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Preface

This thesis is the result of a three year PhD research carried out at the Department of Production at Aalborg University. The thesis is an element in the acquisition of the technical PhD degree under the "Mechanical Engineering" programme at the Faculty of Engineering and Science at Aalborg University.

The thesis is an attempt to contribute to the development of new knowledge and a common understanding of Value in Building. It is my hope that others, with interest in the building process, will find this thesis valuable, and that they will contribute to the needed discussion of the future understanding of value in building. The research and the writing of this thesis has been a long journey, exciting at most times, and in retrospect I am pleased with this work.

I would like to thank my supervisors. Associate Professor Erik Bejder for his high-flying thoughts and fruitful discussions. Associate Professor Willy Olsen for his precise and wise comments at critical moments. Both of them for their always good spirits and never failing believe in my work. I would also like to thank Ms. Annette Riisberg for making valuable linguistic corrections.

Aalborg, August 2005

Søren Wandahl

Abstract

This PhD thesis with the title "Value in Building" is the final documentation of a three-year research process in building management. The project is carried out at Department of Production at Aalborg University, and the project can be viewed at www.wandahl.net.

The thesis appears as a plurality based on eight published papers plus the main thesis. The main thesis presents a coherent overview as well as literature studies on value and value management. The papers are published during the PhD research period, which has been a naturally way of documenting the research process.

The background for this thesis is the increased focus on the lacking productivity development in the building industry, which may have great socioeconomic consequences. Several development initiatives have been initiated to reverse the trend, and an increased focus on production and management concepts likewise. Among others Partnering and Lean Construction have been in focus. Recently, the value concept has emerged in the discussion of the future understanding of the building process, and both Partnering and Lean Construction work more or less implicitly with the value concept. However, no clear perception of the value concept and its relation to the building process has yet surfaced.

The present and most dominant perception of the value concept (value paradigm) is the delivery of value to the client organisation in a "value for money" relation. This is what the management concepts of Value Engineering and Value Management stress. Value Management is applied in the initial phases of the building process to capture and communicate the client organisation's wishes, requirements, and needs. The purpose is to ensure that these wishes, requirements, and needs are contained in the design solution. Value Engineering is applied in the interface between the design phase and the construction phase to optimise the cost of the design solution and to ensure that the design solution is buildable.

However another value paradigm exists. It is rooted in a perception of values as human guidelines of right/wrong and good/bad, thus it influences human behaviour and human actions. This value paradigm is used in the concept of Value-Based Management, which actively works on creating common values of the project organisation. This creates a more cooperation-orientated culture, which has shown to be more proactive than traditional management systems like quality, time, finance, etc. In that manner Value-

Based Management is to be perceived as a supplementary management tool, which should increase the effectiveness and efficiency.

The understanding of Value Management, Value Engineering, and Value-Based Management plus their relation to the building process result in a total picture of "Value in Building", which constitutes the scientific contribution of this thesis. In the thesis three definite contribution areas are pointed out: 1) A perception of the value concept as consisting of two value paradigms, which is referred to as product value and process values in a building context. 2) A framework for a theory of Value-Based Management as a supplementing management tool, which is considered to be more proactive and to increase the efficiency and effectiveness. 3) A total understanding of value and management concept based on an understanding of value and their relation to the building process.

Dansk resumé

Ph.d.-afhandlingen med titlen ”værdi i byggeri” dokumenterer arbejdet bag et 3-årigt forskningsforløb om værdibegrebet i byggeriets ledelsesprocesser. Projektet er blevet udført ved Institut for Produktion på Aalborg Universitet, og projektet kan i elektronisk form findes på www.wandahl.net.

Afhandlingen består af en flerhed, dvs. otte publicerede artikler samt selve afhandlingen. Afhandlingen præsenterer det sammenhængende overblik samt litteraturstudier om værdi og værdiledelse. Artiklerne er publiceret gennem hele Ph.d.-perioden, hvilket har været en naturlig måde at dokumentere forskningsforløbet på.

Udgangspunktet for afhandlingen er den øget fokus på byggeriets manglende produktivitetsudvikling med store samfundsmæssige følger. Iværksættelsen af flere udviklingsinitiativer samt øget fokus på produktions- og ledelseskoncepter skal forbedre udviklingen, og blandt andet har Partnering og Trimmet byggeri været meget i fokus. Senest er værdibegrebet dukket op i diskussionen omkring fremtidens forståelse af byggeprocessen, og både Partnering og Trimmet byggeri arbejder da også mere eller mindre implicit med værdibegrebet. Der er dog endnu ikke opnået en entydig forståelse for værdibegrebet som sådant, samt dets relation til byggeriets ledelsesprocesser.

Den mest dominerende forståelse af værdi begrebet (værdi paradigme), er leveringen af værdi til bygherren og brugerne i en ”mest værdi for pengene” relation. Dette er, hvad ledelseskoncepterne Value Management og Value Engineering arbejder med. Value Management bruges i byggeriets indledende faser til at fastsætte og kommunikere bygherreorganisationens ønsker, krav og behov. Derved opnås, at disse ønsker, krav og behov er indeholdt i designløsningen. Value Engineering bruges i overgangen mellem design- og udførelsesfasen til at prisoptimere designløsningen og sørge for bygbarheden.

Der findes dog også et andet værdi paradigme, som anskuer værdi som det individuelle fundament for menneskelig opfattelse af rigtigt/forkert og godt/skidt, og derved styrer vores adfærd og handlinger. I værdibaseret ledelse (på engelsk Value-Based Management) arbejdes aktivt med at skabe fælles værdier og forståelse for hver enkelts individs forskellige værdier i en projektorganisation. Dette fremmer en mere samarbejdsorienteret kultur, der viser sig at være mere proaktiv end traditionelle ledelsessystemer så som kvalitet, tid, økonomi, mm. Derved bliver værdibaseret ledelse et supplerende ledelsesværktøj, som øger projektorganisationens totale effektivitet.

Forståelse af henholdsvis Value Management, Value Engineering og Value-Based Management samt deres relation til byggeprocessen giver et overordnet billede af "værdi i byggeri" og er, hvad denne afhandling bidrager med. I afhandlingen er der udpeget tre konkrete bidragsområder: 1) En forståelse af værdibegrebet som bestående af to værdi paradigmer, hvilket i en byggekontekst refereres til som produkt værdi og proces værdi. 2) En ramme for en teori om værdibaseret ledelse som et supplerende ledelsesværktøj, der er mere proaktivt, og som øger effektiviteten. 3) En total forståelse af værdikoncepter i byggeriet samt koncepternes relation til byggeriets faser.

