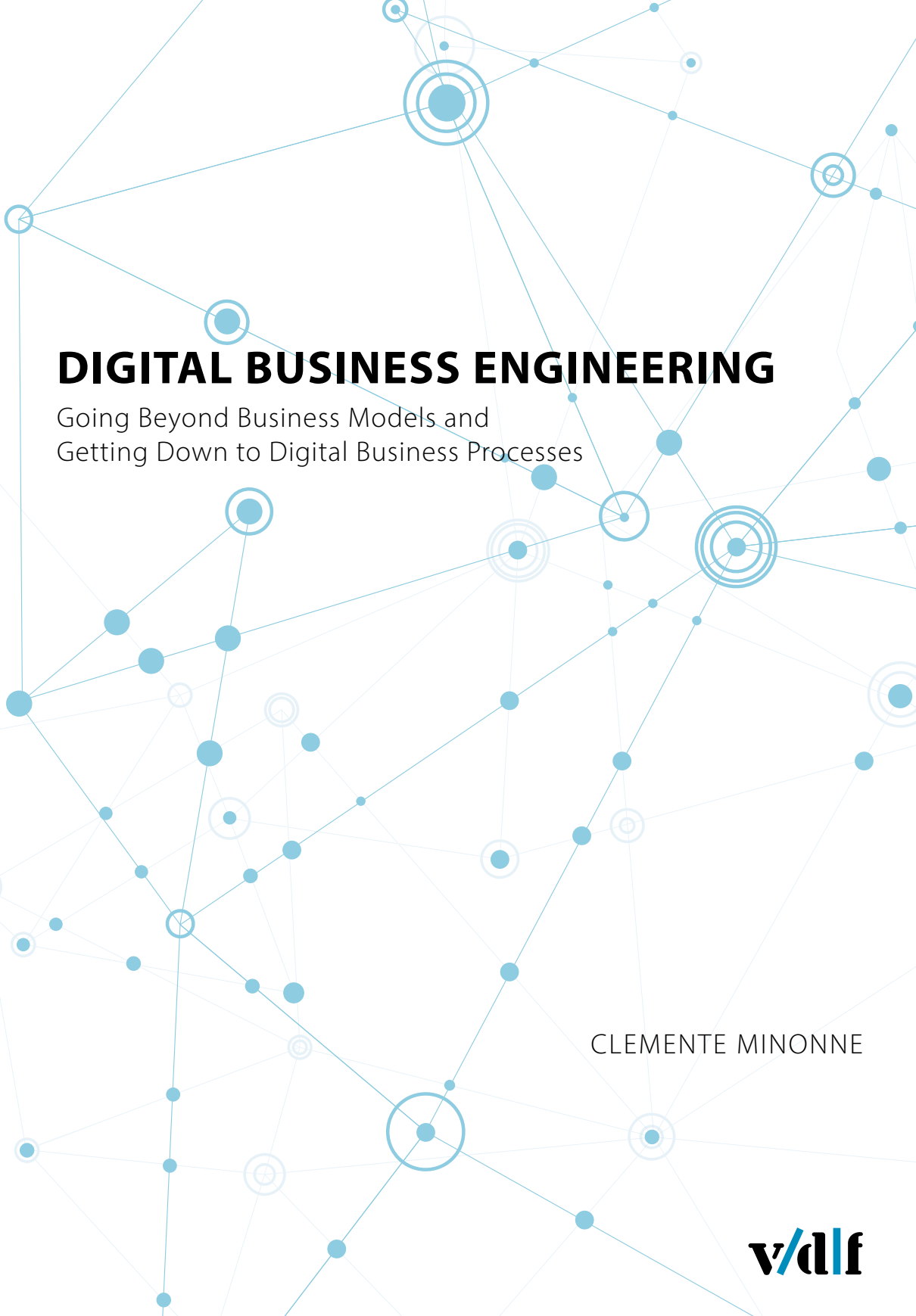

DIGITAL BUSINESS ENGINEERING

Going Beyond Business Models and
Getting Down to Digital Business Processes

CLEMENTE MINONNE

vdlf

For Meret, Matteo, Livia, Giacomo and Dimitri

"Common processes require mutual understanding, flexibility, and trust. Thanks!"

