Journal of Management Information Systems* (19:1), pp. 17-46.

Ross, J., and Vitale, M. R. 2000. "The ERP revolution: surviving vs. thriving," *Information Systems Frontiers* (2:2), pp. 233-241.

Safrudin, N., and Recker, J. 2013. "Identifying the triggers for management services in business transformation management," in *Proceedings of the Pacific Asia Conference of Information Systems (PACIS2013)*. Jeju Island, South Korea.

Safrudin, N., and Recker, J. 2014. "The waves in business transformation management: a conceptualization of how IT enabled business transformations unfold." in *Proceedings of the 25th Australasian Conference on Information Systems (ACIS2014)*. Auckland, New Zealand.

Safrudin, N., 2014. *Business Transformation Management: Composition and Orchestration of Management Services*, Brisbane, Queensland University of Technology.

SAP AG 2016. Last time accessed: June 1, 2016. https://support.sap.com/support-programs-services/methodologies/implement-sap/asap-implementation.html.

Sarker, S., Lau, F., and Sahay, S. 2001. "Using an adapted grounded theory approach for inductive theory building about virtual team development," *Database for Advances in Information Systems* (32:1), pp. 38-56.

Sarker, S., and Sahay, S. 2003. "Understanding virtual team development: an interpretive study," *Journal of the Association for Information Systems* (4:1), pp. 1-38.

Sarkis, J., and Sundarraj, R. 2003. "Managing large-scale global enterprise resource planning systems: a case study at Texas Instruments," *International Journal of Information Management* (23:5), pp.431-442.

Schwarz, G. M., and Watson, B. M. 2005. "The influence of perceptions of social identity on information technology-enabled change," *Group Organization* (30:2), pp. 289-318.

Scheer, A.W., and Habermann, F. 2000. "Enterprise resource planning: making ERP a success," *Communications of the ACM* (43:4), pp. 57-61.

Seddon, P., Calvert, C., and Yang, S. 2010. "A multi-project model of key factors affecting organizational benefits from enterprise systems," *MIS Quarterly* (34:2), pp. 305-328.

Seidel, G. 2009. *A Method for Assessing the Likelihood of Burn-out of Global ERP Programmes*, Hamburg. Dr. Kovač.

Seidel, S., and Urquhart, C. 2013. “On emergence and forcing in information systems grounded theory studies: the case of Strauss and Corbin,” *Journal of Information Technology* (28:3), pp. 237-260.

Shao, J., and Müller, R. 2011. “The development of constructs of program context and program success: A qualitative study,” *International Journal of Project Management* (29:8), pp. 947-959.

Shao, J., Müller, R., and Turner, J. R. 2012. “Measuring program success,” *Project Management Journal* (43:1), pp. 37-49.

Silva, L., and Fulk, H. K. 2012. “From disruptions to struggles: Theorizing power in ERP implementation projects,” *Information and Organization* (22:4), pp. 227-251.

Soja, P. 2010. “Understanding determinants of enterprise system adoption success: lessons learned from full-scope projects in manufacturing companies,” *Production Planning & Control* (21:8), pp. 736-750.

Somers, T., and Nelson, K. G. 2004. “A taxonomy of players and activities across the ERP project life cycle,” *Information & Management* (41:3), pp. 257-278.

Staehr, L., Shanks, G., and Seddon, P. B. 2012. “An explanatory framework for achieving business benefits from ERP Systems;” *Journal of the Association for Information Systems* (13:6), pp. 424-465.

Strauss, A., and Corbin, J. 1990. *Basics of Qualitative Research. Grounded Theory Procedures and Techniques (First Edition)*, Thousand Oaks, California, SAGE Publications Inc.

Strauss, A., and Corbin, J. 1998. *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory (Second Edition)*, Thousand Oaks, California. SAGE Publications Inc.

Sullivan, G. 2014. *The SAP Project: More Than a Survival Guide, 1st edition*, Boston (MA). SAP Press, Galileo Press Inc.

Sumner, M. 2000. “Risk factors in enterprise-wide/ERP projects,” *Journal of Information Technology* (15:4), pp. 317-327.

Tajfel, H., and Turner, J. C. 1986. “The Social Identity Theory of Intergroup Behavior,” in *Psychology of intergroup relations (Second edition)*, S. Worchel and W. G. Austin (eds.), Chicago, IL: Nelson-Hall., pp. 7-24.

Telekom Austria AG. 2015. Last time accessed, 10-Apr-2015. http://www.telekomaustria.com.

Thiry, M., 2001 “Sensemaking in value management practice,” *International Journal of Project Management* (19:2), pp.71-77.

Thiry, M. 2002. “Combining value and project management into an effective programme management model,” *International Journal of Project Management* (20:3), pp. 221-227.

Thiry, M. 2004. “‘For DAD’: a programme management life cycle process,” *International Journal of Project Management* (22:3), pp. 245-252.

Trauth, E. M. 1997 “Achieving the Research Goal with Qualitative Methods: Lessons Learned Along the Way,” in *Information Systems and Qualitative Research*, A. S. Lee, J. Liebenau and J. I. Gross (eds.), London: Chapman and Hall, pp.225-245.

Turner, J., and Müller, R. 2003. “On the nature of the project as a temporary organization,” *International Journal of Project Management* (21:1), pp. 1-8.

Umble, E. J., Haft, R. R., and Umble, M. M. 2003. “Enterprise resource planning: implementation procedures and critical success factors,” *European Journal of Operational Research* (146:2), pp. 241-257.

Urquhart, C. 2001 “An Encounter with Grounded Theory: Tackling the Practical and Philosophical Issues,” in *Qualitative Research in IS: Issues and Trends*, E. Trauth (ed.), Hershey, PA, USA. Idea Group Publishing, pp. 104-140.

Urquhart, C. 2012. *Grounded Theory for Qualitative Research: A practical guide*, London, Sage.

Urquhart, C., Lehmann, H., and Myers, M. D. 2010. “Putting the ‘theory’ back into grounded theory: guidelines for grounded theory studies in information systems,” *Information Systems Journal* (20:4), pp. 357-381.

Uwizeyemungu, S., and Raymond, L. 2010. “Linking the effects of ERP to organizational performance: development and initial validation of an evaluation method,” *Information Systems Management* (27:1), pp. 25-41.

Van Fenema, P. C., Koppius, O. R., and van Baalen, P. J. 2007. “Implementing packaged enterprise software in multisite firms: Intensification of organizing and learning,” *European Journal of Information Systems* (16:5), pp. 584-598.

Velcu, O. 2010. “Strategic alignment of ERP implementation phases: An empirical investigation,” *Information & Management* (47:3), pp.158-166.

Venkatraman, N. 1989. “The concept of fit in strategy research: toward verbal and statistical correspondence,” Academy *of Management Review (*14:3), pp. 423-444.

Vereecke, A., Pandelaere, E., Deschoolmeester, D., and Stevens, M. 2003. “A classification of development programmes and its consequences for programme management*,” International Journal of Operations & Production Management* (23:10), pp. 1279-1290.

Vitalari, N. P. 1985. “Knowledge as a basis for expertise in systems analysis: an empirical study,” *MIS Quarterly* (9:3), pp. 221-241.

Vosburg, J., and Kumar, A. 2001. “Managing dirty data in organizations using ERP: lessons from a case study,” *Industrial Management & Data Systems* (101:1), pp. 21-31.

Wagner, W., and Antonucci, Y. L. 2009. “The ImaginePA project: the first large-scale, public sector ERP Implementation,” *Information Systems Management* (26:3), pp. 275-284.

Wagner, E. L., Newell, S., and Piccoli, G. 2010 “Understanding project survival in an ES environment: A sociomaterial practice perspective*,” Journal of the Association for Information Systems* (11:5), pp. 276-297.

Walsham, G. 1995. “Interpretive case studies in IS research: nature and method,” *European Journal of Information Systems* (4), pp. 74-81.

Walsham, G. 2006. “Doing interpretive research,” *European Journal of Information Systems* (15), pp. 320-330.

Webster, J. and Watson, R.T. 2002. “Analyzing the past to prepare for the future: writing a literature review,” *MIS Quarterly* (26:2), pp. 13-23.

Wheeler, J. A. 1986 “Physics as meaning circuit’: three problems,” *Frontiers of Nonequilibrium Statistical Physics* (135) of the series NATO ASI Series, pp. 25-32.

Wheeler, J. A. 1990. “Information, Physics, Quantum: The Search for Links,” in *Complexity, Entropy, and the Physics of Information*, W. H. Zurek (ed.), Redwood City, California, Addison-Wesley, pp. 309-336.

Xue, Y., Liang, H., Boulton, W. R., and Snyder, C. A. 2005. “ERP implementation failures in China: case studies with implications for ERP vendors,” *International Journal of Production Economics* (97:3), pp. 279-294.

Yin, R. K. 2003. *Case Study Research. Design and Methods. (Third edition)*, Thousand Oaks, CA: Sage Publications Inc.

Yu, A. G., and Kittler, M. 2012. “Matching programme structure to environment: A comparative study of two IS-based change programmes,” *International Journal of Project Management* (30:6), pp. 740-749.

