Framing the Business
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Framing the Business

Business Modelling
for Business Development

Christofer Tolis
To my parents,
Gudrun and Athanassios
“The course of nature is to divide what is united and to unite what is divided”

Johann Wolfgang von Goethe, 1749-1832
Preface

This report is the result of a research project carried out at the Department of Information Management at the Economic Research Institute (EFI) at the Stockholm School of Economics.

This volume is submitted as a doctoral dissertation at the Stockholm School of Economics. As usual at the Economic Research Institute, the author has been entirely free to conduct and present his research in his own way, as an expression of his own ideas.

The institute is grateful for the financial support provided by NUTEK, the Swedish National Board for Industrial and Technical Development, and VINNOVA, the Swedish Agency for Innovation Systems.

Stockholm, February 2005

Filip Wijkström
Associate Professor
Director of EFI, the Economic Research Institute at the Stockholm School of Economics

Mats Lundeberg
Professor
Head of the Department of Information Management, Stockholm School of Economics
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Acknowledgements

As I know that this section has a higher likelihood of being read than most other parts of the thesis, I will take the opportunity to acknowledge quite a number of people. I have been fortunate enough to have many researchers and practitioners who have contributed to my learning and development towards completion of this thesis, and will present them in roughly chronological order below.

First and foremost, my deepest thanks go to Professor Mats Lundeberg who has been my main supervisor and a great inspiration. Ever since his specialisation course in Information Management – the most challenging and exciting course I have ever taken – Mats has been an inspiration through his compelling ideas and encouraging coaching. I have never regretted my decision to start as his doctoral student since I was given the opportunity.

I also wish to thank Professor Anders G. Nilsson, who had the good judgement to invite me to the research consortium on Business Modelling, which was just about to be launched at that time. Since the focus of the consortium was closely in line with my interests, I was able to develop my research with Anders as project leader. With his precision and ability to simplify the search for key ideas, Anders has been very helpful for my work. Our collaboration over the years has also included joint publications, and I am happy to acknowledge his contribution to chapter 5 in this thesis.

As participants of the reference group, I am grateful to a number of experienced researchers and practitioners: Professor Janis Bubenko jr., Claes-Göran Lindström, Björn E. Nilsson, Professor Birger Rapp, Gösta Stenskog, Professor Bo Sundgren, and Hans Willars. They all have their distinctive expertise, which they shared generously at our meetings. Illuminating discussions and insights were prized ingredients in our endeavour to put together the book Perspectives on Business Modelling (Springer-Verlag, 1999) – from which three of the chapters in this thesis have been gathered.

Christer Nellborn and Jörgen Andersson, the two other doctoral students in the consortium, stimulated much interaction and the exchange of ideas. I am grateful to them both for valuable research collaboration. Through precious discussions – not only of research, but also of life in general – Christer and I produced several publications together. In this thesis, I
especially acknowledge Christer’s contributions to chapter 3 and 4. I also wish to thank Jörgen for sharing his experiences from the project described in chapter 4.

It is worth noting that this research would not have been possible without the active participation of people in industry. I would therefore like to thank the people at the two companies that I used as empirical cases in the thesis. In particular, I am grateful to the process owners at Ericsson Radio who contributed their experiences in chapter 3, and the people from Sweden Post who participated in the development project described in chapter 4. The collaboration of these companies, and the enthusiasm of the people involved, have been critical for my work.

Another source of important interaction for my research has been in courses, conferences and workshops. I am grateful for the feedback given by reviewers and participants, and also for the contacts established and developed on such occasions. Among those, let me in particular point out Professor Pelle Ehn, Professor Göran Goldkuhl, and Professor Bo Göranzon. Internationally, one particular rewarding consequence of such contacts was the semester I spent at the University of Wollongong, Australia. I would especially like to thank Rodney Clarke and Professor Graham Winley at the Department of Business Systems for hosting me.

In the later stages of my work, two persons have put in extra work to support my progress. As co-supervisors, Professor Bengt Stymne and Professor Jan Forslin have contributed insightful comments and challenges during my preparation of the thesis proposal, as well as on the actual thesis. In particular, I thank Bengt for succinctly pointing out areas for improvement, and Jan for reflecting on the work and its foundations. The feedback given has enabled me to see where my arguments could be strengthened.

I am also grateful for the opportunities I have had to explore some of the research ideas in the classroom. Especially in the course “Business Modelling & Solutions”, I thank my colleagues Gösta Steneskog and Professor Bo Sundgren for highly rewarding collaboration and many valuable discussions about modelling and the switching of perspectives. Both have been highly inspiring in my thinking – especially Bo on concept modelling (cf. chapter 8) and Gösta on process modelling (cf. chapter 7) – though our foundations and conclusions have differed at times. I also would like to thank the students who participated, as their results and comments have been important for my research (cf. chapter 9). As the
Swedish saying goes: “man lär så länge man har elever”, you learn for as long you have students.

Here at the department of Information Management, I am grateful for the firm support I have got from my colleagues. Particularly over the last couple of months, I have had many crucial discussions with Martin Andersson and Björn Thodenius, both in a similar stage of the process as mine. Also other past and present colleagues have been of great support over the years: Magnus Bratt, Lasse Lychnell, Anders Mårtensson, Pär Mårtensson, Magnus Mähring, Kristina Nilsson, Susanne Ohlin-Kjellberg, Niklas Källberg, Ragnvald Sannes, Frank Ulbrich, Pablo Valiente, Alf Westelius, and Ann-Sofie Westelius.

As research and travelling require its resources and practical arrangements, I wish to extend a special gratitude for those who have made it work. Beside Mats Lundeberg, I am grateful to the late Rune Castenäs and Lisa Tilert for arranging the economic details at the school. I gratefully acknowledge funding by NUTEK, the Swedish National Board for Industrial and Technical Development, and VINNOVA, the Swedish Agency for Innovation Systems. For the benefit of my readers, I also thank Maria de Liseo for earlier comments on my writing in chapter 2, and Paul Schreiber for suggesting a number of grammatical improvements and clarifications throughout the thesis.

I have chosen to dedicate this book to my parents, in that another major source of inspiration ever since childhood has been my family. I wish to thank my mother Gudrun for marvellous support since childhood, and for influencing my interests in pedagogy and education. My father Athanassios’ writing and theorising has been a strong inspiration for me, no doubt contributing to my interest in philosophy and economy. Moreover, my sister Sofia has been a much-appreciated source of encouragement over the years. I thank her and her son Benjamin for their interest and care.

Academia is not only a place for learning. I am happy for my decision to take an extra course in psychology, and to team up with that exciting woman for the course project. Elisabeth, now my wife, has been a constant source of support and encouragement, and always interested in what went on in my research. She has tried to trigger me to increase my pace at times, although with mixed results. I also wish to thank the newest member of the family, Anton, for all his joy and excitement. I am very grateful for his choice of Elisabeth and me as parents!
In addition to those mentioned above, there are many more that have contributed to this thesis in various ways. Thank you all! Of course, all remaining ambiguities and omissions are entirely due to me. However, as this long journey now is reaching its end, I am very happy to present this thesis as a concrete result of the work undertaken.

Stockholm, February 2005

Christofer Tolis
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INTRODUCTION

The initial chapter sets the stage for the whole thesis in three different ways. First, it introduces the research topic by describing the problem area, research question and purposes. Second, it examines the research motivation through practical, theoretical, and personal rationales that influence the research. Third, the initial chapter presents the research process by outlining my personal background, research characteristics, and research design.
Omslagets insida
Chapter 1

Business Modelling for Business Development

Developing some part or aspect of a business involves understanding and changing the way people conceptualise and define the business. Through a combination of theoretical and empirical sources, the present thesis investigates what business modelling means for business development. In particular focus is the use of graphical models and process orientation. The overall aim of the research is to help professionals take charge of the development of their own going concern, and researchers to broaden the concept of information. This introductory chapter outlines the research topic, the research rationale, and the research process that characterise the thesis.
“How can we improve the quality of our products?” “Why are our customers not satisfied?” “What is really our business?” These and similar questions often arise when developing information systems, work practices, competitive strategies, and other parts of a business. People engaged in development efforts strive to facilitate their work through the use of various conceptual and material tools, including models and descriptions of the business. Common to the concerns indicated by the questions is that they cannot be resolved solely by reference to tangible physical processes and structures. The effort of business development also involves understanding and changing the way people frame the business, i.e. how they conceptualise and define it.

**The information field**

My research is done within the information field. At the Stockholm School of Economics, this field is explored within the department of Information Management (IM) – but at other places, names such as Information Systems (IS), Management Information Systems (MIS), Information Technology (IT), and Informatics are used. Judging from the similarities among the different names, there is a common interest in the role of information – for example how it is used, produced, managed, and developed – and how this can be understood and facilitated.

![Figure 1-1. The information field’s position in-between use and technology.](image)

There have been several illuminating discussions about the field (cf. Langefors, 1995; Ehn, 1995; Lundeberg et al., 1995; Davies, 2003; Checkland & Holwell, 1998). Briefly put, the information field can be characterised as existing between the context of information use (such as organisations) and the technological tools for information support (such
as computers), as illustrated in Figure 1-1. Following different paths of influence between the contexts (cf. Baskerville & Myers, 2002), individual institutions and people within the field place their focus differently between organisational issues (towards fields such as business administration), and technological issues (towards fields such as computer science).

In the present research, the role of information is addressed by the treatment of business modelling and graphical models. The research has a strong focus on the organisational side of the field, for example as emphasised by organisational development and business framing. Apart from reflecting my personal interests, this focus is influenced by the institutional context of working at a business school. The technological issues come in only secondarily, for example when enabling and supporting development efforts and future business solutions.

**Outline of the introduction**

The purpose of this introduction is to describe my research and my thesis for interested professionals and researchers. Specifically, I try to address two related questions regarding the research described: “Am I doing the right things?” and “Am I doing the things right?” These two questions demonstrate the issues of relevance and rigor (Keen, 1991) and form the basis for the structure of the introduction.

However, before addressing these two questions, I start with an initial section on what the research is all about, i.e. the research topic. The introduction will thus be centred on the following three sections:

- Research topic (what I study)
- Research rationale (why I study the research topic)
- Research process (how I study the research topic)

The introduction is concluded with a brief outlook at the things to follow in the remainder of the thesis.

**Research topic**

In this first main section of the introduction, I give an account of the topic of my research, i.e. what I study. There are two elements at the core of my research. One is business development, with a particular emphasis on process orientation; the other is business modelling, with a particular
emphasis on graphical models. Loosely based on one of my case studies, I start with a small example of a situation where the two elements come together:

The five people in the room are in the middle of an intense discussion. Each one is normally working in a different part of the organisation. They are temporarily brought together in a development project to explore the concept of business processes and its applicability for the organisation. A number of questions are emerging. What demands would effective business processes put on the organisation’s information technology support? What possibilities could IT provide for enabling new and improved business processes? During the project, the participants venture their own views of the mission and of the business. While one is arguing over an illustration in the company’s annual report, another is drawing a schematic figure on the whiteboard to illustrate his point. In the discussion, the participants express different views, resulting in frustrated arguments as well as new ideas and insights.

**Problem area and research question**

The example above illustrates a situation occurring in many organisations: new ideas and solutions are explored, and the business is examined and questioned in light of the new understanding. Different people have different views of the business that they are involved in and there is a continuous negotiation of the views taking place. This goes hand in hand with more concrete changes in the business, such as alteration of employed technologies and ways of working (cf. Lundeberg, 1993).

Within this context, the issue of framing (cf. Bateson 1955/72, Goffman, 1974) deals with how people conceptualise or define the business. In Swedish, the term “verksamhetsgestaltning” best captures the essence of the activity. “Organizations are many things at once!” as Morgan (1986, p. 339) puts it. There are many different views on organisations (cf. Burrell & Morgan, 1979; Morgan, 1980, 1986; Bolman & Deal, 1984, 1991). A key to a competitive business lies in people’s innovative and creative way of framing and reframing it. Using the concept of problem setting, Schön argues that “we should become aware of the ways in which we set social problems. We should reflect on the problem-setting processes which are usually kept tacit, so that we may consciously select and criticize the frames which shape our responses” (Schön, 1979, p. 269). Fol-
lowing this recommendation, my research is focused on the following research question:

“What does business modelling mean for business development?”

The question brings together the two core elements of my research through the relationship implied in the phrase “mean for”. This particular relationship is chosen to emphasise business modelling as a means for business development, but also to remind of the importance of meaning, interpretation, and sensemaking (cf. Weick, 1979). The relationship includes meanings and consequences that can be seen as both advantageous and disadvantageous, depending on the situation and the people involved. Starting with business development, I will now describe the two core elements in more detail before discussing the specific purposes and expected contribution of the research.

First element: Business development

Business development aims at improving a business in some respect. This means that the development work takes place in a social and organisational setting, where people work together in order to bring about benefits for others – whether these others are referred to as customers, clients, patients, or something else – as well as for themselves. The “business” of the organisation, i.e. its activities and rationale, does not have to be primarily about making profit; public administration and non-profit organisations are also included in this setting.

Business development is a concern for the field of Information Management in several ways, especially due to the importance of IT for organisations and organisational development (cf. Venkatraman, 1994). For example, the organisation places demands and requirements on information flows and structures that need to be considered when developing IT solutions. Knowing where the business is today, and where it is heading for tomorrow, is an important ingredient in acquiring successful IT. Moreover, IT systems provide opportunities and possibilities that can be explored in business development. Insights into new information technologies may therefore give rise to new capabilities and advantages for the organisation.

Planned development of the going concern

Businesses evolve in different ways and for different reasons. One reason is that people decide to develop the business. In this case, the change can
be characterised as *planned*, as opposed to unplanned or emergent change. Attempts at planned change can be described as activities “…in which attempts to bring about change are conscious, deliberate, and intended, at least on the part of one or more agents related to the change attempt” (Chin & Benne, 1969, p. 33).

![Diagram of Strategic Development, Organisational Development, and Systems Development](image)

*Figure 1-2. Development work: activities intended to influence some “going concern” (Tolis, 1999*, p. 135).*

Development work consists of activities that ultimately are intended to influence some other activity (cf. Figure 1-2). Borrowing a term from accounting, I call the target of the development work for “the going concern” (cf. Meigs et al, 1977/99, p. 44) in order to emphasise its continuity. In a general sense, using a term from Lundeberg & Sundgren (1996), development work can be seen as pursuing the goal of “advancing the business” of the going concern.

What this means in practice depends very much on the focus that is placed on different aspects of the going concern, for example in terms of different variables (cf. Leavitt, 1964) or levels of abstraction (Lundeberg, 1993). One example of development work is the acquisition of an information system in order to facilitate the handling of customer complaints. In this case, the development work includes the activities needed to acquire and implement the information system; the going concern, which will be affected by the use of the new system, comprises the activities of handling customer complaints and using the new system.

* Included as chapter 2 in this thesis.
Focus on business processes

Process orientation can be seen as a type of business development, characterised by a specific focus on business processes. It implies an effort to tune the “compass reading” of the business towards processes, in analogy to market or customer orientation. Although older than that, the breakthrough for the concept of business process came in the beginning of the 1990s by the introduction of BPR, Business Process Redesign or Reengineering (Davenport & Short, 1990; Hammer, 1990; Davenport, 1993; Hammer & Champy, 1993). There are a number of more or less similar characterisations of business processes (cf. Goldkuhl, 1995, for a closer comparison), that mainly emphasise their customer-driven and boundary-spanning character (cf. Figure 1-3):

![Diagram](image)

*Figure 1-3. Process orientation focusing on business processes that provide customer value by utilising different organisational functions (adapted from Rummler & Brache, 1995, p. 16).*

“a set of logically related tasks performed to achieve a defined business outcome … Processes have two important characteristics: [First, t]hey have customers; that is, processes have defined business outcomes, and there are recipients of the outcomes. Customers may be either internal or external to the firm. [Second, t]hey cross organizational boundaries; that is, they normally occur across or between organizational subunits. Processes are generally independent of formal organizational structure” (Davenport & Short, 1990, pp. 12-13).

Although BPR brings together also other ideas (cf. Davenport & Stoddard, 1994; Earl, 1994), e.g. radical change, it is the concept of business
processes that is focused here. Following the massive criticism of BPR, e.g. for emphasising a “clean slate approach” and neglecting the personal dimension (cf. Mumford, 1999), “it is important not to throw out the process systems baby with the reengineering bathwater” (Roberts, 1999, p. 138). In order to underline the process focus, names such as “process orientation”, “process development”, and “process thinking” have been used in preference to BPR. The concept of business processes can be found in similar form in a number of more or less different approaches to development work, such as Process Management (Steneskog, 1991; Rummler & Brache, 1995) and Total Quality Management. Inspiration for business processes can be traced back to a number of sources, for example scientific management (Taylor, 1911), industrial process control, and value-chain analysis (Porter, 1985).

Following the increased popularity of the concept of business process, there have been attempts to link it to other types of processes in an organisation (Garvin, 1998). There have also been voices raised that the traditional way of looking at business processes is less valid in the Internet era, when electronic processes become more salient (Steneskog, 1999; Keen & McDonald, 2000).

**Second element: Business modelling**

Business modelling refers to any activity that produces or uses models of a business. A model is something that is seen as referring to something else. In a business context, that “something else” is some part or aspect of the business, justifying the labels *business model* and *business modelling* (for early uses of these terms, cf. Willars, 1991; Whitaker et al, 1991; Nilsson, 1992). Although *business models* sometimes is used in a more restricted way, to mean strategic models for how businesses make money (cf. Timmers, 1998; Afuah & Tucci, 2001/03), the wide interpretation that I use in this thesis parallels that of *enterprise model* and *enterprise modelling* (cf. Nellborn et al, 1992).

This view of models draws on Peirce’s notion of signs: “A sign … is something which stands to somebody for something in some respect or capacity” (Peirce, 1893-1910/85, p. 5). In incorporating the personal dimension, the view also parallels the distinction between data and information made by Langefors (1966/73). Langefors saw information as a function not only of a set of data (symbols), but also of the semantic background of the receiver and the time interval available (ibid, p. 248-249). Apart from Langefors’ focus on data in digital form (ibid, p. 242), a
model can similarly be interpreted as representing different things to different people, depending on their background knowledge.

In addition to the theoretical link to information and data, models are a major practical concern in the field of Information Management. All the way from viewing a computer program as a model of its behaviour, the interest in models has grown to cover most aspects of information systems and their business context. In the development of new IT solutions, models are often used to explore and communicate the organisational environment and elicit system requirements (cf. Loucopoulos, 1995).

Model artefacts of the going concern

A number of different models are produced and used within a business context. Examples include organisation charts (seen as referring to the chains of responsibility within the organisation), computer simulations (seen as referring to the operation of some organisational equipment), and annual reports (seen as referring to the organisation’s financial situation).

It is worth emphasising two characteristics of the models that I focus on: One is that they are intersubjectively accessible, i.e. they exist in physical form. I therefore use the term “model” as shorthand for “model artefact”, i.e. a model produced by people, unless otherwise noted. This means that I try to avoid the label “mental models” (cf. Johnsson-Laird, 1983), and prefer to describe the content of people’s minds in other terms than models.

The other characteristic of the models that I focus on, is that they are models of the going concern itself. This excludes models of development work, which often have a prescriptive aim and make up the foundation of methods and methodologies (cf. Nilsson, 1992, 1995; Kumar & Welke, 1992; Werr, 1999). However, whenever methodologies include guidelines for making models of the going concern, for example through specific modelling techniques (cf. Kettinger, Teng & Guha, 1997), these techniques fall within the research area. Overall, I appreciate the merits of “amethodical” views on development work – which emphasise also opportunistic, overlapping, unique, and negotiated features (cf. Truex, Baskerville & Travis, 2000).

Business models in graphical form

Graphical models represent a delimitation to a specific type of model, namely those expressed in a graphical form. “Diagram”, “map”, “figure”,
and “chart” are some of the more common names of this type of model.
In addition to all unique graphical models, there are a great number of
more or less established graphical “languages” that have been proposed
over the years. These languages, i.e. modelling techniques or notational
systems, comprise a set of symbols and rules for their use and interpreta-
tion. Four schematic examples are shown in Figure 1-4 as illustrations.

Figure 1-4. Graphical models: Four schematic examples of different types of
models expressed in graphical form.

Compared to models expressed in other forms (for example physical,
textual, or mathematical/logical ones), graphical models have a number
of important characteristics. For example, the age-old saying that “a pic-
ture is worth a thousand words” emphasises the possibility of easily
depicting complex relationships visually. At the same time, graphical
models might not be that easy to use for representing abstract sentences,
such as the specific quotation just mentioned. Furthermore, there are dif-
fences in individual preferences, due to personal background or previ-
ous experiences. While some people find it most natural to scribble down
their ideas in terms of words, others are more prone to use graphical
ways of expressing themselves.

Graphical models of businesses have evolved from a number of sources,
for example system dynamics (Forrester, 1961), organisational learning
(Senge, 1990/94) and conflict resolution (Hampden-Turner, 1990). In the
field of information systems, they have a long history as a communica-
tion tool between system developers and users (cf. e.g. Lundeberg &
Andersen, 1974; Gane & Sarson, 1979). Quite a few model types have
started out “close to the computer”, as descriptions for programs and data
structures, and later been transferred to an organisational context. One
late example of this is the influence from object-oriented programming
on object-oriented analysis and design. There have been criticisms that traditional model types emphasise the technical perspective, and provide for an unbalanced dialogue (Ehn & Sjögren, 1991; Ehn & Kyng, 1991; Göranzon, 1990/93). A closer focus on work practices has evolved in relation to the area of CSCW, Computer Supported Cooperative Work (Suchman, 1983; 1995; Kyng, 1995), and process orientation, as described above.

Relating multiple models

As a result of the large number of model types available, especially within the field of information systems, several attempts at structuring have been made. For example, some examinations of models in different form have been made bottom-up (cf. Hernbäck et al, 1990; Olle et al, 1991), also outside the business context (cf. Sällström, 1991; Bamberger, 1991). Meta-modelling, i.e. the process of making models of other models, has been used to examine more closely different model types (cf. Brinkkemper, 1990). Rather than working bottom-up, another strategy has been to start out from an initial set of categories. Such categories have for example been based on English question words such as what, how, when, where, who, and why (Zachman, 1987; Sowa & Zachman, 1992), or on philosophical ontologies, i.e. systems of concepts that describe the assumed elements of the world (cf. Wand & Weber, 1990).

**Purposes and expected contributions**

Within the scope of the research question from page 7, “What does business modelling mean for business development?”, I propose four specific purposes with the thesis. Each purpose points to an area of expected contribution that has been chosen to arrive at appropriate research answers based on complementary material and procedures. Indicating an approximate order of dependency, the four purposes are as follows:

- The first purpose is to develop a conceptual framework that outlines people’s use of business models in development work. This contribution provides a basis for discussing the meaning of business modelling in a wider context, e.g. in terms of different rationales.

- The second purpose is to provide descriptions of existing cases of business development and their use of graphical models. This contribution provides examples of how people in an organisation frame their business and the forms that those frames take.
The third purpose is to *elaborate a set of business frames*, drawing on the conceptual framework and the descriptions of existing cases. This contribution provides key characteristics of available modelling perspectives, including their focus on particular aspects of a business.

The fourth purpose is to *explore challenges in practical use* of the set of business frames. This type of contribution provides experiences from the use of multiple modelling perspectives in different cases of business analysis.

**Research rationale**

In this section, I will describe the aims that influence and motivate my research. It is meant to show why the research is important and addresses the question “am I doing the right things?” What counts as relevant of course depends on whom you ask. Regarding information systems research, Keen (1991) envisions relevance in terms of a “clear conception of the target audiences that it wishes to influence” (ibid. p. 27). Marshall & Rossman describe the issue as “Who might care about this research? To whom will it be significant?” (Marshall & Rossman, 1989, p. 23).

In my case, there are two main audiences that I want to address with my research, namely professionals engaged in development work and researchers studying it. Among Strauss & Corbin’s (1990, p. 242-243) four potential audiences for research – academic colleagues, policy-makers, practitioners, and lay audiences – I have chosen to downplay policy-makers (managers) and lay people (cf. Figure 1-5). Due to the difficulty
of addressing all potential audiences simultaneously, I emphasise the two that I believe are most directly affected by the research.

As the different audiences are characterised by their members’ roles rather than the members themselves, a single person might be member of several groups depending on his or her relation to the specific situation. Hence, instead of saying that a manager or a lay person will not find anything useful or meaningful in the research, I rather say that I have not actively addressed them in their specific role of manager or lay person.

Below, I will discuss the rationale of the research from the point of view of the two main audiences, under the headings of practical and theoretical rationale, respectively. Following that, I will conclude the section with a discussion of my own motivation for the research, under the heading of personal rationale.

**Practical rationale**

A first intended reader of my thesis is someone engaged in development work, whether the focus lies on business processes or some other aspect of the business. I primarily consider people involved in developing their own organisation, where they also in some way are part of the going concern that the development work deals with.

However, I also write for professionals who work in other organisations than their own, for example as management consultants. The disadvantages that these people have in terms of lack of familiarity with the specific going concern might be offset by their familiarity with development work in general. Still, both these groups share an interest in an improved practice, whether it is their own or their client’s.

The overall practical rationale of my research is to help people who engage in development work to better appreciate the various perspectives of (and in) the going concern, and ultimately to support them in taking charge of the development of their own going concern. Three specific issues, through which the research contributes to the practical rationale, are presented in the following: balancing time span, appreciating organisational expressions, and fostering innovation.

Balancing time span: long vs. short term

The situation at many workplaces is that it may be difficult to get enough time for the work of tomorrow (development work) in addition to the
work of today (the going concern). This is particularly evident when time and other resources are scarce, for example when there is a heavy focus on efficiency and downsizing. As IT and other technologies are used to automate more and more of the daily work, it is important that people make use of their opportunities to develop for tomorrow. A risk with a weaker link between people working for today and those working for tomorrow is an increased difference in perspective. A sharper division between developer and “developed” puts larger pressure on communication and mutual understanding.

Researching development work such as process orientation, may contribute to facilitating the balance between the going concern and development work. Developing organisational routines, for example in the form of business processes, might minimise “reinventing the wheel” and free more time to focus on creative and challenging parts of the work. Graphical models might be important tools in explicating and communicating alternative views of the business.

Appreciating organisational expressions: explicated theories vs. enacted practices

Organisational “theories” in a broad sense – documents, strategies, plans, and models – are highly valued by many people, just as they are downplayed by many others. Comments like “It’s just a plan, it’s not how it really works” illustrate an emphasis on organisational practices.
Rather than single-handedly emphasising or downplaying certain organisational expressions, the challenge becomes to appreciate their relative merits and mutual influence (cf. Figure 1-6 above), for example to understand how organisational theories function as enablers of – or obstacles to – successful practices.

Research that deals with business models has the chance to explore strengths and limitations of organisational theories in different contexts. As a great deal of organisational “theory”, for example plans and other documents, is in textual form, there is an added possibility to examine alternative forms of representation, such as different graphical notations.

Fostering innovation: novelty vs. tradition

We are constantly fed with new, more or less “revolutionary”, concepts and ideas. Each innovation is said to bring about important benefits for the organisation or its members. One day it is decentralisation, the other day it is total quality management. Critical examination and the ability to separate novelties from hype, are important skills. This requires relating to existing knowledge and traditional structures, while still being able to appreciate new twists and see new connections.

Research that explores business framing provides a context for fostering innovation by highlighting the tension between novelty and tradition, distinguishing what is new and important from what is hype and fads. Furthermore, the use of business models is in itself a tool for comparison and evaluation of different concepts and practices.

Theoretical rationale

My second intended reader is someone studying development work and/or the use of business models, for example a researcher or a student. Primarily, I am addressing people within the information field, as outlined initially in this introduction; secondarily, people within the business field and related social and behavioural sciences.

The overall theoretical rationale of my research is to help people who study development work to broaden their concept of information. Our ability to use symbols for representation and interpretation has been a foundation for the enormous development of today’s information technologies, which in turn have influenced new ideas about the human mind (Hofstadter, 1979) and society (Castells, 1996/2000). However, our con-
Continuing exploration of technological and societal implications is dependent on our understanding beyond the basic interplay between the things we take as given (data/signs) and the insights (information/knowledge) we gain from them (cf. Langefors, 1966/73, 1995; Peirce, 1893-1910/1985). By exploring different types of models and their use, there is potential to arrive at new insights regarding our view of information.

Three specific issues, through which the research contributes to the theoretical rationale, are presented below: exploring salience, interlinking knowledge forms, and bridging learning gaps.

Exploring salience: foreground vs. background

What people perceive as given is influenced on who they are and how they frame or define the situation (cf. Thomas & Znaniecki, 1918-20). There will inevitably be some kind of focus and, as a result of this, some areas of non-focus or “white space”. What is a “thing” and what is a “nothing”, what is a part and what is a relationship, can all be different for different people (cf. Figure 1-7).

Figure 1-7. Foreground or background? (lithography by M.C. Escher; from Hofstadter, 1979, p. 67).
Researching people’s use of business models gives a chance to further explore the issue of salience. A specific characteristic of process orientation is the ability to see or conceptualise the organisation in a new way, in terms of business processes. The use of different graphical models to describe and analyse the organisation is thus a natural component of process orientation. Being used to other ways of seeing the business, for example in terms of organisational function, projects, or products, means that process orientation becomes an exercise in framing.

Interlinking knowledge forms: tacit vs. articulate knowing

While the concept of information largely rests on a cognitive and reasoning view of human knowledge, there is the additional view that emphasises direct and “tacit” interaction with the world (Wittgenstein, 1953/58; Polanyi, 1958; Kolb, 1984; Dreyfus & Dreyfus, 1986; Molander, 1993). This gives a different view of human endeavours and practices (Schön, 1983; Winograd & Flores, 1986; Ehn, 1988; Göranson, 1990/93; cf. also Brunsson, 1993). It also highlights some limitations in using the computer as an analogy for the human mind (cf. Weisenbaum, 1976; Dreyfus, 1972/79).

Research of the use of business models can provide important insights into the tension between tacit knowing and articulate form, and how models can be used as a means for articulation and imaging.

Bridging learning gaps: individual vs. organisational learning

The learning of individuals, work groups and organisations is addressed by a number of learning theories (Bateson, 1972; Argyris & Schön, 1978; Kolb, 1984; Senge, 1990/94; Lave & Wenger, 1991). Learning provides a promising starting point for making sense of people’s activities when they engage in development work. People's exploration of their environment and of themselves is as valid in a workplace setting as it is in classroom and research situations.

Researching process orientation provides an opportunity to explore learning theories not only on an individual level, but also regarding groups and organisations. There is an added complexity in the handling of differing values and goals between individuals in the organisation and the organisation as a whole. References to “larger ends” and “common good” can be identified and analysed using business models.
Personal rationale

A third type of rationale for this research, following the practical and theoretical ones presented above, consists of my personal rationale. I believe that assumptions and ideas of the researcher comprise an important part of the foundation and motivation for the research. Choices regarding topic and methodology are dependent on basic assumptions of the researcher (cf. Burrell & Morgan, 1979; Morgan, 1983).

Moreover, I view myself as a third intended reader of the thesis as I see the actual writing as an integral part of all research, especially in humanities and social sciences. There is an interdependency between the “external” written text and the “internal” thoughts, similar to what Schön, in the context of designing, describes as a reflective conversation with the materials of a situation (Schön, 1983, chapter 3).

One way of characterising the overall personal rationale of my research is to make use of the quote by Goethe that starts off this thesis: “The course of nature is to divide what is united and to unite what is divided”. Building on my initial misconception of him talking about research and not nature, I can paraphrase Goethe in saying that the overall rationale for me as a researcher is precisely to divide what is united and to unite what is divided. Underlying this personal rationale, and influencing my research, are three specific preferences: broadening the scope, emphasizing the subjective, and exploring constraints.

Broadening the scope: diversity more than focus

As a researcher, I strive to reframe and point to alternatives, rather than to give specific solutions. When travelling, I tend to enjoy the freedom of being on the move more than the satisfaction of arriving at a specific destination. I prefer to emphasise problem-setting and questions rather than problem-solving and answers, and see my role as advocating heterogeneity and diversity.

In situations of asymmetrical valuation, where something is seen as definitely better than its opposite, I argue for balance and dialectic interdependence, and try to emphasise the less-valued alternative. For me, stage models that emphasise progress towards some goal, beg the question of what is being lost when one moves through the stages. I see advantages in acknowledging trade-offs and being aware of what is downplayed. For me, the Swedish word “lagom” – expressing a state of
not too much, nor too little – more often than not represents something desirable.

In the context of models and modelling, my struggle for diversity is evident in my interest in alternative ways of framing and describing organisations. A single perspective – such as business processes – can never be the whole solution. In development work, diversity means trade-offs and alternatives. Diversity rather than focus has also contributed to my disinterest in methodologies and models of development work, as they tend to emphasise “a single way to success”.

In this introduction, for example, my emphasis on diversity has been shown in the earlier statements about issues that contribute to the practical and theoretical rationale of the research. They were given in the form of two potentially opposing alternatives – for example individual vs. organisational learning – precisely to stress the variety involved. However, there are definitely also occasions where a narrow focus is more valuable than diverse alternatives. For example, I do emphasise specific alternatives when I now state preferences that underlie my personal rationale in the research.

Emphasising the subjective: social construction more than objective correspondence

Our language contains an endless number of conceptions and distinctions, for example making it possible to talk about “blue cars” and “centralised organisations”. On the other hand, we have an understanding of some kind of reality, which possibly includes the aforementioned blue cars and centralised organisations.

Figure 1-8. Socially constructing in an ambiguous world, in this case a “duckrabbit” (Wittgenstein, 1953/58, p. 194).
For me, language influences reality just as reality influences language. I see only a loose coupling between the two. I believe that we socially construct and negotiate our reality through the conceptions of our language (cf. Thomas & Znaniecki, 1918-20; Pirsig, 1974, 1991). As illustrated in Figure 1-8 above, reality is ambiguous and open to a multitude of interpretations (cf. Asplund, 1970). At the same time, we are influenced by what we perceive as an independent reality (Berger & Luckmann, 1966; Giddens, 1979).

This paradox is evident in our everyday life: we constantly balance between questioning and developing our language on the one hand, and taking it for granted and using it on the other (cf. the distinction between “exploration” and “exploitation”, used by March, 1991). From my point of view, I read a suggestion to “Perceive reality as it is!” (Lundeberg, 1993, p. 1) simply as “Be curious and creative!” because I believe that the only way reality “is”, is that it is open for interpretation and action.

In modelling, this focus on social construction means that there are always alternatives. At the same time, there are constraints that follow from the context of perspective and language chosen. As a consequence of this tension between creation and discovery, the question of quality surpasses that of simple correspondence. The subjective framings in development work require as much focus as the “objective facts” of the organisation.

Exploring constraints: general principles more than specific details

The last preference that underlies my personal rationale has to do with the tension between the general and the specific. For example, when reading, I often concentrate more on guiding principles than on the concrete details of the text. I tend to focus on the general more than the specific and I am more worried if an account is too complex to be easily understood than if it is too simple to give the situation complete justice. To avoid “not seeing the forest for all the trees” (a Swedish saying), I rather risk “not seeing all the trees for the forest”.

Similar things happen when I write. I place great emphasis on finding interesting guiding principles. These principles acts as constraints, “forcing” me to utilise available resources in the best possible way. Identifying and leveraging key constraints is important for me, in that it restricts me to a limited number of possibilities and thereby challenges my crea-
tivity. Following this, I value working with simple means that involve important constraints higher than utilising complex tools and media.

In modelling and development work, the focus on general principles means a preference for notational systems with few and simple building blocks. Although my own focus on general principles has a strong foundation in the visual dimension, similar values have been expressed in the sciences, for example by the concept of Occam’s razor or by Einstein’s alleged advice to “be as simple as possible, but not more than so”.

Research process

While the previous section discussed the rationale for the research, the purpose of the present section is to answer how the research takes place. It addresses the question “am I doing the things right?” Marshall & Rossman (1989, p. 23) describe the issue as “How will the researcher conduct this research? Is the researcher capable of doing this research?” Following an initial overview of my personal background, the section continues with a characterisation of the research and an explanation of the research design, including an overview of the different activities in the research process.

Personal background

Having already argued for the importance of the researcher to the research performed, I will give a brief glimpse of what I believe has contributed to the formation of my preferences and personal rationale. I spent my initial twelve school years (primary and secondary school) at a Waldorf School in Stockholm. Among the things that I felt especially valuable at the school was the great enthusiasm of the teachers and their commitment to integrate practical and theoretical approaches in the curriculum. One of my favourite subjects, already at that time, was indeed “modelling” – although it was then done with clay. A growing interest in computers was spurred by books such as Weisenbaum (1976) and Dreyfus (1972/79), providing balanced accounts of both benefits and risks. In the beginning of the 1980s, I participated in discussions about using computers in the school’s administration, documenting workflows and exploring the then brand new Apple Lisa, the predecessor to the Macintosh range of personal computers.
In my military service, I worked at the computer department of the regional enrolment office. After a colleague and I had started a user group for a new brand of personal computers, I began working with technical support for the Swedish distributor of that particular brand. Three years later I wanted to try something new and decided on university studies. At Stockholm School of Economics, I completed their M.Sc. program, specialising in Information Management. My focus was on business modelling (cf. Tolis, 1994; 1995) and I also began working as a lecturer at the school. In parallel, I took courses in Pedagogy, Psychology, and Philosophy at Stockholm University.

As a new doctoral student in 1995, I became part of the Business Modelling research consortium, a collaboration between participants from three universities as well as from industry. The overall leader of the consortium was professor Anders G Nilsson (then at Stockholm School of Economics) and participants included researchers also from Royal Institute of Technology and Linköping University. During the period of 1995 to 1997, the consortium was funded by NUTEK, the Swedish National Board of Industrial and Technical Development. The main results have been documented in Nilsson, Tolis & Nellborn (1999).

Research characteristics

Answering my research question – what business modelling means for business development – can be done in several ways. Still, in light of the research rationale, the actual question points towards certain ways of investigation as well as certain types of answers. This will be elaborated in the following.

Explorative research with a qualitative focus

First of all, I view my research as being explorative, in the sense of emphasising language development over language use. This means that I emphasise the exploration of concepts and ideas (e.g. the meaning people make of “process orientation”) over using them as given (e.g. counting organisations currently engaged in process orientation). As a result of this, I prefer to look for variety rather than for the most common way of doing things. By exploring and presenting different alternatives, I hope to give rise to new ideas and interpretations regarding the research topic.

In my collection and analysis of data, I focus on texts and pictures more than numbers. This qualitative focus is in line with my interest in explor-
ing the question of what something “means for” something else, which gives an increased opportunity to go into details of ideas, meanings, and practices.

I rely on our ability to move ideas and experiences between different contexts as a tool for creativity and development (cf. Schön, 1979). This is the core feature of processes of *abduction*, as put forward by the 19th-century American philosopher Charles Sanders Peirce (cf. Fann, 1970; Alvesson & Sköldberg, 1994), and *metaphor* (cf. Ortony, 1979). Identifying and creating different contexts has been a foundation for investigating different levels of abstraction in society and organisations (Bateson, 1979; Pirsig, 1991; Lundeberg, 1993). In my research, I move between theoretical and empirical contexts, combining elements of both induction and deduction (cf. Wallace, 1971; 1983).

**Iterative planning and writing**

Rather than following the rationalistic ideal of planning first and execution thereafter, I have mostly developed my research design iteratively during the research process (cf. Brunsson, 1993; Schön, 1983). From the start in 1995, planning activities have largely been interwoven with engagement in the actual research. This mode of working has had its advantages as well as disadvantages. Being able to make adjustments based on practical experiences has been valuable, whereas the lack of a firm basis has sometimes been frustrating, as there are many interesting paths to follow. As a result of the iterative design, the documentation that describes the research has gradually changed character from a plan of the future to an account of the past. Although the details have evolved, the research has retained its focus on business modelling. As an aside, the titles that I over the years have used for my research indicate a shift in focus from the details of process orientation to the more general issue of business framing.