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Preface to the First Edition

This is the first edition of this volume, which is primarily intended to serve as a methodological guide for practitioners. From the very beginning, it was my intention to present only tried-and-true methods and instruments. Yet, as a contribution for experts from academia, I feel it can also fill some existing gaps in our knowledge. And of course, it will be made available to students and anyone else for self-taught use. During my numerous lectures at universities and in seminars for companies over the last 15 years, I was often asked whether, in addition to the manuscripts, a book is available that compiles the necessary knowledge.

Compared to other works from this subject area, I have deliberately conceived and written this book more from a *methodological* perspective, since practice often applies a rather "technological" approach to problem solving or innovation. The result is that many actors report that the initial situation was too complex to ideally examine the business case (use cases) in a structured manner, and to design it in a technology-neutral manner. Today, I am convinced that one can properly understand a business case only by describing it as a *business process*. As long as the actors involved do not succeed in doing so, they will fail to know exactly how the business case in question functions. In fact, they often admit they do not know what they are doing themselves.

In my experience, analysing business cases is not an act of *inventing* but one of *finding*. How many times have I observed in practice how the content of business cases (and especially business processes) was based on a deductive (top-down) approach and solely on the experience of the knowledge carriers involved! Rarely do they dare to leave their comfort zone and mutate into a researcher ready to explore the truth. In this context, the following question has accompanied me over the years: How can the role of researcher be *added to the profile of a manager or leader*?

Fear of the unpredictable often forces practitioners to overcome their existing challenges by adapting truth invented elsewhere. A detailed knowledge of one's own business cases is not counterproductive and not even necessarily an additional effort, but rather a means to an end, the goal being to represent today's, as well as future, reality. This book is intended to help you overcome the fear of the unpredictable in order to reach new heights.

The preparation of this book is backed by the tireless support of many people. My special thanks go to my clients and partners who contributed to this book through their feedback and recommendations.

Lucerne, December 2021 Prof. Dr. Clemente Minonne

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List of Abbreviations

ABPMP	Association of Business Process Management Professionals
AP	Application
API	Activity Performance Indicators
AT	Activity
BABOK	Business Analysis Book of Knowledge
BI	Business Intelligence
BPaaS	Business Process as a Service
BPE	Business Process Engineering
BPM	Business Process Management
BPM CBOK	BPM Common Book of Knowledge
BPMaaS	Business Process Management as a Service
BPMN	Business Process Model and Notation
BPMS	Business Process management System
BR	Business Rule
BSC	Balanced Scorecard
CBR	Case Based Reasoning
CBT	Computer Based Training
CIP	Continuous Improvement Process
CMM	Capability Maturity Model
CP	Core Process
CRM	Customer Relationship Management
DBE	Digital Business Engineering
DBPE	Digital Business Process Engineering
DMS	Document Management System
EABPM	European Association of Business Process Management
EAS	Electronic Archiving System
ECM	Enterprise Content Management
EE	End Event
eEPC	Extended Event-driven Process Chain
EIM	Enterprise Information Management
EP	Elementary Process
EPC	Event-driven Process Chains
ERP	Enterprise Resource Planning
EX	External Entity
HTML	Hypertext Markup Language
iBPMS	Intelligent Business Process Management Systems
ICT	Information and Communication Technology
IE	Intermediate Event
IF	Information Flow
iPM^2	integrated Process Maturity Model

iPM³	integrated Process Management Maturity Model
IREB	International Requirements Engineering Board
IS	Information System
iSREM	integrated Structured Requirements Elicitation Method
iSBAM	integrated Structured Business Analysis Method
iSPEM	integrated Structured Process Elicitation Method
KMS	Knowledge Management System
KPI	Key Performance Indicator
KRI	Key Result Indicators
MF	Material Flow
MP	Management Process
OA	Object of Analysis
OWL	Web Ontology Language
PCC	Process Cost Calculation
PCD	Process Context Diagram
PCM	Pair Comparison Matrix
PFA	Process Flow Automation
PFD	Process Flow Diagram
PI	Performance Indicator
PKM	Process Knowledge Management
PLD	Process Logic Design
PMPI	Process Management Performance Indicator
PPI	Process Performance Indicator
PPV	Process Performance Validation
PRM	Process Risk Minimisation
PRP	Process Resource Planning
RDF	Resource Description Framework
RDM	Requirements Definition Matrix
RI	Result Indicators
RL	Role
RMS	Record Management System
ROI	Return on Investment
RSM	Requirements Specification Matrix
RTF	Rich Text Format
SCM	Supply Chain Management
SE	Start Event
SF	Service Flow
SIPOC	Supplier – Input – Process – Output – Customer
SOM	Semantic Object Model
SP	Support Process
T	Tools
TQM	Total Quality Management