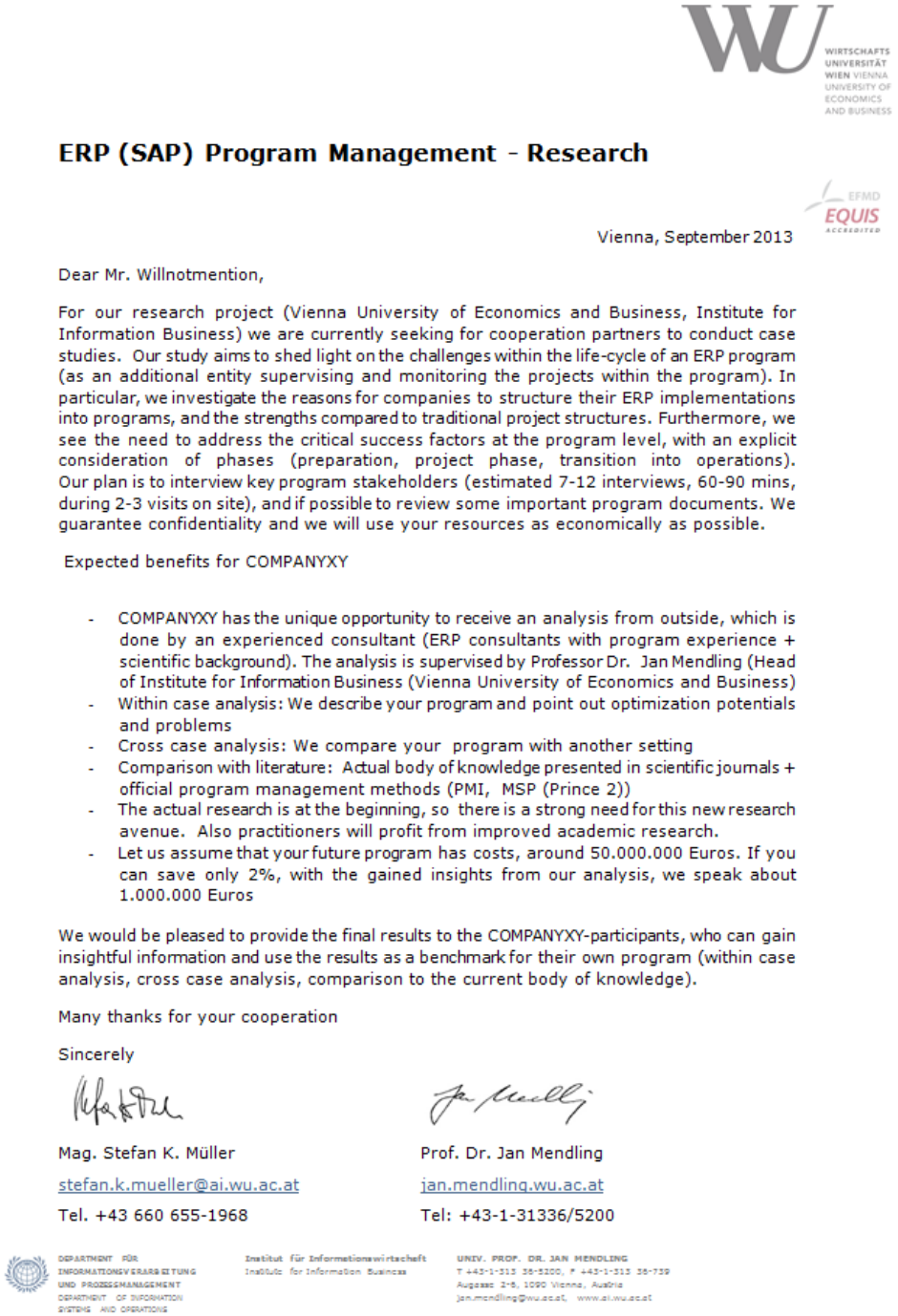
Žabjek, D., Kovačič, A. and Štemberger, M. I. 2009. “The influence of business process management and some other CSFs on successful ERP implementation,” *Business Process Management Journal* (15:4), pp. 588-608.

Zhang, Z., Lee, M. K. O., Huang, P., Zhang, L., and Huang, X. 2005. “A framework of ERP systems implementation success in China: an empirical study,” *International Journal of Production Economics* (98:1), pp. 56-80.

Zhu, Y., Li, Y., Wang, W., Chen, J. 2010. “What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry,” *International Journal of Information Management* (30:3), pp. 265-276.

10 Appendix A – General

10.1 Example of an Invitation Letter



ERP (SAP) Program Management - Research

Vienna, September 2013

Dear Mr. Willnotmention,

For our research project (Vienna University of Economics and Business, Institute for Information Business) we are currently seeking for cooperation partners to conduct case studies. Our study aims to shed light on the challenges within the life-cycle of an ERP program (as an additional entity supervising and monitoring the projects within the program). In particular, we investigate the reasons for companies to structure their ERP implementations into programs, and the strengths compared to traditional project structures. Furthermore, we see the need to address the critical success factors at the program level, with an explicit consideration of phases (preparation, project phase, transition into operations). Our plan is to interview key program stakeholders (estimated 7-12 interviews, 60-90 mins, during 2-3 visits on site), and if possible to review some important program documents. We guarantee confidentiality and we will use your resources as economically as possible.

Expected benefits for COMPANYXY

- COMPANYXY has the unique opportunity to receive an analysis from outside, which is done by an experienced consultant (ERP consultants with program experience + scientific background). The analysis is supervised by Professor Dr. Jan Mendling (Head of Institute for Information Business (Vienna University of Economics and Business)
- Within case analysis: We describe your program and point out optimization potentials and problems
- Cross case analysis: We compare your program with another setting
- Comparison with literature: Actual body of knowledge presented in scientific journals + official program management methods (PMI, MSP (Prince 2))
- The actual research is at the beginning, so there is a strong need for this new research avenue. Also practitioners will profit from improved academic research.
- Let us assume that your future program has costs, around 50.000.000 Euros. If you can save only 2%, with the gained insights from our analysis, we speak about 1.000.000 Euros

We would be pleased to provide the final results to the COMPANYXY-participants, who can gain insightful information and use the results as a benchmark for their own program (within case analysis, cross case analysis, comparison to the current body of knowledge).

Many thanks for your cooperation

Sincerely

Mag. Stefan K. Müller
stefan.k.mueller@ai.wu.ac.at
Tel. +43 660 655-1968

Prof. Dr. Jan Mendling
jan.mendling.wu.ac.at
Tel: +43-1-31336/5200

Figure 10-1 Example of an Invitation Letter

10.2 Information Sent to Pre-Identified Interviewees

WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

ERP (SAP) Program Management - Info Paper

EFMD EQUIS ACCREDITED

Vienna, September 2013

To whom it may concern,

The current body of knowledge agrees on the enormous potentials, e.g. in terms of cost savings, a properly implemented ERP (Enterprise Resource Planning) system offers a company. However, potential benefits are associated with high risks of a complex implementation. These potentials and risks are even higher when more than one project is subject to the ERP implementation. In practice, companies approach this increase in risk by the means of defining a governance structure above individual projects. This structure is typically referred to as a program, being associated with a dedicated program management. It seems that implementation methods changed in the last decades and interdependencies between ERP projects are steadily increasing. This requires new coordination mechanisms, as programs. This study aims to shed light on the challenges within the life-cycle of an ERP program. In particular, we investigate the reasons for companies to structure their ERP (SAP) implementations into programs, and the strengths compared to traditional project structures. Furthermore, we see the need to address the critical success factors at the program level, with an explicit consideration of phases. By answering these questions this research fills some blind spots in prior research, and provides a basis and new avenues for the future. For practitioners it can be used as a point of reference. Your data will be treated confidentially, and we are happy to provide you the final results.

Many thanks for your cooperation

Sincerely

Mag. Stefan K. Müller
stefan.k.mueller@ai.wu.ac.at
Tel. +43 660 655-1968

Prof. Dr. Jan Mendling
jan.mendling.wu.ac.at
Tel: +43-1-31336/5200

DEPARTMENT FÜR INFORMATIONSVERARBEITUNG UND PROZESSMANAGEMENT
DEPARTMENT OF INFORMATION SYSTEMS AND OPERATIONS

Institut für Informationswirtschaft
Institute for Information Business

UNIV. PROF. DR. JAN MENDLING
T +43-1-313 36-5200, F +43-1-313 36-739
Augasse 2-6, 1090 Vienna, Austria
jan.mendling@wu.ac.at, www.ai.wu.ac.at

Figure 10-2 Information Sent to Pre-Identified Interviewees

10.3 A Version of the Interview Guide

WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

ERP program management – interview guide

EFMD EQUIS ACCREDITED

Permission to tape the interview: Y◯ / N◯

Purpose of the study

The current body of knowledge agrees on the enormous potentials, e.g. in terms of cost savings, a properly implemented ERP (Enterprise Resource Planning) system offers a company. However, potential benefits are associated with high risks of a complex implementation. These potentials and risks are even higher when more than one project is subject to the ERP implementation. In practice, companies approach this increase in risk by the means of defining a governance structure above individual projects. This structure is typically referred to as a program, being associated with a dedicated program management. It seems that implementation methods changed in the last decades and interdependencies between ERP projects are steadily increasing. This requires new coordination mechanisms, as programs. This study aims to shed light on the challenges within the life-cycle of an ERP program. In particular, we investigate the reasons for companies to structure their ERP implementations into programs, and the strengths compared to traditional project structures. Furthermore, we see the need to address the critical success factors at the program level, with an explicit consideration of phases. By answering these questions this research fills some blind spots in prior research, and provides a basis and new avenues for the future. For practitioners it can be used as a point of reference. We would be pleased to provide the final results to the study participants, who can gain insightful information and use the results as a benchmark for their own program.

Interviewee understands purpose: Y◯ / N ◯

Interviewee information:

Name of interviewee:

Interview answers are mainly based on general experience with programs: ◯

Interview answers are based on experience with a specific program: ◯

Role in the program:

Years of experience with programs:

Years of experience with ERP:

Contextual Information (only if a specific program is the unit of analysis):

Name of company:

What is the content of the program (Replacement legacy system, introduction, BPR)?

What are the goals of the program (cost reductions, process harmonization)?

What is the history that led to the setup of the program as it is today (internal/external)?

What previous experience does the company have with ERP programs/general programs?

Number of projects (sites) involved in the program:

DEPARTMENT FÜR INFORMATIONSVERARBEITUNG UND PROZESSMANAGEMENT
DEPARTMENT OF INFORMATION SYSTEMS AND OPERATIONS

Institut für Informationswirtschaft
Institute for Information Business

UNIV. PROF. DR. JAN MENDLING
T 43-1-313 36-5200, F 43-1-313 36-739
Augasse 2-6, 1090 Vienna, Austria
jan.mendling@wu.ac.at, www.ai.wu.ac.at

Figure 10-3 A Version of the Interview Guide (Page 1)

Program duration (preparation and setup, delivery of components, closure):

In which phase is the program at the time of the interview?

What were the reasons to choose the management structure of the program, as it is today? (Sponsor, program director, steering committee, program manager, project managers, functional-leads, program management office, program office, etc.)

How were the implementation teams structured and why did you choose this approach (distinctions between a global team and local teams)?

How many persons were involved in the program?
- -Internal/external
- -Program team/project teams

What were the reasons to follow a specific implementation approach (Phased or big bang? How many projects were implemented in parallel?)