Table of Contents

1

Introduction

This chapter introduces the background for the research and the motivation for engaging in the research process. Furthermore, the research objectives are presented along with a short description of the news value as viewed from the beginning of the research process. The structure of the thesis is described in order to guide the reader through the thesis. Finally, summaries of the papers written and published during the research are presented.

1.1 Background and Motivation

This description of the background illuminates the wider problem context and the surrounding environment of the research project. It briefly presents the research area and pass it, therefore, describes the challenges of the building industry, which is common for most countries, at least those traditionally comparable to the Danish building industry. Initially, one could ask "why do research in building management?" The answer to this question will constitute the wider background for the research and this thesis.

Building is often a much criticized industry. The productivity development is considerably low, buildings are too expensive, quality is low, nearly no innovation takes place, exceeded budgets, many accidents on site, a conservative industry, etc. (e.g. ATV 1999; BUR 2001; EBST 2000a; Egan 1998). Even though the industry often argues against these claims there seems to be a lot of challenges in building. This is not unique to Denmark, several characteristics like, fragmentation of trades, short-term cooperation, separation of design and production, price as selection criteria, etc., are present in most developed countries (EBST 2000a; Haugbølle 2002). It is, however, a paradox that the building industry is globally criticized, but nonetheless the organisation and the characteristics are highly uniform in most countries (Thomassen 2004, p. 7). In my

opinion the accusations against the current state of the building industry should be discussed and understood in the right context and not taken for granted as such.

The building industry influences the everyday life of many people. Reports have indicated that up to every fourth employee in the private sector is related to the building industry in one way or another (EBST 2000a, p. 11), and all people are daily in contact with buildings, often through their private house and their workplace, but also in the build environment in general. Building, hence, has great impact on a country's general state (EBST 2000a, p. 40), and the industry is often under political pressure to increase performance or subject to general regulation. The industry can be a political tool for creating and controlling the general welfare. Unambiguous proofs of the poor state of the industry as often indicated cannot be given, it can only be concluded that there tends to be a potential for improvement. This potential can be exploited through an increased research effort, which is often pointed out in governmental reports (e.g. EBST 2002a, pp. 7-53; Regeringen 2003, pp. 15-28). Some of the most common concerns[1] for the building industry are shortly described in the following.

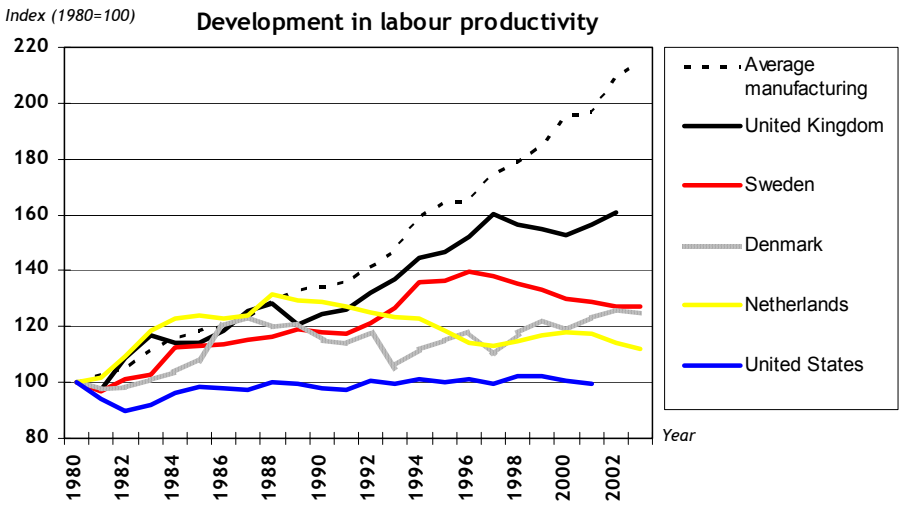

Figure 1.1. Development in labour productivity[2] for the building industry in different countries compared with the average development in labour productivity in the manufacturing industry for these countries. Own illustration of OECD data (STAN 2003)

In figure 1.1 the development in labour productivity for the building industry in different countries is compared with the average productivity development for the manufacturing industry. This reveals a clear tendency of a modest productivity development in the

[1] *A lot of other areas could have been pointed out, but the areas will often affect and overlap each other.*

[2] *Labour productivity is illustrated as a fraction of value added (volume) over total employment (persons).*

building industry compared to the manufacturing industry (AE 1998). It is not unrealistic to expect a productivity development of 2% per year, which is a common goal in other industries. This would result in a total development to index 150 over a 20-year period. Only United Kingdom can present such a development. The poor productivity development has a direct effect on the cost of building, which increases, and the problem of expensive houses is what we are facing today. In (EBST 2000a, pp. 38-42) it is argued that a productivity development of 2% p.a. will accumulate to more than a 10% improvement in five years. Such an increase would result in a 4% fall in real prices on building. This lower price would increase the demand, and the productivity would further increase by 1%. This would in total benefit the general welfare with 6.5 billion Danish Kroners. From this it can be concluded that an unexploited potential for improvement exists. Another area of interest is the level of quality in building. Failure in building is a considerable problem with great socio-economic consequences. This includes not only the remedy cost, but also the cost connected with an inappropriate building process due to failures. The remedy costs amount to 12 billion Danish Kroners p.a., which is equal to 10% of the building production (EBST 2004a, p. 4).

Much more could be written in the critique of the building industry, but on the other hand few good things have come out of criticizing past performance. Instead we should focus on the development potential in front of us. A focus on the value concept in building could be perceived as such a development potential.

It is necessary initially to clearly state how the word value is understood in this thesis. Value is what an individual places upon an object, often in relation to usability, technical quality, design, cost, etc. For example “my cell phone is of great value when I am away from my office”. Hence value is always related to something physical existing. Values, on the other hand, are the beliefs of individuals, i.e. perceptions of good/bad and right/wrong. For example “it is against my values to lie”. However, this creates a problem when mentioning value in plural. In a building context this problem is solved by referring to value and values as product value and process values respectively. This stringent use of value and values is used throughout the thesis.

Anyway, the general debate on the current state of the building industry and future development potentials could benefit from a value perspective. One of the characteristics of value is that it is relative, cf. chapter 5. In that lies that the value of goods are always measured in comparison with the value of other goods. Hence a value spectrum with good buildings and bad buildings in each polar will exist.