Introduction

Target Group of This Work

One of the first duties I ever received from the publisher was to consider a clear target group, that is, who does this work address. The answer to this question was more difficult for me than I had originally thought. The answer should have been "business analysts," though the discussion below suggests that this profession is interpreted in very different ways worldwide. After careful consideration, I came up with the following target group: experts and executives who aim to optimise and transform the business architecture of their organisation[1] in the best possible way or who, within their own business area, increase the productivity, quality, and innovation ability of their organisation – and therefore increase profitability and competitiveness.

Business Analysis as a Discipline

According to the BABOK definition (Business Analysis Book of Knowledge[2]), business analysis represents the sum of the tasks and methods used to mediate between different stakeholders. This definition serves the aim of understanding the structures, principles, and processes of an organisation and recommending effective solutions. It also explains that business analysis requires knowledge of how organisations work, how they achieve their goals, and what skills they need to be able to offer products and services.

However, what causes headaches in many places is the fact that hardly anyone in the organisation can have so much domain experience, and knowledge to carry out the necessary analysis in a well-founded and efficient manner. Consequently, it can be said that this is a discipline in which the ability to "reduce complexity" is of great importance.

Business analysis is comparable to various other well-known disciplines, such as marketing management, human resources management, financial management, or IT services management. In all of these business disciplines, the tasks are so wide-ranging that there is hardly anyone in the organisation who could work out a solution to *all* conceivable problems in these areas. Clearly, different people from the organisation must deal with specific topics, such as those from financial management with financial controlling. From this point of view, it is important today to understand business analysis not only as a professional profile or an activity within certain organisational processes or projects, but also as a "cross-cutting discipline" in business management consisting of different facets.

1 Here, "organisation" is to be understood as a synonym of "company."

2 BABOK (2012).

The Business Analyst as a Professional Profile

By definition, a business analyst should be able to analyse a business. If someone specialises in analysing a business or even a business process, many of us wonder what exactly the "business" part might mean. As in many situations, the dictionary helps us (a little) further. It states that, among other things, a transaction may be "a profit-driven (commercial) enterprise or (commercial) transaction or trade." The fact that in our context it must be something else is immediately felt when we interpret this definition. Another definition from the dictionary for the term "business" is that of a "matter" or "task" to be executed – which seems to fit more with the interpretation of "business analysis." A "matter" or a "task" to be dealt with could surely fit the modern term "business case" or "business process." It would also satisfy representatives of public administrations, since the term does not necessarily imply a profit orientation as a business objective. From this more nuanced view, one could infer that business analysts could analyse business cases and could very well be designated "business case analysts."

The term "business analyst" has now been widely used worldwide for more than a decade and has earned the right to exist by it being accepted that business analysts not only "analyse" a particular business case but also, based on their analysis work, determine requirements for a target state or target system to develop possible solution concepts. Their original analysis function has thus expanded over the years.

Business Analysis as an Activity

Consciously taking an activity-oriented view when looking at "business analysis" means quickly becoming aware that a business analyst should master certain methods to be able to analyse a given business case effectively and efficiently, and to be able to derive requirements for a desired target state or target system of the respective business case based on it. In practice, different approaches are taken, which essentially differ in their degree of structuring. In many places, approaches such as the purposeful description of (business) applications, especially when it comes to looking as realistically and precisely as possible at a business case in more detail to determine the requirements for a new software tool, are applied. But often this is dispensed with and only a categorised list of requirements is interactively developed. The so-called "requirements engineer" plays an important role here. Unless they are immediately responsible for business analysis themselves, they support the business analyst in further concretising the requirements determined for the desired target system – which often requires deeper technical know-how about a specific software environment than may be presumed in a business analyst. At this juncture, there is, of course, often a certain margin of interpretation in discussions surrounding the various occupational profiles. Generally speaking, the role of the requirements engineer differs, particularly regarding the deeper understanding of the technical feasibility of a desired software solution.

But let's go back to the actual activities of a business analyst. An alternative to the interactive description of (business) applications is the elicitation of the respective "business process" in a more structured sense. In many places, however, this is dispensed with on the grounds that the effort is too great to reach the desired target.