**Research design**

Following the four purposes of my research, the research design comprises four main activities that have different emphases in terms of theoretical and empirical balance: “theoretical structuring”, “empirical description”, “frame development”, and “frame application”. Figure 1-9 shows the relationships between these activities, and the chapters in which they are treated.
The logic of the overall design is initially to focus on theoretical and empirical issues rather separately, and focus on integration in the latter two activities.

Below follows a further overview of the four activities that I have chosen to divide my research into. While each activity contributes to answering the research question in a particular way, each has different inputs, execution, and outputs that contribute to its relevant purpose.

Theoretical structuring (chapter 2)

The activity of theoretical structuring has been directed towards developing a set of conceptual dimensions for analysing people’s use of business models in development work. It responds to the first purpose of the study. My main inspiration has come from theories of signs, learning, and knowledge paradigms. Signs and data have been main concepts when I look at model artefacts (Peirce, 1893-1910/1985; Langefors, 1966/73). Learning theories have inspired the exploration of model activities (Kolb, 1984; but see also Argyris & Schön, 1978, Moxnes, 1981; Lave & Wenger, 1991; Senge, 1990/94; Schein, 1993; Nonaka, 1994; Schreinemakers, 1996). Finally, knowledge paradigms have been a starting point for examining model assumptions (Kuhn, 1962/70; Burrell & Morgan, 1979; Morgan, 1980, 1986; Bolman & Deal, 1984, 1993; Alvesson & Sköldberg, 1994).

As a general tool for structuring, I look for differences and explore contrasts and oppositions by constructing dimensions comprising ideal types of thesis and antithesis (cf. Kelly, 1955). Prior publications from this activity are shown in Table 1-1.
Empirical description (chapters 3-4)

Through the activity of empirical description, I respond to the second purpose of the thesis: to provide descriptions of existing cases of business development and the use of graphical models. Emphasising the particular organisational context, I focus on specific experiences of different “use cases”, i.e. situations where business models are being used. The use cases can be considered as embedded cases (Yin, 1984/94, p. 41) gathered from two main organisational contexts, Ericsson and Sweden Post. The two organisations have been participants in the Business Modelling research consortium and were chosen as they provide different emphases in their work with business processes. The empirical activities were mainly undertaken together with other researchers in the consortium as parts of the joint research collaboration.

Table 1-1. Prior publications from the activity of theoretical structuring.

<table>
<thead>
<tr>
<th>Publication</th>
<th>Title</th>
<th>Category</th>
</tr>
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<tbody>
<tr>
<td>Tolis, 1996 b</td>
<td>Working With Models in Development Work: Differences that Hinder or Facilitate</td>
<td>Conference paper</td>
</tr>
<tr>
<td>Tolis, 1999</td>
<td>Facilitating Understanding and Change: The Role of Business Models in Development Work</td>
<td>Book chapter</td>
</tr>
</tbody>
</table>

Table 1-2. Prior publications from the activity of empirical description regarding Ericsson Radio and Sweden Post, respectively.
In the case of Ericsson, qualitative data was gathered in interviews with ten process owners. The aim was to find out and make sense of their concerns as process owners. Notes from the interviews were converted to narratives that described the work and opinions of each process owner. The qualitative data were inductively searched for issues and dilemmas of concern to the interviewees (cf. Glaser & Strauss, 1967; Walsham, 1995). Prior publications focusing on Ericsson are shown in the first part of Table 1-2 above.

In the case of Sweden Post, qualitative data was gathered through active involvement in an exploration project initiated by the organisation. The involvement shared characteristics of participant observation (cf. Myers, 1999) and action research (cf. Baskerville & Myers, 2004). Field notes were converted to narratives describing the work in the project. Also in this case, inductive analysis was employed in order to find the dilemmas that influenced the work with process orientation and business descriptions. Prior publications focusing on Sweden Post are shown in the second part of Table 1-2 above.

Frame development (chapters 5-8)

The activity of frame development responds to the third purpose of the thesis and aims at elaborating a set of business frames in the form of modelling perspectives, and draws on the results from the activities of theoretical structuring and empirical description.

<table>
<thead>
<tr>
<th>Publication</th>
<th>Title</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolis, 1997</td>
<td>Multiple Perspectives on Business: Models of Process and Content</td>
<td>Conference paper</td>
</tr>
<tr>
<td>Tolis, 2004 a</td>
<td>Value Modelling for Exploring Strategy Solutions</td>
<td>Conference paper</td>
</tr>
<tr>
<td>Tolis, 2004 c</td>
<td>Facilitating Knowledge Management: Concept Modelling for Exploring Information Solutions</td>
<td>Conference paper</td>
</tr>
</tbody>
</table>

Table 1-3. Prior publications from the activity of frame development, focusing on overview and two of three distinct perspectives.
The conceptual framework of people’s use of business models in development work is contrasted with the specific results of particular organisations’ use of graphical models in process orientation. Two complementary questions have guided the analysis: First, how can the empirical results enhance the theoretical view of people’s use of business models in development work? Second, how can the theoretical results enhance the empirical descriptions of people’s use of graphical models in process orientation? Prior publications from this activity are shown in Table 1-3 above. Following an overview in chapter 5, three specific frames are further addressed in chapters 6, 7 and 8.

Frame application (chapter 9)

Through the activity of frame application, the elaborated set of business frames is used in different practical contexts in order to arrive at framing challenges as specified by the fourth purpose. A total of 11 cases of business analysis from 2003 have been examined, each dealing with a particular real-world organisation chosen by the analysts. The analysts have been graduate students doing an eight-week assignment on business analysis, in most cases working two and two. The set of modelling perspectives was made available through presentations and exercises in class.

Similar to professional consultants, the analysts were not employees of the organisation that they analysed, but had established contact and offered their services. Although their prior experience with business modelling in most cases was limited, they had basic knowledge of various fields of business administration and management.

Throughout each analysis, a number of business models were produced of the organisation in focus. The models have been used as input in the analysis of challenges related to the use of the modelling perspectives. Prior publications from this activity are shown in Table 1-4.

<table>
<thead>
<tr>
<th>Publication</th>
<th>Title</th>
<th>Category</th>
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<tbody>
<tr>
<td>Tolis, 2004 b</td>
<td>Practising Multiple Framing: Challenges in 11 Cases of Business Analysis</td>
<td>Conference paper</td>
</tr>
</tbody>
</table>

*Table 1-4. Prior publications from the activity of frame applications.*
Structure of the thesis

In this introductory chapter, I have used three main sections to present my research: First, the research topic as using business modelling in business development. Second, the research rationale as helping professionals take charge of developing their own going concern, and researchers to broaden their concept of information. Third, the research process as structuring theoretical ideas, describing empirical cases, developing a set of business frames, and applying the frames in business analyses. My concluding task for this introduction is to look forward by giving an overview of the structure of the remaining thesis.

This thesis shares characteristics both with collections of papers and monographs. It relies on a set of papers for its content, the majority of which have been published as refereed conference papers and/or chapters in edited books. However, several steps have been taken to increase the overall cohesion and integration of the thesis, along the lines of a monograph. For example, although each chapter deals with a separate issue and is written so that a reader can have value in reading it separately, they all follow a monograph’s single line of reasoning with different emphases between theoretical, empirical, and analytical material. Furthermore, the papers have been included in the thesis with minor alteration to improve clarity and links between different chapters. By the chosen structure, I try to combine a number of valuable aspects of both collections of papers and monographs (cf. Table 1-5).

<table>
<thead>
<tr>
<th>Collection of papers</th>
<th>Monograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to follow development of ideas over time</td>
<td>Potential for coherent presentation of ideas</td>
</tr>
<tr>
<td>Packages of relevant information in each part</td>
<td>Everything in its place; no redundancies</td>
</tr>
<tr>
<td>Easier to read individual chapters of the thesis</td>
<td>Easier to read the whole thesis from cover to cover</td>
</tr>
<tr>
<td>Possibility for condensed accounts, limited by length requirements</td>
<td>Possibility for extended accounts without restriction in number of words</td>
</tr>
<tr>
<td>Incremental “added value”; subject to public scrutiny throughout the process</td>
<td>Large “added-value” at dissertation time</td>
</tr>
</tbody>
</table>

*Table 1-5. Advantages of two types of theses.*
The resulting structure of the complete thesis is shown in Figure 1-10 above. Apart from this introduction and the final integration, the thesis builds on the material from the four main activities of the research process. The conceptual framework (chapter 2) comes from the activity of theoretical structuring, the two empirical studies (chapter 3-4) from the activity of empirical description, the elaborated frames (chapters 5-8) from the activity of frame development, and the 11 cases (chapter 9) from frame application. The integration (chapters 10-11) provides a summary and discussion of the results in reference to the initial set-up.

**Figure 1-10. Contents of the chapters that comprise the complete thesis.**
PART I: THEORETICAL STRUCTURING

The first part of the thesis addresses my first purpose, to develop a conceptual framework outlining people’s use of business models in development work. This is done based on theories of signs, learning, and knowledge paradigms and results in three areas of focus: model artefacts, model activities, and model assumptions.
Chapter 2

The Role of Business Models in Development Work*

Models are commonly used by people engaged in understanding and changing organisations. Despite benefits resulting from this type of model work, there are a number of difficulties experienced. Instead of facilitating it, the development work is often hindered by people’s different preferences and the multitude of different model types available. A conceptual framework of model work is presented in this chapter, drawing on theories of signs, learning, and knowledge. The framework highlights differences and alternatives within three areas: model artefacts, model activities, and model assumptions. It is suggested that recognising and exploring a larger part of the framework will facilitate the development work.

Working with models in development work

Much development work in organisations involves working with models in order to facilitate understanding and change. Based on earlier work (Tolis, 1996 a and 1996 b), this chapter argues that many perceived problems and neglected opportunities result from a lack of awareness of certain differences related to model work. Instead of facilitating development work, these differences often hinder it.

Development work and the going concern

The core characteristic of development work is that it is directed towards another activity, a “going concern” to use a term from the field of accounting, an activity that it tries to understand and change. This going concern is viewed as an ongoing activity in contrast to the development work, which is often more delimited in time. For example, the work of developing an information system is more delimited than the business activities that the system is to support. Development work can be seen as an attempt to influence the going concern in some way, while at the same time being influenced by it. When people in the going concern also engage in development work, this might represent a shift in their learning process towards “deutero-learning” (Bateson, 1942/72): in addition to their “normal” learning about their environment, they are also learning about their own learning.

In many cases, the distinction between going concern and development work is vague. Most people in a company face a trade-off between the two and find themselves continuously changing focus – either consciously or not. Although time spent on development work means less time for the going concern of today, the going concern of tomorrow will hopefully benefit. The going concern can thus be said to “work for today”, whereas the development work can be said to “work for tomorrow”. This situation can be viewed as a struggle between the two forces of tradition and transcendence (Ehn 1988, p. 161), or, from another perspective, between the anxiety to change and the anxiety not to change (Schein, 1993).

Development work within companies takes many different directions. The type of problem perceived and the type of solution available (they are often interrelated) are two main reasons for the diversity of directions. However, some directions are more common than others; for
example, many companies do engage in some kind of organisational development.

People might not participate in the going concern that their development work focuses on. Especially in large companies, there are often different people engaged in these activities, leading to a communication gap. The specialisation that takes place is partly a result of differences in knowledge and experience required, e.g. familiarity with certain solutions. Moreover, specialisation often leads to the formalisation of development work, for example by initiating explicit projects that are more or less separated from the going concern. The balance between development work and the going concern is important in this respect. In the context of information systems, this means different emphasis being placed on developing systems and using them (cf. Ehn, 1988; Göransson, 1993).

As Figure 2-1 illustrates, several types of development work are often in progress more or less simultaneously – e.g. strategic, organisational, and systems development. They are often initiated and undertaken by different people and groups, both within and outside the company. While, for example, the development of information systems might involve the IS department, strategic development might be the task of the company’s top management.

![Figure 2-1. Paths of influence between the going concern and three common types of development work.](image-url)

The division of labour between the going concern and various directions of development work has obvious consequences with regard to communication and co-operation. Background, prior experiences, goals and behaviour of people differ to greater or lesser extent. For example, a business manager’s work in a going concern is quite different from a
system expert’s development work. Problems may arise in both directions, i.e. regarding the requirements for development work as well as its implementation. These issues are complex and often problematic, as witnessed by research areas such as requirements engineering and implementation studies.

Model work in the development context

A central feature of development work is the use of models. Model work is a recurring activity, not only in the special context of information systems but also in design in general (cf. Schön, 1988). Common examples of models include drawings of the company’s organisational structure, descriptions of the handling of incoming orders, stepwise instructions on how to run a project, and descriptions of causes and effects in a problematic situation.

Some models are specific to a certain company and situation, while others are intended for more general applicability, e.g. as the basis of methodologies and conceptual frameworks. A specific model might capture the particular company’s information structure used in their databases, whereas a general model might deal with a common procedure for developing information systems. Furthermore, some models use novel ways of expression, while others are instances of already established model types. A novel model in this sense contains new symbols and rules for interpretation, whereas an established model type is made up by a certain standardised notation or language agreed upon (cf. Sällström, 1991).

Whatever the specifics of the models in question, their actual use varies depending on the situation and the people involved. For an individual, models might aid the thought process and provide a basis for action. As development work deals with ideas for the future, it is useful having tools that enable the representation and exploration of ideas. For a group there is an added dimension, as issues of communication, co-operation, and potential conflict become more salient. Consequently, the use of models for those purposes increases in importance.

People’s different preferences

People’s preferences regarding model work can differ in many ways. Each preference, whether explicitly stated or implicitly acted upon, is a case of delimitation in respect to other alternatives. Each preference emphasises certain issues, suggesting that these are especially important
and should be dealt with, if not exclusively then at least primarily or initially. Six examples of common preferences emphasise:

- Detailed, preferably formalised, descriptions
- Objects and conceptual structures
- Analytic work and articulate knowledge
- Preparation and planning
- True descriptions of reality as it is
- Unifying descriptions for shared understanding

Many of the problems and opportunities associated with using models in development work stem from the great diversity of the activity. People with different background bring with them their own preferences, ways of working, and ways of using models. Furthermore, even without counting all the novel models, an almost endless number of established model types are available.

Important differences might both hinder and facilitate the development work. Differences might hinder when they are not recognised and dealt with properly. They can lead to chaos and confusion – making it harder, for example, to see important similarities, discriminate between relevant issues, make useful comparisons, choose appropriate alternatives, appreciate current focus, and see an overall picture. On the other hand, differences might facilitate the work when they are recognised and dealt with properly. They can lead to cross-fertilisation and mutual learning – making it easier, for example, to find new alternatives, avoid unnecessary distractions, develop a clear orientation, understand other perspectives, and improve communication.

A conceptual framework of model work

To benefit from model work, and to avoid the pitfalls, it is necessary to deal with perceived differences. In the following, a conceptual framework is presented, which highlights important differences within the context of development work. The framework is an attempt to provide a basis for understanding and changing model use in development work, drawing on theories of signs (semiotics), learning, and knowledge. As shown in Figure 2-2, the framework explores differences within three areas: model artefacts, model activities, and model assumptions.
Within each area, differences are discussed in terms of two dimensions. Each dimension is made up of two opposing concepts. Rather than representing clear-cut categories, the dimensions are continuums where various artefacts, activities, and assumptions have different emphasis.

**Different model artefacts**

The first of the framework’s three areas concerns model artefacts and how they differ. A *model artefact* is an artefact that is used instead of something else. This notion is inspired by the concept of *sign* used in semiotics, the theory of signs (cf. Peirce, 1893-1910, p. 5). As will become evident below, the term artefact is used in a wide sense, including all results of human activity – also more “processual” ones. In a computer simulation, for example, not only the computer and the software can be considered artefacts – but also the simulation process itself, when the computer is running the software.

The framework divides artefacts using two dimensions, with varying focus between representation-manifestation and content-process (see Figure 2-3).
The first dimension of artefacts is based on the two concepts representation and manifestation. Drawing on the semiotic concepts of symbol and icon (cf., e.g. Peirce, 1893-1910, p. 8), it deals with the question of what leads the artefact to be perceived as a model; how the artefact emphasises what it does.

- A representation artefact is characterised by convention. It is relevant as a symbol, i.e. for what it is representing. Its form is mainly arbitrary.
- A manifestation artefact is characterised by restriction. It is relevant as an icon, i.e. for what it is manifesting. Its form is mainly given.

Another illustration is the distinction between an artefact and its medium. This is clear in case of a representation artefact (e.g. between a text and the ink that it is written with), but less clear in the case of a manifestation artefact (e.g. between a toy car and the material it is made of). Examples of the dimension can be found in clocks and other measuring instruments: digital displays are more representational, analogue ones are more manifestation. The same also applies to user interfaces in the area of human-computer interaction: key words are more representational; graphical icons are more manifestation.

The second dimension of artefacts is based on the two concepts content and process (cf. Tolis, 1994, pp. 8-9). It concerns what the model emphasises.

- A content artefact is characterised by a focus on what is (or might be). It emphasises structures and non-temporal relationships.
- A process artefact is characterised by a focus on what happens (or might happen). It emphasises change and temporal relationships.

The work of two Greek philosophers from around 500 BC can be used to illustrate the dimension’s long tradition. Parmenides emphasised content, arguing that being is everything; all becoming (change) is an illusion (Lübcke, 1988, p. 418). Herakleitos, on the other hand, emphasised process. He argued that change and motion is all there is: you cannot step into the same river twice (ibid., p. 225).
Other related concepts include Structure vs. Activity, Situation vs. Process (Lundeberg, 1993, p. 4), Form vs. Process (Bateson, 1979, pp. 209-219), and Static vs. Dynamic.

**Examples of model artefacts**

The models used in development work clearly differ in many ways. Using the first area of the framework (cf. Figure 2-3, above), four main types of model artefacts emerge. As the two types of representation models contain a large number of established model types, e.g. from the field of information systems, they have been subdivided into two perspectives each (cf. Tolis, 1994, pp. 8-9; Tolis & Nilsson, 1996*).

- **Content representations.** These models can be further divided into two perspectives: category models (e.g. entity-relationship diagrams and semantic networks) and factor models (e.g. causal networks and problem maps). When aiming for more general applicability, content representations often form the basis of conceptual frameworks.

- **Process representations.** These models can be further divided into two perspectives: transformation models (e.g. dataflow diagrams and process graphs) and behaviour models (e.g. flow charts and state transition diagrams). When aiming for more general applicability, process representations often form the basis of methodologies.

- **Content manifestations.** A carved piece of wood resembling a real boat and a physical model of a car used for aerodynamic testing are two examples of content manifestations. This type of model, in the form of mock-ups, has also been used in the development of information systems (e.g. Ehn, 1988, pp. 335-339).

- **Process manifestations.** A simulation running on a computer and a role-play performed by people in the organisation are two examples of process manifestations. Compared to a content manifestation, it is the process itself – rather than the structure of the things or people involved – that comprises the model.

* Included as chapter 5 in this thesis.
Different model activities

The second of the framework’s areas concerns model activities and how they differ. A model activity is an activity that involves models. An activity is something that someone engages in; it can be viewed as behaviour in the widest sense, not limited to externally observable actions.

Kolb (1984) – inspired by the work of Piaget, Dewey, and Lewin – argues that a central feature of all human activity is learning. Drawing on his theory of experiential learning, the framework divides activities using two dimensions, with varying focus between abstract-concrete and reflective-active (see Figure 2-4; cf. Tolis, 1994, pp. 5-7).

![Figure 2-4. Two dimensions of activities explored in the framework (adapted from Kolb, 1984, p. 42).](image)

Abstract and concrete activities

The first dimension of activities is based on the two concepts abstract and concrete. It differentiates between two ways of relating to the world.

- An abstract activity is characterised by a focus on something for what it stands for. Interpretation, reasoning and the verbal aspect of communication are salient.

- A concrete activity is characterised by a focus on something for what it is in itself. Direct experience, using an overall feeling rather than explicit guidelines, and the non-verbal aspect of communication are salient.

Greater familiarity – a higher level of expertise – is coupled with an increased concrete focus. The frame of mind shifts from atomic, analyti-
cal, and rational to holistic and ‘a-rational’ (Dreyfus & Dreyfus, 1986, p. 36). As experts, a driver and a computer user navigate without deliberate decisions; they use their tools (steering wheel, gearshift, mouse, desktop, etc.) in a direct and intuitive manner. In terms of knowledge, the dimension parallels the difference between explicit and tacit knowing (Polanyi, 1958; cf. Johannessen, 1988).

Reflective and active activities

The second dimension of activities is based on the two concepts reflective and active. It differentiates between two ways of transforming one’s grasp of the world.

- A **reflective** activity is characterised by a focus on “inward” behaviour. It aims towards observing, understanding and making sense.
- An **active** activity is characterised by a focus on “outward” behaviour. It aims towards experimentation, change and control.

Other notions of the dimension are problem-setting vs. problem-solving (Schön, 1979, p. 255) and experience vs. action (Checkland & Scholes, 1990, p. 3).

Examples of model activities

Characterising an activity in terms of the framework consists of establishing its focus in terms of the dimensions. As a result, four main types of model activities emerge (cf. Figure 2-4, above):

- **Abstract reflection.** Explicitly analysing key figures in a product report is an example of this kind of activity. Models and other representations are used as a means to achieve understanding. Interpreting and creating models to gain insight are other examples of activities that share this focus.
- **Abstract action.** Presenting a monthly work-plan is an activity of this kind. Models and other representations are used to achieve change. Examples include using models to aid communication and to guide work, e.g. by using existing frameworks and methodologies.
- **Concrete action.** Skilfully assembling the parts of a product is an example of this kind of activity. The activity is not guided by explicit decisions, e.g. following the steps of a methodology, but rather by
experience acquired over a long period of time. Models are acted upon not as abstract symbols, but rather as concrete icons.

- **Concrete reflection.** Appreciating a product’s finish is an example of this focus. The activity makes use of an overall feeling rather than explicit guidelines. Models are perceived not as abstract symbols, but rather as concrete icons.

### Different model assumptions

The third and final area of the framework concerns model assumptions and how they differ. A **model assumption** is an assumption regarding model work. An assumption is an underlying belief that is attributed to people or their constructs, e.g. statements and theories (cf. Burrell & Morgan, 1979, pp. viii-xii). They can be more or less explicit; often they are taken for granted and not reflected upon. In the case of explicit assumptions, the attribution is one’s own; otherwise it is someone else’s.

Building on Burrell & Morgan (1979), the framework divides assumptions using two dimensions, with varying focus between objective-subjective and consensus-conflict (see Figure 2-5). The ideas developed by Burrell & Morgan (1979) have been applied in different contexts, e.g. information systems development (Hirschheim & Klein, 1989). Other classifications of basic assumptions have taken the form of clusters where similar theories are grouped together, for example in organisational theory (Morgan, 1980, 1986; Bolman & Deal, 1984, 1991) and in knowledge theory and research methods (Pepper, 1948; Alvesson & Sköldberg, 1994).

![Figure 2-5. Two dimensions of assumptions explored in the framework (adapted from Burrell & Morgan, 1979, p. 22).](image-url)
Objective and subjective assumptions

The first dimension of assumptions is based on the two concepts objective and subjective. It differentiates between two views of the nature of the social world and the way it may be investigated. In model terms, the dimension concerns the relation between the model and what is modelled.

- An objective assumption is characterised by a focus on structures in the world. Models are viewed as expressions of facts, not influencing what is modelled. They are valued in terms of correspondence.

- A subjective assumption is characterised by a focus on structures in the human mind. Models are viewed as expressions of values, influencing what is modelled. They are valued in terms of beauty (e.g. simplicity, elegance).

The dimension is linked to different views regarding ontology (what exists), epistemology (how to gain knowledge), human nature, and methodology. Objective assumptions focus on realism, positivism, determinism, and a nomothetic interest. Subjective assumptions instead focus on nominalism, anti-positivism, voluntarism, and an ideographic interest (Burrell & Morgan, 1979, p. 3).

Consensus and conflict assumptions

The second dimension of assumptions is based on the two concepts consensus and conflict. It differentiates between two views of the nature of society and has consequences for how the purpose of a model is viewed.

- A consensus assumption is characterised by a focus on agreement, unity, and order. Models are viewed as a means for understanding and consensus. They are valued in terms of meaningfulness.

- A conflict assumption is characterised by a focus on disagreement, contradiction, and chaos. Models are viewed as a means for change, influence, and power. They are valued in terms of usefulness.

Consensus assumptions focus on the status quo, social order, social integration and cohesion, solidarity, need satisfaction, and actuality. Conflict assumptions, on the other hand, focus on radical change, structural conflict, contradiction, emancipation, deprivation, and potentiality (Burrell & Morgan, 1979, p. 18). The dimension can be characterised by the two complementary questions “Why is it like it is?” and “Why isn’t it like it
isn’t?” While the first question indicates an interest in the way things are (focus on consensus), the second one indicates an interest in the way things could be (focus on conflict).

Examples of model assumptions

Using the two dimensions described, four types of model assumptions emerge (see Figure 2-5, above). Each combination represents a certain type of basic assumption in relation to model work, i.e. model artefacts and model activities.

- **Objective consensus.** In this perspective, working with models is geared towards understanding the way things are. Models are seen as meaningful facts. Modelling becomes a rational activity that results in correct models without affecting what is being modelled. Change is primarily viewed as a means for understanding.

- **Objective conflict.** As in the previous perspective, models are seen as representing an independent reality. However, the focus on conflict means an emphasis on different perspectives. While a particular model might be advantageous to some people, it might be disadvantageous to others. Models are viewed as useful facts and modelling as an opportunity to gain and exercise power. Understanding is primarily viewed as a means for change.

- **Subjective conflict.** This perspective shares the assumptions about models as useful tools for change. However, in contrast to the previous perspective, models are viewed as representing useful subjective values rather than an external and objective world. As a consequence, modelling is a way to bring about personal emancipation and change.

- **Subjective consensus.** The subjective focus of this perspective is common to the previous one. However, it shares the focus of consensus with the first perspective. This means that models are viewed as meaningful values, and tools for understanding more than change. Modelling thus becomes a means to achieve consensus and shared understanding.

Putting the framework to use

How can this conceptual framework of model work be of help for people engaged in development work? Of what use can the dimensions describ-
The overall aim of using the framework is to increase the likelihood that differences encountered in the work will facilitate rather than hinder it. Two particular reasons for using the framework are discussed below: to aid understanding and to aid change.

**Understanding model use in development work**

The first reason for using the framework is to aid in the understanding of model work. This includes understanding one’s own focus as well as the focus of others. The earlier examples, of people’s different preferences regarding model work, can be re-stated in terms of the framework. Each preference indicates a certain focus within the framework:

- Detailed, preferably formalised, descriptions: focus on *representation artefacts*
- Objects and conceptual structures: focus on *content artefacts*
- Analytic work and articulate knowledge: focus on *abstract activities*
- Preparation and planning: focus on *reflective activities*
- True descriptions of reality as it is: focus on *objective assumptions*
- Unifying descriptions for shared understanding: focus on *consensus assumptions*

Figure 2-6 illustrates the preferences in terms of the framework. As shown, they represent a focus on certain parts of the framework. For the area of model artefacts, the focus is on content representations; for model activities it is on abstract reflection; and for model assumptions it is on objective consensus. Although there might be common patterns of focus between the three areas, every combination is possible. For example, a person may use all types of artefacts in a certain type of activity and may engage in all types of activities from a certain type of assumption.

Seeing patterns in one’s own model work and that of others is an important way to better understand different situations. The framework might provide a tool for analysing and discussing questions such as: Where is the current focus? What types of artefacts, activities, and assumptions are now being emphasised? Do people within the group have similar or different focus? How are they different? Is the focus for the group as a whole narrow or more dispersed? Has the focus changed in any way during the development work?
A further illustration of the use of the framework to aid understanding is to make sense of different opinions regarding the benefits of model work. In this matter, people in organisations express everything from overwhelming enthusiasm to serious doubts. However, an alternative way of framing the issue, is that the opinions expressed may well concern a particular view of model work. In the field of information systems, the traditional view is perhaps not far from the earlier example of preferences. The framework shows that this view is only one alternative among many others.

**Changing model use in development work**

The second reason to use the framework is to help promote changes in model work. Although the framework in itself does not prescribe any particular course of action (like a methodology might do), it provides a “playground” that allows for different strategies and combinations. However, from the perspective of improvement, what is currently not covered is perhaps even more interesting than what is. One important use of the framework is to help identify alternatives within each area; it enables a search for “blank spots,” i.e. parts of the framework that are not currently covered. Figure 2-7 shows the “blank spots” in the earlier example of preferences regarding model work.

In relation to the framework as a whole, it becomes obvious that any specific view of model work might easily become too narrow. Instead of trying to find one ‘best’ combination – like the example of preferences mentioned earlier – it could be more advantageous to think in terms of repertoire. The larger parts of the framework one is familiar with, the better the chances of finding an appropriate solution in a specific situation.
When using the framework as a tool for change, alternatives to the current focus can be dealt with in two ways: either the people involved try to cover a larger part of the framework themselves, or they bring in other people who have the desired focus. Changing focus in the three areas can be more or less difficult. Switching from one type of model artefact to another, e.g. from *content representations* to *process manifestations*, is probably much easier than a corresponding change in model assumptions, i.e. from *objective consensus* to *subjective conflict*.

The framework might also be useful when new workgroups are being formed. Being aware of the differences, there is the advantage of together having a broader focus of model work. In co-operative work, the team hopefully covers larger parts of the framework than the people do individually.

**Facilitating understanding and change**

To conclude, this chapter has tried to illustrate some of the complexity associated with the use of models in development work. Whether involving one or several people, the dependencies between development work and the going concern provide a context in which a large number of more or less important differences become apparent. The aim of the proposed framework is to support the activities of understanding and change by an increased awareness of certain differences. As summarised in Figure 2-8, this means recognising and exploring differences among various model artefacts, model activities, and model assumptions.
Making sense of differences encountered, as well as taking advantage of them, is hopefully facilitated by the use of this framework. Whether this is done in order to establish a common frame of reference or to strengthen the position of certain interests, is itself an issue that can be discussed in terms of the framework: do we have a focus on consensus or conflict?
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In this second part of the thesis, I address my purpose of providing descriptions of existing cases. Two main cases are presented. In chapter 3, process owners at Ericsson Radio are in focus, whereas process developers at Sweden Post are the main actors in chapter 4.
Process Ownership in a Rapid Growth Situation

“Process owner” is a new role in many organisations as a result of the increased interest in business processes. This chapter reports on the things that ten process owners at Ericsson Radio expressed as important in their work. Their processes all belonged to the early stages of developing new systems for mobile telecommunications. Nine main issues are identified among the things occupying the process owners’ minds. In summary, “process” is found to be a complicated concept in practice, several problematic relationships have to be dealt with, and issues of IS/IT are not in focus.

Introduction

The concept of business process has been highly influential during the last couple of years. Much of the management literature has focused on the issue, e.g. in terms of Process Management (Steneskog, 1991; Rummler & Brache, 1995), Business Process Reengineering (Davenport, 1993; Hammer & Champy, 1993), Total Quality Management (Bergman & Klevsjö, 1994), etc. Many companies have shown a growing interest in process orientation and its implications for the organisation.

Focusing on business processes introduces a new organisational role: the process owner. A process owner is supposed to “oversee the entire process” (Rummler & Brache, 1995, p. 57), being “responsible for the process’ functioning and development” (Steneskog, 1991, p. 14; the authors’ translation). He or she “is responsible for development and improvement of the process” (Bergman & Klevsjö, 1994, p. 347), has “responsibility for a specific process and the reengineering effort focused on it” (Hammer & Champy, 1993, p. 102) or, put simply, “has ultimate responsibility for a process” (Davenport, 1993, p. 182).

But what occupies the mind of a process owner in a company that has dealt with business processes for a number of years? Building on Tolis & Nellborn (1997), this chapter tries to answer that question by providing the results of a study involving ten process owners at Ericsson Radio in the summer of 1995.

The study

In the early summer of 1995, contact was established with Ericsson Radio. They were interested in collaboration regarding business processes and IT support. The initial idea was to provide support for coordination among the different processes within the business unit responsible for European standards for mobile telecommunications. This was to be done by investigating how different process owners perceived their role and the work they were involved in.

The initial contacts led to a focus on the early stages of product development, called Requirement Definition. All ten process owners in Requirement Definition were chosen for interviewing. Before each interview, the process owner received a short list of three broad areas for discussion during the interview: (1) product development, (2) improvement work, and (3) IT support. The first two areas correspond to the main responsi-
bilities of a process owner’s role as expressed in the literature (see above): for the process itself and for its development. The third area, IT support, is interesting in conjunction with both of the first two as it represents an enabler for large-scale change (cf. the literature on BPR).

Each process owner was interviewed for about two hours by the authors. Notes were taken in parallel and later integrated to an interview document. In order to increase the validity of the result, the document was sent back to the process owner for comments. All the ten interview documents were then used as a base for a “bottom-up” analysis inspired by grounded theory (Glaser & Strauss, 1967). The documents were divided into small chunks of meaning, often on a sentence-level, that were iteratively searched for recurring patterns, and grouped together to form clusters of interest. Labels and descriptions of each cluster were added, refined, and extended as the analysis progressed. The result was presented to people at Ericsson Radio as a feedback of the work and a final check of validity.

The business

Ericsson is one of the leading actors in the international telecommunication market. The business area Radio focuses on radio-mediated communication, such as mobile telephony. Within Ericsson Radio, the focus of the study has been on the business unit working with European standards such as GSM, NMT, and TACS. The responsibilities of this unit include development and worldwide selling of all products and services needed to operate a mobile telecommunication network (the mobile telephones themselves are handled by another business unit). Two examples of systems sold are CME20 (for GSM 900/1800 MHz) and CMS40 (for GSM 1900 MHz USA). The main customers are network operators, who in turn provide their services to end-users.

Within the business unit, the organisation is divided into functional units (such as Product Management), development units, and market operations units. The latter are divided according to geographical markets. Legally, the organisation is spread over a number of different companies. Of the roughly 9000 people working in the business unit in 1995, about 1800 were located in Sweden, and the rest in different local companies around the world. The local companies do not only handle European standards; most of them also form parts of other business units within Ericsson.
In addition to the functional organisation there has been an interest within Ericsson for business processes since the mid 80’s. Process management has been actively pursued in different forms since the beginning of the 90’s. In process terms, the business unit comprises two main flows transforming customer needs to customer satisfaction. One flow is the Customer Supply Flow that deals with existing products and services. The other is the Market Supply Flow that develops new products and services.

As shown in Figure 3-1, Ericsson employs a number of techniques and tools in its development activities (cf. Tolis & Nilsson, 1996). For corporate strategies, Ericsson has developed its own method for strategic planning, called ESP (Ericsson Strategic Planning). Process Management, influenced by Rummler & Brache (1995), is used for developing business processes in many parts of the organisation. In the area of information systems development, MQR (Method for Quality and Results) is used as a toolbox of methods that can be adapted to different situations.

**Ten processes and their owners**

In the following, the ten process owners describe their work. They are all involved in the early stages of the Market Supply Flow within the business unit for European standards at Ericsson Radio. As Figure 3-2 shows, this includes the main process Requirement Definition, its four sub-processes (Business Opportunity Tracing, Business Analysis, Product Definition, and Customer Services Definition), and its five control/support processes.

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* Included as chapter 5 in this thesis.
processes (Product Control and Support, Product Decisions, Market and Requirement Analysis, Suppliers Management, and Product Market Information). The main process has customer needs as input. As output, it has assignments for the provisioning of new products and services.

![Diagram of Requirement Definition process](image)

**Figure 3-2. The Requirement Definition process including its control and support processes.**

**Requirement Definition (RD)**

The process owner of RD is also head of the organisational function Product Management. The work can be considered a “gap-filler”, integrating the market side and the development side of the business. During the development process, wishes from actual and potential customers have to be critically examined and turned into requirements for future products. There are often communication problems between different steps in the chain to the end customer. An enhanced communication is important, especially between product management and the market people, and between them and the network operators. Along the process there are “leaks” where ideas and requirements appear and disappear. These can be minimised by employing a continuous dialogue with the customers.

The GSM-standard has led to a more market-driven development process. Much work is concerned with balancing needs and costs. The expression “return on asses” illustrates the limited personnel resources caused by the rapid growth of Ericsson Radio. The rapid growth also makes it difficult to set priorities and divide responsibilities. The respon-
sibilities within the development side are both technical and commercial and are therefore more complicated than those within the market side.

It is important to ensure that the right decisions are being made, especially in the early parts of the process. One way to do this is to build on a well-structured procedure. Two problems with the approach used for project management is that it risks sequential thinking and requires much documentation work. It is a challenge to get people to work more in parallel, while retaining the ability to keep track of their progress.

The process owner has to define the process and identify sub-processes. The responsibility for the process requires work over organisational borders and might give a new perspective of one’s role as line manager. Despite this, seeing the greater picture and facilitating transfers between processes have proved to be two difficult areas.

Business Opportunity Tracing (BOT)

The process owner of BOT is also the Swedish manager for the German market. In BOT, the goal is to develop a specification of customer needs. This specification is later transformed into a business case in the BA-process. Instead of taking requirements for granted, the aim for BOT is to find the underlying needs. Market competition has led to a need for a more systematic way to analyse customer needs. The overall goal is to cut the lead times within the requirement definition process. An important step towards this is to work with the early parts of the flow, i.e. the BOT process. In BOT, information from various sources is analysed to provide new knowledge. One important source is the Customer Supply Flow, in cases when customer needs could not be satisfied through existing products. Conversely, BOT will deliver information on product ideas to the marketing organisation.

The early parts of the Market Supply Flow are different from the later parts. Especially in BOT, but also in BA, the process is not tied to any specific development project and could be described as “temporally disconnected”. Later on, when a project has started, the flow is more “train-like” and easier to describe in process terms. Among the support and control processes, BOT has the strongest connection to Ericsson Strategic Planning (a part of Product Decisions) providing directions, e.g., in terms of prioritised areas.

As BOT is just about to be established, the role of the process owner is currently more like a project manager. Once the BOT process has been
defined, a small pilot will be run in order to test the new ideas. It is important to quickly apply the ideas in order to validate them. Process measuring methods will also be defined. When the process is established in the line organisation, the need for continuous follow-up and improvement will become important.

Ericsson has a conservative IT policy based on IBM mainframes. The MEMO system for electronic communication has been important for the company’s development. One idea for future IT support is some kind of “structured bill-board” where people working with market analysis and marketing can share input and ideas.

**Business Analysis (BA)**

The process owner of BA is also product manager for GSM within the organisational unit Product Management. In order to emphasise the importance of the earliest part of the Market Supply Flow, it has been divided into the two processes BOT and BA. Although still a temporary solution, the division is driven by the competition and market needs. As a consequence of the large expansion, it is important to make priorities. Although everything is profitable, the challenge is to find the things most profitable. Further on in the Market Supply Flow the process structure become clearer. After BA, a project management approach (PROPS) is employed; although minimising the time required for each part, it does not promote concurrent work.

In the early parts of the product development process, customer needs are being refined into business cases and further on into assignments (if found both technically and economically viable). It is important to get higher quality of the business cases as early as possible in the process. As the lead time for developing a new product is around 18 months, Ericsson would soon be left far behind if they only followed their competitors. One idea is to use different development cycles for different products, e.g. using a “fast lane” for smaller projects.

As a process owner, most important is to continually assess the process and to lead the improvement work. In the case of the BOT and BA processes, the first step was to make descriptions of the current situation and suggest improvements. A critical success factor has been to gather people with appropriate competence. Describing the current situation has been an important way to create commitment among people. It is about communicating a “world-view,” showing how every part fits into the overall
picture. The organisational functions are still strong within Ericsson and can cause problems in the process development work. In addition to the process owner, there is the role of the “process driver” responsible for the day-to-day work in the process. In Ericsson, the latter is the responsibility of the line manager.

Today the flow of information in the BA-process is mainly paper-based, although often complemented by electronic communication. There is a strong need for computer based support in order to minimise the risk of forgetting things. By storing decisions and the information on which they are based, an increased traceability could be achieved. Due to large geographical distances, global systems and global networks are important. Ericsson Strategic Plans, the annual five-year plans, can be viewed as a delimitation for the development work that is being pursued.