One of the biggest challenges in building is the initial phases of building. In a building project the briefing process is where the project team tries to comprehend what the client organisation wants and roughly transform these needs, wants and desires into requirements. In this process a number of hazards can occur (Barrett & Stanley 1999; Kelly et al. 2002). Clearly, the briefing process is both critical to successful building and yet problematic in its effectiveness. One of the main problems in the briefing process is that the client is unaware of his needs at this early stage of the building process. As the building process progresses, the client may recognize more needs or change his needs, but then it is often too late to make changes without unacceptable additional costs.

We need to be good at building the right things and to build them right – this is the real quest in building, and in this value(s) should have a central role!

1.1.1 Motivation

My immediate and initial motivation for engaging in this research process emerges from the mentioned problems and challenges in the building sector. Due to its relatively poor development, the building industry has started to look at how other manufacturing industries have obtained development in efficiency and effectiveness and whether the production conditions in building are a hindrance to development. In Denmark the research effort in this area is still relatively small compared to e.g. UK and USA, but during the three years of this research Denmark has improved its research position in building management. In September 2002 the report "Building in a knowledge based society" (EBST 2002a) points out that Danish research activities in the building sector must increase. This is one of the main determinants for my involvement in building management research. Furthermore, the research topic: Value(s) in Building, is motivated by and inspired from an extensive and successful use of a holistic management concept used in other industries (e.g. Beyer 2000; Hauen et al. 1999; Jensen 1998; Petersen & Lassen 1997). These trends have, however, not yet fully been converted to and implemented in the building industry.

There are also more personal motivations behind my engagement. This is partly founded on the results of my education: M.Sc. in Management in the Building Industry (Wandahl 2002) and in this connection my interest in Value-Based Management and partly on my interest in innovation in the Danish building industry. Also, the teaching and supervising part of a PhD study is highly motivating. In this connection, especially the supervision of master students in the building management programme has turned out to be fruitful.

1.2 Research Objectives

The study is approached as a research field situated on the interface between engineering (natural science) and social science. Furthermore, the research is of a theoretical nature.

The objective of this research is to contribute to the emergence of a theory of value in a building context. This could increase the effectiveness and efficiency of the industry in the long term. To further describe the objectives of this research, figure 1.2 illustrates an elaboration of the research topics.

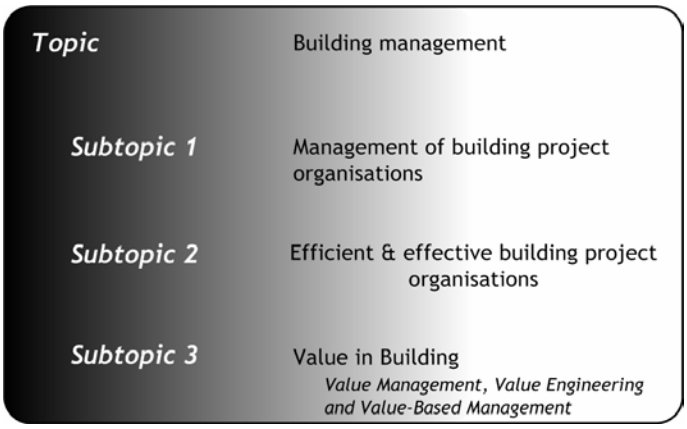

Figure 1.2. Elaboration of research topics.

The overall topic for this research is **building management**. This was the topic of the initial PhD application. According to Apics[3] management is "*The functions of planning, organizing and controlling the transformation process and its utility in providing goods or services to customers*" (Cox & Blackstone 1998, p. 53). Building management is hence management of these functions with the purpose of producing a building. This broad topic is immediately narrowed down to **management of building project organisations**. The further investigation of the organisation of building project is relevant due to a number of facts. In the last decades several initiatives and innovative concepts have been put forward to improve the performance of the building industry, like e.g. Lean Construction, Partnering, Value Management, etc. This is not the place to describe these in detail, but just to state that most of these initiatives have inspired, perhaps at an unconscious level, this thesis.

Many of the ideas can be compiled in a 'Project Management' super-group. Project Management is the initial broad research area of this thesis, which is explained in the

[3] *Apics is the American Production and Inventory Control Society.*

final study plan. Project management is a main characteristic of building projects, but the way building projects are managed is not always fully comparable with general theory of project management. In building projects the organisation consists of multiple companies with individual and often not corresponding interests. This characteristic I call company external project organisations. Furthermore, the building project organisations are temporary, i.e. in most situations no strategic cooperation is used. As the organisation then begins with new legal partners each time, we face further challenges in cooperation. This has lately been described as the dynamic and chaotic conditions of the building industry (e.g. Baccarini 1996; Bertelsen 2003). The old model of hierarchical control of employees is inadequate for this complexity. A new culture in the building industry is required, in which leaders can develop the personal and professional potential of everyone in the organisation (Dolan & Garcia 2002). From this is can be concluded that the management of building project organisation could be one of the reasons for the poor performance of the industry and, therefore, a key to future success. However, it is acknowledged that other of the mentioned functions in the management definition may also hold potential for improvement. Management of building project organisations is a topic with many issues. The focal point of this thesis is how to obtain **efficient and effective building project organisations**. The emphasis is, therefore, both internal in the project organisation and external toward the client and the end users. Effectiveness is to produce what is intended and efficiency is to produce something well without wasting time, money and energy (Wandahl 2004b, pp. 4-6). One proposal for obtaining efficient and effective building project organisations is to work with value(s) in building.

The final focal point is management concepts based on a value understanding, i.e. **Value Management, Value Engineering and Value-Based Management**. The manufacturing industry has paid increased attention to value(s) in recent years, but this tendency has barely surfaced in the building industry. The difference between Value Management and Value-Based Management lies in the definition of value; however, both topics are beneficial. In Value Management the focus is on what the customer needs, requires and wishes and the delivery and fulfilment of this. Value-Based Management stresses the cooperative efficiency of the project organisation by emphasising the utilisation of process values as a supplementary management tool.

1.2.1 Working Hypothesis

Based upon the current state of the building industry and the emerging opportunities to improve the effectiveness and efficiency of building project, I establish the following working hypothesis.

"Highlighting value in building management is a new evolving tendency. The work with values emphasises both Value Management and Value-Based Management as supplementary concepts for managing building projects. However, in this ongoing process of understanding value in building a need for a deeper understanding of the value concept and a distinction between the different value management concepts surface. Especially, Value-Based Management has great potential for increasing the efficiency and effectiveness through management by values. It creates a more proactive management tool than the applied tools today such as quality, time, resources, finances, etc., and, furthermore, it will act as support for traditional Value Management.