Program design (☒ is either the actual state or, for ongoing programs the intended future state)

Business strategy (degree of centralization) of the company before (X) /after (Z) the program (1-10)

1	2	3	4	5	6	7	8	9	10
Regional autonomy					Centralized decision making process (HQ driven)				

(Adapted from Seidel 2009)

Degree of process standardization of the company before (X) /after (Z) the program (1-10)

1	2	3	4	5	6	7	8	9	10
Site specific processes					Fully standardized processes except legal ones				

(Adapted from Seidel 2009)

2

Figure 10-4 A Version of the Interview Guide (Page 2)

Degree of ERP package usage of the company before (X) /after (Z) the program (1-10)

1	2	3	4	5	6	7	8	9	10
ERP and best of breed					Usage of full ERP-package to a maximum level				

(Adapted from Seidel 2009)

Support/Maintenance strategy of the company before (X) /after (Z) the program (1-10)

1	2	3	4	5	6	7	8	9	10
Local ERP Teams (Local support strategy)					Global support centers				

(Adapted from Seidel 2009)

Instance strategy of the company before (X) /after (Z) the program (1-10)

1	2	3	4	5	6	7	8	9	10
Multiple instances (clients)					One instance (client)				

(Adapted from Seidel 2009)

Open part

Why was a program structure chosen to implement the ERP systems?

Where do you see the strengths, compared to a traditional project structure?

Can you give examples?

What are the Critical Success Factors which make a program successful (I.e. Factors which must have a successful outcome, the focus here is on the program level)?

Do you see any direction for distinguishing more important from less important factors?

How is the success of this program evaluated?

- During the life-cycle of the program?
- After the closure of the program?
- If the program is already closed (Match/Mismatch of actual outcomes with predefined goals)
- Why do you think the program was successful / unsuccessful?

Candidate CSFs (Some CSFs will be chosen out of the candidate list, especially those which were not covered within the open part → marked with X in the right column)

Were these CSFs prevalent in your program and do you think they are important?

If they are important, why and in which phase are they of special importance?

CSF	Description	X
Top management support	Sponsorship and commitment are secured during the whole program. Appointing program champion who promotes the program actively	
Business case and vision	Comparing additional costs for managing the change within a program against the additional benefits, defining the intended future state, communicating vision, defining	

3

Figure 10-5 A Version of the Interview Guide (Page 3)

	and updating regularly program business case	
Stakeholder-/Communication management	Identification and categorization of all stakeholders affected by the program, the process how and when information will be distributed, ensuring ongoing commitment from all relevant stakeholders, involvement of stakeholders into benefit management/review	
Change management	Ensuring that target business environment meets requirements of the new business model, organizing trainings, ensuring appropriate resources, managing transition into operations	
ERP strategy (Vanilla ERP / phasing)	Minimum customization, phased implementation approach vs. big bang strategy, Rolling out a template, release and upgrade strategy, aligning the program goals with strategic goals	
Governance management	Management structure, establishing program office, defining decision making, reporting requirements, roles, responsibilities, interfaces and communication to the projects, formal closure and allocation of open issues	
Benefit management	The process of identification and realization of key benefits, key benefits should meet the objectives, Reviewing benefits with stakeholders	
ERP vendor	Choosing the appropriate ERP vendor and package, ensuring ongoing vendor support	
Business process reengineering	Redesign business processes in accordance with the ERP strategy and envisioned target business environment	
Technical Integration	Managing interfaces, Enterprise Application Integration (EAI), Enterprise Architecture Management (EAM), General data entry- and migration procedures	
Risk and issue management	Identification and tracking of risks and issues, risk strategy, ensuring that actions taken succeed	
Integration management	Identifying interdependencies and interrelations, and defining how to manage them, considering shared processes, managing transition into operations, providing customer support	
Program management (in terms of scope, time and budget)	Including scope management (defining what is inside the program, managing change requests), time management (program schedule, planned duration and sequencing projects, analyzing performance against the plans, milestones) and financial management (cost estimation and budgeting, performing within budget, early paybacks, ensuring funds)	
Human resource management	Staffing of skilled resources, efficient use of shared resources, disbanding and reallocating teams	
Knowledge management	Updating and storing of documents, Shared learning between project managers, providing input for future programs and operations, hand over from program to operations	
Quality management	Regression testing, end-to-end -testing, Ensuring that the results meet expectations, audits and reviews	
Infrastructure	Organizing accommodation, equipment, tools to support the program	
Procurement management	Selection of external resources, ERP licenses, hardware, managing contracts	
Methodology	Formal company specific methodology, defining, supporting documents	
System quality	Managing of system-reliability, flexibility, information quality, response time, reporting	
Program team	Composition of the team, internal and external team members with appropriate skills, best people full time, empowered decision making, team morale and motivation	
Use of consultants	Choosing consultants, managing them, building stable relations	
Organizational culture	Considering organizational culture, readiness of sites, national cultures and legal requirements	
User involvement	Requirements, testing, feedback, acceptance	

Is there anything what you still have in mind and we haven't talked about?

4

Figure 10-6 A Version of the Interview Guide (Page 4)

Interviewees (proposed) for the next interview:

Supporting documents proposed:

What could we do better within this semistructured interview?

Many thanks for your participation!

Analysis → Follow up questions:

Figure 10-7 A Version of the Interview Guide (Page 5)

11 Appendix B - A1/TA

11.1 The Case at A1/TA – Results from a CSF Perspective

In this part of the appendix we highlight the story at A1/TA from a CSF perspective. Whereas the story is very similar to the one in the main part we depict here clearly the open- and axial coding part. Furthermore, new insights are given in relation to the SIT interpretation. As a consequence, we provide a more complete view in relation to the derivation of CSFs, as presented in the cross-case analysis.

In Figure 11-1 we depict the salient groups of the program at A1/TA:

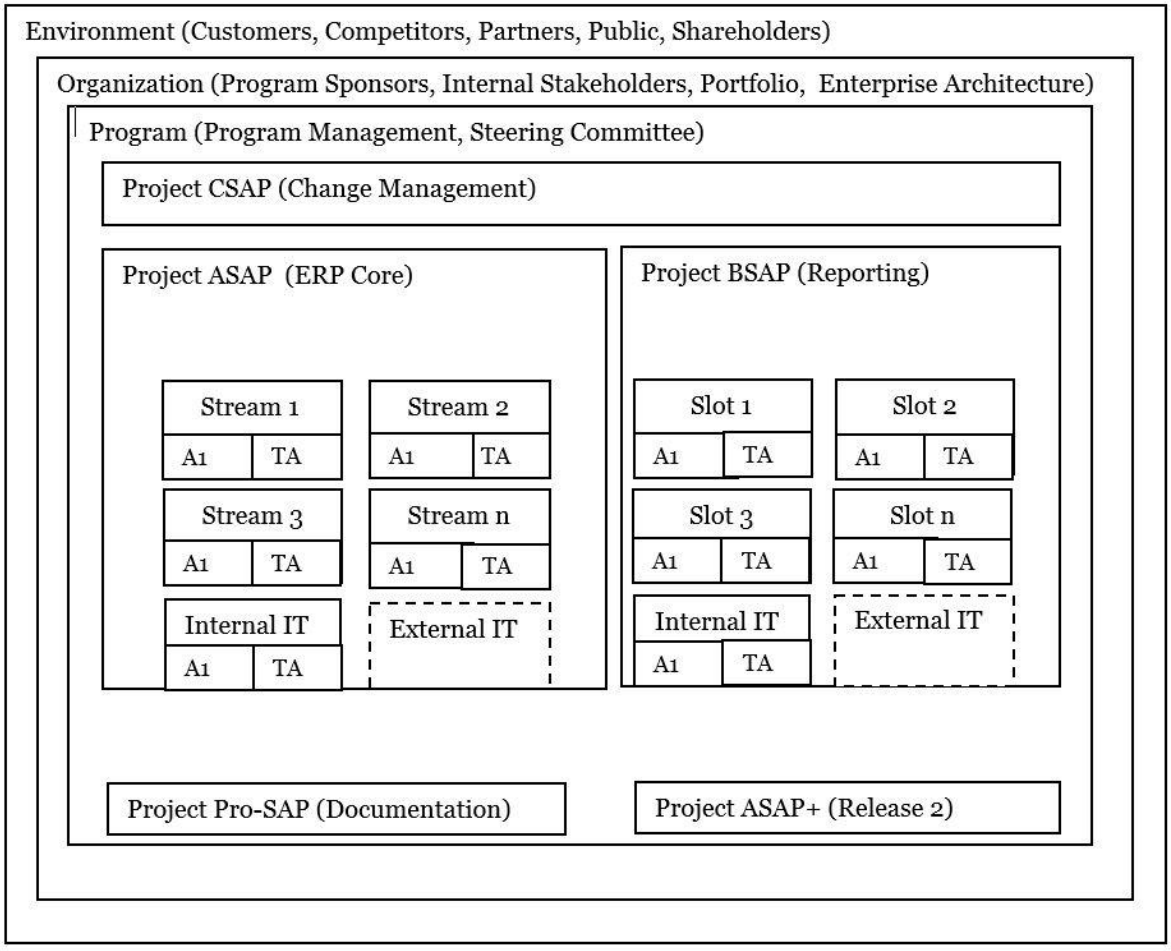


Figure 11-1 Salient Groups of the Program at A1/TA

In Table 11-1 we depict the timeline of the project ASAP. The program and the other projects were very strongly influenced by this project, since it was the main project with the highest priority. Therefore, in this paper, we apply a single case study design with multiple, embedded levels of analysis (Yin, 2003). The timeline spans 31 months, which we subdivided into 9 phases.

T	No.	Time	Phase	Category
↓	1	Oct/ 2010	Blueprint (Conception)	Pre-Crisis
	2	Jun/2011	Implementation	
	3	Feb/2012	Re-planning	Crisis & Reflection
	4	Apr/2012	Realization, Different Migration Concepts	
	5	Jul/2012	Migration Runs (Test cycle X), Realization, Functional Tests	Post Crisis
	6	Sep/2012	Migration Runs (Test cycle Y), Realization, Integration & End to End Tests	
	7	Nov/2012	Final Tests, Final Migration Test Runs (Test cycle Z)	
	8	Dec/2012	Deployment/Cut over/Go-live	
	9	Jan/2013 – Apr/2013	Post Go-live	

Table 11-1 Timeline of the Project ASAP

Pre-Crisis

During the blueprint phase (No. 1 in Table 11-1), not all the design documents were finished sufficiently. The different teams were formed according to their functional areas within A1/TA. In many cases the process spanned more than one functional area, and different harmonized and consolidated processes needed to fit together. The situation was worsened through the cultural and process differences of the formerly independent companies A1 (Mobilkom) and TA (Telekom) (see Quotation 1, Q1, Table 11-2). Prototyping was conducted only in a few cases, also due to time constraints. The streams and their IT-counterparts often had difficulties imagining the complete end-to-end process without sufficient data. Furthermore, the new external implementation partner (A1/TA selected one general vendor for the blueprint phase) did not meet the expectations. Cultural barriers and knowledge gaps (team setup of the external partner) were the main reasons why, in particular, the streams at A1/TA were not satisfied with the performance of the implementation partner. Due to these reasons the blueprint phase did not reach the anticipated goals.