**Product Definition (PBR)**

The process owner of Product Definition (PBR, Product Business Realisation), is also product manager for PCS 1900 (GSM-based products for the American market). As process owner he sees two important tasks: to drive the improvement work and to collect, co-ordinate, and test new improvement ideas. The actual improvement work is handled by a “process developer”. Co-operation between Product Definition and Ericsson Strategic Planning is mainly informal. The product managers provide input to the planning work. Although not directly controlling the Product Definition process, the resulting strategic plan becomes a confirmation of the direction that the company is taking.

One general concern is the consequences of an organisation in three dimensions (line, project, and process). The process is often viewed as the architecture within which projects are performed. One way to increase the commitment to processes within the line organisation would be to employ inter-functional groups for improving and running the processes. Such a solution is currently being used within the Customer Supply Flow. It could facilitate the transfer between different steps in the process and promote concurrent work.

Another issue concerns incentives for improvement work. The managers should be “standing on the barricades”, actively showing their interest in process improvement. It is important to facilitate the learning from the process, for example by means of feedback from the project owner to the process owner.
A third issue concerns “Time To Decision”, i.e. lead times for decisions. There is a gap between the time when a decision is needed, e.g. when requirements are changed, to when the decision is actually made. Both how the decisions are made and how they are communicated need to be considered. This is the only area where a need for IT support is currently perceived. A related question concerns the flexibility for handling new or changed requirements late in the process. Dealing with so called “disruptive technology” (radically new alternatives) is harder than dealing with “sustaining technology” (existing alternatives). While operating procedures are enough for the latter, the former may require more unconventional solutions, such as creating new companies or new alliances with suppliers and/or competitors.

**Customer Services Definition (CSD)**

The process owner of CSD is also head of the organisational function Customer Services. They develop and supply services that the customer needs after the hand-over of the equipment, e.g. problem-reporting and modification-handling. Many services have a product number and are listed in the product database. An aim is to develop generic services, especially concerning “core services”, i.e. the basic services that are required for customer acceptance. The amount of services in a customer order varies, but many times it is significant (e.g. 20% in a recent order).

The process owner did not quite recognise his process in the process map made by the organisational function Product Management. Instead he preferred the business unit’s official process map, where customer needs is a direct input also to CSD, without first going through BOT and BA (cf. Figure 3-2). Experiences from another part of Ericsson have shown that it might be difficult to get commitment within the organisation for processes. However, process orientation is a critical success factor for long-term economic survival. Customer-oriented processes are more complicated than product-oriented ones. The role of process management is about continuous improvements rather than organisational changes. It can be a way to identify similarities and synergies within the business.

As it is people that in the end influence and are influenced by changes, issues of “people management” and change management are more important than information systems, IT, and methods. “Healthy dissatisfaction” is often good for change. From this perspective, Ericsson’s largest problem is its success.
Within the 70-80 countries involved in the CSD process, the process may look quite different depending on the local situation. To manage processes by providing goals might therefore be better than to prescribe a certain way of working. An important prerequisite for improvement is comparison, which in turn requires measurements, e.g. of delivery precision. However, measuring processes is not always easy. Work has been made to document current processes in terms of inputs and outputs. Regarding businesses abroad, it is important to create possibilities for cost and revenue control. The next step is to consider how it ought to be, e.g. in terms of interfaces and transfers between processes. Working with processes leads to stronger commitment. A decision is not taken until it is implemented; it is important with consensus, as it really is the subsidiaries’ money and customers that are at stake. Sweden’s role is to control and improve, and also to disseminate best practices among the subsidiaries.

**Product Control and Support (PCS)**

PCS is one of the five processes outside of the main flow of Requirement Definition. The process owner of PCS is also head of Strategic Product Management within the organisational unit for analogue systems (such as the NMT and TACS standards). The unit is responsible for product planning and for providing economic information used for decisions in the development projects.

Although digital systems are requested due to their newness, analogue ones such as NMT are still attractive. Often, issues such as price and coverage are more influential on the decision than the technology itself. It easily happens that employees, network operators, etc., concentrate on the latest products, e.g. GSM. One problem for the analogue side of the organisation is that people working in sales are measured on number of orders rather than profitability. The interest for “cash-cow management” is not prioritised – it is easier to get resources for new (i.e. digital) technology. This is something that may lead to conflict between process and line organisation. It is doubtful whether the best solution is to have strong line managers as process owners.

It is not self-evident how PCS can be viewed as a process. It includes “Economic reporting and feedback” and “Product substitution/termination” – the latter one being the most emphasised part. Questions of lifecycle cost, product substitution, and product termination need higher priority. In cases of product substitution, it can be unclear who is responsi-
ble for compatibility issues. Currently, descriptions of the future process of product substitution and termination are being developed. Earlier work focused on defining central concepts: what is meant by e.g. “product”, “substitution”, and “termination”.

It is important to be able to compare profitability measures for different products at different points in time. While service and support earlier were financed through product sales, they might be required to cover their own costs in some product areas, e.g. base stations for NMT. That sales are decreasing in these areas does not mean that the networks’ use is decreasing in the same rate. The issue of maintenance represents a cost that needs to be covered and even made profit on. Furthermore, it is important to seriously consider customer queries, the “customer answer process”. The queries should be dealt with consistently, questions should be given in the time specified, etc. There is a potential for improvement. Overall, Ericsson Radio is on its way away from a focus on technology development and towards need satisfaction.

There is a risk with a too strong and too narrow focus on processes. If everything is viewed as processes, they loose their meaning. It is through contrasting with something else that the processes gain their appropriate value. For example, experiences from a network operator point to problems with an unmanageable large number of processes, and processes becoming goals in themselves, at the expense of the products.

### Product Decisions (PD)

The process Product Decisions (PD) also includes ESP, Ericsson Strategic Planning, where the annual business plans are developed. The process owner of PD is also responsible for two specific releases of Ericsson’s GSM-system.

There are problems with measurement and comparison of processes that are not repetitive and have unclear delimitations. This applies to several of the business unit’s processes, mainly to the earlier steps of the Market Supply Flow. Much of the work with developing new products is more project oriented in the sense that each project is unique and has its own prerequisites and rules. The projects are always subject to “disturbances” such as competition with other projects for resources, changed requirements from customers, etc. With development cycles of about two years and increased competition on the market, the number of disturbances will hardly decrease.
There is a risk that too detailed control by means of process descriptions hinders creativity, flexibility, and ability to take initiatives. This can be a problem especially in knowledge-intensive companies such as Ericsson. As the concept of process can be applied in various levels of detail in the business, it is an important task to find a suitable level for a given area. There is a greater need for checklists and guidelines than for normative and controlling process descriptions. The approach used for project management has the disadvantage that it builds too much on serial thinking. This might make it harder to achieve parallelism between different parts of the project. In order to reduce project risks and make projects more manageable, large projects with more than 200 participants are avoided. Concerning organisational changes, it is important to be aware of the vacuum that easily appears before a new organisation has come into effect.

The co-operation is more close with the processes BOT, BA, and PD. It is less developed with CSD as this process belongs to another organisational unit and is not yet fully functional. In the product development process, an increased communication between marketing and product management would enable better utilisation of their respective competencies. As a result of increased degree of market control and competition, lead times and the use of resources has to be reduced. Clearer and smoother transitions between different stages are also needed, as are earlier contacts with market and suppliers. The role of strategic planning needs to be strengthened; follow-up of business cases and feedback from later stages need clearer routines.

Concerning IT support, the possibilities for communication are central. Email, networks, and CD-ROM are some examples. For the economic reporting, one has to be able to get information from other systems. It is important to get a good relationship between the IT systems and their “customers” (the users); it might be difficult to decide what one wants. Two ongoing projects deal with catalogues of products and features (functions). The primary users are marketing, but the projects include participants from different organisational units.

**Market and Requirements Analysis (MRA)**

The process owner of MRA is also product manager for digital systems. The MRA is not really a homogeneous process but rather a collection of six different activities, e.g. “End user analysis” and “Operator analysis”,
without closer connections. The work as a process owner accounts to approximately 10% of the work time, i.e. 4-5 hours per week.

Important goals considering work with process-maps are to sort out what to do and why. The latter becomes a consequence of an increased consciousness of the wholeness that one is part of. Process-maps provide a common world-view. They are especially important when it comes to newly hired employees and training for new positions. Process work can also be a foundation for growth, being a tool for increased effectiveness and efficiency in what is being done. People’s knowledge of the more theoretical base for process-maps is minimal.

There is a perceived need for change of the decision process within product development. Not only do the decisions take too long time, it is unsure whether it is the right decisions that are being made. These factors have influenced the coming re-organisation. As a result of all changes in the environment, it is almost a necessity with a re-organisation about every third year. The coming re-organisation will not affect the process descriptions.

In general, it is managers in the line organisation that have got the role of process owner. It is important that there exists diversity in perspectives among the different process owners; several pictures are needed. As a process owner of MRA, much work concerns co-ordinating and managing the process work within the different sub-processes. It is up to each sub-process owner to develop the necessary material, such as process descriptions. Most important is to be able to describe what is being done in process terms – so that people in the main process “recognises themselves”. It is the main process that decides if the developed descriptions are sufficient – in a narrow sense the descriptions in themselves, in a wider sense the actual work being done in the sub-process.

As a result of the expansion of the business, and the experience of participating at an exciting time, employees within Ericsson Radio often work hard. It is important that employees combine daily work with more long-term improvement work. These two activities should not be handled independently by different people. New hirings is an area with perceived needs for improvement. There is a large turnover in personnel – annually 25-30% – as a result of the company’s growth, required competencies, and internal mobility. The major part of the turnover results from employees moving from one part of the company to another for longer or shorter periods of time.
There is a potential for IT support in all support processes, although it is currently not being used to any larger extent. Gaps in communication might not only exist between business people and IT support people but also between business people and production people.

**Suppliers Management (SM)**

The process owner of SM is also head of Intelligent Network services within the organisational unit Product Management, dealing with solutions that are customer specific rather than generic and mainstream. The SM process has the purpose of creating added value for Ericsson products by combining them with products from other suppliers. Currently, the work is focused on ways to certify external products for use together with Ericsson products. The integrated operation of the products is checked and a division of responsibilities is negotiated. In order to clarify the relationships with suppliers, an approach to process management was chosen as a tool for discussion of problems and solutions. So far, checklists, test-cases, and pilot-cases has been used to gather and disseminate experiences. The knowledge level about the large degree of complexity that characterises acquisition of complete subsystems is low.

In the middle of 1994, the organised improvement work stopped as a result of too high workload; the operative work took all the time. The ambition now is to scale down central process descriptions and to avoid too detailed control of the processes. The approaches used for process and project management are chiefly focusing on the main development process. Using these approaches also for support processes is not always a simple thing to do. The responsibility of a process owner concerns the commitment for the process in the organisation. Currently, the most important issue is to document the processes. A difficult issue is to know how this should be done. How is e.g. feedback represented in process maps; does it exist or are the processes strictly sequential in time? Another difficult issue is that the process descriptions show a mixed “is” and “should” state.

Within the business as a whole, there are a large number of IT systems in operation; however, they do not seem to be co-ordinated with each other. There seems to be a potential for improvement in this area. It is a challenge to get this heritage of support systems to follow the changes in both organisation and processes. There is no point denying that the support systems are controlling the business to a degree. As the SM-process is so
A new, not much thinking has been done concerning information support. However, there is a need to better be able to follow the development process, e.g. in terms of product decisions, economic information, and requirements specifications.

**Product Market Information (PMI)**

The process owner of PMI is also head of Product Market Support within the organisational unit Product Management. The PMI process is a support process for enhancing communication between the Market Supply Flow and the Customer Supply Flow. PMI provides the market with information about products. Its deals mainly with information and sales support, such as maps, CD-ROMs, information leaflets, and courses for people in sales and marketing.

Two parts of the process owner role are to create continuity in the process work, and to drive the improvement work. The tasks require good descriptions and measurements of the process. In PMI, a consultant from another part of Ericsson is developing process maps of the current process. Too detailed descriptions of processes are to be avoided. There is a risk that they become conserving and leave less room for necessary improvisation and flexibility. Concerning measurements, they are being made mainly by means of surveys that are sent out two times per year to sales and marketing.

While PMI mainly interacts with the early parts of the Market Supply Flow, and sales and marketing in the Customer Supply Flow, it has very little to do with the other support processes. One large difficulty for PMI is to find information about the rationale behind a product or a component. While the descriptions available often contain technical information about *what* the product does, they seldom contain information about *why* it does it, i.e. what need it satisfies.

An important tool for PMI is the “feature database”. Currently, a complement to this in the form of a product database is being developed. It is going to contain descriptions of products (collections of features) useful for sales and marketing. As this system might be useful also outside of the business unit, there is a reference group for its development with participants from other parts of Ericsson as well. A special kind of information concerns products that are being developed; this information is much asked for by the customers.
On the mind of a process owner

Having gone through the descriptions from all ten process owners, it is now time to look for some common patterns. As a result of a bottom-up analysis, nine main issues have been identified. These main issues can be considered as areas of interest and their ordering does not reflect any special order of priority. Each main issue comprises several sub-issues that have been highlighted in the presentation. Key questions, induced from the material, are used as quick introductions.

**General changes**

Key question: How can we deal with the possibilities and problems of rapid expansion in an environment of increased competition and faster changes?

Concerning the environment, the use of standards leads to an increased competition and faster changes. Changes are more and more driven by the market, the network operators and the end-users. Satisfying the needs of the customers is becoming ever more important. A challenge is to offer what the customers actually need – which is not always the same as what they first think or say that they need.

Within the company, the large expansion can be both facilitating and hindering for further improvement. Success and good profitability can lead to increased room for action, but also to a decreased motivation for change. As a result of limited resources, especially concerning employees, the expansion forces continuous decisions. To keep reaction times and decision paths short, smaller, autonomous units with clear responsibilities are needed. Well-defined processes are less sensitive to external changes – something to keep in mind as internal change often is a cause of distress. It is felt to be more interesting to work on new products even when the older ones are at least as profitable.

**Process goals**

Key question: How can we shorten lead times, accommodate changes in a flexible way, and make the right decisions in the process?

The issue of decision quality is important; the consequences of the earlier decisions are large, especially when considering the fast changes in the
market. A main concern is to ensure the quality of the information used for decisions, e.g. business cases, during the whole process. It is important to attend to the real problems of the customers – something that put large demands on the ability to look ahead and to articulate the core problems.

Many things can happen along the process. Disruptions, in the form of changes in requirements, tools, standards, etc., have to be managed in some way. Rather than isolating the process from its environment, it is an advantage for it to have enough flexibility not to be affected negatively. At the same time, there is an aim to keep the process and its products as generic as possible.

To be able to succeed also in the future, a faster process is needed – both in terms of the work being done, the decisions being made, and the information being spread. Every lead-time has to shorten in order to increase the speed; doing more things in parallel is another possible way.

**Process orientation**

Key question: How can processes be of help and what are the difficulties, for example in relation to other dimensions of the business?

An important consequence of process thinking is to aid the identification of synergies within the organisation. It encourages discovery of wholeness and reflection of your work in a larger context. It can also form the foundation for change work. Although important in the long run, process thinking can be difficult to implement.

A higher degree of structure is felt to be of need in the process. However, there are also reasons to avoid too detailed control, because of large local variations and the employees’ personal creativity. When it comes to control and support processes, it is uncertain to what extent they can be considered processes at all.

The business is discussed in multiple dimensions: processes, the line organisation, projects and products. Relationships between the dimensions are not clear, in particular not concerning responsibility and authority. These uncertainties can lead to confusion, unbalances and inconsistent priorities. The relationship between processes and the line organisation is central, especially since the processes are run within the line organisation.
Process improvement

Key question: How do we get time and resources for improving and measuring when we hardly have time for the daily work?

Concerning the way-of-working to improve processes, it is important to be attentive on how new ideas are created. Questions regarding incentives, initiative and reuse of knowledge are important. The improvement work itself is done differently depending on whether it concerns businesses within or outside Sweden.

Measuring the processes is central for improvement. However, this is not always easily done, mainly because of significant variations between different processes and also because of partly undefined boundaries for the processes.

Limited resources means that there is a need to constantly balance between the daily work and the improvement work.

Process descriptions

Key question: How do we create and use descriptions to get overall views and facilitate change, while avoiding to make the descriptions too controlling?

Process descriptions can be a practical way to obtain an overall view of the business. A common picture where different groups all recognise themselves and their part of the whole is an important goal. However, due to different perspectives, this goal is not always easy to reach.

Tools for change is another function of process descriptions. They can give rise to ideas for change – both within your own process and others’.

Finished process descriptions can be felt to be controlling and delimiting, especially for someone who has not been involved in the creation. Steps to rectify this are to involve all people that are affected, and to make the descriptions on an appropriate level of detail.

The actual creation of process descriptions is not always easy. Central questions are both what should be described and how the description should be done. Describing a current situation can be as problematic as it is important. Apart from process descriptions, there might also be need of complementary descriptions, such as maps of concepts used and goals pursued.
The role of the process owner

Key question: How do we get an overview of the whole process, improve it, and integrate it with the line organisation?

The process owner works with a broader perspective of the whole. By documenting what the different sub-processes’ bring into the picture, as well as their interactions, an overall view is created.

As a process owner, one is responsible of improvement and follow-up of one’s process. To keep track of the process, and to pick up ideas for change, become important parts of the work.

The process owner aims for integration between processes and the functional line organisation. By having process owners that also are functional managers, a larger degree of integration is possible – for better or for worse. Only a small portion of these persons’ total workload relates to their role as process owners.

Personal competence

Key question: How can the knowledge and commitment of existing employees best come to use while supporting newly employed when they get into their new jobs?

Existing employees have a key role within the business although that role is not always easy. The rapid expansion of the business has both positive and negative consequences for the employees. An important success factor for process management is the knowledge and commitment that the employees have for process management.

The competence of newly employed is especially relevant because of the rapid expansion of the business. There is a high throughput of employees as they often change positions and responsibilities within the company. This makes it important to find ways to support people getting into their new jobs.

Communication

Key question: How can communication be improved within the organisation, between processes, and with customers and suppliers?

In terms of processes, the communication within the main flow is generally regarded as clear and straightforward. However, some of the connec-
tions are still unclear. The communication between the main flow and the control and support processes is significantly more complex and not always defined in terms of input and output.

_in terms of the organisation_, communication and co-operation between different business units concerns mainly products, e.g. telephone switches, and not so much processes or process improvement. Within the business unit, much of the communication in terms of the organisation concerns planning and management, but also the diffusion of ideas and experiences. The communication is not without problems and more extensive contacts are sought after.

_outside the company_, communication and co-operation with customers is important. This is the case both in connection with the initial identification of customer needs and in connection with final delivery. The communication and co-operation with suppliers is increasing.

_information support_

Key question: What can IS/IT do for our business to facilitate information diffusion, communication and co-operation?

Information support of _today_ consists of a variety of systems – some inter-linked, others not. Some systems are global while others are local. Communication and information diffusion through networks and CD-ROM is important.

Coming up with ideas and requirements for _new systems_ can be problematic. On a general level there is a need for support systems that are flexible and easy to modify. A main part of the needs concern various ways to communicate and to support co-operation within the business unit.

_conclusions_

As has been shown in this study, there are a number of things occupying the mind of a process owner (cf. Figure 3-3). In the case of Ericsson Radio, many of the issues are influenced by the context of product development, a successful expansion, and a rapidly changing environment.
Going back to the initial broad areas that were identified for the interviews – the process itself (product development), its development (improvement work), and an enabler for change (IT support) – the results can be summarised in three main points:

(1) The process owners show a strong interest for process orientation and its effects. However, “process” is a complicated concept in practice – even for a company that has been involved with process work for a decade.

(2) The process owners show a strong interest for broad perspectives and co-operation. However, there are a number of complicated relationships where different interests cause problems – not only between processes and organisational functions.

(3) The process owners show a strong interest for communication and information diffusion. However, questions of IS and IT support are not in focus.
Chapter 4

Swedish Post’s Exploration of Processes and Descriptions

Changing a functionally organised, 360 year old, public monopoly into a flexible commercial communications provider on a competitive market – this is Swedish Post’s challenge. One way to meet the challenge has been for Swedish Post to explore the topics of process orientation and business descriptions. The work was started in the spring of 1996, in a project called VEPRO. This chapter focuses on the different issues that were discussed in three of the sub-projects within VEPRO. As a conclusion, five important dilemmas that surfaced during the project are presented: degree of process orientation, process “flow”, multiple descriptions, amount of analysis, and order of development.

Introduction

In 1993, the market for mail delivery within Sweden was opened up for competition. It was the last step in a process of transforming a monopoly into a competitive market. The change was a formidable challenge for Sweden Post. A 360 year old tradition of public monopoly was broken as the government changed the fundamental business rule. For Sweden Post, which had been anticipating this change for a number of years, the loss of the monopoly meant a definite step towards a market situation with increasing competition.

Besides the transformation from public monopoly to competitive market, the situation for Sweden Post is going through another equally dramatic change. The rapidly increasing use of fax, e-mail and World Wide Web has a significant effect on communication habits for both companies and the general public. As a result, the traditional means to communicate in writing – by sending letters – now faces a number of serious alternatives.

A number of ideas and tools for successfully adopting to the changing environment have been explored by Sweden Post over the years. Process orientation and business descriptions are two recent examples. Based on Tolis & Nellborn (1998), this chapter reports on the way Sweden Post, during the spring of 1996, specifically addresses these issues as a way to support the company’s transition into a customer-oriented competitive-market situation.

Sweden Post’s business concept and organisation

To match the new requirements, Sweden Post has formulated its business concept in the following way:

“Through Sweden Post, everyone shall be able to reach everyone with messages, goods and payments. Sweden Post also creates added value for its customers by creatively joining together their own resources with other’s in communication processes and financial services. Sweden Post utilises all available media to ensure that messages, goods and payments reach their recipients wherever they are, and whatever means of reception are available. Every person, company, and organisation in Sweden is a customer to Sweden Post. This includes companies located abroad but with connections to Sweden” (Sweden Post, 1995 b, p. 8; the authors’ translation).
Sweden Post has a very good starting point for its change process. For example, in an evaluation made by International Post Corporation and Price Waterhouse (IPC, 1997), Sweden Post came out among the top six of 18 European postal services when measuring inter-country mail delivery times. In spite of the good performance relative to other postal services in Europe, the challenge of becoming an actor on a competitive and rapidly changing market has triggered several changes within Sweden Post. Although the concept of being customer-oriented is nothing new to the organisation, it now also has to become competitive.

Sweden Post is organised in different business areas as shown in Figure 4-1. Supporting the organisation are a number of group executive staffs. One of them is known as Informatics and deals with a multitude of questions concerning information, information systems and the use of information technology within Sweden Post. This area is fast moving forward. Informatics has to stay abreast of the development of concepts, methodologies, and techniques within research and practice and therefore has to be very active. Within Informatics, they have to evaluate, communicate, and adopt new concepts and techniques to the situation in Sweden Post.

One example is Informatics’ heavy involvement in the development of a business development framework, MIPS (Models for Informatics-handling in Sweden Post). MIPS comprises models for systems development, project management, systems maintenance, and data administration. The aim is to cover the complete business systems cycle from strategic business planning to information systems maintenance. For example, in the handbook in data administration one can find recommenda-
tions, hints and guidelines for how to go about defining important terms and concepts.

The VEPRO project

In the beginning of 1996, group staff Informatics launched an investigation project concerning effective information support for the Sweden Post business in the future. The starting point was the assumption that Sweden Post might introduce process orientation some time in the future as a means of managing the organisation. In order to secure the information support for the actors in the processes, there was an important need for useful descriptions of the business. The project was launched to investigate what process orientation and business descriptions (business models) could mean for the organisation. The project was called by its Swedish acronym, VEPRO.

The project might be viewed as a way for Sweden Post to bridge a gap between two dominant models used for development (cf. Tolis & Nilsson, 1996*). As shown in Figure 4-2, one is Sweden Post Business Plan, the model for strategic planning that the company uses. The other one is MIPS, a set of models used for controlling the development and management of information systems. Before VEPRO, there was a gap between these two levels, a gap that process orientation and business descriptions could help to bridge by connecting strategic goals to information needs in the business processes.

Figure 4-2. Three levels of development with associated development models used in Sweden Post (adapted from Tolis & Nilsson, 1996*).

* Included as chapter 5 in this thesis.
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The assignment went to Sweden Post System Service, a company within the Postbolagen Group of Sweden Post (cf. Figure 4-1 above). The project was divided into sub-projects, each addressing different aspects of the issue. They were executed in parallel and went on for their most intensive parts during the two months of February and March, 1996.

The project manager from Sweden Post System Service ensured that people from all over the organisation participated in the project. In total, around 20 people were directly involved in the project, including several external resources. The authors participated in the project as external resources, providing an external view of the work. Their role was to take an active part in the work done, as well as to observe, reflect, and provide feedback. The sub-projects dealt with:

- **Ongoing process-oriented projects.** Investigating what was being done in other change projects within Sweden Post.
- **Organisational prerequisites.** Addressing what was needed of the organisation for successful implementation of process orientation.
- **Concepts and definitions.** Establishing a conceptual foundation for the new ideas of process orientation and business descriptions.

In the following, each of these sub-projects will be described in more detail. A fourth sub-project, *IS/IT prerequisites*, dealt with the potential use of an object oriented systems architecture as a mean to support process orientation. Although a very important issue in many aspects, it is not within the main focus of this chapter and is therefore not discussed further in the following.

**Ongoing process-oriented projects**

As a sub-project within VEPRO, a number of ongoing projects within Sweden Post were examined. They all shared a focus on process orientation in one way or another. Seven projects were chosen among the ones known by the project leaders. Representatives for each project were interviewed in order to gain knowledge of various aspects of the work going on. The aspects, thirteen of them in total, ranged from the concrete purpose of the project to difficulties experienced. As most of the projects were newly started, the focus of the interviews was on their earlier phases. As the projects were quite different in their character, e.g. in terms of purpose and scope, they contributed to give a widespread picture...
of the process-oriented work that was going on in Sweden Post. Below follow summaries of the seven ongoing projects that were examined.

**New sales organisation**

The first project was about designing a new sales organisation, where sales people from different business areas co-operate in so called “customer-teams”. The purpose was to create one single interface between the customer and Sweden Post in order to keep – and increase revenues from – customers that are common to several business areas. There were many participants in the project from all of the business areas – sales managers, business area managers, sales people, etc. External consultants also played a major role. At the time of the interviews, some pilot cases had been carried out. No special analysis had been done considering information support for the process. In the future, however, the customer system would be of importance.

The choice to adopt process orientation was influenced by consultants; it was believed to facilitate an overall view of the business and its context. A process definition existed but was not considered too important. To help making descriptions, the tool ProcessWise (from ICL) was used in connection with Excel. Team-leaders were owners of the main process, while people from the different business areas were owners of the sub processes. At the time of the interviews, no evaluation criteria for the process had been considered.

The project had created insight into, and understanding of, the business among the participants. It had been noticed that process orientation not always is obvious; it can take some time and work to get used to.

**New process-oriented business**

Implementing a new service, including its underlying organisation, was the topic of the second project. Flexibility, customer orientation, world-class performance, and management of complexity and geographical diversity, were all desired goals that required a suitable structure to guarantee quality of project and the service. At the time of the interviews, a relatively small group of people had been involved. Knowledge of process descriptions and quality had mostly been taken from consultants. No implementation had yet been done. Information support was chosen early on, which had resulted in some problems in the match with the needs.
Process orientation was chosen as it was considered a good way to reach the desired goals of the project. A process definition existed, although it needed to be developed further. Qualicycle (from QualiWare and Met-con) with Business Viewer was used as a tool for making process descriptions. Process owners had been appointed, both for development and operations. Although not developed in detail at the time of the interviews, economical and quality measures would be used in future benchmarking procedures.

An important lesson at the time of the interviews was to focus more on process orientation than on the tool being used. Process orientation was believed to be a good way to create shared images of the business. A risk was that the “receiving” organisation did not understand process orientation and management. This work had been found to take time.

**General description of the sales process**

The third project had a purpose of developing a general description of the sales process. The work was part of evaluating the benefits of a company-wide customer system. A relatively small group of people – all coming from within Sweden Post – had been involved in the project so far. However, the time had came for communication with the business area. As the first description was almost finished, their comments might lead to it being revised. Information support was considered in the form of the existing customer system: how can it best be used in the sales process?

Process orientation was believed to give a good possibility of co-operation across borders, between both different business areas and different technical platforms. It provided a good foundation for further development and re-use – and perhaps also for a future common methodology. A process definition was not used in the project. Qualicycle with the QA model was used as a tool for making process descriptions. A “sales council” was responsible towards the business area for the resulting general description. No criteria for evaluating the process had yet been discussed.

At the time of the interviews, it was too early to speak of real experiences. However, the way of describing seemed to be effective; at least the possibility of re-use was better than with a more traditional methodology.
### Existing process-oriented way-of-working

Evaluating and developing an existing process-oriented way-of-working within a business area was the goal of the fourth project. Concrete purposes were to focus customer benefits, reduce costs, and increase employee’s knowledge and sense of participation. The vision of a future way-of-working, having a strong customer orientation, was a reaction to the perception of being stuck in organisational functions and sub-optimisation of the business. A small group of people worked in the project, having commitment from management. The competence was a result from earlier internal projects and from different external consultants. The project further developed earlier work regarding processes; describing the processes was an activity that was going on. Although the existing production systems had not been considered in the project, there had been loose discussions of possible needs for new types of IT support as a result of new ways-of-working.

It was considered that process orientation would be a good means to achieve the project’s purposes. The process definition used had been established on a management level. Tools used for process descriptions were the simplest possible; content was more important than form. No process owners had been appointed, but instead people responsible for the descriptions. Despite being considered, no evaluation criteria for the processes had been decided upon.

Lessons from the project were that it had been difficult, fun, and that it had led to a large degree of participation. Descriptions of the business and analysis of the information needs might have been more important than the process concept itself. Also important was to anchor ideas among the management. Difficulties had been that the project was long and had met with a bit of resistance.

### EDI system and consultant service

Electronic data interchange (EDI) was the area of the fifth project. The purpose was to develop a technical solution, an operations model, and a consultant service within the area. This was a way to reach the underlying goal of creating new businesses according to the mission of Sweden Post. Eight to nine people with different background participated in the project. Among them were technicians and people with specialist competence of EDI, data administration, computer operations and accounting. People from Ericsson had a function as sparring-partners. The inter-
nal competence of processes was quite varied. A general training pro-
gramme, the Sweden Post IT School, had provided some knowledge;
there was a desire to learn more. The plan was to have the operations
model ready in six months time. A process mapping of their own busi-
ness, in order to learn more, was planned. In terms of information sup-
port, the EDI technology was, of course, the base of the new service.

A major reason for process orientation was that EDI and processes natu-
rally support each other. There were many possibilities internally and
externally; the environment was turbulent and the reach of new commu-
nication media affected the competition. No particular process definition
was being used in the project. Neither tools for descriptions, nor process
owners or evaluation criteria, had yet come up in the project.

Experiences at the time of the interviews showed that the businesses of
different companies had strong similarities. Standardisation was often
performed both top-down and bottom-up in the organisation. A potential
problem was that it took time to create consensus, time that perhaps did
not exist.

Handling of complaints

Developing new forms for the handling of complaints was the issue of
the sixth project. At the time of the interviews, the handling did not suffi-
ciently take into account the content of the complaints in order to
improve the business. The purpose of the project was to rectify the prob-
lems and create solutions that were independent of changes in services
and organisation. A smaller group within Sweden Post had been the
driving force in the project. The task had to a large extent been to try to
anchor the ideas in the business area. Creating a consensus about the
implementation was tried in meetings with the business area. For infor-
mation support, a top-level analysis and a model of the systems solution
had been made. There was co-operation with the customer system pro-
ject.

It was felt natural to view handling of complaints as an information pro-
cess. Process orientation ought to result in greater customer orientation
and lower costs for quality deficiencies. Apart from viewing the business
as an information process, no definition had been made of the process
concept. Simple drawing tools had been used in the process. No formal
decision of process owners had been made; individual business areas
would be responsible for their process. Evaluation criteria had been partly determined but discussions were still in progress.

Lessons from the project were to start with the customer through cooperation, encourage through business plans, follow-up through budgets, make relationships clear through descriptions, and stimulate creativity through networks. Stubbornness was required from a few and engagement from everybody. It was important to anchor the project ideas on a high level in the organisation. It could be difficult to break the borders of the functional organisation.

**Tool for process descriptions**

The seventh project dealt with evaluating a tool for process descriptions. The concrete purpose of the project was to produce an evaluation report, and a specific business within Sweden Post had been chosen as a test case. This was all done in response to the need for a process description tool. A smaller group was working in the project; the competence had got its base from the Sweden Post IT School. At the time of the interviews, the process report was completed. An information support model existed, with examples of functions and screen layouts. The integration between different systems was important.

The idea to keep track of flows in the business had made process orientation a natural perspective. No process definition existed. The tool being used was Qualicycle with the QA model. No formal decision had been made regarding process owners, but natural choices existed. No evaluation criteria for processes had been formulated.

A lesson from the project was that although there were wishes for standards regarding business descriptions, accurate descriptions easily lead to complex and hard-to-read maps. Another potential difficulty was that new organisational forms lead to new roles that could take time to be accepted. Interest for the project had had both its ups and downs.

**Summarising the issues regarding ongoing projects**

- There are differences in the **degree of process orientation** that the projects aim for. Some projects regard it as a matter of viewing workflows and activities as processes. Others couple it to a changed way or working. Still others equal it to a whole new organisation.
There is an aim to increase the process "flow", supporting a strong customer focus. This effort can be more internally oriented, focusing on processes internal to Sweden Post, and more externally oriented, focusing on Sweden Post’s role as a part of their customers’ processes. However, the integration work takes time and is in many cases quite difficult – for example when crossing organisational borders.

The projects engage into different amount of analysis. The interest of going into details varies, e.g. regarding the interpretation of “process”. Their interest is more pragmatic; the content of the descriptions is more important than the form, paper and pen more important than computerised tools. Still, a common standard and tool are believed to be helpful, e.g. by providing a higher degree of unity between descriptions produced in different parts of the organisation.

The projects exhibits different order of development. They begin and end with focus on different types of development activities. Some begin with the process, leaving issues of information support to a later stage; others do the reverse.

Organisational prerequisites

Within the sub-project dealing with organisational prerequisites for process orientation, four people from different parts of Sweden Post participated together with a researcher. The participants came both from different group staffs and from the more operational side of the organisation. They all shared an interest in issues of organisational development. Within the sub-project, the work was mostly done in a distributed manner, matched with a couple of physical meetings. Communication within the group was facilitated by the use of an electronic conference system (First Class).

A number of issues and questions were raised in the sub-project. In the following, we have concentrated on those issues that the group focused on and that resulted in the most intensive discussions.

**Goals and changes influencing development**

There are several things that influence the work of developing the business of Sweden Post. The group discussed basic goals for the organisation, as well as potential changes in its environment. Both goals and
changes were perceived to be relevant as prerequisites for process orientation, although some were seen as having a more direct link to process orientation than others. When it came to basic goals influencing any development activity, the group identified a number of them, based on directives from Sweden Post’s management:

- *Everyone shall be able to reach everyone*. Sweden Post shall be a company offering a variety of message-mediating services to all Swedish citizens and organisations. This goal provides a way to focus the market activities.

- *Creating meetings*. Sweden Post shall be an effective link between people, between organisations, and between people and organisations. This goal opens up for new ways of interaction with customers in the form of new products and services.

- *Customer orientation*. This means having a perspective on services and solutions based on customers and customer segments. The business shall be designed from a customer perspective rather than from a product or service perspective.

- *“One Sweden Post”*. Details of the organisational structure shall be transparent to the customer. Although there are different organisational units, customers shall still perceive that they are dealing with one company. This can for example mean that a customer has only one contact point with Sweden Post, irrespectively of the issues at hand.

- *Integrating Sweden Post’s resources with other resources in communication processes and financial services*. This means integrating the value chain of Sweden Post with suppliers, customers and other companies (partners) in a creative way.

- *Having the most satisfied customers in the markets of operation*. This means selecting markets and performing in such a way that Sweden Post is able to provide its customers with high-quality goods and services.

- *Having a good local foundation*. This enables the use of small-scale advantages such as direct customer contact and knowledge of local prerequisites.

- *Establishing the workplace of the 21st century*. This means a focus on competence development, participation, responsibility, and objectives.
Recognising the “soul” of Sweden Post. Shared values and management by values are important principles to base actions and decisions on. This gives a more homogeneous behaviour among co-workers, and towards customers and other external parties.

When it came to potential changes in the world around Sweden Post, the group discussed what ought to influence a development activity. To begin with, the customer base may change faster in the future than it previously has. With that will follow demands on fast and flexible acting from Sweden Post. Furthermore, a more competitive situation is expected in the future. There will certainly be more actors willing to compete for the customers. Another change is represented by the technological development for communicative services. This will change the markets significantly. The question is what effect this will have on customer needs, and Sweden Post’s ability to satisfy those needs. Also, changes in the society as a whole are important to consider, e.g. in terms of changing value systems and the development of global societies. Finally, changes in the economical situation – for customers, for the country, and of course for Sweden Post itself – need to be considered when developing the company.

Process interaction in the value chain

An important realisation, related to the discussion about potential changes in the environment, was the inter-relatedness of different activities – in and around Sweden Post. In order to create value for the customer, different activities need to interact. From a viewpoint of process orientation, this means that different parts of the value-adding process must work together, whether they are parts of one or several companies. In the context of Sweden Post’s value chain, the possible conflict between process orientation and decentralisation was discussed. For Sweden Post, decentralisation of decision making was seen as essential for the ability to adapt quickly to changes. Decentralisation was also seen as a way to fight bureaucracy. At the same time, there was a belief in the integrated workings of “One Sweden Post”. The question raised was the relationship between the ideas of decentralisation and process orientation. Are they compatible? Will process orientation lead to more bureaucracy, or less?

Important in the context of value-chain interaction, was the development of virtual organisations and networks of co-operating organisations. What effects will that development have for Sweden Post’s role on the
market and the way the company works together with its customers? The traditional boundaries of the organisation, and the way other organisations interact with Sweden Post, might very well have to change. The interface towards customers could change, and also vary more between different customers. Some customers might appreciate if Sweden Post took more responsibility for payments and mailing logistics within their organisation. Other customers might want solutions where Sweden Post co-operates with other companies – perhaps even with competitors of Sweden Post.

The increasingly competitive situation, and the ongoing technological development, were other reasons for considering the issue of managing the value chain. The range of products and services that Sweden Post is providing might have to change due to new alternatives becoming available to the customers. Being able to quickly respond to changes in customer habits and needs, e.g. concerning their use of fax, e-mail, and electronic payment, was considered a reason to explore new possibilities of interacting with the environment. Forming alliances and networks with other companies are only some of the alternatives available.

Decentralising an organisation and co-ordinating a network of co-operating organisations (whether within Sweden Post or outside of it), could be assumed to make it difficult for any process to work effectively. Organisational boundaries tend to be boundaries also for the sense of responsibility. However, the discussion was that there are more than one way to structure an organisation. It is not necessarily so that the organisational boundaries have to go between the traditional business functions. They can for instance go along processes instead of along functional borders. Through clever definition of responsibilities, authorities, roles and their organisational relationships, it can be possible to make the processes work over organisational boundaries.

**Degree of radicality in process orientation**

Given an interest in process orientation, one question was how much to aim for, and how fast. Increasing Sweden Post’s focus on business processes, and improving the effectiveness of those business processes, would involve a number of changes to the current way of thinking and working. Different “schools” of process orientation emphasise different degree of radicality in the changes proposed. Business Process Reengineering (BPR), especially as conceived by Hammer & Champy (1993), has traditionally been advocates of radical changes. Total Quality Man-
Management (TQM), on the other hand, is often used as a collective name for a focus on smaller changes that take place over a long time with stepwise improvements.

While much of the critique against TQM has been that there very seldom are any major improvements achieved this way, the group also discussed the risks associated with more radical changes. Radical changes might have serious effects on the organisation’s behaviour. Its performance might drop dramatically over a period. A radical change comprising vast areas of the organisation under a short period of time may lead to a situation where the organisation is unable to go through all the way with the change, and ends up with a bit of the new and a bit of the old. Another risk lies in loosing the strengths of the current way of working. Organisational knowledge is a lot easier to destroy than to build up.