From a purely methodological point of view, business analysis can essentially be divided into two phases, which ideally are performed sequentially, even if we know from practical experience that a feedback loop must be considered. The first phase could be called "eliciting the business process," the second activity "deriving the requirements."

What sounds trivial in practice proves to be a difficult undertaking. There are different explanations for this. On the one hand, it often occurs in organisations where the business processes concerned are not elicited to the necessary level of detail, which makes it difficult to derive the requirements to be identified from them. Because of a lack of methodological knowledge, there is often talk of "shelved goods." On the other hand, projects based, for example, on scenarios of (business) applications seem to initially move forward very quickly, only to discover months later that certain process-related conditions were only sufficiently or rather "superficially" met.[3]

Organisations that have had the courage and patience to use business analysis as a means to an end for driving organisational change processes now report on the phenomenon of "upstream change management" in the respective business case. This is particularly noticeable when organisations, even during the actual elicitation of a respective business process (e.g., for the purpose of harmonisation), take the time to go through the true mental changes occurring at the human level. In other words, what you can get today do not postpone until tomorrow.

Business Analysis as Antiactionism

Many organisations have recognised at an early stage that investments in business analysis can be used as a cure for so-called "organisational actionism." The business case-oriented application of targeted methodological knowledge eliminates many ambiguities in this context. For example, in many places, during the execution of a business analysis, different internal departments may sometimes make very different demands on a future target system. At this point, the question arises as to how to deal with such a situation. How to identify the so-called "largest common denominator" as effectively and efficiently as possible? Insights from the business analysis community lie in the necessary "methodological knowledge," which today is by no means present in all organisations. On the other hand, some educational institutions have responded in recent years by developing tailor-made

3 Minonne, Koch, & Ginsburg (2015).

training and further education programs that have already been successfully completed by numerous practitioners.

Business Analysis to Optimise and Transform Business Architecture

From the above explanations, we see that it is – still – the case today that business analysis is being defined very differently. Generally speaking, I agree with the interpretation of the practicing community that business analysis (in the sense of analysing a particular business case) essentially serves to optimise and transform the respective business architecture (in the sense of a process and organisational structure). The chapters below present and explain various scenarios of such an application.

To start off, I thus propose the following definition of business analysis:

> Business analysis enables the organisation – in accordance with the implementation measures derived from the strategic objectives and business case-oriented implementation measures – to elicit, model, implement, evaluate, and optimise the respective business models and business processes and their requirements for a specific target system. It also serves as the starting point for optimising and transforming the business architecture in the sense of coordinating the process and the structure organisation. This in turn has the goal of increasing the productivity, quality, innovation ability, and consequently the digital adaptability and the economic viability or competitiveness of the organisation.

Digital Business Engineering Model

Based on this definition, I created the following model as a management cycle-based approach to digital business engineering (including business analysis), which also lies behind the structure of this book.

The model chosen is based on a classic management approach. It distinguishes between external and internal circulation. The *external cycle* points to the strategic objective (Chapter 1), the actual implementation (Chapters 2–5), and the validation (Chapter 6) of the corresponding implemented measures. The *internal cycle*, on the other hand, describes the various disciplinary aspects of the implementation phase, such as the concrete definition of the business case concerned (Chapter 2), the elicitation of the business processes involved (Chapter 3), the derivation of business requirements (Chapter 4) from the circumstances of the business processes involved, and the transformation of the business architecture (Chapter 5).

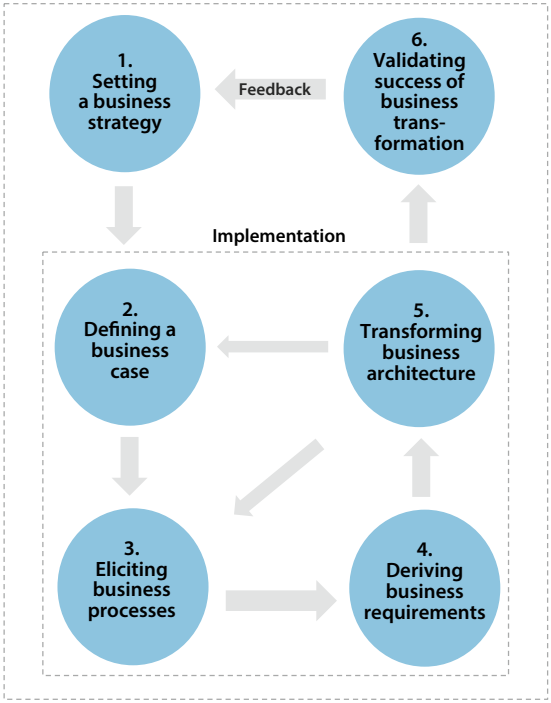

Figure 0-1: Model for digital business engineering underlying the book structure

Learning Objectives for Chapter 1 "Setting a Business Strategy"