During the implementation phase (No. 2 in Table 11-1) the groups within the program tried to catch up. After a new invitation of tenders, the program management at A1/TA decided to proceed with a new

general implementation partner, who should also involve former subcontractors (with a history as vendor either for A1 or TA) more strongly. This decision was appreciated by all program groups (apart from the original vendor). Furthermore, during the tender, the subcontractors were asked to document all the existing processes which were outside of the ERP system's standard. Not only for harmonized processes, but also for consolidated processes, adoptions needed to be made. Conjoint decisions, about the new adopted design, were often not made in a common meeting of all stream members. Instead the functional areas of A1 and TA sat together with their IT-counterparts. Given the strict time plan, the latter often finalized the design in a separate meeting and informed their functional areas later. After all, most processes were implemented, tested separately within the respective functional areas, but the integrated end to end view was still not evident for the single streams (see Q2, Table 11-2).

In general, cooperation with the new partner was much better in phase 2 than in phase 1, but still different views existed (program and project management vs. external IT; streams vs. internal/external IT, program and project management), concerning the test cycles for the data migration. The migration tools and the external management of the migration-team did not meet the expectations of A1/TA. Moreover, the huge amount of data led to long execution times. Even the first test cycles clearly did not achieve the targets. Thus, the data migration became the major problem of this phase (see Q3, Table 11-2).

In addition to the problems of the data migration test cycles, not all the problems in regard to the definition of new processes were resolved. The strict time plan (proposed by the formal program sponsor the CFO, and the CTO), to which the program management (including project managers) committed, was seen as very ambitious by the basis (stream level and below). Some team members even used the term "unrealistic" (see Q4, Table 11-2), and with regard to the persisting problems, the doubts concerning the planned go-live date in 05/2012 increased. Before Christmas, in 12/2011, almost nobody within the basis believed in the feasibility of the original plan. Since the situation did not change for the better, early in 2012, also the program management started to consider different scenarios and a rescheduling of the go-live date. In the meantime, BSAP performed well (see Q5, Table 11-2)

Representative Quotations (translated)	**Interpretation from a SIT Perspective**
Q1: *When is the blueprint detailed and good enough to start with the implementation? This was something where we did not really meet the target. It was a huge challenge, especially for an endeavor of this size. A*	In the beginning the "new" post-merger group A1/TA did still not exist in many heads. Instead, the most salient group for individuals in functional areas was still the respective pre-merger company, either A1 or TA.

second major issue during the blueprint was the post-merger-phase of the company. On the one hand the people from A1, on the other hand the people from TA... before they were not really confronted with each other. (Program manager)	Therefore, the strategy to positively distinct the in-group from the out-group was social competition (Tajfel and Turner, 1986), which made an agreement more difficult.
Open Codes: Team-Composition; Post-Merger Phase to consider; Blueprint Phase not really finished sufficiently **Axial Codes:** Efficient Human Capital Management; Ensuring Business Process Management; Case-Specific Context	
Q2: *The majority of the users is outside the FUNCTAREA2 area.... a lack of awareness that the ERP system is highly integrated and plays an essential role in the entire company. Apart from the FUNCTAREA2 most functional areas did not know that it will also be a change for them.* (Director functional area 2)	Every functional area (apart from FUNCTAREA2) is one in-group. They compare themselves with the out-group FUNCTAREA2 on the dimension "relevance". In the early phases of the program, different perceptions concerning the business impact were perceived.
Open Code: Expandable Transportation of Awareness concerning Importance and Impact **Axial Code:** Secure Change Management	
Q3: *We were always one data migration test cycle behind. The vendor expected a technical migration, we expected already a first test migration... these two perceptions did not fit each other... we expected that they provide technically mature migration tools, which was not the case.... The functional areas realized that not all the data will be migrated.... and they asked themselves: "how can I work with that data".* (Technical coordinator program, project manager ASAP)	Obviously, different groups shared different perceptions. Whereas the program and project expected that the migration tools are technically mature and a first test cycle with plausible data, the ERP vendor saw this test run pure technically. Furthermore, the functional realized that the data will be migrated only partially. This led necessarily to tensions between the groups. (program and project management vs. external IT; streams vs. internal/external IT, program and project management).
Open Codes: Emerging Indicators for Rescheduling; Negative Perceptions concerning Data Migration Test Cycles; fail to fully manage expectations **Axial Codes:** Ensure Data Migration/ Accuracy; Define Stakeholder & Communication Management	
Q4: *The program management and the project managers approved the first go live date, but the basis did not believe that this date is feasible right from the start. With basis, I mean stream leaders, work*	The program management and the project managers affiliated with the higher-status group program sponsors. In other words, the most salient group for the program management and the project managers was

package owners and project staff. I mean you need to convey this plausibly to the basis, otherwise the date won't be accepted. And we did not manage to transport this properly. Therefore, we lost the basis for a certain time. That was one reason why we had to skip the first go live date. (Technical coordinator program, project manager ASAP)	the in-group organization. The most salient group for the "basis" remained their informal lower-status group, since the higher status group did not get them on board. Thus, different perceptions regarding the feasibility of the time plan persisted.
Open Codes: Loosing Trustworthiness; Unrealistic Timeframe **Axial Code:** Ensure Realistic Planning of Time Schedule	
Q5: *We have people who push things forward.....that´s why we said we make our own documents....but we remained lean....This was only possible because we have been our own project....and the program management was happy with our performance right from the start.* (Technical coordinator BSAP)	The group-members of BSAP created positive distinctiveness by comparing themselves with the out-group (e.g. ASAP) on a new dimension. They had no need to deliver the same amount of documents, and were more flexible. Tajfel and Turner (1986) call that social creativity.
Open Codes: BSAP with separate Methodology Requirements; Project Empowerment is seen positively **Axial Code:** Flexibility of Program Components	

Table 11-2 Representative Quotations (Pre-Crisis)

CSFs	Description	Groups at A1/TA
Ensure Business Process Management	Redesigning business processes in accordance with the ERP strategy and envisioned target business environment.	Streams, Internal and External IT (with Subgroups A1 & TA)
Ensure Realistic Planning of Time Schedule	Defining an ambitious but realistic time-frame.	Program Sponsors, Program and Project Management, Basis
Ensure Appropriateness of the ERP Vendor	Choosing the appropriate ERP vendor, ensuring ongoing vendor support.	ERP Vendor 1, ERP Vendor 2, Subcontractors, Internal IT, Streams

Ensure Data Migration/Accuracy	Ensuring that data is migrated accurately to the ERP system with appropriate tools.	ERP Vendor 2, Basis
Secure Change Management	Creating awareness of business impact and relevance.	Change-SAP, Streams
Flexibility of Program Components	Not all of the components needed to meet the same strict requirements, which was particularly good for BSAP.	Project BSAP

Table 11-3 Most Important CSFs and Involved Groups (Pre-Crisis)

In Table 11-3 the CSFs (and the particular properties/dimension in the description), which were not really met are depicted. Other relevant CSFs ("Secure Top Management Support", "Establish Governance Structure", etc.) were addressed appropriately. Additionally, in the last row we report on the program-specific CSF "Flexibility of Program Components".

Crisis and Reflection

Within the re-planning phase (No. 3 in Table 11-1), the original go-live date was cancelled. This decision was appreciated by the basis (stream level and below, see Figure 11-1). The project ASAP was responsible for the cancellation, but likewise all projects were affected (For example, BSAP was performing well all the time). Furthermore, one stream was split into two streams, which reflected strongly the interest of both new groups. The perceived workload decreased heavily for the basis, but at the same time increased significantly, for the program management and the project managers, who started to refine the new schedule and to prepare different scenarios.

Within phase 4 (Realization, Different Migration Concepts, Table 11-1), the program management prepared a detailed plan for the new go-live date in 01/2014, which was presented in a decision workshop in 06/2012. As the data migration was considered as the most serious issue, five different alternatives were proposed. Furthermore, five different deployment scenarios were presented. Additionally, issues with a critical business impact were highlighted. The decision workshop served as a large buy-in of all relevant stakeholders, since beside the CFO, the CTO, the program management and the project managers, also directors and stream leaders (in total 26 persons) participated. Although the new schedule was still ambitious, it was considered as realistic and therefore all participants committed to the new go-live date,

and agreed in accordance on a specific combination of the migration/deployment scenario. The consequence was a strong overall commitment to the new envisioned go-live date (see Q6, Table 11-4)

Representative Quotation (translated)	**Interpretation from a SIT perspective**
Q6: *The crisis had a positive effect on the complete program. We used the time to reflect what went wrong, what do we need to improve, where do we need to change the structure, how must we change our collaboration.... A new quality of collaboration.... The team found together…* (Project manager Change-SAP)	During phase 3 and 4 the group formation (group "program") was strengthened. The extent to which an individual identifies with a group may be affected by interpersonal interaction, common history, shared goals or threat (Ashfort and Mael, 1989). We assume that pressure might also have been a condition.
Open Codes: Positive Reflection of the Past; New Quality of Collaboration **Axial Codes:** Establish Collaboration and Decision Making; Secure Lessons Learned	

Table 11-4 Representative Quotation (Crisis – Re-planning and Reflection)

Actions	**Description**	**CSFs influenced**
Buy-in Meeting	Securing the commitment of stakeholders. Decisions made on data migration and deployment scenarios.	Top Management Support, Establish Commitment of Key Players, Ensure Data Migration/ Accuracy, Define Program Methodology
Reinforcement of Data Migration Team	The data migration team was reinforced with additional workforce, most notably at the management level. The program management realized that the collaboration between functional areas, IT, and the implementation partner needed to be improved.	Ensure Data Migration/ Accuracy
Quality Gates introduced	For data migration, end to end tests, Integration Tests Percentage of executed test cases, percentage of priority 1 errors.	Define Program Methodology
Issue Tracking Tool	An issue management tool was introduced. To prioritize tickets and generate reports.	Secure Issue Management, Defining Stakeholder & Communication Management

Alignment on a Common Communication Strategy	Convey management decisions to Basis, (decisions made in decision workshop).	Secure Change Management, Define Stakeholder & Communication Management
Project Rooms established	Separate project rooms were provided to strengthen the communication and collaboration, and to improve decision making.	Establish Collaboration and Decision Making, Ensure Business Process Management

Table 11-5 Most Important Corrective Actions During the Crisis

Table 11-5 depicts the corrective actions, which we deemed most important during the crisis. These actions influenced certain CSFs, as we show in column 3.