In the case of Sweden Post, the group identified some specific characteristics that ought to affect the intended degree of radicality. With the size of the organisation comes muscles and a well-recognised name. However, the government does not want Sweden Post to “kill the market” by competing too harshly. Furthermore, Sweden Post continues to have certain obligations to society in terms of not being allowed to abandon certain geographic areas, such as sparsely-populated rural areas. Should a radical change result in a dramatic performance drop, this will not only be a problem for Sweden Post, e.g. by providing competitors with new opportunities. Due to the company’s market dominance, it could also be a problem on a larger scale, having serious effects on society as a whole.

On the other hand, Sweden Post has to stay ahead of competition. Current problems, and the expected market position if changes are not made, have to be considered. Although the long-term perspective was hard to predict, the group regarded it as realistic to assume that the market situation would be hard to defend if changes were not made to the organisation’s operation. Being big is not always an advantage in a competitive situation. After a deregulation, the former monopoly often has a difficult position with an inherited reputation of being slow and inefficient, whilst new competitors are viewed as efficient and alert. For Sweden Post this meant that it had to come across to the general public as modern and effective, in order to avoid the monopolistic legacy. If no real changes were made, it was the understanding of the group that the company would have problems due to this legacy.
Instead of hoping to find any conclusive argument for a specific degree of radicality in the case of Sweden Post, the group ended up re-examining the alternatives. It was interesting to note the re-thinking exhibited by Hammer and Champy in the paperback edition of their book (ibid.). In an additional chapter they comment on why many BPR projects have failed. Instead of the earlier focus on quick radical changes as the key to success, they focus on the significance of clear and established processes. The key role that radicality used to play is no longer stressed to the same extent. Another approach to the degree of radicality is to aim for a combination of both small steps and more radical leaps. This makes use of the benefits of the small steps in-between the more radical ones, and does not require investing the whole company future into one major change.

**Success factors within Sweden Post for process orientation**

In the group’s ongoing discussion of Sweden Post and process orientation, questions such as what will happen in the future, and what ought to happen, led to a number of opinions being expressed. For example, the meaning of the term “process orientation” was considered a bit unclear. There was a need to improve the knowledge within the area – process thinking was believed to be quite shallow in the organisation. Although not everyone would believe that process orientation was the right way to succeed, it was important to get everybody in Sweden Post to understand what it meant. Also the meaning of “customer” had to be sorted out. For example, in one of the large common information systems used, “customer” was the same as “company”. However, it is worth remembering that “customer” is not only the one paying; the sender and the receiver are often not the same.

After all, perhaps “customer orientation” would be a better term to use in order to focus on the right problem? In the future, Sweden Post has to focus more on customer needs and offer customer-oriented solutions, working together with other organisations if necessary. Overall, a better understanding of how the organisation works and how it interacts with the environment was seen as needed. Everyone must understand the business foundation of a shared vision, the expected organisational benefits and the personal implications. This is a problem of culture, of management, and – in large organisations – also of volume. There was a demand within the organisation for information about “the whole picture”. In order to better create solutions for customers in the future, lots of descriptions will be needed, e.g. of products and service components
available. A decision has to be made if processes of the whole business should be described, or if it’s enough to describe those that interact with customers. After all, it is easy to get stuck in documentation instead of creating new businesses.

Extensive support in terms of information systems was also required for the future, particularly considering the vision for Sweden Post in the 21st century. There was a need for a “logical undercarriage” that provides proper information, independently of people’s position in the organisation. For example, a strong sale support will be necessary as demands on sales representatives will be higher in the future. They will be required to have knowledge in many fields. Still, an increased amount of documentation would facilitate the situation, e.g. in the event of losing an experienced salesperson. Information is an important strategic resource. However, with increasing amounts of information, e.g. about the customers, ethical issues regarding its handling become more important.

In an attempt to explore process orientation in Sweden Post, it is important to stick to, and support, the valuable aspects of the current organisation. In order to fully succeed with process orientation, the commitment of everybody, including the management, is needed. However, getting commitment is hard when the traditional way of working is a “cash cow” – the majority of the business is working fine. There is a challenge to create a sense of urgency, even though there isn’t a feeling of impending crisis. It can be hard to avoid the impression of just another one crying wolf. In order to depart from the past to reach the future, Sweden Post has to consider the issue of organisational acceptance: how prone to change are the people in the organisation, and how rigid are the current organisational structures? It might be easier said than done to create an environment that recognises and champions the ongoing need for change. To start with, there has to be a recognition of “political” sponsoring, an awareness of the organisation’s formal and informal leaders.

Steps towards a successful change also include supporting and institutionalising the change journey. This might involve using a simple implementation plan with goals and responsibilities, pilot studies, workshops (away from the normal workplace), educational programmes, reward systems, and redesigns of the physical workspace. Many insights can be gained from studying earlier changes, both within Sweden Post and in other organisations. There were several pilot projects going on in Sweden Post that could be success projects for process orientation.
Moreover, there were a number of experiences from similar development projects in other organisations.

**Conclusions from external business development projects**

Reports on process development projects that have failed can be found in journals and conferences every now and then. Discussions with some larger companies in Sweden has confirmed the picture given. The failures have, in many cases, been attempts at extensive, dramatic changes of whole organisations or very large parts of organisations – mainly “classical” BPR projects. However, also more cautious attempts have failed. There are a set of factors that keep being mentioned as critical for successful process orientation. Although a number of them are fairly general, the group felt that they provided valuable background also in the context of Sweden Post:

- **Commitment from management.** The transition from a functional organisation to an organisation that think and work in terms of processes, means a change in the company culture all the way from top management and down. The decision paths in a process-oriented organisation can be very different from those in a traditional functional organisation. So also roles and career paths. To make this happen it is important that the management gets actively involved in the change work, making the necessary decisions and setting a good example.

- **Persistence and patience.** The reason that this kind of change takes time is that it takes place simultaneously on a practical and on a cultural level. Creating an atmosphere of trust and support is crucial to achieving the desired result. Experience from the Japanese car industry shows that it might take ten years to establish process-oriented thinking in a large organisation. This cautions against trying too radical changes too quick – especially if they are not felt to be absolutely needed by the people in the organisation.

- **Small pilot projects to gain experience and set good examples.** Small, well defined, successful examples serve as an inspiration and template for other parts of the organisation. In this way, confidence and commitment will be able to build progressively. It is easy to become too ambitious and try to change the whole organisation in one go.

- **Training in process orientation.** Changing focus from organisational functions to horizontal processes includes a major pedagogical task.
While some people see process thinking as quite natural, others see it as difficult to understand and/or as threatening. Knowledge of what process orientation means to the business and to the individual is of vital importance.

- **Clear and supported process maps.** Easily understood process descriptions are a good help when communicating the process thinking. The descriptions need to be at an appropriate level, neither too abstract and generalised, nor too detailed. They also have to be supported by the management as well as the co-workers concerned.

- **Appointed process owners and process teams.** The new organisation should be manifested at an early stage by the appointment of process owners and process teams. Process owners and process teams are essential to get the change work going. Distribution of responsibilities and authorities between the line organisation and the processes has to be dealt with.

- **Co-ordinated process development.** Having a grip on all process development work is very useful in order to avoid co-ordination problems later on. Different projects need to be co-ordinated and aware of what’s going on elsewhere in the organisation.

Examining what is considered “common wisdom” in the area, such as the points above, was an important part of the group’s discussion. Learning from others includes looking at experiences from similar change projects elsewhere. Although the group felt a need to expand and clarify some of the factors listed, they still considered them as a good source of inspiration. Together with the issues raised from the specific context of Sweden Post, they provided a good coverage of organisational prerequisites for process orientation.

**Summarising the issues regarding organisational prerequisites**

- There are several possible degrees of process orientation with different implications for the organisation. From merely presentational purpose to a thorough process organisation.

- There is a need for maintaining the process “flow” and obtaining a high degree of coupling throughout processes. To overcome different boundaries, e.g. in a highly decentralised organisation, is an important goal for well-functioning processes.
A long-term strategy for introducing process orientation into the organisation is needed, building on a fair amount of analysis. However, although the change process requires endurance, quick results are wished for.

**Concepts and definitions**

Within the second sub-project, dealing with concepts and definitions, five people from different parts of the organisation participated together with an external consultant and a researcher. All of the participants had previous experience of working with business descriptions. The work was done mostly in a number of common meetings during the project time – although complemented with individual “homework” between the meetings, mostly by the external consultant who documented the work. The focus of the work lied in creating a basis for the future development work in terms of a common terminology.

In the following, a number of important issues in the work are presented. They are critical examples of situations when the participants – at least initially – had quite different opinions. The differences resulted in discussions, at times rather heated, that affected the work and the results. The issues are largely kept in the sequence they appeared in the project, although headings have been added in order to emphasise common themes.

*Why business processes and business descriptions?*

In order to anchor the work, the group initially analysed top management’s vision on what Sweden Post should be. Was there anything that pointed to processes? In the business plan, the business concept was described as “joining together their own resources with other’s in communication processes and financial services” (cf. the full quote in the beginning of this chapter).

There was a lot of confusion and discussion concerning the illustration that was used together with the business concept (see Figure 4-3). One interpretation, which eventually gained acceptance, saw it as a visualisation of the joining together of the business of Sweden Post and its customers. The horizontal arrows were thought to describe Sweden Post’s core business, the services it provides to its customers. The vertical arrows were thought to describe areas of the customer’s business. The
junctions show where Sweden Post can, or should, help the customer. For example, a customer’s handling of its financial administration can be helped of Sweden Post’s handling of payments and messages.

Although the word “process” appeared in the illustration as well as in the business concept, it was not clear to the project group exactly how the term should be interpreted or defined. A further exploration of this issue was considered important, partly as a consequence of the general interest in business processes. Sweden Post had a long tradition of using different types of models to describe the business, e.g. data models and routine sketches. A goal of the project was to examine how the different business models fitted together in an overall framework. In order to examine the need for different model types, an inventory of important questions was made among the participants. Rather than looking for patterns in the questions themselves (bottom-up search for clusters), a match was made with an established framework. The framework used was that of Zachman (1987), differing between six foci of a description, based on the English question-words what, how, where, who, when, and why.

While the framework to be developed was to provide an overall guide of how various business models fitted together, the bulk of the work within the project was done with a so-called meta-model. This was a conceptual data model describing the terminology used to describe the business. Together with textual definitions of the concepts, a model comprising the important concepts in the business and their relationships (cf. Figure 4-4) was created step-by-step. This type of model itself had a clear data-focus, focusing on the what-question. Sweden Post has had earlier experience with developing data-oriented tools, such as a comprehensive term catalogue. However, those were only partly used within this project. Process models were only used very briefly, as illustrations. Other model types,
such as goal models supporting exploration of why-issues, were not used at all.

All processes are equal, but some are more equal than others

The term “(business) process” is often used today, and there are many definitions for it in the literature. The group had looked at work by for instance Steneskog (1991), Davenport (1993), Hammer & Champy (1993) and Goldkuhl (1995). Discussing what should be Sweden Post’s use of the term, the group decided that it was important to have a broad definition. It was desirable to keep “process” a relative concept and not restrict it to a certain scope or organisational level. Processes could thus be both large and complex, e.g. distributing mail, or small and simple, e.g. selling stamps. As a result, the definition that was agreed upon allowed processes to consist of, and be parts of, other processes. Other organisations, using “process” as an absolute rather than relative concept, instead need to introduce specific terms like “mega-process” and “sub-process” for large and small processes. In Sweden Post’s definition, “sub-process” became a relationship between two processes instead of a concept of its own (see Figure 4-5).

Given this relative notion of “process,” there are sometimes occasions for identifying central processes within the business that are especially important. In the project, these were referred to as “business processes” or “core processes”. All other processes, that were not in themselves business processes, were called support processes. Their task is to support the business processes in some way. The criteria for a business process that was agreed upon was that it interfaces to an external “customer”
in both ends, e.g. the case of delivering a letter from a sender to a receiver.

![Diagram of processes](image)

**Figure 4-5. Processes on different levels; Z1 and Z2 are sub-processes of Z.**

There was an interesting consequence of this criteria that was not realised or consented by all in the group. It was that a sub-process of a business process, e.g. emptying mail boxes as part of the overall business process of distributing mail, is *not* in itself a business process, but a support process. Going back to the example in Figure 4-5 above, Z is a business process, while its two sub-processes (Z1 and Z2), when discussed in isolation, are support processes. The result of such a criterion is that a focus on business processes becomes an effective means for minimising sub-optimisation, at least from the viewpoint of the customers. Improving only a part of a business process is of no benefit for the customer if there is a bottleneck somewhere else in that process.

**Our processes and theirs**

There was a large interest in the issue of process integration and co-ordination, especially towards customers and partners. It was felt important to reach beyond internal processes, e.g. to see how they form part of a customer’s business. Consistent with Sweden Post’s business concept, the interest was a natural consequence of the company’s role as an intermediary, e.g. delivering parcels between two companies. A practical result of the aim for process integration, was the need for describing and keeping track of processes within other companies. Rather than individual companies, the descriptions would more probably concern types of companies, e.g. certain market segments. However, a potential problem in many of the early process descriptions within Sweden Post was that they were quite unclear regarding the transitions between different processes: explicit interface objects were often lacking. Interface objects are
important when aiming for another benefit of process descriptions, namely to facilitate re-use of excellent processes.

As important as co-ordinating and integrating processes, as important it was to be able to effectively separate them. For a professional working relation, all parties have to be aware of the boundaries. The division between Sweden Post’s processes and external processes, that the group agreed on, was based on responsibility – and not, for example, on the actors’ organisational membership. In this sense, it is customers and partners that are responsible for the external processes. An example considered was the case illustrated in Figure 4-6. There, a partner process is part of a Sweden Post process, which in turn is part of a customer process. While the partner is responsible for its process towards Sweden Post, Sweden Post is in turn responsible for its process (including the partner process) towards the customer. The question of responsibility was illustrated – tongue-in-cheek – in an advertisement from another delivery company: “We keep your promises.”

**What else is going on in the organisation?**

Are there things going on in the business that is outside of any process? Are processes a special kind of activities that are separate from ‘ordinary’ work? These are examples of questions that arose in the discussions around business processes. There was a confusion whether “process” described certain phenomena (in this case the answer to the ques-
tions above was “yes”), or if it described a certain aspect, resulting from a specific point-of-view (the answer was then “no”). The issue became apparent in the work with the meta-model, also with other concepts than “process”. Concepts in the model that were found to refer to “everything” – and thus more of an aspect than a phenomena – were for example “location,” “goal,” and “concept”. As a result of this, the relation between the meta-model and the framework became a bit blurred. Other concepts, such as “person,” were not as salient in the meta-model – it appeared rather late in the modelling process as a type of resource being responsible for an actor role.

A concrete difficulty with the process concept was its relation to functions. The concept of function led from the beginning to serious discussions, as it was used in several meanings. One meaning, largely used in the context of BPR and process orientation (cf. e.g. Rummler & Brache, 1995), sees functions as organisational units specialised in certain tasks. Another meaning sees function as a “pure” task or behaviour – independent of organisational structures or type of actor. In the meta-model, the issue was resolved by introducing the term “business function,” with relationships to both business process and areas of responsibility. Although intended to facilitate re-use, the difference compared to “process” was somewhat unclear.

**Descriptions for whom?**

Descriptions of the business not only focus on certain aspects of the business. Another difference discussed by the project group concerned the intended audience for the model. Zachman (1987) uses the term level of abstraction or perspective when discussing audiences for different models. When working on the framework, this issue came into discussion.

Some of the participants felt that Zachman’s framework was too detailed and placed too much focus on the lower, more technical levels. As a complement, a more basic division was introduced: between models intended for audiences external to the business or internal to it (cf. Figure 4-7). While external descriptions focused on business issues from a consumer point-of-view, internal descriptions focused on technical issues from a producer point-of-view. The question arose whether the central term of “business descriptions”, used throughout the project, should be used for all descriptions relevant for the business, or only for external descriptions.
Figure 4-7. Example of part of the framework; different types of models belong to each shaded cell (adapted from VEPRO, 1996, p. 25).

The issue of audience also surfaced when working with definitions accompanying the meta-model. The concept that initiated the discussion was “service,” something central both for the company and its customers. It is services, e.g. delivering mail, that customers pay for and that Sweden Post provides. In order to obtain maximum flexibility, it was important to be able to form new services by combining and re-using existing ones. In the meta-modelling, this was shown by distinguishing between elementary and composite services (cf. Figure 4-8).

Figure 4-8. Example of a small part of the meta-model concerning services (adapted from VEPRO, 1996, p. 83).
While a composite service was a combination of other services (elementary or composite), the question was what defined an elementary service. From an internal producer point-of-view, it was a service that cannot be provided in parts; From an external customer point-of-view, it was something that cannot be bought in parts.

Another example of the issue of audience for a description, arose in the work with the actual meta-model. Without any conscious reflection on the way of working, the meta-model had been developed on a detailed level from the beginning. Individual concepts, their definitions and relationships, had been added and modified step by step. When the meta-model became excessively complex (over 40 different concepts and their relationships), the issue of presentation surfaced. It was quite a complicated task to fully understand the meta-model – even for the people who had taken part in its development. To overcome this problem, various ways to aggregate the concepts, and simplify the meta-model, were discussed. The answer came in the form of a overview model comprising nine areas with relationships (cf. Figure 4-9).

Although the overview model proved to be valuable also for the participants themselves, it was widely viewed as “merely” a pedagogical tool. The possibility of actively working also with this more customer-oriented description from the beginning, was never seriously considered.

Figure 4-9. The areas of the overview model (adapted from VEPRO, 1996, p. 38).
Where are we heading?

Throughout the project, the participants returned to the issue of objectives, results, and consequences of the work. On several occasions, there were different opinions about the project’s intended results. Should the project only point to possibilities or should it actually suggest changes? How far into the future should it look? How much of the current organisation should be taken for granted? Who benefited from the project? These and other questions partly resulted from a perception of unclear customers to the project as well as unclear users of its results. In spite of this, goal modelling was not used – partly due to lack of time, partly because it was felt more needed for the project as a whole. The objectives were felt to be clear enough not to take valuable time from the “real” modelling work.

Some participants had quite clear pictures of the future use of the results, e.g. as a basis for a database of business descriptions (“Should we really describe the customers’ processes as the meta-model indicates?”). There was interest in having people responsible for central concepts in the business – and hence the meta-model – although it was not quite clear what this responsibility would amount to and who would be suitable to have it. Like ordinary business descriptions, the meta-model was believed to be important for continuous improvement of the business. However, there was a perceived risk that the results were not going to come to use, but to stay in some bookshelf. Whatever effects intended for the business, they required that the results were used and continuously updated. As a consequence, it was felt important to appoint people as responsible for maintaining the descriptions, including the meta-model itself.

The longer the project progressed, the more often the participants returned to the central question of process orientation. Much of the concern related to the relationship between the new business processes and the traditional organisational functions (cf. Figure 4-10). Another way of expressing this concern was to ask if processes or organisational functions should be strongest. What should be controlling? What should be controlled? Should processes adjust to the functions or vice versa? As the project progressed, a growing uncertainty could be felt regarding the actual label “process orientation”. Was it perhaps a bit too “strong” – compared to alternatives such as “process thinking” and “process view”? However, whatever the label used, there was a strong agreement that processes in one way or the other was going to become a key issue for Sweden Post in the future.
Summarising the issues regarding concepts and definitions

- Interaction with other organisational unit’s processes is important to facilitate the process “flow”. There is interest in going outside Sweden Post’s own organisation. Within the organisation, there is a benefit of being able to re-use processes. This requires a focus on responsibilities and transfers (interface objects) when describing the processes.

- There is a need for multiple descriptions using different types of models. Depending on the intended audience, some descriptions might be more appropriate than others. Still, much of the work in the project had a focus on concepts. More than talking “in” processes, the project talks “about” them.

- There is a large amount of analysis being done. Much work is done in order to get a clear picture of what, e.g., a process is. Still, it is not always easy to see all consequences. Many concepts are fundamentally complex.

- The degree of process orientation that is aimed for is subject to discussion. There is an insecurity of how far to go: how “hard” should the concept of process be pushed? How should processes relate to other things in the organisation, e.g. functions?
Conclusions

The loss of the monopoly and the increasing use of new communication technologies, have meant quite dramatic changes for Sweden Post. A formidable challenge for any company, Sweden Post has been mobilising resources in its exploration of alternative means to retain a leading position on the Swedish market and a very good position relative to other European postal services. In the VEPRO project, process orientation and business descriptions proved to be two very promising means, giving rise to many new ideas. However, the concepts were also shown to be quite complex, much more so than suggested by a lot of the management literature around.

For Sweden Post, the VEPRO project provided valuable insights, three of which have been specifically mentioned by its initiators. First, concerning the use of up-to-date descriptions of the business. This gives a better overview and a shorter start-up time for change work. Second, concerning the use of a common and precise way of description based on a metamodel. This helps identifying important phenomena in the business and their relationships. Third, concerning the use of a method base, comprising models, methods, and tools for change work. This supports the development of the business and its IT support.

As has been shown in this chapter, a great many things were discussed in the sub-projects reported on. In a brief initial analysis, reflecting on the things discussed and searching for common themes, five important dilemmas have been found. The term “dilemma” is used here to emphasise that an issue was found not to have any clear-cut answer or solution. A dilemma can be seen as providing a span of different alternatives, ranging from one extreme to its opposite. The dilemmas are considered important as they all led to extensive discussion. They were repeatedly returned to, at different times but also within different sub-projects. The last three of the dilemmas were also evident in the project work itself. Below is a brief description of all five:

- **Degree of process orientation – keeping the old or trying the new?** A thorough reorganisation according to processes provides an opportunity to increase the focus on customer satisfaction and avoiding the legacy from the former monopoly. However, a large organisation is hard to change, especially when the situation is not felt to be urgent. Acknowledging the value of stability and tradition, a lower degree of
process orientation will mean less “disturbance” of the current work in the organisation.

- **Process “flow” – separating or integrating?** Facilitating process “flow” and integration, e.g. by means of appropriate business descriptions, is considered to be helpful in the future. Developing “One Sweden Post” means avoiding the risk of different parts pulling in different directions, at least as viewed by the customers. However, functional and organisational boundaries make integration more difficult. As an alternative, de-centralisation and a higher degree of separation promote competitive structures and agendas, facilitating for smaller and more autonomous units to faster take action, compete, and constructively negotiate responsibilities and goals.

- **Multiple descriptions – being a specialist or a generalist?** Extensive use of multiple descriptions gives a richer view of the business. One type of model is not considered enough, especially when aiming for different audiences. However, multiple descriptions are more demanding to work with and fit together. They require more time and effort, and risk being too complex to understand. Instead, a specialisation in a specific type of description facilitates the development of deep experience and skill in that area. This dilemma was also evident within the project itself, e.g. when arguing for multiple descriptions, although using only one.

- **Amount of analysis – acting or reflecting?** A large amount of analysis, spending time on reflection and planning, gives opportunities to penetrate complex concepts and ideas. It avoids having to rush things and enables the scrutiny of new concepts. However, against this stands a wish for fast results, without too many rules and prescriptions perceived as straitjackets. In a fast-changing market, the ability to act quickly and bring about direct changes in the work performed is considered especially important. This dilemma was also evident within the project itself, e.g. in the concern for how much the analysis done in the project would actually mean to the workings of Sweden Post.

- **Order of development – starting with ends or means?** Exploration of business processes can be facilitated or hindered by other development activities. Developing corporate strategies and IT support have important relationships to process orientation. This dilemma was also evident within the project itself, e.g. how it became influenced by, and influenced, other development activities in Sweden Post.
Of course, exploring a dilemma not only means investigating different alternatives within its reach, but also trying to synthesise and transcend the dilemma itself. Viewed in this way, the challenge lies in finding effective ways to both keep the old and try the new, both separate and integrate, both be a specialist and be a generalist, both act and reflect, and both start with ends and means!
PART III: FRAME DEVELOPMENT

This part of the thesis deals with my third purpose: to elaborate a set of business frames by drawing on the conceptual framework from chapter 2 and the descriptions of empirical cases from chapters 3 and 4. Part III consists of four chapters. In chapter 5, four perspectives are outlined, which are further elaborated in the subsequent chapters as means to explore different business solutions: value modelling for exploring strategy solutions (chapter 6), process modelling for exploring operations solutions (chapter 7), and concept modelling for exploring information solutions (chapter 8).
Using Business Models in Process Orientation*

How can business models be used in process orientation? Here we focus on graphical descriptions of businesses, such as process graphs, routine sketches, data models and goal models. Our experience comes from the research project “Business Modelling” in which researchers from three universities participated together with representatives from four companies. The purpose of the research was to bridge the communication gap between business people and systems people using shared models and methods. The research involved change work at Ericsson Radio and Sweden Post. Our message is that the conscious use of different types of business models improves the prospects of benefiting from process orientation.

What is process orientation?

As a basis for our discussion on the use of business models, we begin by examining the meaning of process orientation. We will deal with the concept of business process, with different degrees of process orientation and with change work on different levels in relation to processes.

What is a business process?

In process orientation, the process concept plays a central role. There are several suggested definitions of a business process – a mapping and comparison of several well-known authors’ definitions of the process concept can be found in Goldkuhl (1995). We propose the following characterisation as a summary:

*A business process is a course of events consisting of one or more coherent activities (operations) which are necessary to deliver a product or service with a tangible value to a customer (client).*

A number of characteristic qualities are linked with the process definition. They do not all have to be present in one and the same situation, but they are usually regarded as important in process orientation. Some examples of characteristic qualities are, that the process:

- has one or more well defined input and output objects
- is repetitive in character
- has clear criteria for starting and stopping
- is performed by one or more actors (people and/or machines) in the organisation
- runs through one or more departments in the line organisation
- uses resources of different types (e.g. IS/IT support)
- contributes to fulfilling the business goals
- is measurable to enable follow-up towards the goals
- has a responsible process owner

The concept of a business process is used in a broad sense. It encompasses both core (main) processes – within or between companies – having external customers, and management and support processes having internal customers. The concept also applies to both market-coupled organisations, e.g. private enterprises, and budget-coupled ones, e.g. public services.
**Degrees of process orientation**

Companies can be characterised by process orientation to differing degrees. There are various motives for a higher degree of process orientation. It allows, for example, better focusing on customers and how they experience the value of a product and also on the cooperation between different actors within the organisation. Process orientation also gives a way of influencing lead times and product quality in order to produce an attractive result for the customer.

Figure 5-1 shows different degrees of process orientation in a company. It is drawn as a ladder with four successively higher levels of achievement. Even if it is possible to jump over a step, there will be consequences to this: Each new step is made easier by the one before.

- When the significance of processes is noted by the company, the first step will be to describe the business in process terms, e.g. with the help of process models. The workflow in the organisation begins to be seen more and more as a collection of processes.

- After such a description, the processes are taken care of through defining and clarifying responsibility for them. Process owners are appointed for important processes in the organisation.

- The next stage involves the processes being assessed. Requirements for a changed way of working within the organisation are followed up. Different measurements of the process, e.g. involving factors such as quality, productivity, lead times and flexibility often form the basis of these assessments (a more in-depth discussion of the assessment of processes is found in Mårtensson & Steneskog, 1996).

- The highest stage, conversion to a process organisation in which the processes are in control, involves a very high level of achievement. Just as with a real ladder, there are reasons to be careful: You can...
reach the heights, but there’s also a risk of falling! An exaggerated focus on processes could mean that other perspectives are being neglected.

An important element of process orientation, therefore, is describing and mapping out the business. It is this work, the framed section of Figure 5-1, which is the focus of the following. It forms an important base for the higher steps, whether they are performed sequentially or more in parallel.

**Change work on different levels**

Change work can be carried out in different ways within companies and organisations. Many of today’s approaches to change work involve process orientation, for example Total Quality Management (TQM; cf. Bergman & Klevsjö, 1995), Business Process Re-engineering (BPR; cf. Davenport, 1993; Hammer & Champy, 1993) and Process Management (cf. Steneskog, 1991; Rummler & Brache, 1995).

Common to these approaches is an interest in the vital and critical processes which flow through the business. An important difference between them is the radicalness of the solutions suggested for solving problems experienced within the organisation. Whereas TQM and similar approaches are based on change in small stages, BPR is a view of process development that suggests radical changes in the company’s business; Process Management is more neutral in its view when it comes to the size of changes. All of the three approaches are mainly focused on organisational development, something which can be seen as the middle of three general levels of change work.

- **Corporate development.** The development of corporate strategies in a company, concretised in business plans with IT policies.
- **Organisational development.** The development of business processes in the organisation, such as order-handling and material flow.
- **Information systems development.** The development of IS/IT support in the form of in-house applications and application packages.

A widespread problem in companies today is that connections between the three levels don’t always function satisfactorily. Figure 5-2 shows a way of clarifying the situation by illustrating the interplay between the three levels: Corporate strategies, Business processes and IS/IT support (cf. Nilsson, 1992; Österle, 1995). The figure illustrates partly the gen-
eral case and partly the two individual cases involving Ericsson Radio and Sweden Post, which will be discussed later.

<table>
<thead>
<tr>
<th>General:</th>
<th>Ericsson:</th>
<th>Sweden Post:</th>
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<tbody>
<tr>
<td>Corporate strategies</td>
<td>ESP</td>
<td>Business Plan</td>
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<tr>
<td>Business processes</td>
<td>Rummel &amp; Brache</td>
<td>VEPRO</td>
</tr>
<tr>
<td>IS/IT-support</td>
<td>MQR</td>
<td>MIPS</td>
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</table>

Figure 5-2. Three central levels in a company.

Corporate strategies define the company’s relations with different actors in the environment and the market. Business processes concern the workflow within the company’s organisation. IS/IT support is regarded as a resource or an enabler in running the business professionally. Business processes are linked with both strategic management questions and the use of information systems in the company and can be seen as a mediating link between these. We will chiefly concentrate on the middle level, framed in Figure 5-2, in the rest of the chapter.

**Business models in practical usage**

In order to gain an insight into the role which business models play in process orientation, we have chosen to illustrate this with two examples from industry. These are Ericsson Radio and Sweden Post – which the research project “Business Modelling” studied in 1995 and 1996.

Both of these companies are interested in process orientation in different ways. Whilst Ericsson Radio has progressed somewhat in perceiving and organising the business in process terms, Sweden Post is about to undertake an introductory assessment of conditions for process orientation.

**Processes and product development at Ericsson Radio**

Ericsson is a major player in the international telecommunications market. Business area Radio deals with radio communication, e.g. in the form of the ever more popular mobile telephony. Ericsson has been interested in processes since the latter half of the 1980s. Process development
has been actively pursued since the beginning of the 1990s. Based on the three levels of change work, help has been derived from the following approaches (compare with Figure 5-2, above):

- **Corporate development.** Ericsson has developed its own method of strategic planning which is called ESP (Ericsson Strategic Planning). ESP work is carried out and followed up by senior management in all business units of the Ericsson group. Work with ESP can provide business vision and goals for investment in organisational development and information systems development.

- **Organisational development.** Process management is the common concept used to describe organisational development in the Ericsson group since the end of the 1980s. In many business units RBG (from the Rummler & Brache Group) is the standard method of working with process development.

- **Information systems development.** For information systems development, MQR (Method for Quality and Results) is currently being launched as a general approach in the Ericsson group. MQR can be seen as a toolbox of methods which can be adapted to each situation. MQR is a further development of, amongst other things, the earlier method KORS which is based on the established REFLEX-method from Programator.

![Figure 5-3. Business within Ericsson Radio.](image)

During the summer and early autumn of 1995 we carried out a study of the business unit which develops and sells equipment for mobile telephony based on GSM and other European standards. The business is illustrated in Figure 5-3 by two ways of converting customer needs to customer satisfaction. These are either through the customer order process
Co-ordination between internal processes. Within Ericsson Radio, efforts are being made to achieve effective co-ordination between different processes in the business. It is important to promote co-operation between the different actors and organisational units. A particular challenge is presented by connecting the main parts of the product development process with the different support/control processes. Transfers and handshakes between the processes are often experienced as unclear.

Common pictures. By working with process models (“process maps”), the intention is to develop a common picture of the business. With the help of models it is hoped that awareness will be raised of the contributions to the process by different persons and departments. In spite of this, many process maps lack precisely this, i.e. identified output from each process. A contributing reason could be that the process perspective is unfamiliar to those involved, compared with the line perspective.

Process maps for change. Identifying synergies between different parts of the business and promoting a broader view of the roles in the traditional line organisation are two other objectives of process maps. These provide a good basis for making measurements and follow-up of the ongoing work towards a more effective business.

Practical work with process maps. The creation of process maps of a business is not always a simple task. It is sometimes problematical to separate how it is from how it should be. Most process maps consist of something of a mixture. Different parts of the business can be more or less simple to describe in process terms. On a practical level it involves a combination of modelling skill and insight into the business: both sides are necessary to create a good business model. On a more comprehensive level, it also involves resistance to models which are too controlling and inhibit creativity.

Complementary goal models. There is a need to complement process maps with other perspectives on the business in order, for example, to
stay aware of connections between processes and goals, and connections among different goals.

**Processes and business models at Sweden Post**

During the past few years Sweden Post has moved from a nationalised public service to a commercially run company which is currently still in public ownership. The business has developed in parallel with the new conditions and increased competition. During the spring of 1995 a new step was taken in the form of VEPRO, a project designed to examine the conditions for process orientation and the role of business models in this change. In terms of the three levels of change work, Sweden Post's development work can be described in the following way (compare Figure 5-2, above)

- **Corporate development.** Sweden Post Business Plan is a unified concept for strategy planning for the whole of Sweden Post. A section on IS/IT plans for the business area in question is always linked to the business plan. Sweden Post Business Plan is originally based on the established method LOTS (acronym for the Swedish for “Logical Methodology”) from the company Lotscenter.

- **Organisational development.** VEPRO is an acronym for the Swedish for “business models and process orientation” and is really a pre-study undertaken within Sweden Post. Here, the conditions were studied for finding common methods of investing in process orientation and organisational development for the whole corporation. The results of the VEPRO work can be seen as a bridge between corporate development and information systems development.

- **Information systems development.** Since the beginning of the 1990s, Sweden Post has invested in a common method of information systems development called MIPS (Models in Sweden Post) MIPS also contains sections for project control and maintenance management. The concept behind MIPS is strongly inspired by the SVEA/DIRECT-method.

Organisationally, Sweden Post is divided up into different business areas – e.g. Sweden Post Sales and Sweden Post Letters – who work together to offer private persons and companies different services. Sweden Post is a mediation agency. Its core business is the carrying of messages, goods and payments; services which, together or individually, play an important role for many of Sweden Posts customers. In Sweden Post this is illus-
trated as in Figure 5-4, in which Sweden Post’s business (horizontal arrows) integrates with customers’ business (vertical arrows).

![Diagram showing Sweden Post's business processes]

Figure 5-4. Business within Sweden Post.

In the VEPRO project, persons took part from different business areas to work together with ideas on business models and process orientation. Some of the experiences which emerged from the project are described below:

- **Process integration.** Within Sweden Post, much emphasis is placed on the importance of integrating its own processes with those of customers and partners. There is much interest in looking outside Sweden Post’s own business and seeing how it can form a part of customers’ business. This could, for example, involve Sweden Post’s work in carrying goods between two companies. Conversely, it involves integrating the different partners’ processes with Sweden Post’s, e.g. in carrying out parts of the goods transport.

- **Processes versus functions.** How does one handle the relationships between processes and traditional functional departments? There is a great need to clarify the content and consequences of process orientation. This is not made any easier by the fact that the term “functions” is used both for organisational structures and purely working assignments.

- **Re-use.** In order to minimise unnecessary work, it is hoped that Sweden Post will be able to use process models to promote re-use. With the help of models one can discover needs and the occurrence of similar processes. In spite of the interest in re-using parts of processes, many of the earlier process models are unclear regarding transfers between different actors and organisational units.
• **Process models and change.** Process models play an important part in continuous improvement work. Constant access to up-to-date models provides a better basis for responding to rapid change. It is seen as important that responsibility for administering models is clearly delegated to ensure continuous updating with business changes.

• **Complementary data models.** Combining different perspectives on the business is seen as a necessary complement to the process perspective. Traditionally, Sweden Post has worked a lot with other business models, chiefly conceptual and data models. It is important now to find forms of interaction between different types of business models.

**Needs for business models**

Above we have described experiences from Ericsson Radio and Sweden Post in relation to process orientation. Both companies have common and separate experiences based on their differing situations. On the basis of these, and earlier experiences, we have chosen to expand on three important areas. The first area concerns important needs for business models.

There are several different motives for working with business models. When investigating the use of models in process orientation, two basic needs become clear. These correspond with two central features of development work: trying to understand and trying to change.

![Figure 5-5. Models as an aid to understanding and change.](image)

Figure 5-5 illustrates the interdependence between the basic needs for understanding and change. Just as understanding can be a means of change, change can be a means of understanding. Rather than forming two watertight compartments, understanding and change represent different emphases. This is also relevant for day-to-day work, which, compared with pure development work, can be seen as smaller and quicker alternations between these two basic needs.
The two basic needs have a parallel in two variations of business models: “is” models describe the current situation and are chiefly aids to under- 
standing, whilst “should” models describe future situations and are 
chiefly aids to change. In the case of process models, many companies 
work with descriptions of both “is” and “should” processes. Describing a 
company in its current and in a desired future situation is not a particular 
novelty in development work in our area (cf. Lundeberg, Goldkuhl, & 
Nilsson, 1981; Goldkuhl, Nilsson & Röstlinger, 1982). What is seen as 
new is the application of this thinking to processes in the form of map-
ping “is” processes (in the current situation) and “should” processes (for 
future situations).

The need for understanding

When working with business models as aids to understanding, “is” mod-
els plays an important part. Through describing, together with other peo-
ple in the company, the business in its current situation, one can achieve 
a better understanding of how the different parts fit together. Business 
models have proved to be effective tools for supporting and specifying 
communications between different actors in development work. They can 
work as an aid in creating a common picture of the business in its current 
state.

“Is” processes are descriptions of processes which flow through the busi-
ness in its current situation. Process models are aids for different actors 
to understand the business during process orientation. A process model 
can, for example, describe the interplay between different actors and 
organisational units in the workflow as it appears in the existing organi-
sation.

An important connection, which process models can illuminate, is that 
between processes and functional departments involved in the business. 
Departmental or organisational units have different forms of resources at 
their disposal, e.g. IS/IT support and the skills of colleagues, which form 
an infrastructure for business processes. A tangible practical problem, not 
only in Sweden Post, is the integration of business processes and depart-
ments in a functioning whole. The same is true for understanding the 
connection between business processes and important IS/IT support 
which process models can clarify. They can support co-operation 
between process and system owners (the latter are normally situated in 
the line organisation).
It is not only Ericsson Radio who have difficulties with pure “is” models. It is often difficult to agree on an exact “is” process for a business studied. Instead, there is normally a large number of opinions on how the “is” process is made up. The differences in perspective of the persons involved affects their assessment of the current situation. Also, people are often affected by how the business “ought to” be, according to themselves or others, e.g. management.

For an “is” model to be usable over a period, steps must be taken to ensure that it is updated when changes take place in the business. Making decisions about changes on the basis of an obsolete picture of the business can have dire consequences. This is particularly true when the process models form the basis for measurement and follow-up of results in business processes.

The need for change

When working with business models as aids to change, “should” models play an important part. By describing an intended future situation one can create a basis for change in the form of suggestions for desired processes and structures. Business models can be used as a basis for establishing a change of responsibility and power, e.g. for managing the connection between processes and departments. They can also form the basis for acquiring or improving IS/IT support.

“Should” processes are improved processes which flow through the business at a desired point in the future. Process models are aids for different actors to change a business through process orientation. Describing “should” processes creates a basis for generating creative changes in the future business and achieving a vision for the business which both management and workers can embrace.

It is normally not enough to merely complement “is” processes with “should” processes in change work. Since “should” processes are directed towards a future vision of the business, it can take many steps to arrive there! It can often be fruitful to prepare process models in a number of stages before the vision for the future is achieved. The more radical the changes suggested in development work, the more important it is to define a number of “intermediate” processes for implementing in stages.