1.2.2 Research Questions

Based on the research topic and the above-stated working hypothesis, I have developed the following general research questions:

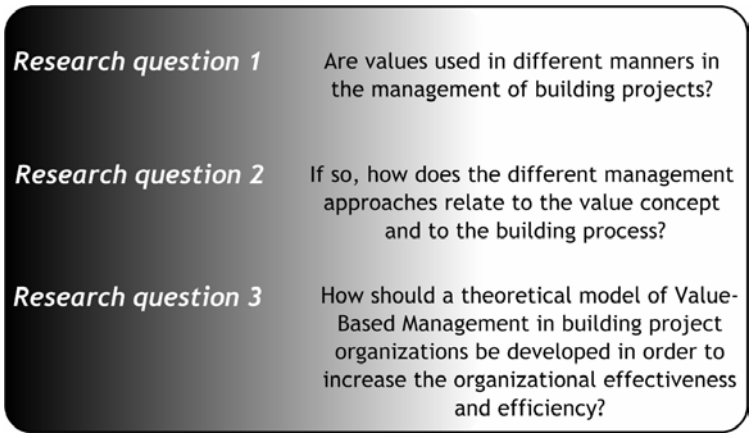

Figure 1.3. Research question to guide the research process.

The first research question focuses on the indistinct definition and use of value management concepts in the building industry. Value and management concepts related to value are attracting increased attention and are predicted to play an important role in the future understanding of the dynamic and complex building process. The second research question follows the tail of the first one and aims at separating the different concepts regarding their connections to the building process and their assumption of the value concept in general. The third and final research question is derived from the first two. It stresses how a theoretical model of Value-Based Management should be developed and, how Value-Based Management can facilitate value delivery and create increased efficiency and effectiveness if it is used in the whole building process.

1.3 News Value

The news value of this thesis is initially presented in this introduction by answering three questions: 1) What is new? 2) What is the contribution? 3) What is the relevance and significance? However, at this point it is important to stress that the scientific contribution will be comprehensively described in the conclusion of this thesis. The news value as presented here serves to set out a research direction at the beginning of the research process, whereas the scientific contribution described in the conclusion describes the achieved target at the end of the research process.

1.3.1 What is New?

A complete and coherent understanding of value in building has not yet been developed. This is, however, something which has attracted increased interest in several research communities in recent years. This can be seen in the Lean Construction society (IGLC 2003), where a debate has begun (e.g. Barshani et al. 2004; Bertelsen 2004; Emmitt et al. 2004; Emmitt et al. 2005; Wandahl 2004a; Wandahl & Bejder 2003). The understanding of value in building presented in this thesis is a contribution to the search for an unambiguous understanding of value in building. The need for a definition and widely accepted understanding of value is also requested among researchers working with the briefing process, attempting to define value for the client organisation (e.g. Barrett & Stanley 1999; Green 2000). Furthermore, it is new in research to apply efficiency and in particular effectiveness as indicators of improvement through holistic management approaches in building.

Also new in relation to building is the emphasis on the soft part of the value concept as a proactive management tool. Since the production philosophies Value Management and Economic Value Added appeared in the 1960ies, the value concept has only been used as means of product and economical value. Only in recent years, it has been acknowledged that the usage of human values (e.g. process values) has great effect as a management concept. In this thesis a conceptual model for Value-Based Management is described. Value-Based Management uses human values as a way of influencing the behaviour in the organisation. This is done by establishing common values for how work should be carried out in trustful cooperation situations. The plausible effect is a more proactive behaviour among all project participants, which should affect the effectiveness and efficiency positively.

1.3.2 What is the Contribution?

The contribution to the scientific research is a clarification of effectiveness, efficiency and value as holistic concepts. Also, a description of the use of values as a proactive management tool. This should contribute to a logical perception of value in building including clear definitions of Value Management and Value-Based Management as well as their distinct differences. Furthermore, a framework for a concept of Value-Based Management is presented. The scientific contribution is further elaborated in the conclusion of this thesis, cf. chapter 9.

1.3.3 What is the Significance and Relevance?

The relevance of research in building management is acknowledged in several reports (e.g. EBST 2002a, pp. 7-53; Regeringen 2003, pp. 15-28) and, furthermore, the current state of the building industry indicates that research is necessary, cf. the background description. The goal of any building project is to deliver value to the client organisation, and in order to do so the building project and its processes must be of value to all project participants. Thus the understanding of value in building is an important part of building management. Furthermore, the book "Survey on Production Philosophies" (Johansen & Kragh-Schmidt 1999) provides a suggestion as to the contents of future production philosophies. There are three tendencies. Firstly, production development will be seen in a holistic view, comprising company internal as well as company external relations. Secondly, a great readiness for changes, both product wise and organisationally. Thirdly, a decentralized human resource development resulting in continuous innovation and utilization of human competences. All three elements are connected to value in building, and thus emphasis the relevance of the research topic.

1.4 Structure of Thesis

The thesis is structured in chapters, which are grouped in sections. This is illustrated in figure 1.4 and further explained in the following. The purpose of presenting the structure of the thesis is to provide the reader with an overview of the thesis, in order to facilitate the further reading of the thesis.