Post-Crisis

The data migration test cycle X (No. 5 in Table 11-1) resulted in additional errors. The bug-fixing, together with the open issues in the implementation (development) of processes, was a challenge for the implementation team and tickets needed to be prioritized. This was done with a dedicated issue tracking tool, which was introduced at that time. The introduction of the tool was generally appreciated and allowed a detailed reporting and communication of the current status (see Q7, Table 11-6).

The data migration test cycles X and Y (No. 6 in Table 11-1) continued with the goal to meet the target values of the quality gate. This was the prerequisite to start with the final test cycle Z in 11/2012. One realized still room for improvement concerning the data preparation for the upcoming data migration runs. Finally, very late, integration- and end to end tests started and new issues popped up. This resulted in new change requests, which needed to be prioritized. Especially in the CS (Customer Service) -stream some critical integration-tests failed. High priority was given to the issues concerning customer oriented processes, and further downtimes and tests were arranged. Additional awareness (at least informally) was given to this topic, since a service oriented company got bad press because of their bad deployment of a new system. By that time at the latest, all groups within the program realized the strong impact an ERP system might have on public appearance, and that the link to the organizational and environmental context is especially important (see Q8, Table 11-6).

In this phase (Final Tests, Final Migration Test Runs, Test cycle Z, No. 7 in Table 11-1) the progress slowly approximated to the desired state, as a prerequisite for the formal approval of the go-live scenario. Initially,

the end to end tests (with data of data migration test cycle 2) did not meet the envisioned targets and the test phase needed to be prolonged. 19 processes were classified as business critical, and needed to pass the final tests. Finally, with a lot of commitment, and increased professionalism, of the whole program team (especially from the project ASAP), all the critical business processes met the acceptance criteria, and data migration test cycle Z passed the target values of the quality gate (see Q9, Table 11-6). Hence, one day after the final end to end tests, the steering committee formally approved the go-live scenario.

The deployment and go-live phase (No. 8 in Table 11-1) was seen as a success by all stakeholder groups. No business critical business issues remained and the steering committee approved the formal go-live date. The project BSAP also went live successfully a few weeks later, followed by the project Pro-SAP, which successfully went live in 06/2013. The project ASAP+ (conception release 2) was delayed and successfully concluded later, i.e., it was rescheduled due to the higher priority of ASAP.

In the post go live-phase (No. 9 in Table 11-1), all the open issues were addressed and prioritized. Again, also within this phase, the issue tracking tool proved to be very valuable and offered high transparency to the relevant stakeholders (see Q7, Table 11-6). All issues were either solved or postponed to release 2. It is important to note that the project Change-SAP was strongly involved in communication and training issues during the post go-live phase. Finally, a last workshop was conducted to reflect upon the entire program. The program was evaluated as a success in most dimensions. While the aspect of collaboration was rated unanimously as excellent in phases 8 and 9, it was assessed as very bad for phase 2 (start of the implementation). Open issues were handed over to operations (including roles, tools, processes), and lessons learned were saved for future programs.

Representative Quotations (translated)	**Interpretation from a SIT Perspective**
Q7: *The open issues were managed with an issue tracking tool. We used it heavily, also for reports depending on the priority and the business impact*. (Program manager)	The introduction of the issue tracking tool was appreciated by all groups, since it positively affected the program. Therefore, it strengthened the identification with the in-group "program", and group formation through shared goals (Ashfort and Mael, 1989). The tool made communication with the out-groups on the organizational level easier.

Open Codes: Positive Perceptions concerning the Usage of an Issue Tracking tool; Intensive Communication of Issues and Errors **Axial Codes:** Secure Issue Management; Define Stakeholder & Communication Management	
Q8: *We had many concerns. That's why we prepared ourselves for the situation. The worst thing is to get bad press, how it happened to the company WILLNOTMENTION.... this would have been the worst case.* (Stream leader, stream 1, functional area 1)	Employees of functional area 1 belong to different in-groups (e.g. their stream, the project, the program, the organization). The out-group is the company (environment), who failed in implementing an IS properly. Given this situation, it is clear, that one wanted to avoid a negative public appearance, by any means.
Open Codes: No bad Press and no negative Public Appearance; Detailed Cut-Over (Deployment) Planning **Axial Codes:** Emphasize Vision and Business Case; Dimensions for Success; Define Program Methodology, Case-Specific Context	
Q9: *The essential point was the increased professionalism in the migration team, we also had some changes in the team composition...collaboration and the interplay between development, test migrations, tests, integration-tests, end-to-end tests, data cleansing....were much better.* (Program manager)	The relevant in-group formation "Data Migration" was strengthened. Additionally, the interplay with salient out-groups "streams" improved. Also the identification with higher-status groups (project, program, organization) increased.
Open Codes: Strengthening and Restructuring of the Migration Team; Perceptions concerning the Collaboration improved steadily; Increasing Professionalism within the Migration Team **Axial Codes:** Ensure Data Migration/ Accuracy; Efficient Human Capital Management; Establish Collaboration and Decision Making	

Table 11-6 Representative Quotations (Post-Crisis)

Table 11-7 (below) depicts the CSFs, which we deemed most important during the Post-Crisis. In the description the properties/dimensions, which were of particular importance at A1/TA are shown.

In this section we presented our interpretive case study. We started with the program structure, followed by the introduction of salient groups within the program at A1/TA. Next, we presented the timeline and continued with our storyline, which is based on social identity theory (SIT). We interpreted some aspects from a SIT perspective and depicted relevant CSFs and corrective actions during our timeline (Pre-Crisis,

Crisis and Reflection, Post-Crisis). Furthermore, we considered the salient in-groups and out-groups. Next, we discuss the most relevant findings of our study, its limitations and avenues for future research.

CSFs	Description	Groups at A1/TA
Ensure Data Migration/ Accuracy	Collaboration and lessons learned in the migration team, additional workforce for the migration team, committed migration scenario, collaboration with other teams, ensure data freeze.	Streams, Internal IT, ERP Vendor
Emphasize Vision and Business Case	No negative public appearance, customers should not recognize the change, adapted business case secured, meeting the defined success dimensions.	All Groups within the Organization, especially the Program Groups
Facilitate Collaboration and Decision Making	Trusting each other and other groups, small teams which are enforced to make fast decisions, interplay between IT and streams.	All Program Groups
Enforce Program Methodology	Strict quality gates for data migration cycles, end to end testing, integration tests.	All Program Groups
Establish Commitment of Key players	Absolute commitment to 2nd go-live date.	All Program Groups
Realize Benefits	Transition into operations, lessons learned, reflecting the project and reviewing the targets.	Streams, Internal IT, Program and Project Management

Table 11-7 . Most Important CSFs and Involved Groups (Post-Crisis)

11.2 Axial Coding – Network View – Realistic Timeframe - A1/TA

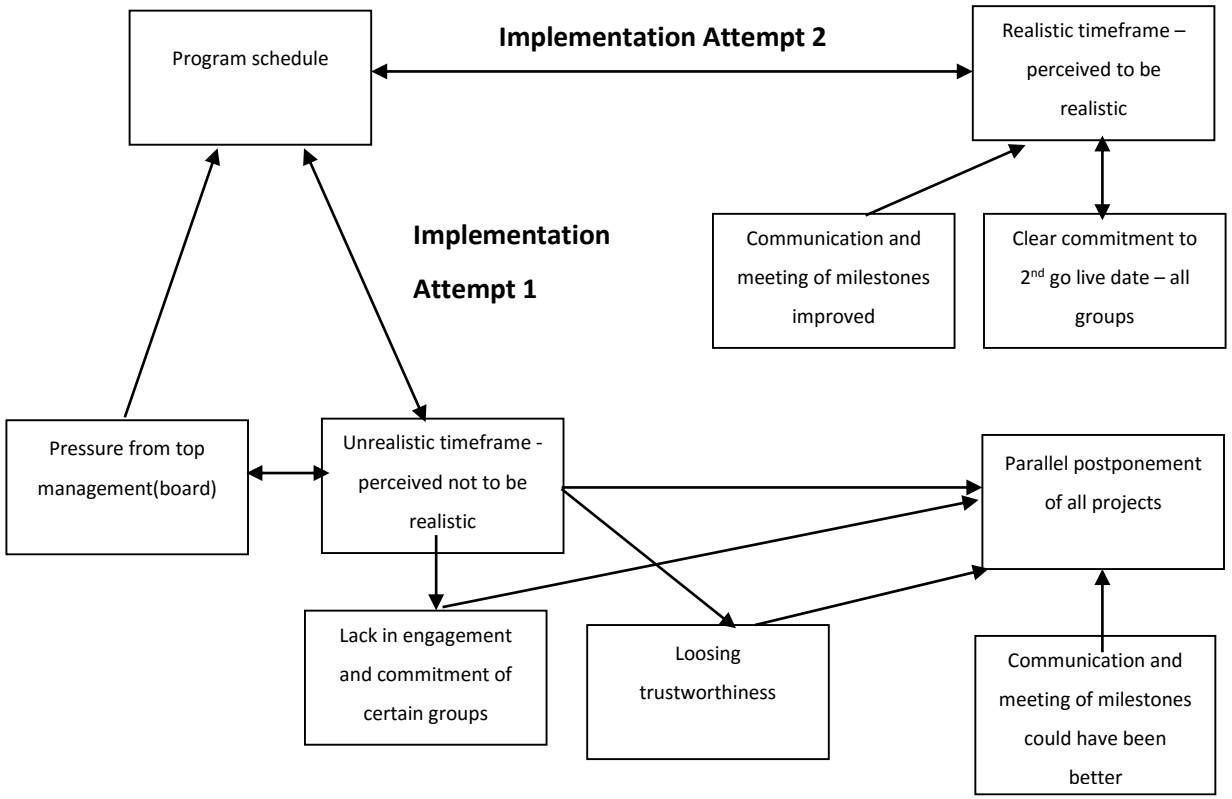


Figure 11-2 Axial Coding – Network View – Realistic Timeframe - A1/TA

11.3 Integrative Memos – Realistic Timeframe - A1/TA

Axial (integrative memo), realistic timeframe (subcategory)

The first go-live date was defined by the board and supported by the program management, program office, project leaders (management coalition). The decision was perhaps influenced by the premise that only certain go-live dates were possible, regarding year end closing or quarter closing (Functional Director 2).

The first go-live date was seen as absolutely not doable by many key players "the Basis" (several statements...). Statement of program group: "very, very ambitious". In certain cases, also timelines regarding the change project were not seen feasible (Stream Lead).