The picture is complicated by the fact that process development often involves continuous improvement work rather than a one-off event. Business
nesses are exposed more and more to continuous change because of internal needs and demands from the environment. Companies are therefore always in an intermediate situation, on their way towards future challenges.

Types of process models

After dealing with the need for business models in general, we have now reached the second of our three areas: types of process models. Process models are business models which focus on courses of events in the business. Change and time-flow are important characteristics of a process model. Process models are particularly significant in process orientation and both Ericsson Radio and Sweden Post use different types of process models.

An important question in this respect is the choice of model type. Today there is an abundance of different types of process models to choose from. The advantage of choosing an existing type is chiefly that one can “talk processes” in a certain way. By choosing an established model it is easier to make oneself understood. There is previous experience to refer to and one doesn’t have to invent the wheel all over again.

In our opinion the type of model chosen is important. Despite some differences being purely cosmetic, others deserve close attention. Here we present a general classification of process models on the basis of their different perspectives. The categorisation is based on earlier works (Tolis, 1994; Nilsson, 1995), even if the nomenclatures have been partly changed.

- **Behaviour models:** an internal process perspective
- **Transformation models:** an external process perspective

To exemplify the different perspectives, a recurring example is used in the following. It relates to planning work, an important part of change work. The example is based on the so-called Y-model described in Lundeborg (1993). In its original form, the Y-model is closest to a transformation model, comprising the parts of current situation, intended future situation, needs for change, alternatives for change and results. The planning work is described with the help of each model type. The importance lies not in the symbols which are used in the examples, but rather in the more basic differences in the types of models illustrated.
**Behaviour models**

A behaviour model describes the work sequence of the actor in the process from beginning to end (see Figure 5-6 for an example). The parts of the process (marked by circles) lead to each other via different states for the subject who is acting (marked with arrows; start and stop states specially marked as rounded rectangles). For example, the change from the first part of the process “identify goals and problems” occurs when the actor begins to “analyse needs for change”.

![Figure 5-6. Behaviour model for planning work.](image-url)

It is clear here that the model describes, and thereby controls, the subject. Possible objects which are used or created in the process have a considerably less visible existence. In the example they are not shown at all.

One consequence of focusing on the subject’s behaviour is that all reiterations which the subject can/should do must be set out in the model. The final check in the example involves a choice: either one is ready or one has to start to “identify goals and problems” again.

As is clearly seen, the subject is treated uniformly in the whole model. It is assumed to be one and the same subject who carries out the whole process. In those cases in which one sees the subject in a wider sense, consisting of several actors (people and/or machines), certain steps in the work can be carried out by parts of the subject. The actual transfer between different actors is however implicit in a behaviour model.

**Behaviour models are process models with an internal perspective: they focus on the behaviour of whoever carries out the process (the subject or actor of the process).**

Central to the internal perspective is the way the work gets done in the process. Characteristic for a behaviour model is that the connections between different parts of the process are formed by the subject, i.e. the actor in the process. Examples of behaviour models are flowcharts (often used to illustrate the logic in a computer program and found in most
basic textbooks on programming) and routine sketches (Axelsson & Ortman, 1990). Behaviour models can be useful when dealing with questions such as:

- Ways of carrying out the process
- Tasks of actors and organisational units
- Instructions for specific ways of dealing with events occurring in the business

Transformation models

A transformation model describes changes in the things which are dealt with in the process (See Figure 5-7 for an example). The parts of the process (marked with circles) lead to each other through different states for the objects affected (marked with arrows equipped with rhomboids). The first part of the process, for example, uses the object “situation description” to create the two objects “goals” and “problems”. These two are then used to arrive at “needs for change” etc.

![Figure 5-7. Transformation model for planning work.](image)

Given that there are input objects to the process, the model says nothing about the order which a certain subject needs to follow. There is no barrier to going back to work more on “needs for change” after creating “course of action”. Possible re-iterations for the subject are thus not described by the transformation model. In the case of re-iterations for the object, on the other hand, e.g. in the case of a warehouse, this can of course be described.

*Transformation models are process models with an external perspective: they focus on transitions of that which is dealt with in the process (the objects of the process).*
Central to the external perspective is what the process uses and what it results in. Characteristic for a transformation model is that connections between different parts of the process consist of its objects, i.e. that which is treated or dealt with in the process. Examples of transformation models are dataflow diagrams (cf. Yourdon; 1989) and process graphs (cf. Steneskog, 1991, using the “fish” symbol for processes – the same symbol which Ericsson Radio uses, cf. Figure 5-3, above). Transformation models can be useful when dealing with questions such as:

- Successive value-adding of core objects
- Transfers between different actors and organisational units
- Integration with external processes, e.g. with customers and partners.

**Advantages of the two types of process models**

The aim of the above explanation is to point out special characteristics in the two types of process models. By being aware of the perspectives it is possible to make a more informed choice in a given situation. Whilst the internal perspective is better in one situation, the external may be better in another. Both perspectives complement each other and it is an advantage to know and be able to choose between them both – or any hybrid forms which exist.

Behaviour models could be said to represent an internal “producer perspective” on processes. The target group for this type of process model is the people in the process (co-workers) who are active in it. Transformation models, on the other hand, could be said to represent a “consumer perspective” on processes. Their target group is persons outside the process (customers in a wide sense of the word) who need to use it.

If the behaviour model describes the internal characteristics of the business process, the transformation model describes its external characteristics (cf. chapter 2 in Langefors, 1995, in connection with the design of imperceivable systems.). In relation to the three central levels in Figure 5-2, the internal perspective has a stronger focus on the relationship with IS/IT support, whilst the external has a stronger focus on the relationship with corporate strategies.

Among the experiences from Ericsson Radio and Sweden Post, a certain difference can be seen in relation to the scope of the processes which are focused upon. Whilst Ericsson Radio focuses more on processes within the company, Sweden Post focuses more on integration with processes outside the company. There is a connection to the division of process
perspectives made here: The need for process models with an external perspective increases if one is considering integration with processes outside the company. One can however take advantage of the external perspective even for processes within the company, not least regarding the transfers between different actors and the need for re-usability.

Re-usability can apply to both complete working processes and the actual specification of processes. In the first instance the company can take on the responsibility for carrying out assignments on behalf of its customers by selling processes, or conversely, getting other things done by buying processes from vendors (cf. the concept of “outsourcing”). One example is Sweden Post which conveys parcels to customers and receives help with certain transports from various carriers. In the second case, a possible scenario is that management consultants will, in the future, sell business processes “off the shelf” (cf. Bragée, 1995).

Complements to process models

Having discussed the different types of process models, we have now reached the third and last of our areas: complements to process models. Alongside process models there are other types of business models worthy of attention. Instead of focusing on dynamic courses of events like process models, these focus on the more static conditions in a business. These types of models grasp the content and structure of work rather than its processes, hence their common name, content models.

Even in a case of process orientation there is a need to describe things other than processes. Other types of business models then become complements to process models. Both in Ericsson Radio and Sweden Post, the importance of such complements was emphasised.

Just as with process models, there are a large number of differing content models available. The type of model which is suitable depends, of course, to a large extent on the situation. In order to orientate oneself amongst all the complements to process models, we differentiate here between two main types. The categorisation is based on Tolis (1994). Similar categorisations are found in Nilsson (1995) and Willars (1993).

- **Category models**, e.g. conceptual models
- **Factor models**, e.g. goal models
To illustrate the two complements we will continue to use the example of planning work. In these cases it is no longer the work-process which is focused upon, but the work-content. The complementary model types deal with the characteristics and conditions which prevail over time. They focus on that which is regarded as stable and tone down aspects of change and time-flow.

**Category models**

A category model describes how different phenomena in the business relate to each other (see Figure 5-8 for an example). The parts of the work content are categories, (marked with rectangles) which together build a structure. The categories normally include a number of common phenomena. The category “alternatives for change”, for example, contains a number of different ways of bringing about a change.

![Figure 5-8. Category model for planning work.](image)

Relationships exist between categories (marked with lines; arrows indicate reading direction). A relationship can include one or several phenomena within the category (marked without or with a fork on the line). For example, a “need for change” can be solved by several “alternatives for change”, whilst an “alternative for change” solves a specific “need for change”.

In comparison with process models, category models focus on phenomena which are unchanged or constant in the business. For example, instead of describing how goals are created or used in different processes, category models describe how goals relate to other phenomena, abstract or concrete, e.g. stakeholders.

*Category models are content models which focus on important categories of phenomena in the business and their relationships to one another.*
Categories exist in many forms. Some examples are concepts, data, business objects, standard components, and areas of responsibility. Characteristic for a category model is that connections between categories are formed by prevailing conditions. A common type of category models is conceptual models or data models (cf. Sundgren, 1992). Examples of questions for which category models can be useful are:

- Connections between central concepts in the business
- Structures in product and service ranges
- Responsibility relationships between different stakeholders

**Factor models**

A factor model describes different conditions in the business and how they affect each other (see Figure 5-9 for an example). The parts of the work content are factors (marked with circles), which can vary in strength or scope. “Situation knowledge” is the degree of the same, in this case in the persons involved with the planning work.

![Figure 5-9. Factor model for planning work.](image)

The connection between factors consists of influence or dependence relationships (marked with arrows). Another name for factor models therefore, is influence models. If one factor is changed, others can be affected either in the same direction or the opposite (marked with +/- on the arrows). For example, an increase in “evaluation ability” leads to an *increase* in “usability of course of action” whilst an increase in “forgetfulness” leads to a *decrease* in “situation knowledge”.

Compared with process models, factor models focus on conditions which vary in the business. For example, instead of describing how goals are created and used, factor models describe how insight into them is affected by other factors varying, e.g. problem insight.
Factor models are content models which focus on important factors (conditions) in the business and the influences these have on each other.

Factors occur in different forms. Goals, visions, problems, strengths, fields of force, and critical success factors are some examples. Characteristic for factor models is that the connection between factors consists of their experienced influence. A common type of factor model are goal models (cf. Goldkuhl & Röstlinger, 1988; Willars, 1993, takes them up under the label intention perspective). Examples of questions where factor models can be useful are:

- Influences between important problems, causes and symptoms
- Supporting and hindering factors for a certain result
- Causal relations between central quantities and variables in the business

Advantages of the two types of content models

The above description showed both similarities and differences between category and factor models. Compared with process models they both focus on content rather than process, but this happens in different ways and from different starting points. As often as the two types of content models are confused with each other, the connections between them are missed. In spite of the fact that category models and factor models represent different ways of looking at a business, they have close points of contact with each other.

The similarities and differences between content models form their contribution as complements to process models. Both category and factor models offer the possibility of toning down the focus on dynamic courses of events and instead looking more closely at the conditions prevailing in the business over time.

With the help of category models one can examine that which is included and processed in the processes – e.g. by looking more closely at relationships between different services, products and actors. With the help of factor models, one can investigate what different things are good for and how they affect one another – e.g. through looking more closely at the purposes and goals of different processes and structures.

There can, therefore, be reasons for working with several types of business models, even in the context of process orientation. Not just models
which focus on the processes in themselves, but also those that offer complementary perspectives on the business. Through working with different types of business models, one reduces the risk of missing some important aspect of the business.

Both Ericsson Radio and Sweden Post have seen the advantages of working with different types of models in learning about or affecting their businesses. One can either work with different types of models in sequence, by beginning with one type and continuing with another, or one can try working with different models in parallel and let them affect each other.

**Points to remember**

The combination of business models and process orientation has proved fruitful, if not always simple, in many companies. Figure 5-10 illustrates the underlying perspectives of the four types of business models which we have discussed in this chapter.

![Figure 5-10. The four perspectives on the business.](image)

Benefiting from the opportunities of using all four types of business models – as aids to understanding and change – is demanding for all involved. Our hope is that the experiences and ideas put forward in this chapter will act as an inspiration. We conclude with three points to remember in order to more fully benefit from process orientation:

- Use business models as aids to *understanding* (e.g. “is” models of the business today) and as aids to *change* (e.g. “should” models of a desired future business)!
Use process models which focus on *behaviour* (an internal perspective from the actors’ point of view) and those that focus on *transformations* (an external perspective from the customers’ point of view)!

Use complementary content models which focus on *categories* (e.g. concepts) and those that focus on *factors* (e.g. goals and problems)!

*Cf. chapters 6, 7, and 8 for elaborations of the different modelling perspectives.*
Value Modelling for Exploring Strategy Solutions

This chapter elaborates on value modelling for exploring strategy solutions. Examples of generic and specific strategy solutions – comprising strategies, objectives, goals, mission, etc, of a business – are presented and their core elements extracted. Among available graphical modelling techniques, value modelling is examined as a main perspective for exploring strategy solutions. Despite low attention for this perspective in the context of information systems, examples of value modelling techniques are found in widely different fields of inquiry. In relation to the core elements of strategy solutions, two key differences among the candidates are identified and discussed. The first difference concerns the focus on particular values vs. general factors. The second deals with the focus on linear hierarchies vs. feedback loops.

Introduction

The aim of this chapter is to elaborate on value modelling for exploring strategy solutions. Strategy solutions is an overall heading covering ideas and things related to the direction of a business, for example strategies, missions, visions, objectives, goals, corporate identities, electronic business models, etc. Value modelling denotes using and producing graphical models that emphasise a value perspective, highlighting key factors of the business and their influences on each other.

Exploring a business’ strategy solutions is crucial in information systems development and other types of business development. Not only do strategy solutions indicate the desired direction of the business, providing guidance for development activities, but they can also themselves be affected by the development taking place, leading the way to new strategy solutions. Although these issues are important for understanding and changing a single business, it becomes even more salient when exploring interorganisational settings as strategic differences among potential business partners strongly influence their collaboration.

Like other areas of a business, strategy solutions can be explored from many different perspectives. Depending on the perspective that you use for exploration, you will see some things more clearly while overlooking others. This goes beyond the importance of perspective in a literal sense, where your physical position will enable you to observe things within your field of vision, and prevent you from noticing other things that are obscured by walls and other tangible objects. Rather than one perspective being the “right” one, the challenge lies in appreciating the merits and challenges with different perspectives (cf. Nilsson, Tolis & Nellborn, 1999). In this chapter, the focus lies on value modelling as a suitable perspective for exploring strategy solutions.

Following this introduction, the chapter is divided into two major parts. First, it gives an overview of different strategy solutions in order to arrive at their core elements. Second, it shows examples of value modelling, and discusses them in relation to the core elements of strategy solutions. For conclusions, merits and challenges of using value modelling for exploring strategy solutions are presented.
The diversity of strategy solutions

Strategy solutions in various forms are abundant in today’s businesses and contribute answers to why a business is the way it is. Implicit and explicit strategies, objectives, goals, mission, etc. all relate to the present and future direction of the business. Like other types of business solutions, strategy solutions are the result of human activity, whether they appear as documents or as ideas in someone’s mind. Behind the strategy solutions of a business might lie work not only by the people in the business but also of external consultants specialising in strategy issues. Despite that the word “strategy”, strictly speaking, has more to do with a way to reach established goals, it normally covers also the goals themselves.

To give a brief overview of the strategy landscape, two types of strategy solutions will be discussed in the following: specific strategies of particular businesses, and generic strategies for ranges of businesses. From these, core elements common to all strategy solutions are identified.

Specific strategy solutions

Over the years, there has been a shifting emphasis on explicit and analytically derived strategies vs. implicit and evolved strategies (cf. Bengtsson & Skärvad, 1988). In most businesses, there are ongoing mutual influences between the two forms of strategies, each both affecting and being affected by the other. The two forms mirrors the distinction made by Argyris & Schön (1974) between espoused theories and theories-in-use. Whereas espoused theories cover what people say when asked about their behaviour, theories-in-use cover the guiding principles that can be deduced from their actual behaviour. Needless to say, there can be a smaller or larger gap between what is espoused and what is in use. In terms of strategies, this means that although the explicit strategy states that the customer is king, the salespeople may well behave as if she was merely a nuisance.

Explicit strategy solutions might be more or less elaborated, e.g. depending on its intended use. When trying to reach potential customers and other external stakeholders, often brief and condensed versions are being used, functioning as easy-to-remember slogans, such as “connecting people” (Nokia) and “building the information society” (TietoEnator). Slogans and logotypes are often combined with a more elaborated description of the mission of the business. In the following, we will take a closer
look on specific strategy solutions from two businesses chosen from different industries.

### H&M: FASHION AND QUALITY AT THE BEST PRICE

Our business concept is to give the customer unbeatable value by offering fashion and quality at the best price. To be sure we can offer the latest fashions we have a design and buying department that creates our clothing collections.

We ensure the best price by:
- having few middlemen
- buying large volumes
- having extensive experience of the clothing industry
- having a great knowledge of which goods should be bought from which markets
- having efficient distribution systems
- being cost-conscious at every stage

We put a lot of energy into ensuring and improving the quality of the goods. We also have the resources to carry out careful testing and quality controls regularly. In addition to good quality products, our quality concept also requires the garments to be manufactured without the use of environmentally hazardous chemicals or harmful substances and to be produced under good working conditions.

*Table 6-6. Example of strategy solution: H&M’s slogan and philosophy (H&M, 2003).*

The first example is from the Swedish fashion retailer H&M. As shown in Table 6-6, H&M uses the slogan “Fashion and quality at the best price” to summarise the benefits it brings to its customers. In describing its philosophy, H&M expands on its slogan by detailing the three components of its slogan and business concept: Latest fashion, best price, and (high) quality. For each of these components, the philosophy describes some of the bases for being able to offer the intended benefits, e.g. the quality is supported by resources for testing and control.

### HONDA: THE POWER OF DREAMS

It is our mission to improve the lives of customers and communities where we all live, work and play. We will continue to develop and build products in local markets around the world to create value for all of our customers. Our established directions for the 21st century provide a balance of fun for the customer and responsibility for society and the environment. This is demonstrated through advanced technologies such as a humanoid robot and gas-turbine airplane engine. A more familiar example, the S2000 sports car, is a Low-Emission Vehicle that will safely transport you down the highway with 240 horses of driving excitement.

*Table 6-7. Example of strategy solution: Honda’s slogan and strategic vision (Honda, 2003).*
The next example comes from the Japanese company Honda, originally a motorcycle manufacturer but now producing a wide range of motorised products. In Table 6-7, Honda’s strategic vision describing the aims of the business and the benefits it seeks to provide is listed. In addition to its customers, Honda also includes communities and the society in its vision, illustrating an aim for balancing benefits, e.g. between fun and responsibility. The strategic vision also includes two concrete examples of products that demonstrate this balance.

**Generic strategy solutions**

Having seen some examples of specific strategy solutions in the previous section, we will now turn to a number of commonly used generic frameworks that bring together considerations that are supposed to be important for many different businesses. Even if not an entire generic framework is observable in a specific strategy solution, they have often contributed underlying issues and trade-offs. Because of their use as templates and checklists, an awareness of different generic frameworks is a valuable ingredient in understanding the overall landscape of strategy solutions.

Generic frameworks have different focus depending on their background and intended application. In order to give an overview of the differences, we will concentrate on two main dimensions. The first dimension concerns portfolio vs. unit level. In many cases, there are possibilities for focusing on the business both as a collection of parts (the portfolio level) or as a single whole (the unit level). Different strategy solutions have different focus in this dimension, either focusing on the business portfolio or on the business unit. The second dimension concerns external vs. internal emphasis. As the basis for strategy in general can be seen as the interaction between external and internal features, this dimension is about emphasis rather than delimitation. Hence, a strategy solution with a strong external emphasis might also have, less salient, internal components, and vice versa.

On the level of business portfolios, strategy solutions deal with the balance and potential synergies between different business units, often under the heading of corporate strategy. This level emphasises the heterogeneity of the business by treating it as a collection of more or less independent units that together form a portfolio. Although the units often are conceived as different production units, they might as well be seen as different offerings by the business. Strategy solutions on this level focus
on the balance between different units depending on their characteristics. For illustration, two generic frameworks for business portfolios are outlined below, each with a different emphasis along the line from external environment to internal state of affairs.

**Figure 6-11. Characterising the relation between the business and its markets, according to the BCG matrix.**

- Emphasising the external environment, the market position is the focus of the BCG (Boston Consulting Group) growth/share matrix (cf. Fleisher & Bensoussan, 2003). Different markets that the business is operating on are characterised in terms of their growth and the current market share for the business. Figure 6-11 illustrates the market position of three business units (the circles A-C). The size of each circle corresponds to the sales of each business unit.

**Figure 6-12. Ansoff’s growth vectors resulting from different product and market decisions.**

- With an internal emphasis, the investigation of possible ways to grow is the focus of Igor Ansoff’s growth vectors analysis (cf. ibid.). He uses the product/market combination as a prime indicator for the focus of each business. As shown in Figure 6-12, four main strategies are discerned by looking into the choices of developing new products...
and/or new markets. The alternatives range from market penetration, making the best use of existing products and markets, to diversification, where new products are introduced into new markets.

On the level of business units, strategy solutions deal with the advantages sought and the resources required, often under the heading of competitive strategy. This level emphasises the homogeneity of the business by treating it as an undivided unit. Strategy solutions on this level focus on the individual characteristics of the business in relationship with its environment. To illustrate, two generic frameworks for business units are outlined below, each with a different emphasis along the line from external environment to internal state of affairs.

![Five forces of competition in an industry](adapted from Porter, 1980, p. 4).

- The work of Michael Porter (1980), dealing with industry analysis, has a strong external emphasis. He distinguishes between five forces that affect the competitive situation in an industry (cf. Figure 6-13): threat of new entrants, bargaining power of suppliers, intensity of rivalry, bargaining power of buyers, and threat of substitutes. Each of the five competitive forces is influenced by a number of determinants. For example, the intensity of rivalry among industry competitors is influenced by things like industry growth, informational complexity, and exit barriers.

- The components of an electronic business model, as articulated in the area of electronic commerce and Internet business (cf. Timmers, 1998; Afuah & Tucci, 2001/03), have a stronger internal emphasis. A business model in this particular sense is a strategic blueprint how one or more businesses make money. This narrow use of the term business model is in contrast to the wider meaning used elsewhere: that a business model is any model of a business, not necessarily one with a
strategic focus. The business model may comprise a number of elements that influence the possibilities of the business to gain competitive advantage and make money in the long run. As shown in Figure 6-14, this might include the profit site of the business, i.e. its place within the industry’s value network, the value it provides to its customers, and its sources of revenue.

![Diagram of Business Model](image)

**Figure 6-14. Content of electronic business models (adapted from Afuah & Tucci, 2001/03, p. 52).**

**Core elements of strategy solutions**

Having seen examples of different strategy solutions in the previous two sections, we are now in a position to look for common core elements. On the surface, there are of course a large number of differences. The specific solutions come from businesses operating in widely diverse contexts, including different industries, different offerings, different capabilities, etc. The generic frameworks similarly differ in many respects, not only in their different focus in terms of business portfolio vs. business unit and external vs. internal emphasis. However, although the actual content of strategy solutions might be largely different, some common elements can be extracted. These core elements can be seen as the building blocks for strategy solutions, whether specific for particular businesses or in the form of more generic frameworks. On a fundamental level, strategy solutions describe the direction of the business in terms of means and ends, and their influences on each other. Two types of core elements will therefore be discussed in the following.
The first type of core element of strategy solutions is means/ends comprising actual or desired values in the business. The means/ends may be specific as seen in the examples of specific solutions (cf. Table 6-8), or generic as seen in the generic solutions. For example, whereas a specific company might talk about the desired value of a “leading position in the marketplace”, the generic BCG matrix includes the corresponding factor “market share” and its range of values from “low” to “high”. The generic frameworks typically include several factors, or sometimes groups of factors. The SWOT matrix is an exception in this respect, instead focusing on certain factors depending on their current values. For example, it is only if a factor has a poorer value than what is desired that it is included as a weakness in the SWOT matrix.

<table>
<thead>
<tr>
<th>MEANS/ENDS</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>“unbeatable value”, “latest fashion”, “good quality”, “best price”,</td>
<td>H&amp;M</td>
</tr>
<tr>
<td>“few middlemen”, “large volumes”, “extensive experience”, “great</td>
<td></td>
</tr>
<tr>
<td>knowledge”, “efficient distribution systems”, “cost-conscious at every</td>
<td></td>
</tr>
<tr>
<td>stage”, “good working conditions”</td>
<td></td>
</tr>
<tr>
<td>“expansion of business”, “present everywhere”, “good service”,</td>
<td>Danzas</td>
</tr>
<tr>
<td>“new air and sea routes”, “successful operations”, “far-reaching network”,</td>
<td></td>
</tr>
<tr>
<td>“closely meshed network”, “market-oriented organization structure”,</td>
<td></td>
</tr>
<tr>
<td>“optimal fulfilment”, “corporate value”, “leading position in the</td>
<td></td>
</tr>
<tr>
<td>marketplace”, “profitability”</td>
<td></td>
</tr>
<tr>
<td>“lives of customers and communities”, “local markets”, “balance of … and …”, “low-emission vehicle”, “safely transport”</td>
<td>Honda</td>
</tr>
</tbody>
</table>

Table 6-8. Examples of means/ends in strategy solutions.

The second type of core element of strategy solutions is influence relationships between the factor values that are linked as means and ends. Although a strategy solution in theory might contain only a single factor value, the desired goal of the business, it most often contains several. Hence, there are always explicit or implicit relationships between the means/ends. The relationships are directed in that they indicate how a means influences an end, as shown in Table 6-9. That the word “strategies” is used both for ways to reach established goals and for the goals themselves, as mentioned initially, is not surprising given the close link between means and ends. What is considered an end in one context might very well be seen as a means in the next as it really is a question of the relationships with other factors. For example, high profit may one moment be considered an end to means such as low costs, and the next moment considered a means for ends such as global expansion. Hence,
means and ends are closely linked in their development: if you explore one, the other is often likely to be affected.

**INFLUENCE RELATIONSHIPS**

| "to be sure <end> we have <means>“, |
| "we ensure <end> by <means>“ |
| "<means> to enable <end>“, |
| "<means> forms the basis for <end>“, |
| "strengthen <end> by <means>“, |
| "successful <end> are built on <means>“, |
| "because the essential ingredient of <end> is <means>“, |
| "<means> aimed at <end>“ |
| "<means> to <end>“, |
| "<end> is demonstrated through <means>“ |

**SOURCE**

H&M

Danzas

Honda

**Table 6-9. Examples of influence relationships in strategy solutions.**

---

**Techniques for value modelling**

Following the identification of some core elements of strategy solutions in the previous section, we now turn to value modelling as an exploration tool. In addition to knowledge of generic strategies, there is still a need to be able to explore also the particularities experienced when analysing a particular business.

To support exploration of strategy solutions, value modelling facilitates the identification of crucial influences between means and ends and points of leverage. Using different graphical symbols, value models can take many forms. In addition to all unique models, there is a great number of more or less established “languages” – modelling techniques or notational systems – proposed over the years. Depending on what these languages emphasise, some of them can be seen as stressing the value perspectives.

Common to different types of models within the value perspective is a shared focus on the influence between factors, i.e. things that might vary over time and hence influence other things to vary as well. The factors might comprise objectives, goals, strengths, problem, critical success factors, etc, and a value model can thus be seen as an illustration of what is believed to drive the particular business. As value models focus on factors and their influences, they are also referred to as factor models (cf. Tolis & Nilsson, 1996).
In the context of information systems and technology, the value perspective has often been poorly recognised and seen only as a peripheral perspective (cf. Olle et al., 1988/91). Part of the explanation for this might lie in the fact that there are no direct links from value modelling to an actual implemented system, in a similar manner as offered by concept modelling (e.g. entity-relationship diagrams and object-oriented models) for realising the structure of a database, or process modelling (e.g. dataflow diagrams and flowcharts) for realising the behaviour of the system.

However, without an understanding of the underlying values of the business, the other issues loose much of their meaning. For example, knowing what products a business produces, or how it produces them, become more meaningful and useful if one also knows the values that underlie and follow from this. This has been understood by some accounts of modelling perspectives (e.g. Zachmann, 1987; Willars, 1988) who have included value modelling under names such as intention, objective, purpose and motivation – although its theoretical and practical influence use has not always been as salient as that of the other perspectives. Despite a weak position for value modelling in information systems development, the value perspective in general has become increasingly important in the early phases of development, e.g. in the activity of change analysis (cf. Lundeberg, 1993). One important aim of this is to increase the likelihood that an IT system will be used and beneficial to the business.

**Examples of value modelling from different fields**

To examine the possibilities of value modelling, we will present some examples of different types of value models. The examples come from a

* Figure added to illustrate links to chapter 5.
number of different fields outside the realm of traditional strategy analysis, such as information systems, quality control, and quantitative research.

An important ability in all cases of business modelling is to separate what the different symbols mean from how they actually look. It is hence a challenge to recognise when two different symbols have the same meaning, and when two similar symbols actually mean very different things. As all examples share the value perspective, they all make use of the core elements of factor values and means/ends relationships – although in different ways and with quite different symbols.

![Diagram](image)

**Figure 6-16. Example of problem graph (adapted from Röstlinger & Goldkuhl, 1988, p. 37).**

- Problem and goal graphs are two related techniques used before commencing development of a new information system (cf. Röstlinger & Goldkuhl, 1988). Figure 6-16 shows a partial example of a problem graph illustrating the problems in a purchasing department of a large organisation. Each box represents a problem, and an arrow indicates a causal relationship between two problems. For example, one important cause of the problem that damaged goods is handled as if it was OK, is the problem that damages are not discovered as soon as possible. This latter problem is itself caused by three other problems as indicated in the graph. By extending the chain of causes in this way, root causes of problems are sought. In a similar manner, goals of an organisation are illustrated by means of a separate goal graph.
Causal Loop Diagrams (cf. Senge, 1990/94) build on the work by Forrester (1961). This type of model lacks specific current or future values. As the name implies, causal loop diagrams often have a strong emphasis on circular chains of influence and feedback loops (cf. Richardson, 1991). In the example, the development of new products in an organisation is explored. The number of new products is influenced both by the R&D budget as well as the product development time. Whereas there is a reinforcing loop on the left-hand side (illustrated by the snowball), there is a balancing loop on the right-hand side (illustrated by the scales).

Figure 6-17. Example of causal loop diagram (adapted from Senge 1990/94, p. 97).

Figure 6-18. Example of fishbone diagram (adapted from Ishikawa, 1976, p. 21).
Fishbone Diagrams are often used in areas of quality work, in particular Total Quality Management and many Japanese approaches. Fishbone diagrams focus on a single end, and explore the means influencing it (cf. Figure 6-18). The structure is normally a simple hierarchy, neglecting more complicated relationships, including feedback loops. The example depicts a number of causes for the wobbling of a particular machine. The causes are grouped into four larger categories: Workers, materials, inspection, and tools. From the diagram, one can learn that causes may range from the training of the workers to the “punch width” of the “F axle cover.”

![Diagram showing Fishbone Diagram](image)

**Figure 6-19. Example of causal research model (adapted from Pfeffer, 1981).**

Causal Research Models are widely used in research contexts. Especially in quantitative research, this is the predominant perspective used, explicating the research area in terms of a model with independent variables influencing a dependent variable (cf. the right-hand side of Figure 6-19). Using the label variance theory for what is here called causal research models, Mohr (1982) describes the situation as “the variance-theory outlook dominates thinking about theory by scientists, philosophers, and the general public, even though the variance-theory form does not in practice dominate theory itself” (ibid., p.45; emphasis in original). When used as input for business modeling, the research model might be too general, not taking the particular circumstances of the actual business into account. It is also lacking specific current or future values.
**Characteristics of the techniques**

Although sharing the value perspective, the value models examined above differ in several respects. Corresponding to the core elements of strategy solutions identified earlier, one way to characterise the differences is by looking closer on the nodes of the models, and how they are related (cf. Figure 6-20).

<table>
<thead>
<tr>
<th>Linear</th>
<th>RELATIONSHIP STRUCTURE</th>
<th>Circular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particular</td>
<td>Problem graphs</td>
<td>Cognitive maps</td>
</tr>
<tr>
<td>NODES</td>
<td>Goal graphs</td>
<td>Fishbone diagrams</td>
</tr>
<tr>
<td>General</td>
<td>Research models</td>
<td>Causal loop diagrams</td>
</tr>
</tbody>
</table>

Figure 6-20. Summary of distinctive characteristics of different types of value models.

Starting with the relationships, they can form a structure that can be characterised as either linear or circular. In a linear structure, there are chains of influences leading from one or more means to one or more ends. In a circular structure, the distinction between means and ends is further weakened by feedback loops where a node may ultimately influence itself. However, there is often nothing inherent in the model types themselves that limit the relationships in each case to either linear or circular. Instead, it is the underlying ideas and context of the use of each model type that rather strongly suggest one of the two. Going back to the strategy solutions examined, there was a strong emphasis on linear hierarchies rather than circular relationships where factors influence themselves through smaller or larger loops.

Continuing with the nodes, these can either be particular or general, depending on if they include specified values or not. Examples of specific nodes can be found in problem and goal graphs (cf. Figure 6-16), e.g. “damage not discovered at arrival control”. Examples of general nodes are found in most of the other examples such as the research model in Figure 6-19, e.g. “Importance”. In the exploration of strategy solutions, specific nodes have two consequences. First, it runs the risk of introducing duplicate work in problem and goal graphs. For example, a
goal graph might well have the corresponding goal that damage is indeed discovered at arrival control. Second, the graphs become almost entirely time-dependent. When things change in the business, what used to be considered a problem might now have changed into a strength, and a previous goal might have been reached. However, compared to general nodes, specific ones can be easier to get hold of – whether from text or during an interview.

Conclusions

This chapter has elaborated on the exploration of strategy solutions using value modelling. Two kinds of strategy solutions have been examined, encompassing ideas and things dealing with the direction of a business, e.g. strategies, goals, objectives, etc. First, specific strategy solutions in the form of brief slogans as well as more elaborated direction statements for individual businesses. Second, generic strategy solutions in the form of strategy frameworks for business units and portfolios. Following the different examples, two core elements of strategy solutions were identified: means/ends and influence relationships.

In the second part of the chapter, value modelling was presented and illustrated with examples of different modelling techniques. Value models were shown to support identification and analysis of relationships between business problems, strengths and goals. Despite low attention for this perspective in the context of information systems, examples of value modelling techniques were found in widely different fields of inquiry. In relation to the core elements of strategy solutions, two key differences among the techniques were presented. The first difference concerned the focus on particular values vs. general factors; the second dealt with the focus on linear hierarchies vs. circular loops.

Through an awareness of the characteristics of different techniques, value modelling provides a tool that is particularly appropriate for exploring strategy solutions of a business. By focusing on key factors and their influences, value modelling provides a foundation for informed strategic analyses and activities.
Chapter 7

Process Modelling for Exploring Operations Solutions

The operations of a business are crucial to its existence. To facilitate the management and improvement of operations, this chapter elaborates on process modelling for exploring operations solutions. Operations solutions is used as a general term encompassing the different ways a business creates value for its stakeholders, through tasks, activities, routines, procedures, processes, etc. The first half of the chapter deals with different operations solutions that can be distinguished in a business. Here four sets of alternative operations are presented and examined in order to arrive at core elements: supplier vs. customer, horizontal vs. vertical, products vs. services, and material vs. immaterial. In the second half of the chapter, different process modelling techniques, e.g. flow charts, process graphs, and action workflows, are analysed and contrasted. Resulting from the analysis, two key differences among the different techniques are discussed in the light of the core elements of operations solutions. The first difference concerns the focus on behaviour vs. transformation; the second concerns the focus on needs vs. supplies.
Introduction

It is through clever operations that the business can make the most of available resources in providing benefits for the stakeholders involved. For this reason, managing and improving current solutions for business operations is top priority for people concerned with the business’ success and survival. This includes people developing and managing information systems, as a thorough understanding of the operations is an important prerequisite for providing valuable support for the business (cf. Lundeberg, 1993; Checkland & Holwell, 1998). Especially in the light of increased interorganisational collaboration, the understanding needs to go beyond the individual business, and also cover what goes on at customers, suppliers, and other external stakeholders (cf. Håkansson & Snephota, 1989; Venkatraman, 1994).

Figure 7-1. Exploring operations solutions in the business using a process perspective.

Among available tools for understanding and changing operations, process modelling deals with models that focus on what happens in a business (cf. Tolis, 1999*). Process issues became widespread through management ideas such as business process reengineering and process management (Davenport & Short, 1990, Hammer, 1990; Steneskog, 1991), although its roots go back longer (cf. Earl, 1994). Complementing the vast literature focusing on models of development work such as methods or methodologies (cf. Kettinger, Teng & Guha, 1997; Werr, 1999), the focus here is on techniques for using and producing process models of the business itself. Hence, this chapter looks at process perspective in general and how it can be of help in making sense of what’s going on in a

* Included as chapter 2 in this thesis.
business. The aim of this chapter is to elaborate on process modelling as a tool for exploring operations solutions (cf. Figure 7-1).

Operations solutions is a general term encompassing the different ways a business creates value for its stakeholders, whether directly or indirectly, and independently of any organisational units. “Operations” is thus used in a wide sense for the work that goes on in a business, e.g. in the form of business activities, tasks, routines, procedures, processes, etc, and not only limited to the workings of a main production or operations unit. This is a wider definition than in many treatments of operations management, which emphasise operations as a specific function (cf. Slack et al., 1995/2001, p. 18), or at least do not place equal emphasis on other business functions, such as marketing and sales (cf. Brown et al., 2000).

The chapter is structured as follows. In the first half, different aspects of operations solutions are considered in order to give an overview of the diversity available. Thereafter, a number of process-modelling techniques are examined, and their characteristics as tools for exploring operations solutions identified. The chapter is concluded with some implications for using process modelling for managing and improving business operations.

The diversity of operations solutions

In one sense, the operation of each business is unique. There are always specific details that differ from one business to another, even if there are a number of similarities. Such specific operations solutions can be studied for particular businesses, e.g. for reasons of benchmarking between businesses in different industries, markets, etc.

Existing operations solutions might be the result of explicit design or more implicit evolution of the business. Similar to the distinction between espoused theories and theories-in-use (Argyris & Schön, 1974), explicit solutions are articulated and deliberate whereas implicit solutions are tacit and emergent. As with other types of business solutions, there is a reciprocal interplay between these two types of operations solutions. In addition to rational design and structuring, there are many other determinants that contribute to the way operations are in a business, such as power and politics, commitment and feelings, and culture and symbols (cf. Bolman & Deal, 1991).
In addition to specific solutions that are unique for a particular business, there are more generic solutions that are relevant for a range of businesses. With an understanding of such general patterns for business operations, many individual characteristics become easier to identify and value. Generic solutions have different focus depending on their background and intended application. In the following, some common operations solutions will be briefly introduced to better appreciate the range of alternatives available. In order to give an overview of the differences, the selection has been made according to two main dimensions that are used to characterise different operations solutions: subject-object and external-internal (cf. Figure 7-2).

Subject vs. object. Operations solutions either focus on the actors that participate in the operations, or on the “things” (in a wide sense) that are handled by the operations. This distinction between subject and object has its roots in philosophy and is especially evident in the analysis of language. For example, sentences like “the hairdresser cuts the hair”, points to two ways of specifying the operations: either focusing on the subject (e.g. cutting by different hairdressers) or on the object (e.g. cutting of different types of hair). Rather than implying a philosophical dichotomy, the distinction is more pragmatically used to distinguish a focus on “who” vs. “what” in relationship to the operations, and has previously been used to describe different focus of process-modelling techniques (Tolis & Nilsson, 1996*).

* Included as chapter 5 in this thesis.
External vs. internal. As operations solutions comprise components that are both external and internal to the business, this dimension is about emphasis rather than delimitation. Hence, an operations solution with a strong external emphasis might also have, less salient, internal components, and vice versa. As discussed by Ventatraman (1994), the scope of business transformation can vary from an internal focus of local changes to an external focus of redesigning the larger network and rethinking the business idea (i.e. specifying the relevant network).

**External subject operations – Who is collaborating?**

Operations solutions with a focus on external subjects concern the collaboration with actors outside the business, i.e. external stakeholders. The operations are affected by the involvement of different actors, so that different solutions are required to support or enable effective and efficient execution. An important distinction regarding this has to do with the difference between supplier and customer operations. Supplier operations concern the business’ supply side, and are often the focus of supply chain management (cf. Slack et al., 1995/2001). Customer operations, on the other hand, concern the business’ demand side, and are often the focus of customer relationship management (cf. Grönroos, 1990/2000). Table 7-1 contains some examples of supplier and customer operations. The contents of this and the following three tables are provided as illustrations, and do not constitute any complete enumerations.