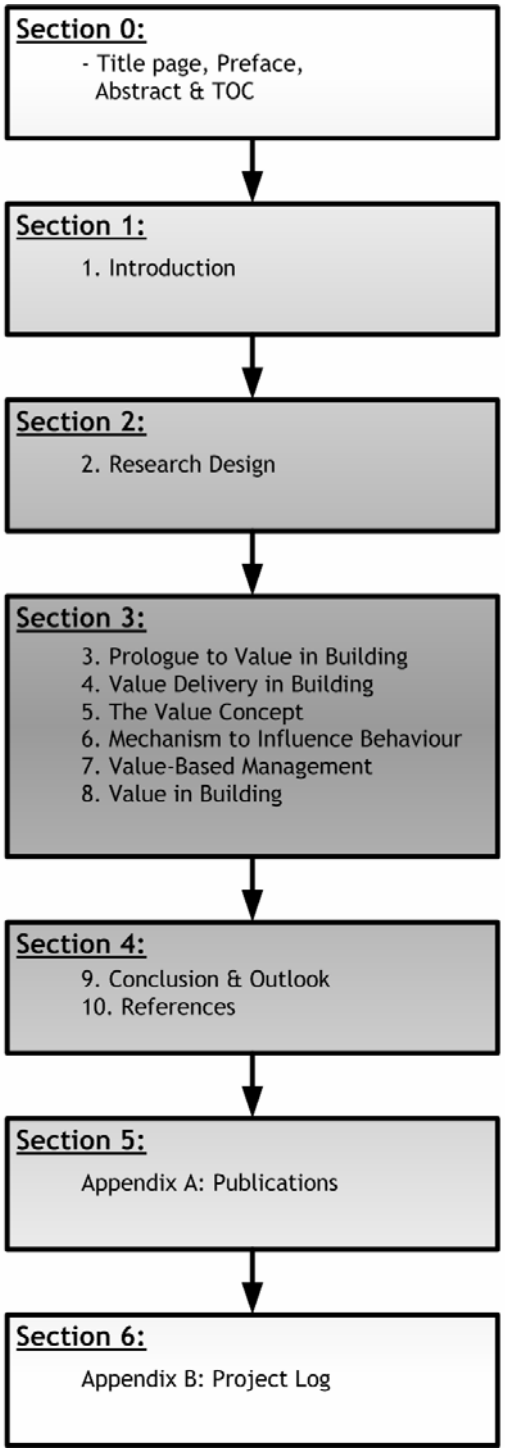

Figure 1.4. Structure of the thesis.

Section 0 is a pre-section containing the formalities of a thesis such as title page, abstract, table of content, etc.

Section 1 is this present section. It presents an introductionary outline of the thesis, which among others includes background, motivation and scope.

Section 2 is where the research design is described. It includes a scientific paradigm of this research and the methodology applied.

Section 3 is the main section of the thesis. Here the findings of the research are presented. The section consists of several chapters, which logically should lead the reader through the "Value in the building universe" as understood by the researcher. The final chapter in the section serves as a reflection of the findings.

Section 4 contains the last chapters of the thesis, primarily the conclusion and the description of future research topics. The conclusion explicitly summarises the scientific contribution of this research.

Section 5 comprises the published papers made during the research process.

Section 6 is an appendix containing the project log book, i.e. description of PhD courses, communication of knowledge, teaching activities, conferences, etc.

1.5 The Published Papers

As described in the preface this thesis is a 'paper model', which means that the primary research is documented in papers published in conference proceedings and scientific journals. At the end of the research period the papers are put into a coherent context, briefly describing the research. That is the thesis. The papers are attached to this thesis in appendix A including further details on their publication. In the following pages summaries of all the eight papers are provided.

1.5.1 Paper 1: Value-Based Management in the supply chain of construction projects

This paper initially stresses the value concept, and how value is perceived in Lean Construction. It concludes that Lean Construction has a uniform view of value as related to the product. The paper hence presents process values, and how these can be used in Value-Based Management. Through the description of Value-Based Management, a model of behaviour regulation in building is presented. Furthermore, the model is linked to the ideas of management by values and management of value.

1.5.2 Paper 2: Partnering combined with Value-Based Management in a building project organisation – an action research experiment

This paper is a case study describing the experiences gained in a real building project utilizing the partnering concept combined with elements of Value-Based Management. The paper starts by describing how Supply Chain Management in the manufacturing industry has developed, and how this is different from partnering practice in building. This leads to the idea of utilizing elements of Value-Based Management in building projects. The case study reveals that by continuously stimulating a trustful atmosphere by actively working with values, a better project performance can be achieved including a more proactive work environment, and a more committed workforce.

1.5.3 Paper 3: Value-Based Management as means for increasing effectiveness and efficiency in construction projects

This paper discusses how performance should be measured by either productivity or effectiveness and efficiency. The conclusion is that productivity is not the most appropriate measurement for documenting development through modern holistic management ideas such as Value-Based Management. Instead effectiveness and efficiency should be applied. Further on, the paper presents a theoretical connection

between the use of Value-Based Management in building projects and an increase in both effectiveness and efficiency.

1.5.4 Paper 4: Value Carriers in a Construction Project – How Different are they?

This paper is built on the hypothesis that the different legal parties in a building project have different perceptions of value, and that they, thus, take different values with them into the project. To test the hypothesis, three experiments are carried out, of which two are set-ups with building industry practitioners, and the third is more an analysis of a former experiment. The result is a clear indication that the different parties have different perception of what is of value in building projects due to their background and interest.

1.5.5 Paper 5: Activation of hidden resources. Experience from a development initiative in a regional area in Denmark

This paper elaborates on the experiences gained from a development initiative in a regional area in Denmark. The initiative focuses on committing the practitioners of the industry in a continuous undertaking in order to improve the efficiency and effectiveness of the building sector. The experiences are presented along with a discussion on how to activate a greater deal of the workforce as an important source of ideas that could stepwise improve the building process.

1.5.6 Paper 6: Visual Value Clarification – a Method for an Effective Brief

The purpose of this paper is to explore the processes in the conceptual phase of building projects. More specifically it discusses how it can be ensured that the client receives the right product, i.e. that the real and justified needs of the client and the users are captured, and that they are transformed into building requirements through an iterative process. The Visual Value Clarification method is presented as a simple method for supporting the client and the project team in the briefing process. It applies pictures of reference buildings as a way to determine the client organisation's values.

1.5.7 Paper 7: New Cooperation Trends in the Building Industry

The starting point of this paper is the modest development in the building industry measured by productivity. It then discusses how new cooperation methods like Partnering, Supply Chain Management and Value-Based Management are plausible methods for improving effectiveness and efficiency. Finally, thoughts of more strategic

partnering concepts, i.e. 2nd and 3rd generation partnering, are presented as future options for the building industry.

1.5.8 Paper 8: Power, Interest and Value in Building Project Organizations

The objective of this paper is to explore the concept of power in building project organisations and to investigate how it can influence the management of projects. Furthermore, to relate the concept of power to Value-Based Management and to explore whether power is a barrier to holistic management. It is concluded that power and diverse interests are present in building projects and that it causes sub-optimization in many cases. Furthermore, it is concluded that Value-Based Management will most likely decrease the use of power for personal use.

2

Research Design

In this chapter the research design is presented. The purpose is to present the author's scientific standpoint, the applied research method and the connection between these. This is carried out by presenting a scientific paradigm and an operative paradigm.