The conception and blueprint phase already had delays. The plan was seen by some players as already being unrealistic in this phase; according to a Functional Director 1, even before the implementation phase was started. One aspect which was raised is the fact that the ERP vendor changed and perhaps would have needed an assimilation phase (Functional Director 2). Although some players also defended the initial plan of the program (and top) management, they perceived the plan as not doable, as Functional Director 2 said "it is always difficult, since when you would have stretched the time plan by 6 or 9 months, then perhaps other problems had occurred, due to less pressure, although the daily work would have been more comfortable". The unrealistic timeframe was stretched several times in the lessons-learned workshop and its minutes.

Nobody wanted to say something against the first time-plan, as high top-down pressure was perceived and the go-live date was clearly defined (two persons of management coalition, one person of the Basis).

Retrospectively also the program management admitted, the partial greenfield-approach and the timeframe of Implementation Attempt 1 was not realistic (Several quotations).

The unrealistic timeframe had also consequences on the engagement and commitment of the staff (Change Manager, Functional Director 1), and problems appeared during the data migration test cycles 1,2 and 3, where nothing worked out properly.

The Basis (implementation below project leads) did not believe the plans anymore, and the program management lost credibility. This lack of commitment, engagement and believing in the feasibility of the plan led to the re-planning. Although the rumors had been circulating for a certain time, the official

cancellation- and postponement decision was officially taken by the steering committee only late (March 2012), as a decision with that impact needs a proper and structured analysis in advance.

In the buy-in meeting (26-Jun 2012) a realistic but ambitious timeframe, with different cutover variants, migration variants, was presented to representatives of all impacted stakeholder groups. This plan was seen as realistic; the decision was taken in unison. Afterwards, the new plan was communicated from the stakeholder representatives to their groups. As such, the absolute commitment of these groups was secured for the 2nd go-live date. This ambitious timeframe and commitment manifested in weekend work and night shifts ("it was an enormous effort" (1 person from the Basis). Functional people and business experts worked together and made the 2nd go-live date happen. This willingness to meet the 2nd go-live date and the absolute commitment were also stressed in the lessons-workshop and its minutes.

Functional areas as logistics reported that the 2nd time schedule worked out properly, with all core functionalities, and it was good that not earlier alternatives were pursued. Some areas as Customer Services really needed this time to meet all the requirements

The pressure was after the cancelation of Implementation Attempt 1 a little bit lower for a limited time, but increased as the 2nd go-live date approached (2 persons from the Basis). The pressure on the 2nd go-live date also effected that certain positions of stakeholder groups were weakened and the stakeholder groups (Mobilkom, Telekom) worked cooperatively together with the commonly accepted date, and found appropriate solutions (Management coalition).

Axial memo (integrative memo) – stakeholder and communication management (core category)

In the beginning, not all stakeholders were properly identified (e.g. line management). It was difficult in any case to receive the commitment of the functional areas. The functional areas had the wrong perception that it is an IT endeavor. Many stakeholder groups needed to be involved as stated by one member of the PMO, e.g. portfolio-management, enterprise solution architecture.

At a later stage [perhaps also impacted by the fact that the project manager of the change project was exchanged, and the new project manager had more experience regarding communication], change impacts were clearly communicated as well as the errors which might be expected. Different channels were used, (e.g. meetings, newsletter, roadshow) and transported mainly to the managers. The managers transported

it to the next levels. In that relation also a meeting intended for the line management was scheduled [very late] as recorded in the meeting minutes of 09-Nov-2012 and 28-Nov-2012. To a certain extent the information meetings were scheduled right from the start, but stronger in Implementation Attempt 2.

A key-user concept was developed, and single points of contact regarding training were defined. The key-users should transport the information to lower levels. The responsible persons for training were trained from training consultants. During the re-planning it was explicitly defined and recorded that the "results must be conveyed to lower levels by line manager". The line managers act as multipliers

Only at a later stage was it possible to communicate to the functional areas, which expectations (again perceptions) they could have towards the new system. They realized which data they could expect in the new system (data migration). Furthermore, the implementation team realized that the process could only be observed and tested together with the data (which was not there in a sufficient state during Implementation Attempt 1) The data migration strategy was not properly communicated during the blueprint-phase. This should have been done (Technical Director Program, Project Manager ASAP), although it would have been "abstract" and hard to comprehend for the functional areas. As a consequence, also the process view needed to be corrected several times.

During Implementation Attempt 1 daily SCRUM meetings were scheduled as it is recorded in the minutes of 03-Feb-2016 [Perhaps as a final means to meet the deadline of Implementation Attempt 1]

A functional director clearly asserted that the communication and the Communication and meeting of milestones, as well as quality, improved over the course of the rollout.

The change impact was not clearly transported "not enough project-marketing, no pure accounting-endeavor", expectations transported to the management. Not all Stakeholder groups were identified, e.g. one major area and its impact was not clearly identified. Only commitment of the top management is not enough. Commitment is also needed within the functional areas. In areas where the stakeholders were identified, they trusted the project members.

The quality of collaboration and the expectations to each other were reflected during the re-planning. In the beginning partially too many persons were involved in the meetings (too large rounds). No clear definition of accountability. Later, during Implementation Attempt 2 small, empowered teams were co-located (in separate rooms). The collaboration significantly improved as recorded in the lessons learned document.

The reporting function (to the management) benefited significantly through the program construct. Overview of several projects and transparency were mentioned several times.

The buy-in meeting 29-Jun-2012, where all major stakeholders were involved, contributed significantly to a better work situation and a successful Implementation Attempt 2. Reflection, new-definition of communication strategy (managers transport info to subordinates, to secure the involvement of all stakeholders), separate project rooms, smaller, empowered teams, data migration scenarios, cut over scenarios. Very important was the definition of a new go-live date (several scenarios discussed)

Approval of all stakeholder groups secured a strong commitment during Implementation Attempt 2.

Tools contributed to better communication, in Implementation Attempt 2.

Post go-live: hypercare support was planned during the cut-over planning. Errors and expected solution times were properly communicated. Training sessions were partially repeated, skills and training materials optimized. Finally, during the lessons learned workshop (end of hypercare phase) the communication (internal and external) was seen positively. Emphasized was the target-group-specific communication and the communication-plan.

Selective coding: realistic timeframe regarding core category (stakeholder- and communication management)

During Implementation Attempt 1 the go-live date was defined by the board and supported by the program management (Believers). It seems that other stakeholders (line managers, implementation team starting from stream-leads) were not much involved in the definition of this date. The go-live was tacitly accepted from these Skeptics, but had was not perceived as doable (realistic). This had an impact on commitment, engagement and the management coalition (Believers) lost trustworthiness. Nobody of the Skeptics believed in the plans “they put on the walls” and its feasibility. As a consequence, a negative fit of perceptions towards the CSF “realistic timeframe” existed. The CSFs was not met.

2 salient groups: Believers vs. Skeptics

During the re-planning several scenarios were discussed, and all stakeholders- groups were identified properly and involved. During a buy-in meeting one scenario regarding “new timeframe, new go-live date” got formal approval. The managers transported this in a new (better) communication strategy to their

subordinates, securing that all levels are involved. Several other actions (e.g. regarding decision making and empowerment of smaller teams) helped to save time.

During Implementation Attempt 2, all stakeholder groups perceived the feasibility of the timeframe, showing strong commitment and wanted to stick to the go-live date at all costs. They worked long hours and weekends. The time-schedule where all stakeholder groups were “bought in” through effective stakeholder- and communication management was perceived as ambitious but doable (realistic). As a consequence, the group borders blurred, all stakeholders had the same perceptions towards the CSF, leading to a high positive fit towards the CSF “realistic timeframe”. The CSF was met.

1 Salient Group: Believers

12 Appendix C - Pantheon

12.1 Some Reference CSFs (Concepts)

Program Governance/Project Governance

During the rollouts, the program cluster proved to be very valuable, and we propose that the establishment of this additional entity was the best choice, particularly when many stakeholder groups are involved (Chang et al. 2014) with different backgrounds, experiences, and perspectives (Jiang et al. 2014). First, the program cluster provided valuable guidance throughout the implementation life cycle and introduced best practice methods which were consistently sharpened. Second, the program cluster had an overview of the larger picture, the overall timelines of all projects within the Jupiter rollout series, but also to surrounding projects and products in the environment. The program cluster also intervened in situations which were not always evident for the sites. Third, the program cluster was participating in and reporting to the steering committee and therefore secured top management support (Bernroider, 2008; Markus and Tanis, 2000; Ribbers and Schoo, 2002; Seidel, 2009), which is indispensable. Fourth, the program cluster also had a mediating role from a neutral perspective which helped to find resolutions when other stakeholder groups (sites vs. Jupiter Competence Center) had different perceptions. This was often necessary since the two parties often acted like a customer and an external implementation partner, although both were under the roof of Pantheon. Bottom line, we believe that embedment into the larger program and the introduction of the program cluster was absolutely essential.

Business Process Redesign

The general business blueprint and the development of the template were not met sufficiently and weighted towards Apollo1, but was improved within the flexible blueprint phases during each rollout. In general, we believe that it is a huge challenge to develop a comprehensive template which covers all envisioned consolidated and harmonized business processes in sufficient detail, particularly when too much time passes between the blueprint and the rollout, and the requirements and surroundings change (“moving targets”). The results suggest that a blueprint phase with a fit-gap analysis should be done at the start of every rollout project, which details the outcome of the general blueprint. Furthermore, it seems that the more the business processes differentiate (e.g., more local laws) the longer this flexible blueprint phase will last. Of

course, this proposition needs further investigation and we see here a potential for further research. For Pantheon, it might have been one reason that the scheduled rollout implementation times had to be extended.

Overall, the program contributed to an effective business process redesign, although the missing directive power made process harmonization more difficult. First, the global blueprint and the integrated view with respect to other products paved the path for increased awareness (also for future contract negotiations) at the site-level. Second, although the blueprint could not meet the envisioned targets, the case at Pantheon illustrates the dynamics of a learning program. This includes the products and best practice lists issued by the program cluster and the Jupiter Competence Center. Third, a strict change process prevents the development of unnecessary process varieties. Fourth, the development of a common release management (with inclusion of Jupiter and other products) secures common and integrated end-to-end processes. For all those reasons, this CSF was strongly leveraged by the program.