<table>
<thead>
<tr>
<th>Supplier operations</th>
<th>Customer operations</th>
</tr>
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<tbody>
<tr>
<td>Supplier co-production</td>
<td>Customer co-production</td>
</tr>
<tr>
<td>Parts inventories</td>
<td>Finished-products</td>
</tr>
<tr>
<td>Sub-assemblages</td>
<td>Tailoring and adjustments</td>
</tr>
<tr>
<td>Managing suppliers'</td>
<td>Managing customers'</td>
</tr>
<tr>
<td>suppliers</td>
<td>customers</td>
</tr>
<tr>
<td>Participation in developing new offerings</td>
<td>Participation in developing new offerings</td>
</tr>
</tbody>
</table>

*Table 7-1. Examples of different supplier and customer operations.*

The business environment contains a number of external actors, which in different ways are involved in the operations of the business. Work for, and together with, external actors such as suppliers and customers, can take many forms, and the operations solutions vary accordingly. Through
its offerings, the business can relieve its customers of operations that they already perform, or enable them to perform new operations (Normann, 2001, pp. 73-74). Conversely, the business can turn to its suppliers to be relieved or enabled. Moreover, different types of external actors – e.g. consumers (physical persons), private businesses, and governmental agencies – all exhibit different characteristics and require appropriate operations.

Over time, the borders between internal and external operations change. Through vertical integration, a business may acquire operations from its suppliers or customers, and thereby extending its share of the larger operations network (cf. Slack et al., 1995/2001, pp. 156-159). Through outsourcing, it may instead sell operations, often relating to information systems or other parts that are seen as non-strategic utilities (cf. Lacity & Hirschheim, 1993). Furthermore, interactions with suppliers and customers can vary between one-time transaction to long-term relationships. Especially in the latter case, more partner-like interactions may develop, borrowing characteristics from both suppliers and customers relationships. Such partnerships can take the form of alliances, joint-ventures, and other long-term agreements. Businesses partnering to form dynamic entities are often referred to as virtual/network/extended corporations/ organisations/enterprises (cf. e.g. Davidow & Malone, 1992).

**Internal subject operations – Who is involved?**

Operations solutions with a focus on internal subjects concern the activities of actors within the business. The operations are affected by the division of labour that exists, so that different solutions are required to support or enable effective and efficient execution. An important distinction regarding this has to do with the difference between horizontal and vertical operations. Using terms influenced by a traditional organisational pyramid, horizontal operations provide what the business offers to its customers whereas vertical operations control and support the horizontal operations. Mintzberg (1979, pp. 18-19) refers to the two as the operating core and the administrative component, respectively. Table 7-2 provides some examples of each type.
The division of labour that makes up an organisation’s structure can rationally be seen as filling two functions: to derive at delimited and specialised parts, and to provide for the coordination between those parts (Mintzberg, 1979, p. 2). Who is involved in performing various parts of the operations is clarified by the organisation and structuring of the business. The overall distinction between horizontal and vertical operations provides a rough indication of the general roles for different operations: without horizontal operations, the business would not be of value for its customers; without vertical operations, it would be of less value, at least eventually. Among existing categorisations of organisational structures, many make this type of general distinction, e.g. Porter’s (1985, p. 38) separation of primary and support activities.

As the distinction between horizontal and vertical operations is dependent what the business offer to its customers, the same operation can be of different type depending on the actual business. For example, meal preparation for a restaurant’s customers is a horizontal operation whereas meal preparation for a bank’s employees is a vertical operation. However, it can be argued that meal preparation in the two cases is not – and should not be – “the same” operation, precisely because it differs in relation to the customers of the business. It is particularly the distinction between supporting vertical operations (rather than controlling) and horizontal operations that is subject to the concrete situation. One example of a change occurring over time is the role of IS operations in a bank: from its supporting role in the early days of computing, to its core role for horizontal operations in today’s Internet banks. Using terms from the strategic grid model (McFarlan et al., 1983), the strategic impact of existing systems in this case has changed from low to high.

<table>
<thead>
<tr>
<th>Horizontal operations</th>
<th>Vertical operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouse logistics</td>
<td>Strategic management</td>
</tr>
<tr>
<td>Product assembly</td>
<td>Reporting and auditing</td>
</tr>
<tr>
<td>Operating production machinery</td>
<td>Business development and improvement</td>
</tr>
<tr>
<td>Advertising and marketing</td>
<td>Developing new offerings</td>
</tr>
<tr>
<td>Customer support</td>
<td>Hiring employees</td>
</tr>
</tbody>
</table>

Table 7-2. Examples of different horizontal and vertical operations.
External object operations – What is offered?

Operations solutions with a focus on external objects concern the handling of “things” in respect to customers and other external stakeholders. The operations are affected by the type of object transfers that takes place, so that different solutions are required to support or enable effective and efficient execution. An important distinction regarding this has to do with the difference between goods and services. In ideal form, goods operations involve transferring the ownership of existing “things” from the business to its customers, e.g. cars are sold. In service operations, this does not happen, and the “things” handled remain the property of the initial owners (cf. Grönroos, 1990/2000, pp. 47-49; but disregard his mistaken counter-example). Table 7-3 contains some examples of the two types of operations solutions.

<table>
<thead>
<tr>
<th>Goods operations</th>
<th>Service operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading sport convertibles</td>
<td>Haircuts</td>
</tr>
<tr>
<td>Selling hot dogs</td>
<td>Bank deposits and withdrawals</td>
</tr>
<tr>
<td>Giving away music CDs</td>
<td>Apartment rentals</td>
</tr>
<tr>
<td>Retailing pet snakes</td>
<td>Book translations</td>
</tr>
<tr>
<td>Ring signals for mobile phone</td>
<td>Financial advice</td>
</tr>
</tbody>
</table>

Table 7-3. Examples of different goods and service operations.

Despite a large proportion of service operations in most industries, ideas and concepts from goods operations and traditional production have historically been dominant. This is for example shown by the habit of lumping together goods and services, often referring to the offerings as “products”. Rather than the exact distinction, appreciating the differences between goods and service operations stress an external focus and a view beyond the individual business. Quoting marketing professor Theodore Levitt, that people do not buy “quarter-inch drills but quarter-inch holes”, Grönroos emphasises that “customers do not look for goods or services per se; they look for solutions that serve their own value-generating processes” (Grönroos, 1990/2000, pp. 4, 18). Not restricted to customer relationships, goods and service operations also apply towards other external stakeholders, such as suppliers and partners.
There are several characteristics that differ between goods and service operations, and the division is not always clear-cut. Furthermore, most businesses offer a combination of the two. Some of the differences suggested are that services generally, in contrast to goods, are intangible, cannot be stored, are heterogeneous, cannot be mass-produced, are produced and consumed simultaneously, have high customer contact/interaction, are processes/activities, cannot be transported, have facilities located near to customers, are labour-intensive, and have quality that is difficult to judge. (Grönroos, 1990/2000, pp. 47-49, Slack et al., 1995/2001, pp. 13-16, Brown et al., 2000, pp. 19-24).

**Internal object operations – What is handled?**

Operations solutions with a focus on internal objects concern the handling of “things” within the business. The operations are affected by the type of objects that are dealt with, so that different solutions are required to support or enable effective and efficient execution. A key differentiator in this respect is the distinction between operations handling material or immaterial objects. Material objects are objects that are important in themselves whereas immaterial objects are important for what they represent. As the physical form is important for material objects but not for immaterial, the distinction is sometimes referred to as physical vs. virtual (Rayport & Sviokla, 1995). Some examples are given in Table 7-4.

<table>
<thead>
<tr>
<th>Material operations</th>
<th>Immaterial operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading sport convertibles</td>
<td>Bank deposits and withdrawals</td>
</tr>
<tr>
<td>Selling hot dogs</td>
<td>Book translations</td>
</tr>
<tr>
<td>Haircuts</td>
<td>Giving away music CDs</td>
</tr>
<tr>
<td>Apartment rentals</td>
<td>Financial advice</td>
</tr>
<tr>
<td>Retailing pet snakes</td>
<td>Ring signals for mobile phone</td>
</tr>
</tbody>
</table>

*Table 7-4. Examples of different material and immaterial operations.*

The consequences for operations become evident in the course of modifying, transporting, reproducing, etc, when material and immaterial objects require different treatment. Following the increased use of digital computers, more and more objects are being treated as immaterial, e.g. when making mail, books, and music available electronically on the
Internet (cf. Normann, 2001 for other effects of this “dematerialisation”). However, the physical form is seldom totally arbitrary, not even for immaterial products: Although it’s the specific combination of “ones” and “zeroes” that make up the computer program Microsoft Excel, most people nowadays prefer it delivered on a CD-ROM rather than on 5 1/4” disks. Furthermore, even if humans share the importance of physical form, there are other reasons for separating living objects from other material objects. People, animals, plants, etc place other requirements on the operations solutions than non-living objects. Roughly the same distinction is made by Slack et al. (1995/2001, pp. 10-13) using the three categories material, information, and customers.

Different parts of a business’ operations often handle various types of objects. Even if the business manufactures furniture (material objects), much of its marketing and product development operations deal with immaterial objects such as documents and specifications. In a similar vein, the provision of electronic services (immaterial objects) requires the purchase and installation of physical equipment such as computers and technological infrastructure. Hence, the distinction is relevant to all parts of the business, and irrespectively if the business mainly provides goods or services to its customers.

**Core elements of operations solutions**

Above, four examples of the diversity of operations solutions have been described. The four examples concerned subjects collaborating externally, subjects involved internally, objects offered externally, and objects handled internally. Through different alternatives presented in the examples, some of the more salient characteristics and issues regarding business operations are illustrated – issues that are solved in different ways in specific operations solutions, and need to be resolved in the design of new operations solutions. Moreover, the examples shed further light on the core elements recurring in different operations solutions:

- **Operations**: In various ways, all the examples had to do with business operations, i.e. what is going on in a business and its environment. Noticeable is how operations are described with different focus, and in different levels of detail. Activities, actions, tasks, processes, and functions are some of the terms used for delimited operations. Closely linked to the question of dividing operations into delimited parts, is the question of how these in turn connect to each other, i.e. their relationships.
• **Objects**: The objects that are handled in, and offered through the operations, is a second core element of many operations solutions. Although especially apparent in the two examples that focused on objects, also subject-focused solutions may need to take objects into account, e.g. to clarify what different actors work with. Objects can also be referred to as products, offerings, matter, substance, and things.

• **Subjects**: The subjects collaborating and involved in the operations, is a third core element. Most clearly, this was shown in the two examples focusing on subjects, but also object-focused solutions may need to explicitly include subjects, e.g. to specify who work with what. Including both physical people and more abstract roles or organisational units, subjects can also be talked about as actors, agents, and performers.

**Techniques for process modelling**

Having discussed key aspects of operations solutions in the previous section, a sample of techniques for process modelling will be presented in this second half of the chapter, and their applicability for exploring operations solutions characterised. Process modelling is about using and producing process models, i.e. models that focus on what happens in a business. This in contrast to content models, such as categories/concept and factor/value models, which instead have a non-temporal focus on what is in a business (cf. Tolis, 1999*).

Process models can take many forms depending on what particular aspects of the business that are emphasised, and how these aspects are represented. Such models include those focusing on transformation as well as on behaviour (cf. Figure 7-3). The techniques have been selected according to a shared emphasis on processes, and also to illustrate the wide range available. This means that among a group of similar techniques, only one representative has been selected. In the context of developing business processes, various techniques and tools are available (cf. Kettinger, Teng & Guha, 1997), although not all embody a process perspective.

* Included as chapter 2 in this thesis.
Different process modelling techniques have been developed in diverse areas, and the five shown in Table 7-5 have been selected to give an indication of the existing variety. The actual selection is not crucial, especially since there are a number of more or less different alternatives available. However, all selected techniques are well known and used in their respective area, and all share the process perspective, although exhibiting large individual variation, as evident when examined more closely below.

<table>
<thead>
<tr>
<th>MODEL TYPE</th>
<th>PREDOMINANT CONTEXT OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowcharts / UML Activity Diagrams</td>
<td>Information systems development</td>
</tr>
<tr>
<td>Process graphs</td>
<td>Business process development</td>
</tr>
<tr>
<td>State transition diagrams / network diagrams</td>
<td>Management science</td>
</tr>
<tr>
<td>Role Activity Diagrams</td>
<td>Business process development</td>
</tr>
<tr>
<td>Action workflows</td>
<td>Organisational development</td>
</tr>
</tbody>
</table>

*Table 7-5. Type of process modelling techniques and their main fields of use.*

* Included as chapter 5 in this thesis.

**Figure 7-3. Illustrating the process perspective in relationship to four common perspectives (adapted from Tolis & Nilsson, 1996*).**
Flowcharts / UML Activity Diagrams

Flowcharting is one of the original techniques used for describing the logic of information systems and surrounding activities. In more recent development approaches, UML activity diagrams (cf. Eriksson & Penker, 2000) has appeared as a developed version of flowcharts. Whether performed by people or computers, flowcharts describe the flow of activities from beginning to end. Alternative routes among the activities can result from different conditions being met or decisions being made.

![Flowchart Diagram](adapted from Eriksson & Penker, 2000, p. 43).

The example in Figure 7-4 shows an iterative systems development process comprising five activities, beginning with requirement analysis and ending with delivery. As shown by the diamond signs after three of the activities, the process might either continue forward or iterate back to a previous activity, depending on the decisions made at those points. The sequence of activities is explicitly described by the model, so that any iteration must be specifically indicated.

Process graphs

Process graphs (Steneskog, 1991) describe business processes in terms of a transformation of inputs into outputs that are of value for a customer. Each step of the process uses one or more inputs to create one or more outputs. These outputs are in turn used as inputs for the next step of process, leading to a further refinement and value-adding.

In Figure 7-5, a partial example of the handling of customer orders in a company is illustrated. The process graph shows how the initial input, in the form of a “Customer order”, is used to create various intermediate results, and ultimately two outputs of direct value to the customer:
“Order confirmation” and “Delivery to customer”. Although not shown in this specific example, the actors that perform the work are often indicated below each process step. As the focus of the technique lies on transformation of input into output, the specific sequence of activities for a particular actor is only indirectly described by the process graph. Any and all iterations that might occur are covered by the graph as long as the actual transformations are not altered.

State transition diagrams / network diagrams

State transition diagrams (STD) are used to show how a system can move between different states by means of certain events or activities. The system studied may vary from specific computer programs to large organisations. In the areas of management science and project management, specific techniques have been developed to analyse and specify projects and other goal-directed activities (cf. Eppen, Gould & Schmidt, 1984/87). Two of the most common are project evaluation and reporting technique (PERT) and critical path method (CPM), both of which are often visualised in network diagrams of the state-transition type.

Figure 7-6 shows an example of a move to a new factory site. A total of 10 activities labelled A-J are required to complete the move by shifting from the initial state 1 to the final state 8. For example, the move starts by selecting the office site (A) and creating an organisational and financial plan (B). The dotted arrow between state 4 and 2 represents a fictitious activity that does not require any resources or time to complete. It is added in order to correctly show that activity D require the completion of both A and C before it can commence; although F only require that C has completed.
Role Activity Diagrams

Role activity diagrams (RAD) have been developed to analyse business processes (Ould, 1995). It places particular emphasis on the interaction between different roles in a business. A role involves a set of activities which carry out a particular responsibility (ibid., p. 29), and should not be confused with either job titles or organisational departments.

A partial example of a RAD is shown in Figure 7-7, illustrating the activities of two roles – designer and manager – when carrying out a design project based on some “terms of reference” (TOR). The black boxes denote activities that a role performs individually, whereas the horizontally connected white boxes indicate interactions where different roles have to synchronise in order to perform. In the example, the designer, after agreeing on the TOR, chooses an appropriate method and
prepares an estimate that is given to the manager in exchange for a plan. Triangles pointing upwards indicate the start of concurrent activities whereas those pointing downwards denote alternative paths depending on a specified situation. Thus, should the design be found not ok in the example, another round through the activity of producing a design will be performed.

**Value chains**

Through the influential work of Michael Porter (1985), businesses have been characterised as value-adding chains that manage to create a margin by performing the required activities at a lower cost than the value for the customer. The business is described in terms of five primary activities and four support activities. The primary activities consist of inbound logistics, operations, outbound logistics, marketing and sales, and finally service. Contributing to each of the primary activities, the support activities provide assistance in terms of firm infrastructure, human resource management, technology development, and procurement.

In Figure 7-8, an example of value chain for a copier manufacturer is shown. The primary activities include discrete activities such as inbound material handling and inspection (inbound logistics), assembly and fine tuning & testing (operations), and order processing and shipping (outbound logistics). Advertising promotion, and sales force (marketing and sales) make sure that people buy the copiers and service reps and spare parts systems (service) take care of any events after the sale is completed. The support activities include firm infrastructure as well as training and recruiting (HRM), design of systems and machines, IS development, market research, and service manuals (development), and acquiring
transportation services, materials, services, travel, and spare parts (procurement).

**Action workflows**

Building on speech act theory as developed by Austin (1962) and Searle (1969), the theoretical foundations of language-as-action (cf. Winograd and Flores, 1986) emphasise the role of language and communication in everyday work activities. Developed out of the linear “basic conversation for action” (Winograd & Flores, 1986, p. 65), action workflows consist of loops that describe the building and resolution of commitment between two parties: the customer who wants something done, and the performer who makes this happen. Each workflow loop is divided into four phases: proposal, agreement, performance and satisfaction (Medina-Mora et al., 1992). Depending on problems with communication, any loop can break down before it is completed.

*Figure 7-9. Example of Action Workflow loop (adapted from Medina-Mora et al., 1992, p. 284).*

The example in Figure 7-9 illustrates the process of managing a candidate review as requested by the director and performed by the manager. Shown slightly larger near the centre of the figure, the main loop titled manage candidate review is surrounded by three connected loops, detailing three of the four phases of the main loop. For example, in the third phase of the main loop (performance), the manager in turn requests the technical directors reviewing the candidates to submit evaluation forms. The main loop ends through the fourth phase (satisfaction), where the manager declares the assessment of candidates, hopefully to the satisfaction of the director.
Characterising the techniques

As can be seen from the previous sections, the various techniques for process modelling differ in many ways, not only in the symbols being used. Each technique focuses on specific details of the operations at the expense of others. In order to better appreciate the options available when exploring business operations, a characterisation of the main differences can be helpful. In relation to the core elements of operations summarised in the first half of the chapter, the main differences lies within two dimensions: the nature of the nodes that form the basis for each technique, and the structure of the relationships that link the nodes together.

- The first difference concerns the focus on *behaviour* vs. *transformation*. As discussed in Tolis & Nilsson (1996*), behaviour models, focus on the activities performed by the actors in the business. This means that, apart from the indicated iterations, a behaviour model does only cover the direct sequence indicated. Transformation models, on the other hand, focus on how the objects of the business are used and produced, and only implicitly show the sequence of activities that the actors perform.

- The second characteristic concerns the focus on *needs* vs. *supplies*. Here the techniques differ in what is considered the start of a process. With a focus on needs, the process start with the request, order or other expression of demand that triggers the process. With a focus on supplies on the other hand, the start instead becomes the raw material that is needed in the process.

Using different names, all the techniques provide different ways of representing the operations. Most provide a certain amount of freedom regarding the level of detail. In relation to the examples of operations solutions given in the first half of the chapter, transformation models place a stronger emphasis on the objects whereas behaviour models focus more on the subjects. Needs and supplies models represent two alternative ways of selecting a subject/object to start the process, and thus emphasise different ways of moving between the external and the internal of the business.

* Included as chapter 5 in this thesis.
Figure 7-10 illustrates the two characteristics discussed. Each of the presented techniques is placed in a position that indicates its relative focus concerning nodes and relationship structure. For example, the nodes of process graphs have a strong emphasis on transformation of input into output. At the same time, its relationship structure starts with customer needs, often represented by an order or a request of what is needed. In contrast, the nodes of flowcharts focus on behaviour and their relationship structure is more undefined; flowcharts models are commonly used for describing either how material is being used, or how orders are handled.

Conclusions

Following the aim of this chapter, to elaborate on process modelling as a tool for exploring operations solutions, two main parts have been covered. First, the diversity of operations solutions was illustrated in terms of four different kinds of generic solutions. This type of general overview of the topic for exploration is for providing a basis for discussing the tools for exploration. Second, a selection of tools in the form of process-modelling techniques was presented. Being used in different contexts, these techniques exhibited different characteristics to bear on the exploration. Not neglecting the effects of different assumptions underlying users and producers of models (Tolis, 1999*), this chapter focuses on the actual modelling techniques and the general meaning of the models produced accordingly.

* Included as chapter 2 in this thesis.
For conclusions, the different process-modelling techniques were found to emphasise certain aspects of the operation solutions. In particular, techniques based on transformation nodes focus on object operations, whereas those using behaviour nodes instead focus on subject operations. One implication of this is that flowcharts and other behaviour models are more appropriate, if the actual sequence of activities for a business actor is important. For better or worse, a behaviour model specifies the operations from the subject’s point of view, while downplaying the fate of the objects handled. Process graphs or other transformation models, on the other hand, leave the actor with a larger degree of freedom concerning the sequence of his/her behaviour, as long as the transformation of objects proceeds as described.

Another conclusion concerns how techniques that have a relationship structure starting with supplies are congruent with much traditional thinking on goods production. Techniques that instead start with needs place a stronger emphasis on the stakeholder that initiates the operation, matching the growing focus on customer-orientation that often goes hand-in-hand with service offerings. However, for many techniques, this characteristic is not as strong as the different types of nodes – it is often based more on suggested use and examples, than on more formal specifications. It can therefore be seen as a less significant deviation if using a process graph to track supplies (rather than needs) than if using it to model behaviour (rather than transformation). Still, considering the relationship structure is one way to reflect on which type of operations that is most appropriate to follow – those starting with raw material and other supplies, or those starting with the needs of customers or other stakeholders.

Practical implications of this chapter lie mainly in the support for evaluating the use of different modelling techniques, and in selecting appropriate techniques depending on what aspects of the operations solutions that are at stake. Theoretical implications lie mainly in relating modelling characteristics to operations issues, and clarifying the process perspective in exploring operations solutions.
Chapter 8

Chapter 8

Concept Modelling for Exploring Information Solutions*

Through clever use of information solutions in a wide sense, a business can facilitate its operations and promote its strategies. However, as careful considerations are needed to understand and leverage the concept structures involved, the aim of this chapter is to elaborate on concept modelling for exploring information solutions. In the first main part of the chapter, different types of information solutions are presented and discussed to clarify key characteristics, based on the dimensions of personalised-codified and external-internal to the business. The second part examines a number of concept modelling techniques, including OPR models, UML class diagrams, semantic nets, organisational charts, and computer network diagrams. In different ways, these techniques enable a bottom-up analysis of the concept structures embedded in the information solutions of the business. In the third and final part of the chapter, two main distinctions among the modelling techniques are discussed against the requirements of information solutions. The first distinction concerns the focus on singular concepts vs. concept types, and the second on hierarchical vs. lateral relationships.

Introduction

Knowledge, information, and data can be key resources for any business. Their development and value are closely linked to issues of learning and innovation. As Stata (1989, p. 64) argues, “the rate of which individuals and organizations learn may be the only sustainable competitive advantage, especially in knowledge-intensive industries”. Partly influenced by rhetoric and current trends, there has been a gradual shift over the last decades from “data” to “information” and “knowledge” as the focal point for management’s attention. However, one salient aspect of the shift has been the increased focus on intangible characteristics and the need to acknowledge and deal with organisational and strategical challenges. Despite being utilised and appreciated for long in practice, “explicitly recognising knowledge as a corporate asset is new, however, as is understanding the need to manage and invest it with the same care paid to getting value from other, more tangible assets” (Davenport & Prusak, 1998/2000, p. 12).

In this chapter, *information solutions* is used as a general heading for organised resources of knowledge, information and data – whether they are based on people, practices, systems, and/or technologies. Through innovative use of appropriate information solutions, the business can provide not only support for the daily operations, but also valuable foundations for long-term strategies. Depending on the setting, information solutions have important roles to fill both within limited parts of a single business, and in a larger business network involving interorganisational collaboration (cf. Venkatraman, 1994).

**Figure 8-1. Two linked systems entailed by information systems (Checkland & Holwell, 1998, p. 111).**

Drawing on the concept of information system, Figure 8-1, illustrates the involvement of both purposeful actors and the serving of their information needs (Checkland & Holwell, 1998). In a similar vein, Langefors
(1966/73, p. 199) describes an information system as an auxiliary to its “object system” that it is to serve or control. Depending on the particulars of a specific business, the significance of the support provided may range from “nice to have” to absolute crucial. Overall, in order to identify and handle challenges related to information solutions, a multitude of different tools are available that facilitate knowledge management and other initiatives.

The purpose of this chapter is to elaborate on concept modelling as a specific tool for exploring information solutions. Through concept modelling, existing information solutions can be analysed and new ones designed. To achieve its purpose, the chapter is divided into two main parts. First, different types of information solutions are discussed to outline a principal area of exploration. Second, a selection of concept-modelling techniques is examined to clarify the scope of the focused tool. The chapter is concluded with an elaboration of concept modelling for exploring information solutions.

The diversity of information solutions

Information solutions in different forms involve things and ideas for what they represent rather than what they are in themselves. In contrast to other resources, information and information solutions are about something. For example, knowledge about production, information about long-range plans, and data about machine configurations can all be crucial components of a business’ information solutions. In contrast to some author’s more delimited use of the term “information”, I use it here in a wide sense to encompass everything that has meaning beyond itself. With this view, a document contains information, and information is what a person gets when reading the document. Information is what informs (source) and well as what is derived (result).

Many discussions about information – both in academia and in practice – also involves talking about data and/or knowledge. In academia, the distinctions are emphasised although the same terms are defined in different ways (Checkland & Holwell, 1998). In some cases, information is seen as data that have been interpreted by someone (cf. Langefors, 1966/73), and hence is a property of persons. In other cases, information is seen as data that has been given form (cf. e.g. Laudon & Laudon, 1996/2002, p. 8), and hence also can be a property of documents and computer systems. Although many people adhere to such restricted views on information in
principle, a common problem is that they find the distinctions difficult to uphold in practice. Contributing to this is that the distinctions between data, information, and knowledge are much more blurred when moving from academia to practice. Although “data” is more often used in connection with artefacts than with people, and “knowledge” the other way around, the three labels are many times used interchangeable as synonyms. Hence, instead of trying to hang on to some limited definition of information, I use it in a more general sense and further specify it when necessary.

Information solutions might be either explicitly designed or implicitly evolved to their current form. There is a mutual tension between espoused solutions and solutions-in-use (cf. Argyris & Schön, 1974). In addition to all specific solutions that are unique, there are a number of generic solutions available. Generic solutions can be seen as condensed and simplified templates that can lend some characteristics to specific solutions. To better appreciate some of the generic solutions available, four different types will be presented in the following. These are selected according to two main dimension used to characterise different information solutions: if their character is personal or codified, and if their emphasis is external or internal in relation to the business. I have summarised the dimensions in Figure 8-2 below.

![Figure 8-2. The information grid: Examples of different kinds of generic information solutions.](image)

**Personal vs. codified.** Personal information solutions are characterised by a focus on the information (knowledge) held by people. Codified information solutions, on the other hand, focus on the information (data) held by computers, books, and other artefacts. Using terms made popular in the area of knowledge management (Hansen et al., 1999), the dimension distinguishes between different carriers of information, such as per-
sonal information based on people, and codified information based on computers, documents, etc. Personal focus includes issues of presuppositions, beliefs and values, whereas codified focus includes a more task-orientation, salient information systems, data and programs, and computer systems (cf. Lundeberg, 1993, pp. 73-74, 169-170).

External vs. internal. Information solutions may have an external emphasis that stresses the relationships with the world outside the business. Or they might have an internal emphasis stressing the inside of the business. In practice, most solutions have a mixed emphasis rather than a clear-cut distinction, although one side is often more salient at the expense of the other. The distinction parallels that between inter-organisational and intra-organisational systems.

Internal personal information – Knowledge resources

Information solutions with an internal and personal focus make use of knowledge resources based on people in the business. Different aspects of these resources can be salient depending on the solution, including presuppositions, beliefs and values (cf. Lundeberg, 1993, pp. 169-170). Whereas explicit knowledge is what readily can be put into words, tacit knowledge is integral to the person and not easily communicated through language. Beside tacit, Polanyi (1958) discusses it as inarticulate and ineffable.

In addition to explicit propositional knowledge, Johannesen (1988) further specifies the tacit aspect by distinguishing between practical knowledge and knowledge of familiarity. Polanyi discusses the distinction in terms of skill and connoisseurship (Polanyi, 1958, p. 54). Although not explicitly, also Schön discusses tacit knowledge in these terms when stating that “Our knowing is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing” (Schön, 1983, p. 49; my emphases).

Also explicit information can be further detailed as representational and action aspects (cf. Winograd & Flores, 1986). Representational information is important for what it refers to, e.g. when a salesperson describes the characteristics of a specific product. Intentional information is valued for its actions and effects, e.g. when a priest proclaim a couple husband and wife. Information is here discussed under the heading of language, where the emphasis on language as action (cf. Austin 1962; Searle, 1969) developed as a reaction to the traditional emphasis on language as representation.
For information solutions in a business, explicit information is predominantly related to situations where language is salient, whereas tacit information is more concerned with people’s experiences and capabilities. In Table 8-1 above, I give some examples of each type. The emphasis on explicit vs. tacit information has implications for issues of trust, authority, traceability, expertise, etc. For example, it matters that it is a priest and not a doctor that proclaim the couple husband and wife. What is possible and desirable to mediate or automate by computerised information systems is dependent on the type of information. Different technologies have been used trying to capture explicit and tacit information, e.g. expert systems and neural networks.

**External personal information – Knowledge sharing**

With an external focus, issues of communication and relationship with the business environment come into play. Regarding personal information, the focus lies on information exchange and knowledge transfer. Building on the distinction between explicit and tacit knowledge, Nonaka (1994) distinguishes four alternative forms of social knowledge “conversion” between individuals and between organisations. The four alternatives represent conversions from and to explicit and tacit knowledge, respectively, and are labelled socialisation, externalisation, internation-alisation, and combination (cf. Figure 8-3 below).

Nonaka describes the characteristics of the four modes and their dynamic interaction in the “spiral of knowledge” (ibid., pp. 18-20). Through socialisation, tacit knowledge is converted in interaction that facilitates the sharing of experiences and perspectives. Rather than relying on language, the interaction is characterised by observation, imitation, and practice. Going from tacit to explicit knowledge, externalisation is triggered by successive rounds of meaningful dialogue. Use of metaphor can enable articulation and reveal hidden tacit knowledge. Internalisation moves in the opposite direction and involves a conversion from explicit
to tacit knowledge. Learning by doing and trial-and-error are common ingredients. Lastly, combination deals with exchange and amalgamation of explicit knowledge that occurs in meetings and telephone conversations. New explicit knowledge is created through manipulation and recontextualisation.

![Diagram](image)

*Figure 8-3. Example of different personal information solutions (Nonaka, 1994, p. 19).*

Information solutions having a personal and external focus tend to emphasise one or more of these four conversion modes. Across multiple businesses, the information and knowledge sharing that goes on is affected not only by prerequisites in terms of available channels and interaction patterns, but also by the objectives and values held by the actors involved. For example, in some service operations, there is close collaboration with customers, suppliers, and partners, enabling a wider range of knowledge conversions. As attempts for increased economies of scale and scope often lead to stronger focus on productification and weaker on personal interaction, the modes involving tacit knowledge get downplayed. However, personal marketing and advertising efforts stress internalisation in order to evoke feelings and emotions.

**Internal codified information – Data systems**

With codified information solutions, we enter the realm of computerised information systems and information technology in a wide sense, also including books, documents, and other data artefacts. Emphasising task rather than person, this covers issues regarding information, information systems, data and programs, computer systems (cf. Lundeberg, 1993, pp. 73-74). With an internal focus, it is the solutions within the business that are highlighted. Here, a number of different systems are being used, both those acquired by buying existing packages and those developed in-
house. Based on ideas from Langefors (1966/73, pp. 200-208), a main distinction made by Sundgren (1996) concerns operative vs. directive information systems (cf. Figure 8-4 below).

Operative information systems are systems that support the repetitive workings of the operative activities of the business. Directive systems on the other hand are designed to support the ad-hoc and unique workings of more strategically oriented activities of planning and control. In contrast to the operative systems’ requirements to provide necessary information despite costs, directive systems aims at improving the directive activities (ibid. pp. II:5-6). For example, although an operative order-entry system must be able to accept all new customer orders, a directive decision support system will only be used if it adds to the value provided at that stage.

Many information solutions include both operative and directive components, each with their own distinctive characteristics. Apart from differences in tasks automated or supported, there are further differences in their use and development. Operative systems have a strong connection between data input and output, and both users and uses are known at development time. For directive systems, on the other hand, much output is only loosely connected in time and structure to the input. Furthermore, only few users and uses are normally known at development time, requiring a higher degree of flexibility to be adaptable for changing requirements (ibid., pp. II:6-7).
External codified information – Data communications

Information solutions with an external focus imply an emphasis on issues of communication, networks, and infrastructures that goes beyond the individual business. Following a codified focus, there is often a strong technical dominance, where information and communication technology in different forms is utilised. For successful connectivity between different types of equipment, standardised protocols are needed on different levels, not only for technical issues but also regarding applications and information exchange. For example, while the TCP/IP protocol is needed to access the Internet in general, specific EDI standards may be required to enable different business systems to communicate.

Computer systems that support the interaction of different businesses are often known as interorganisational systems (IOS). Communication between the business and outside actors can be arranged in different ways, resulting in a blurring of the business’ boundaries often referred to as extended enterprises, virtual corporations, and network organisations. Depending on the communication patterns, one can distinguish between three prototypical configurations (cf. Applegate et al., 1983/99, pp. 71-76). First, one-to-one solutions concern communication with a specific recipient. Second, one-to-many solutions enable the business to communicate with a group of participants. Third, many-to-many solutions cater for connecting several participants to each other. I present some examples of the three in Table 8-2 below.

<table>
<thead>
<tr>
<th>ONE-TO-ONE</th>
<th>ONE-TO-MANY</th>
<th>MANY-TO-MANY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directed e-mail messages</td>
<td>Customer extranet</td>
<td>Market place</td>
</tr>
<tr>
<td>EDI link to specific supplier</td>
<td>Supplier extranet</td>
<td>Customer community</td>
</tr>
<tr>
<td>Leased communication line to key customer</td>
<td>Supplier’s extranet</td>
<td>Shared document repository</td>
</tr>
</tbody>
</table>

Table 8-2. Examples of types of external codified information solutions.

The three configurations have a background in the historical development of technology. Early communications solutions often made use of specific and proprietary technologies that only connected a limited number of parties. Following its increased presence as a global and open communications architecture, the Internet has become widely used for all three types of solutions. Intranets, intra-business solutions using Internet
technology, are supplemented by extranets that invites external parties into the system. Since in most situations it no longer is practical or necessary that the business itself own all parts of the system, there are increased use of interconnected systems, shared solutions, and intermediaries. In many-to-many solutions, the business itself acts as an intermediary to facilitate communication between others, either through a central host or a distributed peer-to-peer solution.

The three configurations also have some parallels to the stereotypes for e-business solutions linking businesses – in a wide sense, including government – and consumers. Whereas business-to-business (B2B) have its roots in one-to-one solutions, business-to-consumer (B2C) are primarily based on one-to-many solutions, and consumer-to-consumer (C2C) mostly involves many-to-many solutions.

Techniques for concept modelling

Having looked at the topic of exploration, in the form of diverse information solutions, it is now time to turn to tools for exploration. Especially in the context of information systems development, there have been a large number of techniques proposed for exploring information solutions. Following a focus on processes in the early days of computing, the issue of data and information structures became more salient at the end of the 1960s. After seeing computers merely as number crunchers, they became useful also for handling more complicated data sets. With the arrival of more sophisticated database systems, and particularly the relational data model, the need for exploring information structures became more salient. During the 1990s, this need was further emphasised by the object-oriented tradition.

In this chapter, a particular family of modelling techniques is focused upon as tools for exploration, namely concept models. Concept models share a specific perspective that focus on key concepts or categories and their relationships (cf. Figure 8-5 below). Although some authors refer to these models as conceptual models (cf. Sundgren, 1989), I believe that the term conceptual is better reserved for models intended for humans rather than machines, irrespectively if they are concept models or different types of process models, etc. To complicate things a bit, there are those who talk about concepts also in models that focus on factors and their influences (cf. Eden, 1988). However, this can be understood if recognising a factor as a combination of two or more concepts, e.g. “com-
pany profit” or “number of employees”, whereas concepts in concept models are treated independently. All in all, the present selection is therefore based on the characteristics of the techniques, rather than their names.

![Figure 8-5. Illustrating the concept perspective in relationship to four common perspectives (adapted from Tolis & Nilsson, 1996).](image)

Collected from different contexts of use, as I have summarised in Table 8-3 below, all the techniques comprise the basic elements of the concept perspective:

- Key concepts or categories (whether labelled *objects*, *classes*, *entities*, etc).
- Relationships among the concepts.

<table>
<thead>
<tr>
<th>MODEL TYPE</th>
<th>PREDOMINANT CONTEXT OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object-property-relationship models</td>
<td>Analysis and design of information systems</td>
</tr>
<tr>
<td>UML class diagrams</td>
<td>Object-oriented systems analysis and design</td>
</tr>
<tr>
<td>Semantic nets</td>
<td>Artificial intelligence</td>
</tr>
<tr>
<td>NIAM conceptual schemas</td>
<td>Specification of database structures</td>
</tr>
<tr>
<td>Organisational charts</td>
<td>Organisational analysis and design</td>
</tr>
<tr>
<td>Network diagrams</td>
<td>Information infrastructure design</td>
</tr>
</tbody>
</table>

*Table 8-3. Type of concept modelling techniques and their main fields of use.*

* Included as chapter 5 in this thesis.
Object-Property-Relationship (OPR) models

Developed in the early 1970s, the OPR approach (Object-Property-Relationship; cf. Sundgren, 1989) makes use of object types to group similar things together. An object type is characterised by a set of properties, and related to other object types through relationships.

The object graph given as example in Figure 8-6 above, shows four object types, each with a number of properties showing its characteristics. For example, in addition to the identifying property “pid”, the object type person is characterised by name, sex, age, and income. Between the object types, relationships are shown as lines, accompanied with extra symbols further specifying the type of relationship. For example, a person may work for one or more companies, and he or she also belongs to exactly one household.

UML class diagrams

UML (Unified Modelling Language) has become the de-facto standard for object-oriented modelling (Ericsson & Penker, 2000, p. 5). The language itself contains a number of different subsets for different types of models; here we focus on object and class diagrams, its contribution to concept modelling. An object is any specific entity, concrete or abstract, that together with other objects of the same type make up a class. For example, Adam and Eve could be two objects that belong to the class “persons”.

Figure 8-7 below shows a class diagram consisting of eight classes shown as boxes. Although not indicated in this diagram, each class may comprise properties and methods that describe the characteristics and behaviour of the objects of that class. Between the classes, two types of
relationships are shown. The fork-like relationship marked with an arrow indicates three subclasses to the class “insurance”, i.e. specifying that there are at least (cf. the label “incomplete”) three types of insurance: car, life, and homeowners’ all-risk. The other relationships are associations between specific objects in different classes. For example, a person has one or more insurance contracts in the role of policyholder.

![UML class diagram](image)

Figure 8-7. Example of UML class diagram (adapted from Ericsson & Penker, 2000, p. 20).

**Semantic nets**

Semantic nets have its roots in research in artificial intelligence (AI) as an attempt to structure the knowledge of people for supporting the development of “intelligent” computer systems such as expert systems (cf. Bench-Capon, 1990). Through the net, the conceptual structure of a person can be described and analysed.