When conducting a research study, scientific or not, it is important to be aware that the researcher's presumptions affect the way (s)he observes and collects data from the surrounding world, and the way the data is analyzed. As a scientist who seeks scientific integrity, it is important to respond to fundamental questions of the world, like what is knowledge, conception of reality, what is truths, etc. Thinking in this direction is called philosophy of science and is basically the foundation for all positioning (Thurén 1999, p. 9). Moreover, philosophy of science could be explained as the branch of philosophy which studies philosophical foundations, presumptions and implications of science. Science makes assumptions about the way the world is, and the way in which theory relates to the world. If you as a scientist does not reflect on how your ultimate presumptions affects the choice and use of methods and analysis of data, it will not be possible (only speculatively and reflectively) to verify the results and come up with a solution which holds an innovative contribution (Arbnor & Bjerke 1997, p. 3). This is why every scientific research needs a research design, either explicitly or implicitly, to guide the researcher through the research process.

2.1 Introduction

The research field of building management is situated on the interface between natural science and social science. Not many methodological approaches are fully developed for this interface. Arbnor and Bjerke (1997) have, however, developed an approach for the

studies of business knowledge. The approach is illustrated in figure 2.1 and contains some basic elements that should characterise any research process.

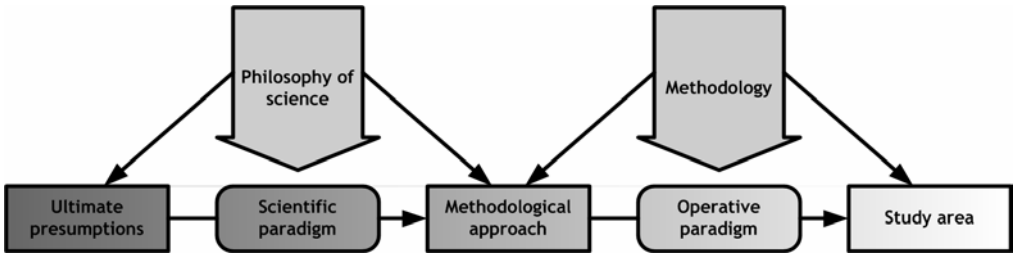

Figure 2.1. Methodological approach, adapted from (Arbnor & Bjerke 1997, p. 15).

Arbnor and Bjerke's foundation is the general agreed-upon existents of two meta-theories, philosophy of science and methodology. Arbnor and Bjerke's model asserts that there is a connection between meta-theories and scientific perspectives (ultimate presumptions), methods and study area. A short description of the elements in the model is given below.

The two meta-theories are defined as: Philosophy of science is "*the discipline applied by researchers, scientists, philosophers and others to study the nature of science and the nature of* society" (Burrell & Morgan 1979). The science process described by philosophy of science appears to show that science is both a product of history and a method to represent objective patterns of the material reality at the same time (Jensen 1980, p. 209). Philosophy of sciences takes positions regarding views on the reality, knowledge and methods. Methodology is the set of methods and principles that you use when studying a particular subject or doing a particular kind of work (Longman 1995). It could basically be elements like executing experiments, case studies or surveys.

Every human being has certain ultimate presumptions about what the environment looks like, about his or her role in the world, what to do when and how, etc. These presumptions are quite unconscious and are aggregations of living in a particular culture or subculture (Layder 1994, p. 143). The French sociologist Bourdieu created the term "habitus" for this phenomenon. Habitus is the bodily and cognitively structures, which guide humans' actions, their opinions and the choices they make, i.e. their practice (Bourdieu & Wacquant 1996, p. 106). Our ultimate presumptions will have a bearing on everything we do, in term of for example a research study it will affect, perception of problems, choice of available techniques and their solving. In general, ultimate

presumptions in Arbnor and Bjerke's framework describe the researcher's ontology[4]. However, this part of the framework will not be further explained in this thesis.

The ultimate presumptions are the foundation of a scientific paradigm, which develops through epistemology[5], i.e. the theories or philosophies of science. The scientific paradigm clarifies how different schools of thought relate to the research process. And the researcher's position in or choice of paradigm affects the methodological approach of the whole research process.

Methodological approach is a set of ideas/views, which builds on the scientific paradigm. The methodological approach encompasses certain ultimate presumptions and at the same time it provides the framework for a more concrete approach. The framework could be the analytical approach, the systems approach or the actors' approach according to Arbnor and Bjerke (1997, p. 49). This view of the research process is the critical point in their model, and as later explained the author can not fully agree with this part of the model.

The operative paradigm is the actual method for the research process and contains descriptions of how to carry out experiments, case studies or surveys. Comprising steps on how to collect, analyze, interpret data, etc.

2.1.1 Deviation from the Model

One of the major elements, which must be mentioned in Arbnor and Bjerke's framework, is that the methodological choice of approach has complete unilateral impact on the concrete choice of method (the operative paradigm). They present three different methodological approaches for business research; analytical, systems or actor, but the authors do not consider their relevance, reliability and validity of the three methodological approaches available. Furthermore, it is problematic that they for each methodological approach specify concrete types of method sequence and associated methodics techniques and tools in a quite rigid manner (Rytter 2004, p. 29). Arbnor and Bjerke (1997, p. 217) states that the operative paradigm creates a fit between the choice of methodological approach and the concrete area under study. In layman term they say 1) choose either analytical, system or actor as your methodological approach, 2) consider

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4 Ontology is a fundamental branch of metaphysics and is a study in philosophy concerned with the nature of being and existence (Longman 1995).

5 Epistemology is a study or a theory of the nature and grounds of knowledge especially with reference to its limits and validity (Merriam-Webster 2005).

your area under study and 3) an unambiguous operative paradigm will occur as a perfect fit. In doing so they cut of the researcher's possibility of using an independent methodological approach to carry out empirical studies of the reality from different scientific theoretical and methodical orientations and vice versa.

The research design in this thesis will, therefore, "only" consist of the elements highlighted in figure 2.2.

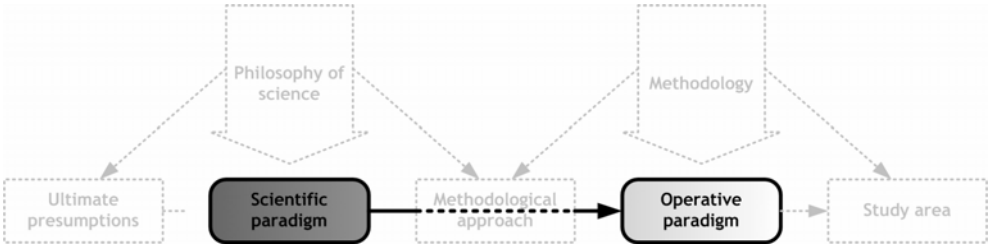

Figure 2.2. Elements from Arbnor and Bjerke's model which is described in the research design.