Appropriate Methodology

Particularly for an endeavor of this size, an appropriate methodology is of major importance. This is stressed extensively in program management literature (e.g., Cabinet Office, 2011; Lycett et al., 2004; PMI, 2008), but also in ERP literature (e.g., Markus and Tanis, 2000; Ribbers and Schoo, 2002; Seidel, 2009). In our specific case it is important to mention that an appropriate methodology was used extensively at the level of the program cluster, as well as for the ERP implementation itself; the Jupiter Competence Center used a well-established method developed by the ERP vendor. Moreover, the methodology was adapted and improved over the course of the rollouts. Furthermore, a rigid change process and a common release management strategy secures the integrity of the ERP system over all sites and with respect to other products. Certainly it helped that quite a few members of the program cluster and from the Jupiter Competence Center were experienced and certified users. All in all, we conclude that the usage of appropriate methodologies contributed to the overall success.

Target Group Specific Trainings

Pantheon conducted training at all levels, which was certainly an important factor for the success of the Jupiter implementation. In program management and ERP research, training is addressed extensively, but mostly covered under the summary term ‘Change Management’ (e.g., Cabinet Office, 2011; Lycett et al., 2004; Markus and Tanis, 2000; PMI, 2008; Ribbers and Schoo, 2002; Seidel, 2009; Somers and Nelson, 2004).

In our case the training included product training for the members of the Jupiter Competence Center, general and specific process and product training for key-users, and project preparation training for key-users. This training was so comprehensive that we decided that it exceeds the level of a subcategory. From a program cluster perspective, it was beneficial that certain training sessions were bundled, including participants from different sites, and that the learning effect with respect to this CSF was transferred from one site to another. Thus, we conclude that "target group specific trainings" were leveraged by the integrated program view.

Lessons Learned - Continuous Improvement & Product Quality

The continuous improvement over the course of the rollouts was a CSF of major importance for the success of the overall rollout series. The 'watermelons' Vesta2 and Neptune2 had the worst starting conditions, since on one hand the initially planned implementation time was simply too short for them, and on the other hand the blueprint was not meeting their needs. This was a turning point in the project and the implementation times were extended; the product quality was improved significantly. Furthermore, all participating stakeholder groups gained experience over the course of the rollouts. This was due to the sharing of experiences, e.g., the biweekly telephone conference where all relevant stakeholder groups participated, the increasing awareness about potential problems, and the continuous improvement of best practice guidelines. The continuous improvement was certainly only possible since Pantheon followed a phased rollout approach (subsequent rollouts) compared to a big bang approach, where everything is implemented at once (Davenport, 2000; Markus et al., 2000a). As a consequence, the remaining rollouts could profit significantly, from a methodological and best practice perspective, as well as from the perspective of a continuously improved product quality.

12.2 Sample Quotations for Concepts:

Program Governance/Project Governance

A really complex issue which was evident throughout the program cluster was the complex enterprise structure with the autonomous sites. Basically, each site was responsible for its rollout project and the implementation of Jupiter (Q14). The program cluster accompanied the rollouts with best practice methods and a neutral view (Q15), but had no authority to give directives, like it is common in a matrix organization. At the steering committee level, where directors of all sites participated, the program cluster reported the

current status. Nevertheless, although the program cluster as additional coordinating and neutral entity was without a doubt necessary, the enterprise structure of Pantheon was challenging at its best.

Q14: In principle the problem of self-administration [autonomous sites] is that each site, or each part in each site, is independently responsible, ok. And, when I've got a matrix organization, I have to check where the linking is stronger, horizontally or vertically? How is it, for example, if someone sitting in a site gets an order from the Jupiter Competence Center, but he knows that this against the view of his director, what is he going to do? The Jupiter Competence Center is a temporary organization, compared to the line organization. After all, there are many potential causes of conflict, which wouldn't occur in a 'real' hierarchical organization. (Senior program manager, 153 ff.)

Open code: Self-administration (autonomy) without real directive power needs to be treated carefully

Axial codes: Program governance; project governance

Q15: ....it [we] were those blue helmets [UN peacekeeping forces], with the motivation to lead confusing structures or conflicting situations, to support them professionally, summarizing, and trying to observe neutrally....since we were not suffering when something was implemented differently or needed to be implemented...or [we did not have] the pressure of the functional areas...we were free and could view at a topic from different angles, and trying to lead to a decision. And when this was not possible there was the program steering committee as an escalation level, where we said: 'ok, this problem needs to be led over to a different project', or making recommendations.....since when someone is involved and discussion partner, then it is hard to moderate, when one has interest. (Junior program manager 23:7)

Open Codes: Program cluster from a neutral perspective as mediator; reporting of program cluster to program steering committee

Axial Codes: Program governance; project governance; Stakeholder- and communication management

Quotation Q16 illustrates again the autonomy from the sites. This manifested that the situation during some rollouts was a black-box for the members of the Jupiter Competence Center. This is very interesting, since for the same rollouts (Juno5 and Minerva5) the senior program manager of the program cluster rated the project management capabilities of these sites as excellent. It seems that particularly for Juno5 the program cluster had insights in regard to the status of certain deliverables, which were not visible to the members of the Jupiter Competence Center.

Q16: After all, the transparency which we would have desired existed only conditionally. Minerva5 laid open everything what they did, and what they do, where they have got problems. Juno5 only said: 'everything works properly or the Jupiter Competence Center is responsible since they didn't resolve the error in time.' This was difficult in the beginning... (External senior consultant, Jupiter Competence Center lead for several rollouts, 545 ff.)

Open codes: Sites own governance and responsibility of rollouts; no directive power towards sites for the Jupiter Competence Center, different levels of transparency from sites to competence center

Axial codes: Project governance; collaboration

Business Process Redesign

Although the Jupiter Competence Center spent considerable time and effort to prepare an extensive blueprint document, it was not specific enough to meet the requirements of the different sites. The blueprint was acceptable for Settlement Area 1 for the Apollo1 rollout, since this was the only site where an SAP legacy application existed in that specific area, and where the functional and business experts had SAP experience. For Settlement Areas 2 and 3, Apllo1 faced a similar situation as the other sites for all settlement areas. Furthermore, Apollo1 was the first rollout and therefore subject to fewer changes (legal, process and changes in surrounding and related products), called 'moving targets' in quotation Q8. Eventually, the situation improved as the missing sections were subsequently carried out over the path of the rollouts, as Q17 indicates.

Q17: First, when the sites don't take the blueprint discussions seriously. For example, that they say: 'ok, this is in 5 years, who cares what happens in 5 years,' and when they don't break it down into the details...second, deliverables were realized differently since it was not described so detailed in the blueprint, for example not meeting the requirements....third, certainly the changing requirements, since I shoot at a moving target. Since during the blueprint [phase] I can say to a certain point in time: 'this is the situation now,' but how it will be in 5 years, when it will be implemented, nobody knows, it can happen a lot [in the meantime]. And these things, these moving targets, were in a major part implemented in the meantime. (Senior program manager, 946 ff.)

Open codes: Steadily changing requirements - moving targets; different perceptions regarding blueprint and template

Axial codes: Business process management; scope management, perceptions

Appropriate Methodology

The strict usage of an appropriate implementation methodology was evident at all levels throughout the whole implementation life cycle. The program cluster Saturn/Jupiter used certain checkpoints and checklists as Q18 indicates. The methodology was refined continuously over the course of the rollouts. Exactly as the program cluster the Jupiter Competence Center also understood the importance of a proper usage of methodology. In their case they used a well-established method of the ERP vendor. Furthermore, within Pantheon, project management certifications or ITIL (IT Infrastructure Library) are prevalent. Thus, we conclude that from the methodological perspective best practices were met.

Q18: The entry points were definitely very important. We saw....during their introduction that the importance was very high, ok, and for the last sites, it was rather like that we knew what we have to do, it was rather formalism. After all, it was important, that we structured certain things and that we defined processes. ....certain checkpoints and checklists, saying that this must be finished before we can go to the next phase. (Senior program manager, 1189 ff.)

Open codes: Program methodology for standard products has positive effects; continuous learning curve over the course of the rollouts

Axial codes: Methodology; lessons learned - continuous improvement

Q19: As SAP uses a proven implementation methodology in their projects, ASAP was used for the Jupiter project. The 6 key elements are Project Preparations, Business Blueprint, which contains the analysis of the business requirements and the description of future processes. In our project this was the "holy bible." Once you have the Business Blueprints finished, the Implementation phase starts followed by the Preparation for Go-live. The project life cycle ends with the Go live and Support phase. Then, the phase Run SAP starts. (Submission template, quality awards, business transformation category p. 6)

Open code: Usage of SAP ASAP implementation methodology

Axial code: Methodology

Target Group Specific Trainings

At the beginning of each rollout, different trainings were conducted for the new project members, in particular key-users. On the one hand, they were trained as new users of the upcoming SAP standard product Jupiter (Q20); on the other hand, they were prepared for the rollout project. Particularly for the project part, the extent of providing training depended on prior experience of the site staff. All in all, it seems that considerable effort was spent in getting the different staff ready for the rollout projects.

Q20: The trainings were composed that initially....during one day the focus was the overview of Jupiter. What is Jupiter How does Jupiter work? Which processes, do we have in Jupiter and things like that.... Then later…the detailed trainings. (ERP expert, work-package responsible, participated in all rollouts, 56 ff.)

Open code: Extensive key-user trainings at rollout start with differentiation between general and specific training

Axial code: Trainings

Q21: The focus was on the staff of the sites, making them fit for such a large project. The people from the functional areas were mainly, one cannot generalize, but there were many sites where the people from the functional areas were not used to work on projects. They had their daily routines....and now they need to implement something new, test it and things like that. With those things they were not so familiar, to work on projects, deadlines...we tried to prepare them for all those things. (Senior program manager, 518 ff.)

Open codes: Program cluster conducts rollout preparation trainings; different project cultures as starting conditions for program cluster

Axial codes: Trainings; contextual conditions

Lessons Learned - Continuous Improvement

An essential point for the increasing success of the rollouts was certainly the continuous improvement throughout the program cluster life cycle, which was evident for all groups involved. The members of the

program cluster Saturn/Jupiter had certain best practices lists, a kind of knowledge database for the underlying methodology, which was subsequently updated and improved. This helped to carry forward the lessons learned, as illustrated in quotation Q22, and improved the quality of recommendations and preparations for future project teams of other sites. Furthermore, together with the Jupiter Competence center a regular telephone conference was established. Beside the program cluster and the Jupiter Competence center the rollout managers from all sites participated, regardless if their implementation was already finished or not yet started. This regular telephone conference raised awareness and ensured learning amongst participants.