![Semantic network](image)

Figure 8-8. Example of semantic network (Bench-Capon, 1990, p. 80).
Figure 8-8 above shows a semantic net involving a number of concepts and their relationships. For example, the model indicates that Tweety is a bird, that birds have 2 wings, 2 legs, feathers, and can fly. Each relationship has a name that describes how the concepts relate. The concept themselves are either common names, such as “bird” and “engine”, or individual names, such as “Tweety” and “2”. Concepts involving predicates that can apply to other concepts, such as “fly”, can also be included.

**NIAM conceptual schemas**

Developed as a way to represent facts about the world in relational databases, NIAM (Nijssen Information Analysis Method) focuses on key entity types and the roles they play in relation to each other (Nijssen & Talpin, 1989).

In Figure 8-9 above, a total of seven entity types are shown by the ellipses. Two of these, “student” and “lecturer”, are sub-types of “person”, dependent on the value of the associated entity PersonKind. The remaining entity types are related through roles, indicated by boxes, played in relationships. For example, “lecturer” is related with “Salary” through the role “earns per year”. An arrow under or above one or several roles indicates that this portion of the relationship is unique, i.e. that a particular combination of roles can occur only once. For example, a lecturer only earns *one* salary per year, although a person might be of *several* “personkinds” at once, i.e. both a student and a lecturer, as it is the combination of person and personkind that is unique in the relationship.
Organisational charts

Organisational charts, or “organigrams” using the French word (Mintzberg, 1979, p. 36), are representations of the hierarchical structure of an organisation. Although the roots of organisational charts lie in the age-old ideas of specialisation and chain-of-command in organisations, especially military ones, they have become widely used in the last half century. Rather than based on detailed techniques, organisational charts are often produced in slightly idiosyncratic forms. In its basic form, the chart’s vertical dimension depicts levels of authority, where higher levels govern lower, and lower levels report to higher. The horizontal dimension depicts specialisation, where units are differentiated in some respect. In more elaborated form, the organisation chart might contain units related sideways (staff functions) and/or units with multiple authorities (matrix organisations).

The example in Figure 8-10 above shows an organisational chart comprising eight organisational units and their relationships. There are three levels of authority, where for example the assistant accountant reports to the director of accounting, who in turn reports to the corporate president. Specialisation occurs on two of the levels, where three directors are responsible for different functions in the business, and two groups of sales representatives address different geographical areas.

Computer network diagrams

Following the increased complexity and connectivity of computer systems, different techniques are used to analyse and design the structure of computer networks. The communication links relating different computer equipment are the focus of computer network diagrams, illustrating how
a large system is made up of smaller components that are connected in different ways (cf. Goldman & Rawles, 2001). Although seldom treated as a specific modelling technique, often various types of equipment are represented as easy-to-recognise icons, although more abstract representations may also be used, particularly in cases of complex networks involving a large number of equipment.

Figure 8-11. Example of computer network diagram (adapted from Goldman & Rawles, 2001, p. 527).

Figure 8-11 above shows an example of a network diagram illustrating the communication links between various types of computer equipment. The equipment is specified through a combination of hardware type (cf. the different icons) and the functions performed (cf. different labels for same type of icon). Two separate portions of the network communicate through a wide-area network (WAN) or the Internet, depicted without further details as a large cloud. The links are mostly wire-bound as indicated by the lines, except for the wireless communication between the remote client and its application server.

Elaborating the concept perspective

Following the purpose of this chapter, to elaborate on concept modelling for exploring information solutions, the topic of exploration and the tools for exploration have been discussed in the previous two main sections. Using this as a foundation, the elaboration will be concluded in two ways: First by examining the variety of the concept perspective, and then by discussing the applicability of it in relation to different types of information solutions.
Contrasting the techniques

A comparison of the six modelling techniques presented reveals a number of differences despite their common core. The focus perspective issues means that differences in graphical details, symbols used, etc, will not be dealt with. Instead, it is the meaning and use of the core constructs that is emphasised in the following.

As mentioned before, the common core of concept models consists of key concepts and their relationships. Starting with the concepts, one needs to look beyond the different labels used – object, class, entity, etc – to examine variations in perspective. One main difference is between the use of singular concepts on one hand, and concept types comprising a whole set of instances on the other. For example, concepts such as “Tweety” (Figure 8-8), “director of production” (Figure 8-10), and “remote client” (Figure 8-11) refer to specific and individual instances, whereas “bird” (Figure 8-8), “person” (Figure 8-6), and “insurance” (Figure 8-7) instead refer to generic concept types that potentially include an endless number of instances.

Moving to the relationships between key concepts, these are of different types in the various techniques. One particular difference concerns if they describe hierarchical connections between sub types and super types, or lateral associations between concepts irrespectively of their level of abstraction. For example, the relationship between “insurance” and “car insurance” (Figure 8-7) is hierarchical, whereas that between “person” and “company” (Figure 8-6) is lateral.

In Figure 8-12 above, I have illustrated these two distinctions. Model nodes are either predominately concept types or singular concepts, and relationships are either predominately hierarchical or lateral. Using some
of the described techniques as examples, UML class diagrams have a strong hierarchical focus, although also lateral relationships are common. OPR and NIAM models are the opposite in this respect, with lateral relationships primarily, and hierarchical secondarily. Semantic nets lie somewhere in between, utilising both hierarchical and lateral relationships among its nodes.

Despite these differences in relationship structure, all three techniques mentioned share a focus on concept types rather than singular nodes. This means that in most cases the models will contain multiple rather than individual instances as nodes. This is in contrast to both organisational charts and network diagrams that focus on individual units or network components, respectively. Because it becomes less meaningful to keep track of number of instances involved in a relationship (cardinality) for techniques with singular nodes, they often lack special arrows, forks, or other symbols to describe this.

**Revisiting the information solutions**

The applicability of concept modelling depends both on the specific technique used and the characteristics of the exploration topic. As detailed earlier, the diversity of information solutions implies a wide variety of systems, issues, and challenges. The interaction between solutions and modelling goes in both directions, where tools can help in analysing existing solutions, and in designing new ones. Worth noting is that there is no direct link between business solution and modelling technique. For example, the concept perspective focused in this chapter might be useful for exploring also other types of solutions than information solutions, e.g. strategies and operations. Conversely, other perspectives might be useful for further exploring information solutions, e.g. process and values.

In general, the basic elements of the concept perspective are applicable to all types of information solutions. Key concepts and their relationships are relevant for both personal and codified information solutions having both internal and external emphasis. However, the use and benefits may vary for different types of information solutions. For example, in the design of a codified information solution involving a database, more syntactical details are eventually needed in comparison to explaining a knowledge area for a set of experts in the set-up of a personal information solution. Humans’ greater ability to handle ambiguity has conse-
sequences for the use of modelling techniques, but so have our limited cognitive abilities.

Continuing with the different concept modelling techniques, there are strengths and weaknesses with each variety. For example, whereas concept types are particularly important for structuring codified databases, singular concepts may – because they are more concrete – be easier to understand for personal information solutions. Some techniques anticipate this by providing extensions and/or related diagrams to capture individual instances, e.g. object models in UML. However, using an additional technique of course adds to the overall complexity of the exploration, especially since the concept perspective often needs to be complemented by radically different perspectives, in the form of process or value models.

Concerning the different types of relationships, there are other issues involved. For example, in the area of codified information solutions, lateral relationships are more emphasised in relational databases whereas hierarchical relationships are more emphasised in object-oriented approaches that encourage inheritance and polymorphism. In personal solutions, both lateral and hierarchical relationships have their merits and proponents. However, there are potential risks for confusion between the two types of relationships, and some of the techniques also use symbols that remind of flows more akin to process models than concept models.

**Conclusions**

The interplay between information solutions and concept modelling has been the focal point of this chapter. To conclude, two main contributions have resulted from the purpose of elaborating the concept perspective:

The first, an overview of the topic of exploration, was done by discussing examples from four types of information solutions with different focus along the dimensions of personal-codified and internal-external. In addition to providing insights into different issues and requirements of importance for supporting the business, the overview also gives a basis for evaluating and applying different tools for exploration. Practical implications for business furthermore include a raised awareness of the variety of solutions related to knowledge, information, and data. Types of solutions, their development, and their alignment with business values and operations provide bearings for knowledge management and business development activities. On a more theoretical note, further research
is warranted on a pragmatical basis regarding the core and differentiations of information solutions.

The second contribution of the chapter, a clarification of the tools for exploration, was done by discussing a sample of concept modelling techniques from different contexts of use. Through contrasting the techniques, issues of perspective core, variety, and boundaries become salient. In particular, the differences of hierarchical vs. lateral relationships and singular vs. type nodes contribute to the understanding and selection of appropriate techniques based on underlying perspective rather than syntactic details. Further practical implications involve the interplay of techniques from different contexts of use, and an increased consideration for alternative tools. Concerning future research, it is needed to clarify challenges of using the concept perspective, identifying useful extensions as well as restrictions, and strengthening appropriate set ups for different types of solutions.

Especially when taken together, an understanding of both information solutions and concept modelling mutually reinforce each other. An elaborated concept perspective helps recognise strengths and limitations of both the perspective itself and the solutions explored. Facilitating knowledge management initiatives is an important step towards even more innovative design and use of information solutions.
Part four of the thesis addresses my purpose to explore challenges in practical use of the business frames. The frame set comprises the perspectives that were elaborated in the previous three chapters: value modelling (chapter 6), process modelling (chapter 7), and concept modelling (chapter 8). In chapter 9 that follows, the tools are employed in practical situations of business analysis.
Understanding the business context of a current or future information system is crucial for obtaining maximum leverage and benefit. As the understanding of a business is dependent on how it is perceived and conceptualised, working with systems analysis and design benefits from employing multiple framing, taking different aspects into account. Building on theoretical foundations of business framing and modelling perspectives, this chapter makes use of empirical material from 11 cases of business analysis, each documented using three types of graphical models: value models, process models, and concept models. Using mostly qualitative techniques, different challenges are distinguished and explored for each model type. Concluding the chapter is a discussion of two main issues for analysts, teachers and researchers. The first issue concerns the distinction between perspective challenges and delimitation challenges; the second issue addresses the role of certain challenges in pointing to potential confusion between use of different perspectives.

Introduction

In business analysis, you consciously try to make sense of a business, whether it is your own or somebody else’s. Irrespectively if you analyse the business where you normally work or if you are looking into another business as a consultant or external facilitator, the analysis is often an initial or integrated component of a larger development effort that also includes business change in some way. “Business” is here used in a wide sense to denote purposeful activities using and producing information and other resources, and includes also non-profit organisations and public administrations.

As many issues contribute to an existing business situation, the analysis may explore widely different realms of the business, also if there are indications of specific problems already at the outset (cf. Lundeberg, 1993). This can be seen as a focus on problem setting (cf. Schön, 1979) and sensemaking (cf. Weick, 1979) regarding the business and its environment. A core component of business analysis is therefore how the business is defined or conceptualised, or in other words, how it is framed (cf. Bateson 1955/72, Goffman, 1974). The way a business is framed and analysed affects what problems are seen and what actions are taken. In information systems (IS) development, the decisions made consciously or unconsciously in the early analytical stages have more fundamental consequences than in later stages.

Facilitating the analysis, people use different graphs and models to develop and express their framing of the business. Especially in IS development, graphical modelling has become a standard tool to visualise an existing situation and proposing an improved one (cf. Wand & Weber, 2002). Much has been written on modelling and specific techniques and methods, partly because the great variety available (cf. e.g. Olle et al, 1988/91; Avison & Fitzgerald, 1988/2003). Despite some consolidation in the object-oriented arena with Unified Modelling Language (UML), there is still an endless number of approaches available. Although considerable work has been done concerning different modelling techniques and their conceptual arrangements, less has been done concerning concrete modelling artefacts in the wider domain of business modelling.

The purpose of this chapter is to explore challenges in using a set of modelling perspectives in business analysis. This study contributes experiences from using a set of multiple perspectives and is undertaken within the overall research question of how businesses are framed using graphi-
cal models in the context of business analysis. Instead of developing new techniques, the study focuses on “testing” a set of previously developed modelling perspectives by examining the results of using it in practical situations. People with limited modelling expertise are emphasised in the study, as this is the case in many situations where you analyse and change your own business. Also in situations were you work as an outside consultant, you yourself – or the people you work with – often bring expertise in other areas than modelling. Although the study focuses on the different modelling perspectives themselves, its emphasis on practical situations means that the challenges explored also have causes in, and consequences for, how the perspectives are being applied and learned.

After this introduction, the chapter continues with a theoretical overview of the set of modelling perspectives employed. An outline of the empirical approach is presented in the section thereafter, followed by a summary of the empirical cases examined. Challenges are subsequently identified and discussed and the chapter is concluded with a section summarising and discussing the results.

**Modelling perspectives**

This study emphasises actual model artefacts influenced by a set of generic modelling techniques and methods. It is through the specific model artefact that the framing of the business is expressed. In business modelling, the model artefact most often takes the form of a graph, more or less closely following the rules of some modelling technique. Under the heading of conceptual modelling, Wand & Weber (2002) outline four key elements: a *modelling script*, resulting from using a *modelling grammar*, as indicated by a *modelling method*, in a specific *modelling context* (cf. Figure 9-1). As “script” has a certain procedural connotation, the more general term model artefact is here preferred. Furthermore, also grammars are closely related to artefacts: each grammar specifies an abstract set of model artefacts that follows its rules.

Wand & Weber (ibid.) point to different research opportunities related to each of the four elements. Using their words, this study is intended to shed light on certain issues regarding modelling scripts (e.g. “intergrammar evaluation of scripts”, “evaluation of multigrammar scripts”), modelling grammars (e.g. “better use of grammars”, “use of multiple grammars”), and modelling methods (e.g. “methods to identify types of phenomena”, “methods to classify phenomena”).
As each way of framing and modelling a business contributes to shaping it, some aspects will be highlighted while other will be downplayed. In order to give a richer understanding of a complex business, more than a single perspective may be used. Bateson (1979, p. 92) advocates this as “the method of double or multiple comparison”, illustrating it with the ability to perceive depth when using two eyes instead of one.

“Perspective” is here used to characterise a particular way of framing a business, as expressed by a family of model artefacts sharing the particular aspect highlighted. In this sense, perspectives also apply to generic modelling techniques, although this partly depends on how the techniques are being used. For example, there have been instances where people employ a process perspective using any type of modelling technique, even ER-diagrams that normally belong to another perspective.

Three modelling perspectives comprise the specific set used in this study: values, processes, and concepts. In addition to the dual perspectives of process and data, prevalent in an information systems context, more or less extensive sets of modelling perspectives have been suggested (e.g. Zachman, 1987; Willars, 1988). Believing that too fine distinctions can hamper the practical usefulness, the chosen three perspectives can be characterised as a limited set of simple “few-dimensional” models (cf. Lindström, 1999, p. 154). Compared to earlier specifications that have presented four perspectives (Tolis & Nilsson, 1996), one

* Included as chapter 2 in this thesis.
has been omitted in the current selection. The three perspectives comprising the set used in this study, can be briefly characterised in the following way:

- The value perspective focuses on important factors in the business and the influences these have on each other.
- The process perspective focuses on important transformations of inputs to outputs that are going on in the business.
- The concept perspective focuses on important categories in the business and their relationships with each other.

The perspective left out, behaviour, focuses on processes from the viewpoint of the actors and is evident in modelling techniques such as flow charts and most applications of state transition diagrams. It is not included in the set used in this study for several reasons; the most important is that the perspective has important limitations when analysing the collaboration between different actors. Furthermore, behaviour is already a strong perspective for most people – developed from early years by reading recipes and instructions. Indeed, the two perspectives of transformation and behaviour can be seen mixed-up in many instances of process modelling.

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* Cf. chapters 6, 7, and 8 in this thesis.
† Included as chapter 5 in this thesis.
Empirical approach

To address the purpose of exploring challenges of using a set of modelling perspectives in practical situations, two issues are particularly important: the selection of empirical setting and the choice of data material and analysis procedure.

Empirical setting

That the set of modelling perspective for this study was given, places some restrictions on the selection of empirical setting. Although the perspectives in themselves are rather wide, so that a number of different modelling techniques fit into each perspective, the aim is to have all three of them used in the same situation, for the analysis of a particular business. Furthermore, in order to facilitate identifying and quantifying the challenges, it is preferable if the number of analysis cases is not too small.

The empirical setting selected was a university course in information management, where the participants used the particular set of modelling perspectives for analysing businesses of their choice in a vein of experiential learning (cf. Kolb, 1984). Considering the characteristics of the setting as indicated by Table 9-1 below, and comparing them with typical modelling situations, reveal many similarities with consultants analysing their clients’ businesses. Most important, the cases were generally done by people not working in the business they analysed. The participants’ limited prior knowledge of modelling resembles a situation of a junior consultant more closely than that of a senior one. The expectations from the teachers have a counterpart in expectations from a consultant manager. What differs from many junior consultant situations is that the business to be analysed was self-chosen by the participants, as was the detailed focus of the analysis.

From a research point of view, the main advantages with the selected setting were access to the results of the analyses and control over the perspectives used, while at the same time maintaining similarities with common professional situations. As the author was one of three lecturers in the course, with main responsibility for one of the three perspectives used, the issues of access and control were manageable. However, the study only made use of the material produced in the course, it did not influence the way the course was carried out. Having said that, the involvement by the author is in itself something that requires careful consideration in order to minimise any negative effects. The present study is for example not intended as an evaluation of the specific activities of the particular course,
but rather concerns issues that are relevant for people interested in understanding and improving business analysis, also teachers.

PARTICIPANTS:
A total of 24 international participants in a university course in information management given in English were involved.
The participants were generally new to systematically working with a set of modelling perspectives. Some had previous modelling experience.
Although the amount of personal work experience varied among the participants, they all had at least 3,5 years of university studies in business administration and related areas.
In most cases, the participants did not work in the business they analysed, although some had previously done that or knew somebody who did.

TASK:
The analyses were normally performed by groups of two participants each. Out of the 11 cases, the exceptions to this were two groups with 3 participants each.
Each group by themselves selected and established contact with a business to analyse. Detailed focus of the analysis was not given beforehand, and could be influenced by the participants themselves.
Each analysis included modelling using three different perspectives: values, processes and concepts. No particular modelling tool was used; most groups used Microsoft PowerPoint.
The participants were introduced to their task in a 4 hour long general introduction. Each of the three perspectives was later presented in 4-hour sessions prior to using that particular perspective.

RESULTS:
The initial models were later elaborated after discussions and feedback among the groups and the complete business analysis was documented in an integrated report.
In addition to communicating the analysis results to the business, the models developed by the groups were part of the examination for the course.

Table 9-1. Characteristics of the empirical setting.

Data material and analysis procedure
For each case of business analysis, the material selected for this study consists of three types of models in accordance with the set of modelling perspectives used: a value model, a process model, and a concept model. The models examined were in their initial form; they were later elaborated by the groups into final versions.
When analysing the models, the approach has been largely qualitative. The identification and structuring of challenges was mostly done in a bottom-up, iterative way by examining each specific model in detail. In this study, “challenge” refers to a more or less distinct deviation from the
core of the modelling perspectives used. Following the focus on underlying perspectives rather than specific notational details, the analysis has explored semantic and pragmatic aspects more than syntactical and graphical. In practice, this means that challenges regarding symbols used, visual arrangements, line crossings, etc, have been left out in favour of challenges regarding the content of the models and the particular aspects being emphasised.

In order to shed further light on the challenges, some limited quantitative measures have also been used. Following the identification of a specific challenge, the occurrences among all the cases has been counted to gauge how common it is. To avoid the measures being considered too absolute or precise given the limited number of observed cases, they have been converted into three intervals, low/medium/high*, to provide a rough indication of the extent of each challenge.

The iterative approach of the analysis has meant that the labels developed for the challenges have been subject to continuous revisions to enhance the clarity of the results. Also the challenges themselves have been iteratively evaluated, both internally to minimise possible overlaps, and against the key concept of challenge. One result of this evaluation was the removal of one tentative challenge that was determined to mirror another challenge without representing a challenge on its own. Hence, the resulting challenges as presented in this chapter should not be considered final, but rather as an invitation for further development and expansion through additional iterations, additional cases, and additional structuring.

Describing the models

Among the 11 cases of business analyses studied, many different businesses are represented: a humidity control company, a political party, a fashion retailer, a brokerage firm, a hospital department, a fitness chain, a ferry company, an internet business, an organisational consultancy firm, an IT consultancy company, and a newspaper.

To give an overview of the empirical cases, the material is presented as follows: For each of the three modelling perspectives examined, a brief description of key characteristics is illustrated by a specific example

* Values up to 1/3 are represented as “low”, between 1/3 and 2/3 as “medium”, and over 2/3 as “high”.

model and some measures of the complexity of the models studied. The example models all come from a group that was randomly selected among the 11 cases.

**Value framing**

The value perspective focuses on important factors in the business and the influences these have on each other. A factor is something that varies over time, and its current and future values are often characterised as objectives, goals, strengths, problem, etc. A number of different modelling techniques, in particular problem/goal models (Röstlinger & Goldkuhl, 1988) and causal loop diagrams (cf. Senge, 1990/94), expresses the value perspective. The particular type of value models used in this study is factor models, comprising identified factors, their values and influence relationships. Figure 9-3 shows an example of an initial factor model.

![Figure 9-3. Sample of initial value model of an internet business, showing different factors influencing each other.](image)

* Cf. chapter 6 in this thesis.
To give an overview of the complexity of the models, the number of factors in the initial factor models ranged from 5 to 23 (median of 12), and the influence relationships ranged from 9 to 34 (median of 14). Any bi-directional relationship was seen as shorthand for two ordinary relationships, and therefore counted twice.

**Process framing**

The process perspective focuses on what is going on in a business, in particular transformations of inputs to outputs in different stages. The perspective is salient in techniques such as dataflow diagrams and IDEF0 functional modelling. In the present study, process graphs adapted from Steneskog (1991) were used, comprising identified processes, object relationships (input/output) and actors. Responsible actors could either be indicated below each process or across horizontal “swimlanes”, where relevant processes and/or objects could be placed. Figure 9-4 shows an example of an initial process model.

![Figure 9-4](image)

*Figure 9-4. Sample of initial process model of an internet business, showing inputs transformed into outputs.*

Indicating the complexity, the initial process models had between 3 and 23 subprocesses (median of 6), and between 0 and 30 object relationships (median of 7).

* Cf. chapter 7 in this thesis.
Concept framing*

Figure 9-5. Sample of initial concept model of an internet business, showing different object types associated with each other.

The concept perspective focuses on important categories in the business and their relationships with each other. Entity-relationship (ER) diagrams and object-oriented models such as UML class diagrams share the concept perspective. In this study, object graphs (Sundgren, 1992) were used as a particular type of concept models, comprising identified concept types, association relationships and attributes. Figure 9-5 shows an example of an initial concept model.

Model complexity among the initial concept models is reflected by the number of concept types ranging from 2 to 17 (median of 4), and the association relationships ranging from 2 to 14 (median of 5).

* Cf. chapter 8 in this thesis.
Framing challenges

The examination of the models from the 11 cases has revealed a number of salient challenges related to each of the three perspectives: values, processes, and concepts. In the following, the results of the analysis are presented according to the three perspectives. Each challenge is given a numbered label for easier reference – the actual ordering of the challenges is not significant. In addition to the descriptions provided, the challenges are summarised together with indicators of their extent among the models examined.

**Value challenges**

V1: *Concept factors*. A concept factor is a factor that is labelled only as a process or a thing, without indicating what it is that may vary over time. For example, saying that “Order handling” is affecting “Customers” may indeed be true. However, the follow-on question is what, more specifically, it is about order handling that affects customers, and what in particular about customers that is being affected. With proper specification, perhaps it is “Order handling response time” that is affecting “Customer satisfaction”. Concept factors make it harder to identify specific influence links, and risk the general chaos of “everything influencing everything”.

V2: *Value factors*. Contrary to a concept factor, a value factor includes an unnecessary specification of direction and/or value. For example, “High personnel turnover” and “Lower failure rate” are not only identifying the factors, but also indicating their values as a problem, strength or goal. By instead keeping the extra specification separate, without integrating it with the factor itself, it is easier to indicate if that value is current (e.g. “High” in the first example) or future (e.g. “Lower” in the second example). It is also easier to add the missing value, e.g. that the desired value of personnel turnover is 12%, where this is appropriate.

V3: *Absolute ends*. An absolute end is a factor that does not influence any other factor although it itself is influenced by one or more factors. The existence of an absolute end in a factor model normally indicates a focus on linear chains rather than circular feedback loops. Although linear chains highlight the desired ends, they can also be seen as indicating a too narrow delimitation; with a larger scope they could have been recognised as parts of larger feedback loops. Stopping short of determining the complete loop(s), that the absolute end is part of, may reduce the
chances of finding suitable points of leverage that facilitates understanding and changing the business.

<table>
<thead>
<tr>
<th>CHALLENGE</th>
<th>DESCRIPTION / MEASUREMENT</th>
<th>EXTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1: Concept factors</td>
<td>Models that contain factors consisting of only single concepts, representing either things (e.g. “Customers”) or processes (e.g. “Product development”)</td>
<td>High (66-100%)</td>
</tr>
<tr>
<td>V2: Value factors</td>
<td>Models that contain factors also including values (e.g. “High personnel turnover”)</td>
<td>High (66-100%)</td>
</tr>
<tr>
<td>V3: Absolute ends</td>
<td>Models that contain factors not influencing other factors</td>
<td>High (66-100%)</td>
</tr>
</tbody>
</table>

Table 9-1. Summary of identified and quantified value challenges.

Process challenges

P1: Unspecified relationships. With unspecified object relationships, the hand-over between two processes is not described. What the first process produce (its output) and the second process uses (its input) is omitted, leaving only an arrow to indicate the relationship. Without clear input/output, there is a larger risk that the model perspective comes closer to behaviour than to transformation. Should that happen, the focus on strict time sequence for the actors rather than the objects makes it more difficult to identify possible parallel sequences.

P2: Contingent relationship. Having a contingent relationship in a process model means that the object relationship to or from a process includes a property that is questionable rather than definite. For example, the input to a restaurant may be presented as “Hungry customers”, and the output as “Satisfied customers”. However, closer examination might well reveal that most of the customers are not really hungry at arrival, instead they came for the great atmosphere. Also, when leaving, perhaps it’s only a minority of the customers that are satisfied. Including questionable relationship properties raises issues that are outside the scope of the perspective. The degree of hunger and satisfaction is better explored separately in a value model, to enable a deeper analysis of causes and consequences.

P3: Relationship isolation. Relationship isolation is when a process model only contains a single input and a single output. For example, a model of a call centre might only show the query as input, and only the
answer as output. An alternative to this could be to include other inputs (e.g. FAQ lists, directories, etc) and outputs (e.g. statistics, account data, etc) in the model as well – even if these relationships are not elaborated any further. By avoiding relationship isolation, an increased connectivity is stressed by the added inputs/outputs that connect the process to other surrounding processes, thus facilitating the hand-overs.

P4: *Open-ended processes*. Open-ended processes do not provide a closure in the sense that the final output fulfils the expectations of the initial input. For example, if the process starts with submitted applications and ends with all applications being sorted, then the process is open-ended in regard to the initial expectations. Normally, avoiding open-ended processes means including more of the process’ length and returning to the original actor, but that in itself is not always sufficient as illustrated by the distinction between narrow and broad sense of a request: That a potential traveller receives the ferry ticket she requested does not mean that her broader request for a ferry ride has been fulfilled. Other common types of process models are quite different in respect to this issue. The value chain concept, going from raw material to finished product (Porter, 1985) is open-ended in character whereas the action workflow loop, going from request/offer to acknowledge of acceptance (Medina-Mora et.al., 1992), is highly closed.

<table>
<thead>
<tr>
<th>CHALLENGE</th>
<th>DESCRIPTION / MEASUREMENT</th>
<th>EXTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1: Unspecified relationships</td>
<td>Models that have relationships that are unspecified, i.e. only indicated with an arrow</td>
<td>Medium (33-66%)</td>
</tr>
<tr>
<td>P2: Contingent relationships</td>
<td>Models that have object relationships with questionable properties (e.g. “Satisfied customers”)</td>
<td>Medium (33-66%)</td>
</tr>
<tr>
<td>P3: Relationship isolation</td>
<td>Models that have only a single input and a single output</td>
<td>High (66-100%)</td>
</tr>
<tr>
<td>P4: Open-ended processes</td>
<td>Models whose final output does not fulfil the expectations of the initial input</td>
<td>Low (0-33%)</td>
</tr>
</tbody>
</table>

*Table 9-2. Summary of identified and quantified process challenges.*

**Concept challenges**

C1: *Unspecified relationships*. An unspecified relationship is when an association between two (or more) object types in a concept model lacks a name. For example, just drawing a line between “Sales personnel” and
“Customers” does not specify what relationship was intended. That sales personnel are responsible for customers, or that customers are familiar with sales personnel are just two possible interpretations of the unspecified relationship.

C2: Singular categories. A singular category is when a concept only denotes an individual object, instead of a set of objects, i.e. a concept type. For example, “The company”, “The warehouse”, “sales department”, are all examples of singular categories. Having singular categories leads to problems with both attributes and relationships, e.g. relationships that indicate associations with many instances becomes hard to use.

C3: Bare categories. An concept type without attributes lacks any details about what characterises individual instances of the concept. For example, the concept “Employee” gets its meaning in the analysis by noting that relevant attributes for example include “Year employed” and “Monthly salary”, but not “Highest degree obtained”. Without any attributes, the concept only relies on the common-sense interpretation of its label in the context of the other concepts. Bare categories can be a sign of limited reflection on what it is about the concept that make it interesting to include in the analysis.

C4: Separate clusters. Separate clusters occur when the concepts analysed are not related to each other but left in two or more separate groups. Different clusters might be a sign that not enough effort has been put on considering important relationships among the concepts, or possibly that the scope of the analysis has been too broad, so that too diverse concepts have been included.

<table>
<thead>
<tr>
<th>CHALLENGE</th>
<th>DESCRIPTION / MEASUREMENT</th>
<th>EXTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Unspecified relationships</td>
<td>Models that contain relationships that are unidentified, i.e. lack a proper label</td>
<td>Medium (33-66%)</td>
</tr>
<tr>
<td>C2: Singular categories</td>
<td>Models that contain concepts that are singular instances (e.g. “The sales department”)</td>
<td>Medium (33-66%)</td>
</tr>
<tr>
<td>C3: Bare categories</td>
<td>Models that contain concepts without any attributes</td>
<td>Medium (33-66%)</td>
</tr>
<tr>
<td>C4: Separate clusters</td>
<td>Models divided into different clusters without relationships to each other</td>
<td>Low (0-33%)</td>
</tr>
</tbody>
</table>

*Table 9-3. Summary of identified and quantified concept challenges.*
Discussion

As have been shown in the previous section, a number of challenges have been identified in the initial models from 11 cases of business analysis. In each of the three modelling perspectives used – values, processes, and concepts – more or less widespread deviations from the specified perspectives were found. Each challenge represents an opportunity for reflecting on the way the business is framed using different graphical models. In particular, using a set of complementary perspectives provides the analyst with rich possibilities for making sense of the complexities of the business. At the same time, the study shows how the sometimes fine distinctions between the different perspectives, ultimately expressed in the model’s symbols and wordings, also might present the analyst with some difficult choices. Some of these difficulties have close links to the issues of deletion, distortion, and generalisation, raised by Bandler & Grinder (1975) and discussed by Lundeberg (1993) in relation to processes of business change.

**Perspective and delimitation challenges**

Going beyond the individual challenges, a larger pattern became salient in the analysis of the models. When identifying and quantifying the challenges it became apparent that they are of two kinds: one type deals with individual parts of a model, and the other type with the model as a whole. For example, the process challenge of unspecified relationships is based on individual relationships in the model, whereas the challenge of open-ended processes concerns the overall structure of the model.

This difference in challenges can be seen as refinement of the initial view of business framing and modelling. Up until now, “framing” has been used mainly as a synonym for “perspective”. But framing is more than only perspective – it is also delimitation. Distinguishing between business framing in terms of both perspective and delimitation is also consistent with the literal interpretation of what it means to frame something (cf. Figure 9-6): the application of a frame affects both what gets into the picture (delimitation) and from what angle it is presented (perspective).
Perspective-crossing challenges

In addition to providing insights into each modelling perspective individually, the different challenges identified also enable us to learn more about the interplay between the three. Engaging in multiple framing using a set of complementary perspectives, represents an added complexity over restricting oneself to a single perspective. With this in mind, some of the challenges can be seen as related to the existence and use of different perspectives.

As illustrated in Figure 9-7, specific challenges may suggest possible mix-ups, where one perspective is “pushed” towards another. For example, finding singular categories in a concept model can be seen as a step towards the process perspective. Furthermore, contingent relationships in a process model might be a sign that the issues explored have more to do with the value perspective. Lastly, coming across concept factors in value models might indicate a step towards the concept perspective or – especially if they refer to processes and activities – the process perspective. The existence of any of these challenges may thus be used to reconsider the most suitable perspective in the given situation.
Figure 9-7. Challenges indicating possible mix-ups between different framing perspectives.

Conclusions

Through the challenges identified, this chapter has contributed insights into business analysis practising multiple framing. In particular, the results have helped to clarify the distinction between the role of perspective and delimitation in framings, as well as illustrating possible confusion between different perspectives. Although the results will benefit from further structuring and elaboration, careful consideration of the challenges will hopefully promote an increased awareness of the features of different ways of framing, facilitating the selection of appropriate perspective(s) and making the most of them. There are direct implications for further development of the modelling perspectives and how they are learned, and for deepened research about key practices for making sense of and improving complex businesses.
Concluding the thesis, the remaining two chapters have an integrative focus. Chapter 10 brings together findings from the previous parts. Conceptual, empirical, analytical, and pragmatic results contribute to form key answers to the research question. Chapter 11 ultimately explores practical, theoretical, and personal implications of the research.
Chapter 10

What Business Modelling Means for Business Development

Having addressed the specific purposes of the thesis, in this chapter I return to my overall research question, of what business modelling means for business development. In explicating the main results from previous chapters, this chapter makes use of the conceptual framework, the two empirical cases, the elaborated frames, and the modelling challenges identified. The contributions are consolidated and structured in terms of model artefacts, model activities, and model assumptions, to arrive at a set of partial research answers, each detailed by relevant foundations and features. Ending the chapter are the main conclusions of the thesis: for business development, business modelling means versatility, depth-seeing, delimitation, and dual dependencies.
Introduction

The main task of this chapter is to make use of the contributions from the previous chapters in order to derive answers to the overall research question that was introduced in chapter 1. Answers to the research question – of what business modelling means for business development – will initially be sought in three areas: model artefacts, model activities, and model assumptions (cf. Figure 10-1). These areas follow from the conceptual framework described in chapter 2.

![Research question and research answers diagram]

Figure 10-1. Structuring of the research answers into different parts.

For each area of research answers, material for the answers comes from all the preceding chapters in the thesis, although in varying degree depending on the issues at hand. The references to Ericsson Radio and Sweden Post are based on the specific cases described in chapters 3 and 4, and should not be taken as accounts of these companies in general. Furthermore, the empirical chapters provide somewhat broader descriptions that incorporate also material that is not explicitly used in this discussion.

Starting with the concrete artefacts, the chapter will discuss answers for each of the three areas, followed by a section on more general conclusions regarding the meaning of business modelling for business development.

The meaning of model artefacts

The initial focus is on model artefacts, i.e. the actual graphic models that are used and produced in business development. Such issues have occurred throughout the thesis, in the various chapters. Before distilling appropriate answers concerning model artefacts, the results from previous chapter will be summarised.
Illustrating artefacts

In the conceptual framework (cf. chapter 2), two dimensions were used to characterise different model artefacts. Based on the field of semiotics, a distinction was made based on how the model signifies what it does: a representation artefact is characterised by convention as a symbol, whereas a manifestation artefact is characterised by restriction as an icon. Complementing this, the second dimension distinguished two aspects that the model may emphasise. A content artefact is characterised by a non-temporal focus on what is. A process artefact is characterised by a temporal focus on what happens. The two aspects were further linked to four separate perspectives, where categories and factors were subtypes of content artefacts, and behaviour and transformation were subtypes of process artefacts.

In Ericsson Radio (cf. chapter 3), four different types of models were used, nick-named according to the basic metaphors employed: “Fish” models were based on a common technique of depicting processes in “swimlanes” separating different actors. The “train” metaphor was used to talk about the company-wide standard for handling activities in structured projects. “Funnels” referred to the view of the early phases of product development as successively filtering out and refining ideas for future products and services. Lastly, “boxes” described the different organisational units that formed the building blocks for organisation charts. In Ericsson, there were indications that “process” was a complicated concept to distinguish and relate to other perspectives, despite a strong interest in process orientation and its effects in the business.

In Sweden Post (cf. chapter 4), the business modelling work was almost exclusively done with concept models, even if the topic largely centred on business processes. Process models were only used for brief examples, and the relationship between processes and functions was not clear. Despite this, the issue of using multiple descriptions was seen as important by the people involved in the project. On one hand, extensive use of multiple descriptions was believed to give a richer view of the business, but also to raise complexity and require multiple competencies. On the other hand, specialisation in a particular type of model facilitates the development of deeper experience and skill in that area. Moreover, although means and ends for the business and its development were an important part of the discussion, no specific model type was used for this.
In frame development (cf. chapters 5-8), the four model perspectives from chapter 2 were rearranged into three, each of which was subsequently elaborated in a separate chapter. Value models were found to differ according to if they are made up of particular or general factors, i.e. if specific values are integrated in the factors or not. The factors can either be linearly related or structured in circles and loops where a factor ultimately influences itself. Process models can either emphasise the transformation of inputs into outputs or the behaviour of preceding and succeeding activities. Process models can either start with the origin of supplies needed in the process or with the request that initiate the process. Concept models were found to differ regarding the focus on singular instances or concept types that comprise sets of instances sharing similar characteristics. The relationships can either link concepts on the same level through lateral relationships, or link concepts on different levels of abstraction through hierarchical relationships, illustrating different super and sub concepts.

In frame application (cf. chapter 9), challenges were found to concern either the perspective itself (i.e. how core parts of a model emphasise specific details of the business) or the delimitation (i.e. how a model as a whole includes certain things and not others). Among the perspective challenges, some challenges seem to indicate confusion between the different perspectives, where one perspective is “forced” into use as another perspective.

**What model artefacts mean for business development**

Given the material on model artefacts presented in the thesis and illustrated in the section above, there are three main answers to the research question. The three revolve around the meaning of process, concept and value artefacts for business development (cf. Table 10-1). In the following, foundations and features of each of these answers will be discussed.

<table>
<thead>
<tr>
<th>Meaning of model artefacts</th>
<th>Meaning for business development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process artefacts</td>
<td>Coordinating the business</td>
</tr>
<tr>
<td>Concept artefacts</td>
<td>Structuring the business</td>
</tr>
<tr>
<td>Value artefacts</td>
<td>Motivating the business</td>
</tr>
</tbody>
</table>

*Table 10-1. Summarising the partial answers to what model artefacts mean for business development.*
Process artefacts mean coordinating the business

Through their focus on the relationship between different activities carried out in and outside the business, process artefacts mean coordinating the business. The use of process models in different forms may be well pronounced, as in the case of Ericsson Radio, or less so, as in Sweden Post. Although both companies paid serious attention to process issues, e.g. in discussions about activity flows and sequences of work, the interest was manifested through quite different graphical models. Ericsson, with a longer history of considering business processes, used a range of process models describing different parts of the business, both in their current state and in intended future states. On the other hand, Sweden Post, investigating benefits and consequences of an increased focus on business processes, used process models only for providing limited illustrations, and then mostly in general terms.

Looking more closely into process framing, the two subtypes, transformation and behaviour, envision processes in different ways. The transformation perspective focuses on the things dealt with in the process – how inputs are transformed into outputs – and was dominant in both Ericsson Radio and Sweden Post, at least according to the prescribed standards. For example, in Ericsson, “fish”, “funnels”, and “trains” all referred to process models with a more or less clear focus on transformation. However, as in many of the cases of business analysis in chapter 9, both Ericsson and Sweden Post demonstrated examples of process models that lacked clear inputs and outputs, hence in effect moving to behaviour models that focuses on the work sequence of the actors in the process. This switch did not seem to be deliberate, and there was no awareness of any possible links to the concern that models were becoming too controlling.