Chapter 1 pursues the following learning objectives:

- Learning about current topic-specific empirical findings
- Understanding an organisation's position within its environment
- Getting to know the Strategy Map approach and understanding the importance of formulating strategic goals
- Understand how to create a balanced scorecard
- Knowing the role of the process approach during the implementation of the strategy
- Understand how the organisation strategy yields a value chain-oriented view of the organisation
- Becoming familiar with the term "process landscape" (or "process map") and becoming acquainted with the categories and examples of a process landscape

- Becoming aware of the interaction between the organisational strategy and the business processes, and understanding the cause/effect principle contained therein
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Learning Objectives for Chapter 2 "Defining a Business Case"

Chapter 2 pursues the following learning objectives:

- Learning about current topic-specific empirical findings
- Understanding why business process management can be described as a driving sub-discipline of digital business engineering
- Knowing the latest developments and trends in digital business process engineering
- Becoming familiar with the cycle-based approach of digital business process engineering
- Becoming aware of the following areas of business case that can be optimised through digital business engineering:
  - Process Performance Validation (PPV)
  - Process Cost Calculation (PCC)
  - Process Knowledge Management (PKM)
  - Process Flow Automation (PFA)
  - Process Logic Design (PLD)
  - Process Resource Planning (PRP)
- Understanding why digital business engineering is divided into two basic phases: "Process Elicitation" and "Requirement Derivation" (©*iSBAM* method)
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Learning Objectives for Chapter 3 "Eliciting the Business Processes"

Chapter 3 pursues the following learning objectives:

- Learning about the role process elicitation plays in the context of digital business engineering
- Getting to know different techniques of information collection and their fields of application
- Recognising the differences between different common methods of process elicitation
- Knowing the procedure and the steps applied to "structured process elicitation" according to the ©*iSPEM* method
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Learning Objectives for Chapter 4 "Deriving the Business Requirements"

Chapter 4 sets out the following learning objectives:

- Learning about current topic-specific empirical findings
- Understanding the terms of requirements engineering and classifying them accordingly in the context of digital business engineering
- Specifying a requirement
- Becoming acquainted with models and methods for eliciting/deriving requirements
- Understanding the difference between linear and iterative practices
- Knowing the differences between the three phases of a structured requirement elicitation
- Being able to carry out a structured requirements elicitation and knowing the necessary techniques
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Learning Objectives for Chapter 5 "Transforming the Business Architecture"

Chapter 5 pursues the following learning objectives:

- Learning about current topic-specific empirical insights for optimising the business architecture
- Understanding the business architecture and its components as well as the importance of digital business engineering
- Gaining knowledge of the organisational structure model and the organisational process model
- Understanding the gap between the structure and process organisation and how it can be bridged
- Knowing how to optimise and transform your business architecture
- Understanding the difference between renewing and improving business architecture
- Being able to explain Lewin's 3-phase model
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Learning Objectives for Chapter 6 "Validating the Success of Business Transformation"

Chapter 6 pursues the following learning objectives:

- Learning about current topic-specific empirical findings
- Understanding the purpose of the performance validation

- Getting to know the different levels of performance evaluation and justifying the validation at that level
- Gaining knowledge about the units of measure of performance validation
- Understanding the different ways to apply an ongoing and a periodic performance validation
- Knowing the different types of performance validation
- Understanding the meaning and purpose of maturity models in digital business process engineering
- Reflecting on the knowledge derived from the case study on Construction Management Ltd.

Introduction to the Case Study: "Construction Management Ltd."

To illustrate the contents of the individual chapters, they are illustrated respectively in the last subchapter using a concrete example. To this end, I use the case study of the fictitious company, Construction Management Ltd. I therefore present this company as an organisation at this point. The model depicted here shall serve as a basis in the following chapters to locate the aspect currently being illuminated.