Q22: Carrying forward the lessons learn from one site to the other, mainly [about] the structure and the sequence of the rollout project....for example...about social issues, how one needs to structure a project, also in regard to certain tests which made problems...'please look at that in particular, this is interesting for you etc., or this phase which you planned is simply too short according to our experience and needs to be longer,' or does it make sense to plan certain deliverables earlier since their rectifications last longer. Well, conveying such experiences to the sites. (Senior program manager, 1117 ff.)

Open Code: Dynamic lessons learned best practice list program cluster

Axial Code: Lessons learned - continuous improvement

Q23: After all, it was a large learning effect, and in that direction also the attention of the other sites... 'there are troubles during the project leader-telcos [telephone conferences]' where others also started earlier to engage with that, perhaps taking the blueprint and reading it, marking sessions and making first thoughts in that direction...how we will implement it and how will the project organization look like....where do I see difficulties, what one needs to consider in each case.....the attention that they find themselves, in no case in a difficult situation like that. (Junior program manager: 24:1)

Open code: Awareness of sites regarding potential problems; perceptions

Axial Code: Lessons learned - continuous improvement; perceptions

12.3 Axial Coding – Network View – Business Process Redesign - Pantheon

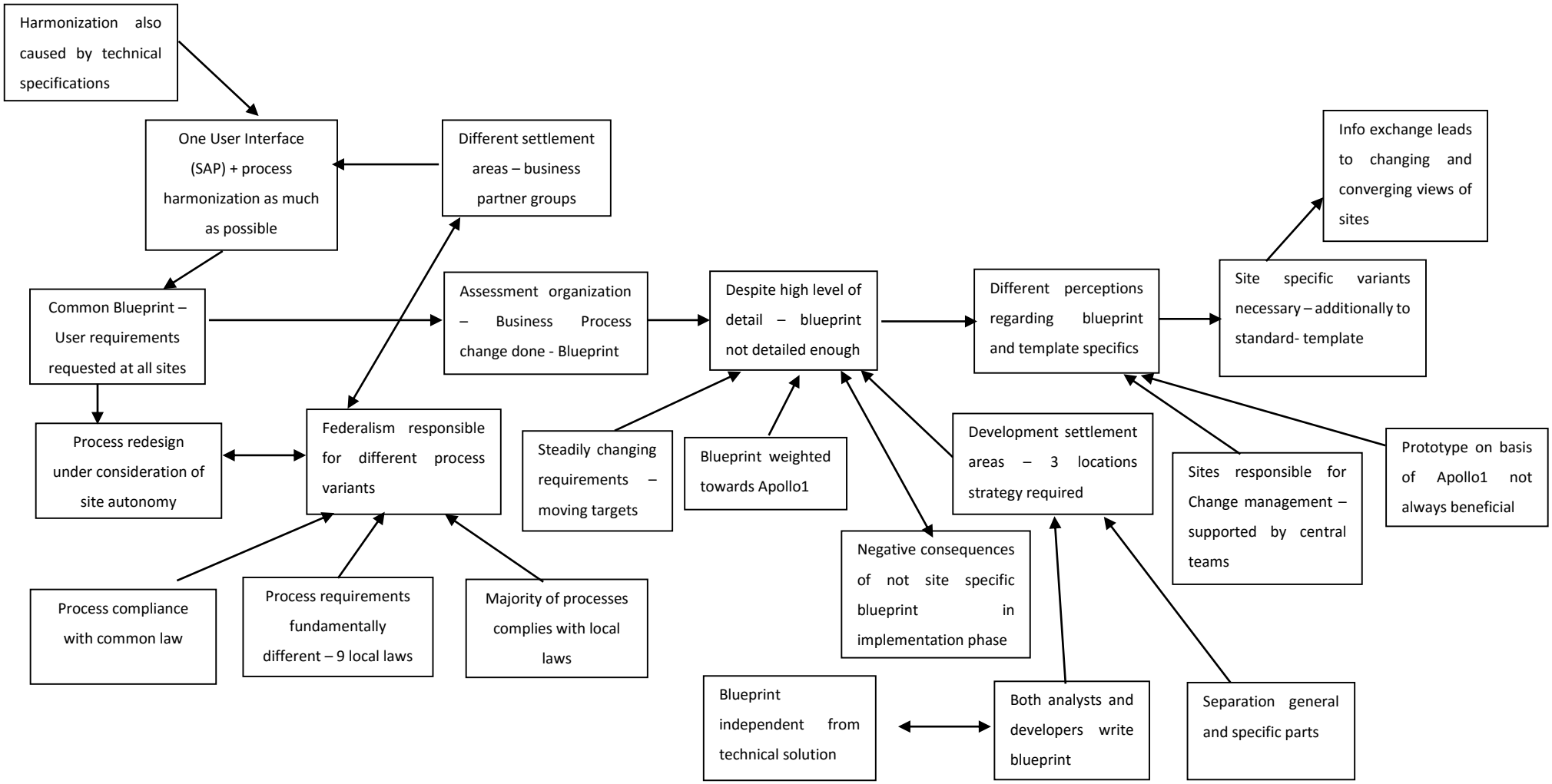


Figure 12-1 Axial Coding – Network View – Business Process Redesign - Pantheon

12.4 Integrative Memos – Business Process Redesign - Pantheon

Axial (integrative memo), Business Process Redesign

The mandate of the program cluster Saturn-Jupiter pursued the clear goal to harmonize business processes (business partner settlements in three settlement areas) as much as possible, considering site autonomies. The top management decided that SAP will be the software (operating on a common platform) that replaces the various legacy host applications. The endeavor was part of a larger program Saturn, including the internalization of the data center.

A development project was started with the Jupiter Competence Center after they got the mandate from Pantheons top management. The first phase was to raise the user requirements of all sites, and to write a common blueprint. The process redesign and the concrete realization needed to consider site autonomies (federalism), local laws, and the corresponding liberties regarding the concrete contracts with business partners in the relevant settlement areas. The sites are characterized by fundamentally different settlement processes in Settlement Area 1, as a result of nine local laws, negotiated with the special interest groups of the business partners. For Apollo1, a legacy application for Settlement Area 1 existed and the SAP experts of Apollo1 were assigned to lead the development project. They were supported by the IT experts of Mars3 who led developments within Settlement Area 2, and IT experts of Neptune2 who led developments within Settlement Area 3. Settlement Area 2 had different settlement rates for each subsidiary, but at least one underlying common law which made process agreements easier. Settlement Areas 2 and 3 had no SAP legacy application which made the development more difficult.

Additionally, the development and the blueprint were separated into general and specific parts, and were written by analysts and developers after input from functional people at each site. The sessions also included an impact assessment. The blueprint was very detailed but was weighted towards Apollo1 because of the existing SAP application at Apollo1 (Settlement Area1) and the SAP knowledge of IT experts at Apollo1. This happened, although it was planned to write a non-software-specific blueprint. Despite those efforts the blueprint was very bad (“a disaster”) for all sites. This was caused because the functional people could not answer the questions from the SAP-experts as they had no SAP experience or the relevant experience about the legacy systems (black boxes). Furthermore, they could not judge what is important and what is not.

The understanding of business people regarding the ERP system and the new processes only increased after the first template (test system) was presented. The business people realized the deficits of the blueprint and

the template, and the ERP system strongly reflected the requirements of Apollo1. Additionally, the requirements changed in the meantime, as the duration of the development project was more than three years (laws changed and new contracts were concluded). These gaps needed to be closed in separate fit-gap sessions during the rollout projects. Lastly, the autonomy of the sites contributed to the need for product improvements.

The deficits of the blueprint and the standard templates and the different perceptions (rollout team vs. functional people and site) led to rollout delays as the standard template required major adjustments. However, the number of adjustments declined over the course of the rollouts (and waves), as a result of "lessons learned" and the flexibilities of the system (custom built, that is not SAP standard) and the associated rigid change process.

Despite the constraints caused by federalism and the associated basic agreements with the special interest groups, a conversion of the sites (and increased awareness) is visible (as much as it was possible) and therefore Pantheon moves towards its initial goal (process harmonization). This is caused by the periodic exchange of information across different sites and roles (telephone conferences and fewer physical meetings), which adds to a common understanding of the benefits of process harmonization; on the other hand, the one-platform architecture plays a role (performance, side effects). Furthermore, a common release concept is in place and integrated with other standard products within Pantheon.

Selective Coding: Lessons Learned regarding Business Process Redesign

The program (cluster, rollout team, but also sites) realized that the solution is not valid for all sites. Particularly in Settlement Area 1, with different local laws, the solution could not be applied as developed and was not so flexible as intended (hoped) in the blueprint. Furthermore, the business people in the rollout projects only realized the meaning of the blueprint after the first template (test system) was introduced. As a consequence, the blueprint and the template did not reflect the requirements and process variations of all sites. During the blueprint phase the Jupiter Competence Center and the business people had different understandings regarding the intended outcome of the blueprint.

Anticipated outcome: Blueprint and new business processes in the system match with site requirements, show high fit (continuously growing).

Conditions:

1) Multisite implementations with processes complying with different laws. Dimensions: (a) No. of sites; (b) No. of processes

2) Flexibility/Maturity/Quality of system (product)

3) Time between blueprint and implementation: (a) Degree of affectedness, (b) Timeliness of targets, comprehension of business regarding new system and requirements (high/low), leading to valid requirements

Actions: Facilitate comprehension of system and requirements (training, test instance of system), requirements and fit-gap closed to realization phase, flexible blueprint-phase with sufficient time for template-adjustments.

Lessons Learned: The program facilitates a flexible adjustment of the standard-template (product) regarding local process (or global process variations). Valid requirements can be comprehended closer to the implementation phase, what raises the degree of affectedness of business people at the sites (immediate impact). A necessary condition is sufficient (possibly learned) comprehension of the system, what might be facilitated through training and a test instance. The standard product learns as well, as functional and business experts learn new and flexible business processes.

13 Curriculum Vitae

Stefan K. Müller is a Senior Consultant in Information Systems with more than 15 years of relevant industry experience. He has participated in numerous full life-cycle ERP projects and large scale programs in different roles, including diverse management and functional roles. Furthermore, he has introduced business processes in global environments. Stefan is the founder of SKMis - information systems - internet services – consulting (www.skmis.com), and holds a diploma in Business Administration (main area of expertise: Information Systems) from Vienna University of Economics and Business (WU Vienna). He wrote his doctoral thesis with Vienna University of Economics and Business (WU Vienna) from March 2012 – May 2016. In his role as a researcher, he combines his theoretical knowledge with his broad industry experience and investigates the management perspectives of ERP implementations and the interactions between humans and technology.