2.2 Scientific Paradigm

Paradigm[6] is a central concept in the theories of science and can be said to describe the framework wherein scientific business takes places. A paradigm encompasses rules for scientific work and the discussion of scientific questions. It is decisive for what is fact, how these facts should be interpreted, which conclusions that can be drawn, etc. within a specific scientific work area in a specific era (Fjelland 1999, p. 112). Paradigm is a central concept in Kuhn's theories, and his definition is now one of the most used: *"..a universally recognised scientific achievement that for a time provides models, problems and solutions to a community of practitioners*" (Kuhn 1962). Kuhn was, however, not fully consistent in his use of paradigm, Masterman (1970, p. 65) pointed to 21 different meanings in which Kuhn used the term. This illustrates that the concept of paradigm is not easily comprehendible.

Kuhn's idea with the concept of paradigm is to make it possible to understand how scientists work, and why, at different times in history, they have chosen a specific way to describe a phenomenon that would otherwise be difficult to understand. The concept is a summarizing term for those factors that guide and put a limit to how a researcher is permitted to work within a group of researchers, and what is understood as science and as not-science within that group. The researcher, therefore, behaves according to the scientific group that (s)he is a part of and with whom (s)he shares scholars of thought,

[6] *The word paradigm comes from the Greek word "paradeigma" which means "patter" or "example". (Merriam-Webster 2005).*

and with whom (s)he is connected through a particular direction of scientific puzzle solving.

Psychological and social elements are also a part of Kuhn's understanding of a paradigm. This implies that the paradigm governs the process of what is called "normal science". Kuhn points out that scientific theory develops revolutionary. That is, new research patterns replace old ones only after heavy arguments have taken place within the community. The discussion arises due to the occurrence of numerous anomalies because the scientific community will try to cover the first many occurrences of anomalies. Kuhn also points out that a scientific community consistent with a scientific paradigm only includes approximately hundred scientists. Scientific revolutions, therefore, occurs in many scientific communities within the whole scientific world. Periods of heavy arguments is refereed to as "revolutionary science" instead of "normal science". Scientific change, i.e. a shift of paradigm would then look like the illustration in figure 2.3.

Figure 2.3. Kuhn's model of the revolutionary change in science.

Later in his research, Kuhn specified the concept of paradigm by stating four elements which characterize a paradigm (Arbnor & Bjerke 1997, p. 12). It should, however, be mentioned that Kuhn only worked with paradigms within natural science, where he specifically states that paradigms replace each other, and that two paradigms cannot exist simultaneously (Fjelland 1999, pp. 126-9). In other science, e.g. human and social, different paradigms can easily exist at the same time (Thurén 1999, p. 74). Törnebohm (1974) has, therefore, made an adaptation of the mentioned four elements whereby they should fit more properly to social science. Since building management is situated on the interface between natural and social science Törnebohm's paradigm theory is chosen. Törnebohm (1974, p. 2) specifies that a scientific paradigm should consist of four elements: (1) conception of reality, (2) conception of science, (3) scientific ideals, and (4) ethical aspects. These four elements will not be further processed in this thesis, but are, thus, the foundation for the scientific paradigm.

As this thesis's view on the paradigm concept is now clarified, the theoretical foundation of this thesis's scientific paradigm will be progressed. Finally, it can be concluded that paradigms is founded on the fact that all observations is theory-loaded, all opinions is

theory-dependent and all facts is theory-loaded. That is why a researcher should state his scientific paradigm.

2.2.1 Different Scientific Meta-Paradigms

When looking at scientific paradigms, two different general paradigms exist (Burrell & Morgan 1979; Fast & Woodrow 2000). I will refer to them as objectivity and subjectivity, and they can be characterized as polarized regarding their view on epistemology, ontology and methodology, cf. figure 2.4.

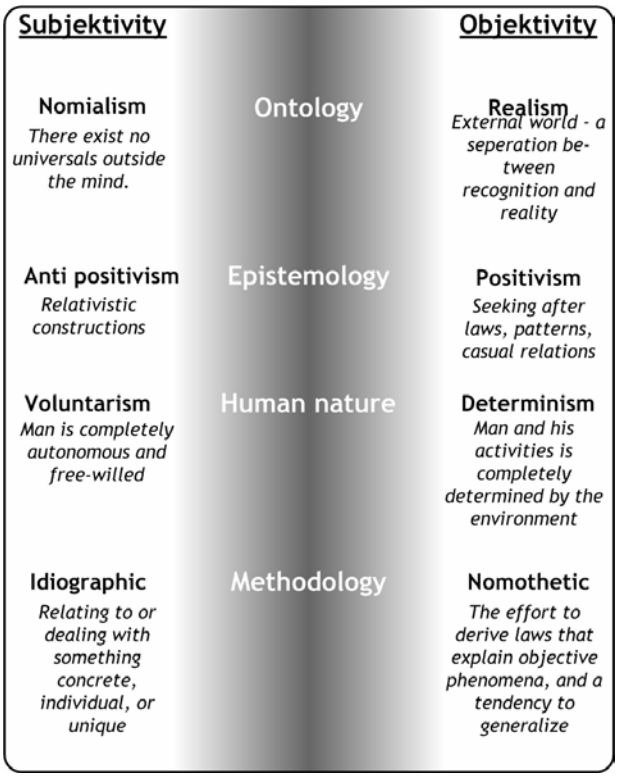

Figure 2.4. Subjectivity vs. objectivity. Adapted after (Fast & Woodrow 2000, pp. 58-9).

These two paradigms represent different scholars, direction of thought on how to obtain information about reality, what true knowledge is, etc. Historically, objectivity has been associated with quantitative research, whereas subjectivity has been associated with qualitative research. This has caused a great deal of scientific rivalry.

2.2.1.1 Objectivity

In the objectivity paradigm a rational way of thinking dominates. It states that the recognition of objects and events are independent of one's perception of them, or one's personal feelings, opinions and beliefs (Collin 1993, pp. 52-68). The reality is analyzed through scientific quantitative methods (Popper 1974, p. 356).