Despite a widespread view that processes provided value for customers, not all process models take their starting point in what the customer needs or requests. Instead, the starting point might be the supplies required for carrying out the process, leading to an open-ended process model as examined in chapter 9. Porter’s (1985) value chain has been a prototype for such supply processes, where raw material is input to the final product/service output. Contrary to Porter, both Ericsson Radio and Sweden had a strong focus on process models that started with needs. Not uncontroversial among the people involved, Sweden Post used the criterion of starting and ending at the customer to distinguish core business processes from support processes.
Concept artefacts mean structuring the business

The use of concept models brings an increased focus on the structure of a business. In Ericsson, concept models in the form of organisational charts provided a salient view of the organisation’s different units, although they were often time-stamped or amended to account for the latest reorganisation. Each of the “boxes” included one or more important characteristics, such as name, code, and responsible manager. As with organisational charts in general (cf. chapter 8), the lines between the boxes described relationships of authority rather than the operative work going on. In Sweden Post, the main concept model that was produced focused on the content of the business that could be relevant to keep track of through various business descriptions, including business process, market, and service. Supporting the discussions about the business, and describing the potential content of other models, contributed to label the concept model a “meta” model.

Depending on the nature of the concepts linked, a concept model will exhibit different characteristics. Models using concept types that cover multiple instances, as in Sweden Post, emphasise the need for categorisation when a set of instances is summarised down to a common label with shared attributes. Models that instead use single instances, like Ericsson’s organisational charts, where each “box” depicts a single organisational unit, gives a more concrete and direct link to the business, without the need to summarise. However, as shown in the frame application in chapter 9, there is a risk that the use of singular concepts outside organisational charts is a sign of confusion with the process perspective. Concept models are therefore more often associated with concept types than with individual instances, especially in the area of information systems. Allowing also for singular concepts is one reason for using the label “concept models” (cf. chapter 8) rather than “category models” (cf. chapter 5).

Focusing on hierarchical relationships between concepts implies an emphasis on inheritance, i.e. similarities and shared characteristics between super and sub types. Hence hierarchical relationships can be seen as providing economy in the model by minimising redundancy. Super types also provide a means for aggregating a complex model, e.g. dealing with vehicles instead of cars, buses, and trucks separately. Or, regarding the organisation, dealing with the sales department instead of the regional sales offices separately. For lateral relationships, such an aggregation must be specified separately, e.g. by delimiting and labelling
specific areas of the model as was done in Sweden Post. Particular care is required to specify the particular lateral relationships that are included, as those can be widely different. Despite the difference between a person owning or admiring a car, this type of specification is often forgotten in practice (cf. chapter 9).

Value artefacts mean motivating the business

Through value framing, the focus lies on important factors and their influences on each other. Value artefacts emphasise motivational issues in business by focusing on factors that underlie business problems, strengths, goals, strategies, etc. For business development, this focus means motivating the business. Like other forms of framing, actual model artefacts can be used more or less. For example, Sweden Post discussed value issues without explicitly modelling them. No attempts were made to work explicitly with factors, despite concerns for the direction and goals of the project. There are other examples of value models not being used, despite value issues being in focus, e.g. in the strategy area where more emphasis is put on generic solutions (cf. chapter 6). A similar imbalance exists between the excess of generic value models in research, and the scarcity of specific value models in business development. Part of this may be the result of a too narrow view on the influences represented in value models; they may be equated with the traditional notion of causality.

As seen in chapter 9, factors in value models are often particular or compound, in the sense of also incorporating a specific value. In the area of information solutions, techniques used for value analysis are generally limited to this type of particular factors. For business development however, particular factors contribute to making the model more time-dependent, but also sometimes easier to develop: formulated goals and problems can then be used and understood without rephrasing. The alternative, of instead using general factors without any integral value, requires that the important values be specified separately, which allows for both current and intended future values for the same factor. Without such added values, the current and/or future situation of the business is not expressed, as is the case in many model types with a background in operations.

Depending on the structure of the relationships, value models may mean quite different things for business development. A linear structure, having one or more absolute ends that do not influence any other factors,
invites the traditional notion of causality and control. Influencing the means is thus a way to affect the ends. In circular loops, where factors are simultaneously means and ends, the patterns of influence become reciprocal, and invite a more dynamic view of the evolution of the business. The lack of loops might indicate that the scope of the value model is too limited; a larger scope might be needed to explore how “ends” also becomes motivated by including their corresponding function as “means”. In order to be able to pinpoint “ends” as part of a larger loop, they need to be supplemented with desired future values.

The meaning of model activities

The second part of the answer to the research question lies in the area of model activities. As described in chapter 2, model activities deal with persons’ behaviour – in the widest sense – involving models. After a recount of some of the key results regarding the area from earlier chapters, I will present my answers to the meaning of model activities for business development.

Illustrating activities

Based on theories of learning, and experiential learning in particular (Kolb, 1984), the conceptual framework distinguished among model activities in two dimensions. The first dimension described two ways of experiencing the world, through abstract or concrete activities. An abstract activity was characterised by a focus on something because of what it stands for, whereas a concrete activity was characterised by a focus on something because of what it is in itself. In knowledge terms, abstract activities are linked to explicit and articulated knowledge, and concrete activities to implicit and tacit knowing. The second dimension involved two ways of transforming the experiences, either through reflection or action activities. A reflective activity was characterised by an “inward” focus on understanding, whereas an action activity was characterised by an “outward” focus on change.

In Ericsson Radio, the activities of the participating process owners engaged on the one hand process improvement and on the other the daily work within the business. Activities were aimed at getting an overview of the process, improving it, and integrating it with the line organisation. Important aspects of the work included making the best use of existing employees’ knowledge and supporting personnel who were new on their
jobs. Communication and information diffusion was emphasised, more so than questions of supporting technologies.

The activities in Sweden Post involved a large degree of analysis when the need for process orientation and business descriptions was investigated. However, coming up with suggestions and drawing out implications from the results meant that some steps towards implementation and change were also made. The benefits and risks with both types of work were discussed. Spending time on analysis and reflection gave opportunities for tackling complex issues, although fast results, without too many hindering restrictions, required action-taking. As the work also involved providing recommendations, one issue was how large a step should be taken towards process orientation. Although the introduction of new ways of organising could provide important opportunities, it was valuable to keep what worked and limit large disturbances.

During the overview of perspectives in chapter 5, activities were discussed in terms of degree of process orientation, three types of development work, and the two ambitions of understanding and changing the business. When working with business processes, a range of alternatives was presented depending on the actual or desired degree of process orientation. The alternatives ranged from using describing business processes to having them shape the entire business. In addition to business process development, change work in a business might also involve two other areas: corporate strategies and information systems. Examples of supporting methods or models for development activities on the three levels were given. The three areas of development work were returned to in chapter 6-8 in the form of strategy, operations, and information solutions, although activity issues were more indirect in those chapters. As the final activity issue in chapter 5, work that aimed at understanding or changing a business where partly associated with models either focusing on the current situation or on a desired future situation.

The activities from the frame application in chapter 9 included investigation and modelling of the businesses chosen by the participants. As the end-result of their analyses consisted of integrated business reports, the participants were not expected to achieve any changes in the business they investigated. From interviews and observations, they developed their different models, and subsequently elaborated them further after discussions with colleagues.
What model activities mean for business development

Within the area of model activities, the material from this thesis points to three partial answers to the research question. The three deal with the meaning of abstract, reflection, and action activities for business development (Table 10-2).

<table>
<thead>
<tr>
<th>Meaning of model activities</th>
<th>Meaning for business development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract activities</td>
<td>Communicating the business</td>
</tr>
<tr>
<td>Action activities</td>
<td>Changing the business</td>
</tr>
<tr>
<td>Reflection activities</td>
<td>Understanding the business</td>
</tr>
</tbody>
</table>

Table 10-2. Summarising the partial answers to what model activities mean for business development.

Abstract activities mean communicating the business

For business development, abstract activities mean communicating. Through the use of language, models, documents, etc, we handle artefacts not for what they are in themselves, but for what they represent. Contrary to the field of semiotics, it is not the sign in itself that is the starting point, but rather the human ability to appreciate something as standing for something else (cf. Peirce). By using models, our relationship with the business becomes more distanced and subject to our communication, a distance that gives opportunities for overview as well as risks for separation. For example, by working with models of the production, we are a step away from the direct experience of the business operations.

Reflection activities mean understanding the business

The meaning of reflection activities for business development is understanding. Through individual and group observation, deliberation, and analysis, models are used to support the development of meaning and understanding. For example, the project investigated at Sweden Post had a strong focus on analysis, with the aim of investigating what process orientation and business descriptions could mean for the organisation. The business analyses that were studied in chapter 9 also had an overall focus on understanding, with the developed models making up the end-result of an integrated report.
Depending on the overall focus of the activity, understanding can be seen as a desired end in itself, or it can be an important means for subsequently switching to a stronger focus on action and change. The focus of the activity goes hand-in-hand with the view on the utility of the models used and produced, and how they should be valued. For business development that strives for understanding, the models are valued for their meaningfulness.

**Action activities mean changing the business**

Change is the meaning of action activities for business development. Through focus on transforming and influencing the business in some desired direction, the development work makes use of models as tools for change. In this way, business modelling is used to explicate and test ideas, and turn them into practical realities. Issues of application, pragmatic use, and effects become salient. With a strong action focus, modelling becomes more than description and production of models. This instrumental view of models could, for example, be noted in Ericsson Radio’s attempt to improve the early stages of the market supply flow, which were responsible for developing new products and services for their customers.

In addition to striving for change as an end in itself, e.g. through the effects produced in the business, change can also be seen as a means for deepened understanding. As expressed by Kurt Lewin, the father of social psychology, if you want to truly understand something, try to change it.

**The meaning of model assumptions**

Model assumptions constitute the third part of the answer to the research question. As described in chapter 2, model assumptions deal with persons’ underlying beliefs in relation to models and modelling, and can be attributed by oneself or by someone else. Answers to the meaning of model assumptions for business development will follow after a summary of the key results regarding the area from the thesis.

**Illustrating assumptions**

Two dimensions, based on theories of knowledge paradigms (Burrell & Morgan, 1979), were used in the conceptual framework to characterise different assumptions. Objective and subjective assumptions were dis-
tistinguished in the first dimension, where an objective assumption was characterised by a focus on structures in the world, and a subjective assumption by a focus on structures in the mind. The second dimension distinguished between consensus and conflict assumptions. A consensus assumption was characterised by a focus on agreement and unity, and a conflict assumption by a focus on disagreement and contradiction.

In Ericsson Radio, assumptions promoted a united view, were process models where advocated as an important means for creating a common understanding among the people working in the business. Co-operation was emphasised, and process orientation was seen as a way to facilitate the business to work better as a whole. Against this, other assumptions could be inferred, e.g. from the a person rejecting a process model that differed in the way his process was depicted, or from the resistance to talk about certain support and control activities for “processes”. The focus on processes was sometimes seen as problematic and to complicate work in relation to organisational boundaries and the established project approach.

Sweden Post expressed assumptions regarding coordinated flows and integration in an organisation perceived as “One Sweden Post”. On the other hand, decentralisation and a higher degree of separation were seen as advantageous for faster action.

The elaboration of the frame set was based on the assumption of a certain independence between the solutions explored and the modelling tools used for the exploration.

Assumptions underlying the application of the modelling frames in chapter 9 focused on investigating the businesses as they were, but allowing for complementing views as a result of using multiple modelling perspectives.

What model assumptions mean for business development

Based on the model assumptions presented in the thesis, and illustrated in the section above, there are four answers to the research question. They deal with the meaning of objective, subjective, consensus and conflict assumptions for business development (cf. Table 10-3), and each of these answers will be discussed further in the following.
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Table 10-3. Summarising the partial answers to what model assumptions mean for business development.

<table>
<thead>
<tr>
<th>Meaning of model assumptions</th>
<th>Meaning for business development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective assumptions</td>
<td>Discovering the business</td>
</tr>
<tr>
<td>Subjective assumptions</td>
<td>Inventing the business</td>
</tr>
<tr>
<td>Consensus assumptions</td>
<td>Balancing the business</td>
</tr>
<tr>
<td>Conflict assumptions</td>
<td>Promoting the business</td>
</tr>
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</table>

Objective assumptions mean discovering the business

With objective assumptions the focus of business modelling lies in discovering and making use of the business as it is. For business development, this means a focus on how the real business can be revealed, illuminated and changed. In analysis, the role of the developer is primarily that of an observer, where the main direction of influence goes from the business to the model and framings developed. In situations of change, the focus lies on tasks and material conditions. In the cases of business analysis in chapter 9, objective assumptions were seen in comments and motivations such as “the models show how it was in the business”.

Subjective assumptions mean inventing the business

For business development, subjective assumptions mean inventing, through a focus on creativity and imagination. In analysis, the developer actively contributes to the creation of the business through models and other framings. The main direction of influence goes from the models to the business. In change efforts, the focus lies on relationships and personal conditions. Rather than an independent phenomenon, the business becomes what the people frame it as, and issues of personal perspectives become more salient. In the analyses from chapter 9, subjective assumptions took the form of comments such as “the models showed how the business was seen”, either by the people interviewed or by the analyst him/herself.

Consensus assumptions mean balancing the business

Balancing diverse interests in the business is the meaning of consensus assumptions for business development. Business modelling activities are
intended to contribute and enhance the unity and shared values of the business. Business modelling thus becomes a means to balance the interests of internal and external stakeholders of the business. The desire to have “One Sweden Post”, and the ambition of Ericsson Radio to develop a common view of the business, were examples of consensus assumptions in the empirical cases. Most of the analyses in chapter 9 expressed signs of consensus assumptions, e.g. when they described the businesses in terms of order and agreement.

Conflict assumptions mean promoting the business

The meaning of conflict assumptions for business development is promotion of specific interests. Issues of persuasion, coercion, and agenda formation become salient with this focus. How the business is modelled and framed therefore involves influence and manipulation (cf. the meaning of “frame” as trapping or setting someone up). With conflict assumptions, models are instruments for power, and framing is done to conquer. When business development is part of a political agenda with potentially conflicting goals and ambitions, business modelling provides tools for getting one’s voice heard. In Ericsson Radio, conflict assumptions were shown in the emphasis placed on a particular model, when the alternative was rejected. Among the three frames elaborated in chapters 6-8, the value perspective enables conflicting means and ends to be identified, whereas the concept perspective can be used for distinguishing between different ideas and views.

Conclusions: The meaning of business modelling

Above, answers to the research question were derived within the framework’s three areas. What model artefacts, model activities, and model assumptions mean for business development was discussed in terms of ten partial answers (cf. Table 10-1, Table 10-2 and Table 10-3). Together, these answers give an overview of the different meanings of business modelling for business development that I have arrived at in this thesis.

However, there are aspects of the research question that do not relate to any one of the three areas individually, but rather to the general issue of what business modelling means for business development. These remaining aspects clarify the foundations of the partial answers, and draw on the thesis and its contributions as a whole. They are discussed below as four
key conclusions of the thesis, each illustrating a key aspect of the view that for business development, business modelling means framing the business.

**Business modelling means versatility**

To paraphrase Morgan’s (1986, p. 339) statement about the multiplicity of organisations, cited in chapter 1, one key conclusion of this thesis is that business modelling is many things at once! To appreciate what business modelling means for business development, one has to distinguish between the meanings of a number of different characteristics as described regarding the detailed answers above. Business modelling is more than the models themselves: activities and assumptions also have important meanings for business development (cf. Figure 10-2).

![Figure 10-2. Three contexts of business modelling.](image)

Whether labelled “diagrams”, “figures”, or just “models”, model artefacts are a concrete starting point in understanding the meaning of business modelling, e.g. in terms of process models for coordinating. However, a central part of grasping the meaning comes through investigating the larger context of model activities, i.e. the use of model artefacts. With this, the meaning of the artefact gets mediated by, for example, reflection activities for understanding. Another context of meaning appears by looking into model assumptions, i.e. the guiding beliefs underlying model activities and model artefacts. For example, conflict assumptions for promoting interests adds to the meaning. Understanding each area of business modelling contributes to enriching and moderating the others. As discussed earlier, for each of these three areas, there are relevant answers to the question about the meaning for business development.
Business modelling means depth-seeing

The different model artefacts allow us to frame the business using different perspectives. What is emphasised and what is downplayed characterises each framing. Functioning like a filter, the particular perspective determines the salient issues. As the example of seeing depth with two eyes, Bateson’s (1979, pp. 73-74) principle of multiple comparison applies here: “In principle, extra ‘depth’ in some metaphoric sense is to be expected whenever the information for the two descriptions is differently collected or coded”. For business development, this means seeing the “depth” of business by business modelling using multiple perspectives.

![Diagram](image)

**Figure 10-3. Seeing depth of the business through multiple perspectives.**

The perspectives suggested in this thesis – processes, concepts, and values (cf. Figure 10-3) – each cover a number of specific modelling techniques. This perspective set deals only with the form of the model, and does not take possible phenomena or solutions into account, something that obscures some other sets. For example, “objects” (cf. Andersen 1991/94) and “rules” (cf. Bubenko, 1999) are here rejected as independent perspectives because they represent phenomena that can be viewed from several perspectives. Through the “family tree” of model perspectives, business development more clearly can distinguish between the tools available for development, and the solutions being developed. Contributing to the depth of business are the relationships between the perspectives, where some are more closely related than others. For example, concept and values share their common focus on business content, whereas processes cover both transformation and behaviour processes.
Business modelling means delimitation

In addition to the perspective it offers, a model’s delimitation determines what is included in the business frame or not. Different models emphasise these characteristics to different degrees, from "perspective models" with little or no focus on delimitation, all the way to “delimitation models” with virtually all focus on delimitation. For business development, “perspective models” in the form of modelling techniques, such as causal loop diagrams (cf. chapter 6) and process graphs (cf. chapter 7), mean a “soft frame” where the actual delimitations are not in focus. “Delimitation models” in the form of frameworks and methods, such as Lundeberg’s Y model (cf. chapter 5) and Porter’s five-forces model (cf. chapter 6), instead mean a “hard frame” (cf. Figure 9-6).

![Figure 10-4. The issue of delimitation in business framing (adapted from Tolis, 2004 b*)](image)

For business development, soft frames imply a specific form or way of thinking that can be applied in various contexts. On the other hand, hard frames imply fixed messages that are important for their content rather than form. Although the focus of this thesis has been on soft frames (perspective models) more than hard (delimitation models) an awareness of the full range of models strengthens the varied requirements of business development.

Furthermore, even if the distinction between content and process discussed earlier is based on perspective, it is also affected by the model’s delimitation. For example, a top-level (“contextual”) dataflow diagram often has a content-like character following the specific delimitation, although they both share a process perspective. Conversely, a factor model in the form of a straight sequence often has a process-like character following the delimitation, despite its content perspective.

* Included as chapter 9 in this thesis.
Business modelling means dual dependencies

Although business models for most practical purposes are seen as dependent on the business, they are at the same time artefacts, i.e. human creations, and hence dependent on the personal frames of the human mind. Despite many definitions of a model that downplays the personal aspect, e.g. by describing a model as “a simplified view of a complex reality” (Eriksson & Penker, 2000, p. 2), some try to make the dependence on the person stronger. Recall for example Peirce’s characterisation of signs from chapter 1 as “something which stands to somebody for something in some respect or capacity” (Peirce, 1893-1910/85, p. 5). Also Langefors’ (1966/73, pp. 248-249) so-called infological equation implies that data is created based on information that a person wants to express (I) and his or her “semantic background” (S) resulting from the total life experience of that individual.

In chapters 6, 7 and 8, the balance between business reality and modelling perspectives was emphasised through the introduction of business solutions. Different solutions represented specific areas of concern in the business, e.g. strategies, operations, and information. Despite a strong initial link to particular modelling perspectives, other combinations are advocated as tools in business development efforts (cf. Figure 10-5).

![Figure 10-5. Switching to complementary perspectives on the business.](image)

The balance of the two dependencies is illustrated more clearly through the dimension of model assumptions, where objective assumptions emphasise the model’s dependence on the business, and subjective assumptions emphasise its dependence on the person. With objective focus, the question of following a model is unproblematic, whereas with subjective focus, it instead becomes a question of “frames for inspiration” (cf. Andersson, 2005, p. 287). Stressing dual dependencies as a meaning of business modelling for business development, entails the use of models to learn about the mind, and not only about the business.
Emphasising this meaning enables a closer look on mind matters, making it clearer how we can “reflect on the problem-setting processes which are usually kept tacit, so that we may consciously select and criticize the frames which shape our responses” (Schön, 1979, p. 269, cf. chapter 1).

For business development, the dual dependency on mind and business represents a parallel to the distinction between person and task issues (cf. Lundeberg, 1993). Furthermore, business modelling as framing not only acknowledges framing in the sense of defining the business, but also in the sense of trapping or tricking it. Obvious as they might seem, models contribute to the formation of business.
Framing the Business
Chapter 11

Implications and Reflections

In this concluding chapter of the thesis, I discuss practical and theoretical implications of the research, as well as personal reflections. For professionals, this means the implications for better appreciating various business perspectives. For researchers, it means implications for broadening the information concept. On a personal level, I reflect on my ambition following Goethe – to divide what is united and unite what is divided.
Introduction
As Professor Benn Konsynski expressed it at a Ph.D. course in Denmark in 1997, interesting research is characterised by “questions that matter and answers that inform”. In chapter 1, the line of reasoning of this thesis started with three broad rationales – practical, theoretical and personal – that motivated the overall research question. Four specific purposes detailed the research question and provided delimited means for arriving at the desired contributions. The four contributions comprised different kinds of material, which were used to form answers to the research question. What remains is to use the research answers for exploring implications and reflections that are relevant for the intended audiences for the thesis. In this way, the aim for this final chapter is to allow for a wider interpretation of the significance of the results (cf. Figure 11-1).

As illustrated in the vertical placement of different elements of the thesis in Figure 11-1, they reside on different levels of abstraction (cf. Lundberg, 1993). As indicated in the figure, rationales and implications are at the highest level of abstraction, since they are concerned with a wider and more general context than both the research question and the research answers, developed in the previous chapter. Research question and answers, on the other hand, are on a higher level of abstraction than the more specific purposes and contributions of the thesis.

To put the answers into perspective, I will describe some implications for my intended audiences. In the light of my initial rationales, what difference can the thesis make for professionals and researchers?
Appreciating various perspectives of the business

The first intended reader of my thesis has been professionals who are engaged in activities of business development, especially those activities that involve business modelling. I have primarily considered people involved in developing their own organisation, but also those who work in other organisations than their own, for example as management consultants.

The overall practical rationale of my research has been to encourage people who engage in development work to better appreciate the various perspectives of the business, and ultimately to support them in taking charge of the development of their own going concern. After the focus on meaning when discussing the conclusions in the previous chapter, it is now time to explicitly turn to their usefulness. Below, I will therefore discuss some of the implications of the research in relation to the practical issues from chapter 1 in terms of balancing time span, appreciating organisational expressions, and fostering innovation.

Continuous development

Balancing long-term and short-term activities involves dividing resources between business development for tomorrow and the going concern of today. One implication of the present research can be found in the links between the two. Through business modelling, development work can be more closely integrated with the going concern, by supporting more continuous development. For example, my conclusion that business modelling means dual dependencies implies that people engaged in the going concern, e.g. fulfilling customer requests, may initiate changes in reaction to differences between the espoused view of current models and the operations-in-use.

Other implications of the research for continuous development can be found in the use of the modelling perspectives. In particular, the value perspective can be used to explicate factors of mutual interest for the going concern and development work. An agreement on factors of means and ends can reduce the gap between the two activities. For example, clarifying the factors of lead-time and customer satisfaction, and the influence between them, creates a stronger link between the going concern and efforts of development work. As emphasised by Schön, “In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic
situations which are puzzling, troubling, and uncertain” (Schön, 1983, p. 40). In practical terms, this leads to the following suggestions:

- Use business modelling to explore what is problematic with your going concern and how it ought to be developed. Make use of models as a means for understanding and changing the business.
- Be aware of the discrepancies between existing models and descriptions, and the actual practice experienced. Consider how the current models are used to balance or promote different interests.

**Getting the picture**

Being able to not only appreciate, but also to actively exploit, organisational expressions, is a practical implication of business modelling. Through my conclusions about what model activities and model assumptions mean for business development, the thesis points to the specific characteristics of business modelling, and also its limitations. For example, the promotion of interests, evident in conflict assumptions, emphasises the political implications of business modelling. The labels used in a model, the relationships shown, the positions chosen – all these have consequences in regard to which actors and interests are promoted and which are downplayed. Moreover, the use of models also has consequences in terms of leveraging the vagueness in the business (cf. Barinaga, 2002), of “talking the walk” (cf. Weick, 1979), and of exploiting justification and hypocrisy (cf. Brunsson, 1993).

An important step in exploiting organisational expressions lies in selecting means of expression appropriate to the issues at hand. Based on my conclusions about what model artefacts mean for business development, I would like to highlight some practical implications, all of course subject to the larger context of activities and assumptions described above. I offer suggestions, together with explaining reasons, to support decisions on appropriate perspectives and delimitations in business modelling for business development.

- Use value models that focus on general factors and circular relationships. Despite requiring further analysis of goals and problems, a separation of specific values from underlying factors emphasises more long-term factors, and facilitates the distinction between deliverables and effects. Circular relationships remind of the larger contexts and stimulate the search for points of leverage rather than simple causes.
• Use process models that focus on the transformation of objects in closed processes going from customer requests to fulfilment. Despite that many find behaviour models more familiar, such models bring a focus on the activities performed by the actors rather than the results of these activities, which can be unnecessarily limiting and controlling for those affected. Avoiding open-ended processes also increases the chances that development efforts will benefit the external stakeholders who make the business possible.

• Use concept models that focus on concept types and lateral relationships. Concept types emphasise the issue of categorisation, and support the bridging between incompatible conceptualisations among different parties within the business and external stakeholders. For business development, hierarchical relationships are of less importance than in information systems development. Instead, lateral relationships can inspire further exploration of the processes in the business.

Each of these three recommendations represents a specific focus for framing the business. Taken together, they provide means for seeing depth in a business while avoiding most of the challenges discussed in chapter 9. The wider range of alternatives were described in chapters 6 (value modelling), 7 (process modelling), and 8 (concept modelling).

Appreciating ideas

Fostering innovation involves both coming up with new ideas and solutions, and evaluating those from other sources. Making use of the implications of model assumptions, a stronger focus on subjective assumptions can inspire the use of metaphors and perspective switching in idea generation (cf. Schön, 1979). If we believe that the world is different if we cut stone or build cathedrals, then we can engage in language games and framing exercises through business modelling. Also, with more objective assumptions, we can use concept modelling in contrasting existing and new ideas, process modelling in assessing new ways of doing things, and value modelling in challenging the motivation that underlies an innovation.

Innovative business development not only means focusing on creative goals and ends, but also having an acute awareness of all possible means to be exploited. As evident through value modelling, especially with circular relationships, there is a close link between means and ends. Contrary to rational change approaches that focus on ends first and means
second, value modelling emphasises dealing with them concurrently. This supports the advice not to use a change model sequentially “from left to right”, but instead to switch between different foci, e.g. in the Y model that was used in chapter 5 (cf. Lundeberg, 1993, p. 116). The means that we are aware of influence the ends that we suggest. Taking a rather extreme example, the reason we do not seriously suggest a goal of instantaneous transportation, is that we do not believe that teleportation and similar technologies are a realistic means for transportation. If we did, transportation delays and other ends would certainly be stated differently. More concretely, this thinking translates to the following suggestions:

- Consider both means and ends in the business, and how they influence each other, as sources of inspiration. Use value models to explore different means that contributes to a desired end, and different ends that are affected by an existing means.

- Use business modelling to evaluate new ideas and solutions, and to explore their potential consequences. Appreciate what is new and what is already known and used by the business, in terms of both concepts, processes, and values.

Broadening the concept of information

My second intended reader has been the person who studies development work and/or the use of business models, for example a researcher or a student. The overall theoretical rationale of my research has been to encourage people who study development work to broaden the concept of information. Below, theoretical implications of the research are discussed regarding the issues from chapter 1: exploring salience, interlinking knowledge forms, and bridging learning gaps.

Punctuating experience

The issue of salience is central to business development as it affects what is focused on, analysed, and changed. Along with the conclusion that modelling the business means framing it, there are implications for how salience evolves and is developed. The link to modelling as a learning process, which was made in chapter 2 when developing the area of model activities, suggests some further implications regarding the nature of modelling.
Using ideas of levels of learning (Bateson, 1972), there are aspects of both first and second order learning in business modelling. Bateson explains first-order learning as taking place within a fixed structure and second-order learning as a change in that structure, i.e. a new way of punctuating experience. As such, second-order learning is neither true nor false, and patterns of punctuation are harder to change than the content of first-order learning. Seeing business modelling in these terms provides additional basis for understanding the common examples of perspective-crossing challenges in chapter 9.

Reconstructing information

The relationship between tacit and articulate knowing has received significant attention, especially following the increased use of computers and other information technologies (cf. chapter 8). Difficulties in providing “intelligent” support and enhancements for people has led to a renewed interest in the basic concepts of data, information, and knowledge. A parallel development can be seen in business modelling, where the traditional cognitive and analytical view of modelling has been augmented by a social-construction view that also emphasises people’s direct and “tacit” interaction with the world.

In this thesis, “framing” (“gestaltning” in Swedish) has been used as a general term for people’s view of the business. Graphical models represent the particular type of material expression of such framings focused on here. In a similar way, “information” is well suited as a general term for our ability to see some things as representing others (cf. Peirce). As long as the distinction between what is codified and what is personal is maintained whenever it is appropriate, I argue that there are too many conflicting ways of separating information from data or knowledge, to succeed in using “information” in a more limited way (cf. chapter 8).

Knowledge sharing

The gap between individual and organisational learning has been illustrated by the observation that just because people in an organisation learn, it does not necessarily mean that the organisation itself learns (Argyris & Schön, 1978). This has nothing to do with the difficulties that some researchers have with the whole idea of an organisation learning, but it rather points to the intricate relationship between micro and macro levels. Although most theories of learning take humans as a starting point
(cf. Kolb, 1984), some are applied and extended to the organisational level (cf. Nonaka, 1994). After looking at business modelling for business development in this thesis, I believe that Nonaka’s and others’ focus on conversions between different knowledge types needs to be complemented with an additional focus on the area of assumptions. Although many difficulties do arise from incompatible knowledge forms and structures – corresponding to my area of model activities – there is an added complexity in the handling of differing assumptions, values and goals between individuals in the organisation and the organisation as a whole.

**Dividing what is united and uniting what is divided**

In chapter 1, I described the personal rationale that motivated my research from a personal standpoint. Overall, I summarised it as “to divide what is united and unite what is divided”, using a quote from Goethe. In further detail, my rationale included interests in diversity, social construction, and general principles. Being at the last pages of the thesis, this is an opportunity to reflect on the research process and results in the light of the personal rationale – and also to address drawbacks and potential problems.

**Exploiting diversity**

One indication of my aim for diversity rather than focus lies in the use of material from different areas. I have chosen to work with ideas from different disciplines, e.g. in the development of my conceptual framework in chapter 2, or the examples of modelling techniques in chapters 6-8. Inspired by Peirce’s theory of abduction (cf. Fann, 1970), I have moved fragments between contexts in order to further the development of the research topic. This has included fragments that are directly related to business modelling and business development, as well as those that are usually seen as more distant. Also the results are characterised by diversity: I come up with several answers to the research question, and focus on alternatives rather than rules and directions. For example, I advocate values as a distinct but related perspective, and separate two often confused process perspectives: transformation and behaviour.

However, exploiting diversity brings a corresponding risk for inconsistencies and misunderstandings. As each fragment is influenced by the area and tradition of which it is part, meanings are bound to be affected.
Requiring a sensitivity of underlying assumptions, this means that people with other specialisations may well have remarks on the interpretations that I make. Furthermore, my aim at diversity will not be seen as helpful by some readers, especially if they are looking for direct answers without too many “ifs” and “buts”. However, since I see the complementary value also of more focused approaches, I do outline some concrete suggestions from my research when I discuss its practical implications. I definitely view this as an important continuation of the research.

**Negotiating multiple truths**

In line with my emphasis on social construction, issues of framing, perspective, and delimitation are central to this thesis. Different assumptions are all treated as valid, each with its distinctive foundation, meaning and consequences. With a stronger objective focus by the researcher, one could still have discussed the alternatives, but more in order to evaluate their correspondence to reality. In my research in business modelling, I have used people’s models as expressions of their framings or “personal ontologies”, rather than starting out from an established and documented structure of the world. Also in interviews and observations for the empirical cases in chapter 3 and 4, my focus has been on the views and realities interviewees expressed.

Of course, my stance vis-à-vis social construction is not without problems. For example, there is sometimes a thin line towards “anything goes”. However, despite the merits of each individual model, I personally think that this is to make it too simple, and that truth is still an issue also from a social-constructivist position. As illustrated in this thesis, the value of a model goes beyond that of objective correspondence, which follows from the balance of difference assumptions. Issues of meaningfulness, usefulness, and beauty need to augment the concept of truth. Following my emphasis on the social as mediating the personal, and a belief that the world is not completely malleable to our views of it, I still see a place also for correspondence. But instead of “right and wrong” (objective focus) or “no right or wrong” (subjective focus), I see the issue of truths as “many rights and wrongs” that are continuously (re-)negotiated. However, for the most part, I still find unnecessarily strong objective focus, both in the practice and research of business modelling.

After all, without humans, nothing (or everything) exists in the world.
Exploring principles

My focus on general principles has influenced this thesis in several ways. First of all, it has contributed to my interest in recurring patterns in modelling techniques as well as individual model artefacts. Despite that each model ultimately is unique, my research is based on the belief that much can be gained from exploring general principles, e.g. in terms of the value, process, and concept perspectives elaborated in chapters 6-8. Moreover, my own research process, and subsequently the complete thesis, has been affected by working with a particular principle regarding the structure of the thesis. As outlined in chapter 1, chapters 2-9 in the thesis have been designed as rather self-contained units in order to be meaningful when read separately, despite their essential role in the larger context of the thesis and its overall research question. Taking advantage of the opportunity of external feedback along the way, the process of publishing conference papers and book chapters has been an important aspect of this principle.

A key risk in adhering too strongly to principles is, of course, that of getting stuck in too much structure at the expense of specific content. In order to balance my interest in general “forests”, I also examine individual “trees” along the way, e.g. through the foundation cases (chapters 3-4), the modelling techniques (chapters 6-8), and specific instances of business analyses (chapter 9). However, the principle that guides the structure of the thesis has consequences for the level of detail in each chapter, as a result of the focus required for successful communication and publication. Furthermore, the principle has some potentially negative effects on the links between different chapters, although this I have hopefully offset by a clear introduction and integration within the whole thesis.

Epilogue: Discussing the research

Partly based on the comments and questions that I have received while finalising my thesis, I include a brief Q&A session below. My aim is to conclude the thesis with a short discussion to summarise key issues and their role within a wider practical and theoretical context. Instead of going into full details, I refer the reader to relevant parts of the thesis.

Why business modelling?

Business Modelling represents a unique combination of business and information issues. In chapter 1, I outline my interest in the use of differ-
ent kinds of models when one develops a business. My particular focus on graphical models follows from their widespread use and symbolic richness. The focus on business development that is related to business processes has its background in the high popularity of process orientation, particularly in the empirical cases. Theoretically and analytically, however, I stress the benefits of treating process as one of several ways to focus modelling and development activities.

**Are models not structural and rationalistic?**

For some people, models and modelling are closely associated with issues of structure, rationalism, control, rules, logic, and positivism. However, the conceptual framework that I develop in chapter 2 emphasises a wider view of the area. To understand the meaning of business models, it is not enough to know about different model artefacts and their characteristics. It is through model activities that the models are produced and used, and through such activities that they can contribute to understanding and changing the business. Moreover, the activities are linked to model assumptions that give them a wider foundation. Structure and rationalism are only specific examples of such assumptions.

**How do development and modelling take place?**

The two empirical cases that I describe in the thesis provide concrete examples of business development and the use of graphical models. As I describe in chapter 3, the application of business processes can be quite complicated even for a company with long experience of this perspective. Models are used as tools to get overview and facilitate change, although there are uncertainties about what should be included and how the models should be done. In chapter 4, the exploration of process orientation and business descriptions was done to prepare for future changes. The models developed and used were mostly in the form of concept models, despite the focus on processes and intense discussions about the objectives and consequences of the work.

**What about the specific frames?**

In chapter 5, I use the empirical cases as a basis for describing four distinct modelling perspectives for framing a business. The perspectives have been formed out of a combination of inductive analysis of existing
models used, and deductive inference from the general distinction between process and content (cf. chapter 2).

In order to simplify the overall complexity, and to create a more balanced set for business development in general, the main perspectives are reduced to three in the following chapters: values (factors) in chapter 6, processes (both behaviours and transformations) in chapter 7, and concepts (categories) in chapter 8. Except for this type of hierarchical rearrangement, I regard these frames as a complete set; there is no additional form that a business model can take.

**How do business solutions relate to modelling?**

Business solutions are what the modelling and development activities are all about. Whether they involve strategy (cf. chapter 6), operations (cf. chapter 7), or information (cf. chapter 8), the business solutions is the topic of the development effort. Although the desire to separate the “phenomenon” from the analytical frame had been there for a long time, the actual label was coined when I came up with the name “Business Modelling & Solutions” for a graduate course. The name captures the topic of the exploration in a general way, whether it is of enterprise systems or something else of importance for the business. The label *solution* also indicates that it is a human creation, and that it the flip side of problems; as Senge (1990/94, p. 57) puts it, “today’s problems come from yesterday’s solutions”.

Although each type of business solution is presented together with a specific modelling perspective, each modelling perspective can be used to explore any type of business solution. From this it also follows that there can be more and other types of solutions than the three discussed; these have been chosen as main examples of key areas of concern in a business.

**How do the frames work together?**

In chapter 9, the three frames are put into practical use as tools for business analysis. When used to make sense of businesses, each perspective gave rise to its series of challenges. Value, process, and concept models were used together to stimulate multiple framing and switching of perspectives.

As a result of this, some of the challenges identified indicate possible mix-ups. Moreover, the challenges are of two kinds, where some involve
individual parts of the model, and others involve the model as a whole. From this, the term *business framing* can be clarified to comprise both a perspective and a delimitation component, akin to the literal meaning of framing a painting. Still, it is worth noting the validity also of the alternative meaning of the term, to trap and trick someone; business models also frame in this sense.

**What are the results?**

There are results of this research on several levels, all linked to the research question of what business modelling means for business development. To start with, there are four contributions linked to the purposes of the thesis: the conceptual framework, the empirical cases, the set of business frames, and the challenges of applying it. Since I have covered these contributions in the answers above, I will focus on what the specific and general conclusions are.

On a specific level, there are the meanings of ten specific model artefacts, model activities, and model assumptions for business development. As described in chapter 10, these partial answers are made up of elements from the different part of the thesis, which together provide key ideas, examples, and reasoning. On a general level, there are four conclusions of the thesis: For business development, business modelling means versatility, depth-seeing, delimitation, and dual dependencies. All four contribute a specific aspect of the view of *framing the business* as what business modelling means for business development.

**For whom are the contributions?**

For my first intended reader, a practitioner involved in business development, the thesis contains results that can support him or her through informed use of graphical models. Some specific implications for practitioners are discussed in the beginning of this last chapter. However, as this is an academic thesis, further development and refinement will be needed to fully leverage the contributions in practical situations.

For my second reader, a researcher studying business development and/or business modelling, the results are directly linked to issues in the fields of information and business. Since the thesis is influenced by several research traditions, it has somewhat different contributions to them. For researchers in the information field, the thesis builds on research on modelling as a preamble to IS development, but broadens the scope to
business development in general. Arguing that information is the core of that field, rather than computer-based technologies, I focus on graphical models as a supporting “technology”. For researchers in the business field, I extend the research on metaphors and multiple views on organisations by exploring graphical models as a specific tool for framing and perspective switching. By combining material from various parts of the business field, I contribute a synthesis centred on the role of business modelling in the social construction of business.
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