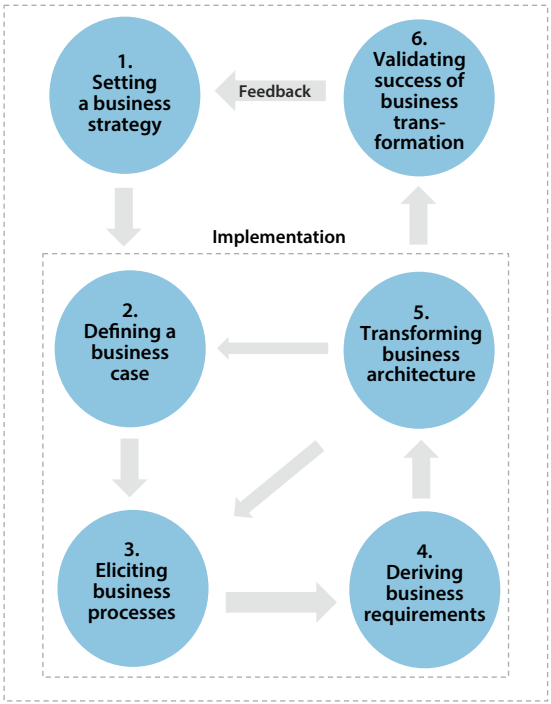

Figure 0-2: Model for digital business process engineering

Construction Management Ltd. is a service company in the construction industry that looks back on a more than 60-year history. It is located in the greater surroundings of the city of Lucerne, in the heart of Switzerland, where it has now assumed the role of an economic engine. The company is active in two major business areas: the planning of construction projects as well as the realisation of construction projects. Further, Construction Management Ltd. has a comprehensive real-estate portfolio and attends to the management of

these properties. The company employs a total of 1,600 people to carry out these diverse tasks.

In addition to the two business segments mentioned above, the company also includes the areas "Sales," "Finance," and various staff offices grouped together in the "Services Department," which support the core business. On the website this is shown as follows:

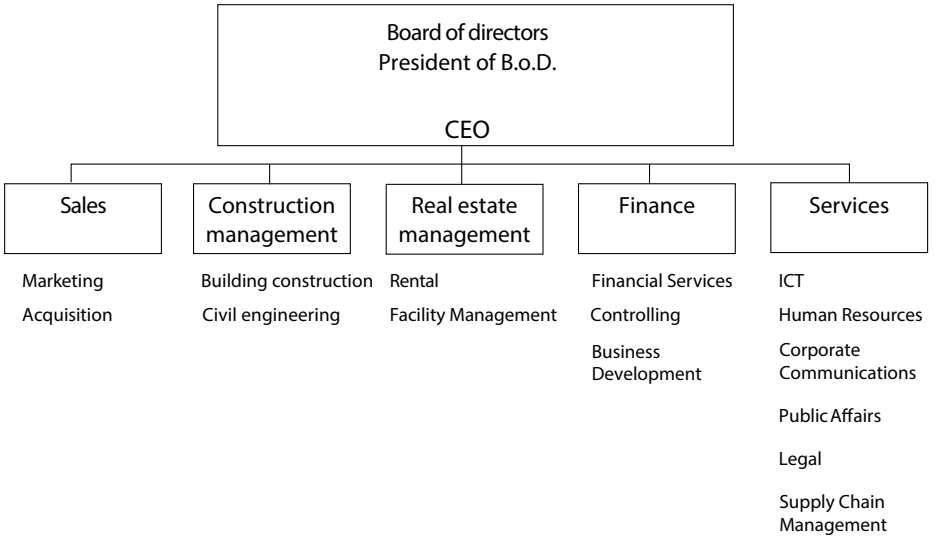

Figure 0-3: Organisational chart of Construction Management Ltd. (suboptimal)

The employees of the "Sales Department" are concerned with selling the comprehensive product range of Construction Management Ltd. and tend to the acquisition of various construction projects, which are then further processed by the "Construction Management" department.

The task of the Construction Management department is to plan and subsequently implement construction projects in the areas of building construction and civil engineering. This is done throughout Switzerland in very different projects ranging from the implementation of small private construction projects to major construction sites, such as a new shopping mall in central Switzerland.

The "Real Estate Management" department in turn develops and manages real estate, which Construction Management Ltd. partly owns, but also assumes such over these tasks for the real estate of its clients. The real-estate portfolio includes, for example, office centres, car parks, shopping malls, and logistics buildings. Blocks of flats are also present, in which apartments are rented out to private individuals.

The "Finance Department" deals with the financing and liquidity of Construction Management Ltd. and ensures a transparent presentation of the financial results as well as the procurement of resources and their application in the individual departments of the company. Business development is also located in this department.

The various staff posts subsumed under "Services" provide support services. "ITC" ensures the information and communication infrastructure and ensures its expansion and maintenance. "Human Resources" tasks are carried out by the personnel of Construction Management Ltd. The departments of "Corporate Communications" and "Public Relations" deal with ensuring a uniform brand appearance as well as internal and external communication. The "Legal Services" department is responsible for governance and compliance. Finally, "Supply Chain Management" performs an important task for Construction Management Ltd.: procuring the required goods, machines, and services of third parties.

The customers and partners of Construction Management Ltd. are very diverse according to the company's mixed economic orientation. On the one hand, these consist of a great number of different companies that rely on or need the services of the company. On the other hand, private individuals can also take advantage of the services provided by Construction Management Ltd. Other important stakeholders are the city of Lucerne and the Canton of Lucerne, where Construction Management Ltd. is located.

The three dimensions of economic efficiency, the environment, and society are central to the strategy of the company. These values form the basis for maintaining and continuously increasing the company's competitiveness and credibility. As a company, it is important to continuously adapt to market needs by continuous further development, consistent customer support, and quality orientation as well as developing new projects. It is precisely the preservation of value and the constant optimisation of managed real estate that should become even more important in the future.

Not only its many years of experience and its own know-how are essential for Construction Management Ltd. to achieve its goals; partnerships and cooperation are also crucial for this. To remain at the top in the long term, the company must actively involve these stakeholders.

In principle, Construction Management Ltd. is well positioned. The business area of planning and realising construction projects contributes a large part to the business success of the company. Yet, the management of Construction Management Ltd. still sees great potential for further development in the area of real-estate management (and rental).

In general, it should be noted that the company operates in an aggressive, dynamic, and quite complex environment. The construction industry is caught up in difficult economic times. While planning, building, and maintaining a wide variety of real estate is still impor-

tant, today the construction industry is no longer the central motor of the country's economy. In the recent past, this industry has been rather insolvent, and in some cases even very well-known companies went under. On the one hand, therefore, there have been repeated calls for the state to stimulate demand; on the other hand, construction companies need to revise and adapt their strategies, processes, and structures to be prepared for future challenges (e.g., digitalisation) (Girmscheid 2010).

For these reasons, constant development remains the central instrument for the company in securing market share and expanding it in the future. To this end, it recently carried out an internal situation analysis, which revealed that Construction Management Ltd. is currently facing a number of challenges:

- Submitting building applications is a central task (especially for the Construction Management department). This step is considered critical to the execution of construction projects insofar as, on the one hand, significant delays can crop up very quickly and, on the other hand, various external actors are involved. The employees in this area repeatedly point out the need for optimising measures regarding the corresponding processes.
- Construction managers are one of the central personnel resources of the company. However, regularly uncertainties occur regarding the operational planning of the construction operators at the individual construction sites. Because of this suboptimal planning, Construction Management Ltd. is effectively wasting valuable resources.
- In the area of Real Estate Management, employees of Construction Management Ltd. are employed on site as caretakers/superintendents. The reporting of findings or completed work has been a difficult matter for many years. For example, the reports are filed in paper form and then sent by mail to the evaluation centre in the Controlling department of the company. Some superintendents scan them at home and then send them off by email. The employees concerned complain that this state of affairs is far from optimal and would like to see a more efficient process.
- Construction Management Ltd. proposes reducing its process costs by automating the purchasing process ("procurement"). A suitable IT solution is currently being sought, with various vendor companies under evaluation.
- The core of the company is at the same time a warehouse and a logistics centre. There, for example, the machines the company owns (or has borrowed) are stored and released according to the respective requirements for the individual construction sites. However, there are regular bottlenecks, so that all parties involved demand more reliable resource planning.
- In a recent strategic measure, management created a strategy map and developed a first version of a Balanced Scorecard (BSC), all with the support of an external strategy consultant. However, management subsequently felt unable to use the BSC to make a