The objectivity paradigm could be regarded as the traditional perspective and has been the most disseminated in (natural) scientific communities for a long time. The ontological view pre assumes the existence of an objective world, independent of how we as humans recognize it. Thus, the world will not disappear if we do not think or talk about it. Epistemologically, the objectivity paradigm believes that absolute knowledge of the world can be obtained, and they indirectly do not recognize that the world might change over time. The objectivistic favourite method is the hypothetico-deductive[7] method (Thurén 1999, p. 18), which uses hypotheses as premise, and thereby, implies both empery and logic.

2.2.1.2 Subjectivity

Subjectivity is the antithesis of objectivity, and it holds it roots in scientific and methodic directions like phenomenology and hermeneutic. It is a radical perspective due to the lack of realism and total relativism, and in an extreme form, it may hold that nature and the existence of every object depends only on someone's subjective awareness of it. A person experiences material things, but their existence is not independent of the perceiving mind; material things are thus mere perceptions (Britannica 2005). In the 18th century the subjectivistic philosopher (and bishop) George Berkeley succinctly formulated his fundamental proposition: "*Esse est percipi*", "*To be is to be perceived*" (Jensen 1980, p. 288). This illustrates the true thinking of a subjectivist, even though Berkeley's thought had a religious spin. A subjectivist, therefore, is one who judges according to personal feelings or intuitions, rather than according to objective observation and reasoning. Ontologically, the world is presumed not to exist in itself. It is either not existent or exist only through the human recognition of it.

Some scientists and philosophers argue that a third paradigm exists in addition to the objectivity and subjectivity paradigms. They call this for the constructivism paradigm. However, it can be questioned whether the constructivism paradigm is really a paradigm, or it is product of a revolutionary scientific period, cf. Kuhn, because it questions the present accepted paradigms. More correctly, constructivism should be addressed as a perspective (Jacobsen et al. 1999, pp. 153-160). Anyway, the constructivism paradigm consists of ideas that phenomena, which we normally consider as independently existing only, are constructed through our thinking, language and social practices (Collin 2003,

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[7] *Induction is to draw generalized conclusions from empirical data (singular observations). Induction requires, therefore, quantification. The other main scientific approach is to make conclusion by deduction. Deduction is to make logical singular conclusions from general hypothesis. The logical conclusions are valid as long there is a logical connection, but they do not necessary need to be in accordance with reality. (Brier et al. 2004, pp. 13-40; Thurén 1999, pp. 18-26)*

pp. 11-33). An unambiguous definition of the constructivism paradigm is not possible, it would be more correct to state that currently constructivism is a collection of different discussion (Hansen & Sehested 2003, p. 9). The constructivism paradigm is in opposition to both the subjectivity and the objectivity paradigm. It embeds an ontological realism like the objectivity paradigm and an epistemological constructivism like the subjectivity paradigm (Rytter 2004, p. 45). Most of all, this paradigm can be characterized as critical realistic.

2.2.2 A Framework for Choice of Paradigm

The scientific paradigm of this thesis is described through a framework presented by Burrell & Morgan (1979). They want to relate the theories of organisation to their wider sociological context. Their proposition is that social theory can be conceived in terms of four paradigms based upon different sets of metatheoretical assumptions about the nature of science and about the nature of society (Burrell & Morgan 1979, p. iix).

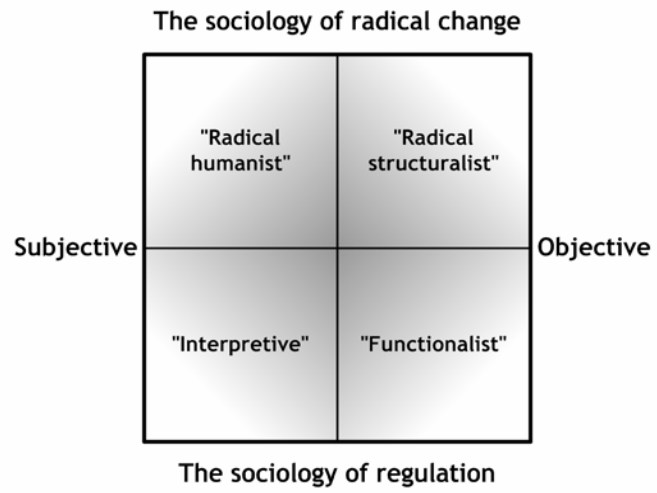

Figure 2.5. Four different paradigms that can be utilized for analysis of social phenomena (Burrell & Morgan 1979, p. 22).

The two dimensions in figure 2.5 illustrate horizontally metatheoretical assumptions about the nature of science and vertically metatheoretical assumptions about the nature of society. They describe the metatheories of science as a spectrum with the subjective paradigm in one end and an objective paradigm in the other end. This is equal to the biased position of this thesis, as described in the past paragraph. What is additional in Burrell and Morgan's framework is that they add an axis concerning the nature of society. Again they present a polarized view "regulation versus radical change" (Burrell & Morgan 1979, pp. 16-9). This dimension is founded on the "order-conflict debate".

Whilst the order theorist view society in terms of stability, integration, co-ordination and consensus, the conflict theorist places emphasis on change, conflict, disintegration and coercion. Regulation is concerned with the need for regulation of human affairs. It attempts to explain why society tends to hold together rather than fall apart. On the other hand, Radical change is essentially connected with man's liberation from the structures which limits the potential for development. It is concerned with what is possible rather than what is. The four paradigms in this framework is Radical humanist, Radical structuralist, Interpretive, and Functionalist.

> "*A synthesis is not possible, since in their pure forms [the four paradigms] are contradictory, being based on at least one set of opposing meta-theoretical assumptions. They are alternatives, in the sense that one can operate in different paradigms sequentially over time, but mutually exclusive, in the sense that one cannot operate in more then one paradigm at any given point in time, since in accepting the assumptions of one, we defy the assumptions of all the others.*" (Burrell & Morgan 1979, p. 25).

The four paradigms will briefly be described, and afterwards the paradigm applied to this thesis will be pointed out.

The functionalist paradigm is rooted in the sociology of regulation, which it approaches from an objectivistic point of view. It seeks to provide rational explanations of social affairs in a pragmatic and problem-orientated manner, i.e. it seeks practical solutions to practical problems. It applies approaches from natural science to study social science, and it, therefore, understands the world as composed of relatively concrete artefacts and relationships which can be identified, measured and studied.

The interpretive paradigm is embedded in a concern to understand the world as it is. It seeks to understand the fundamental nature of the social world through subjective experience. The social world is an emergent social process created by individuals. This paradigm can hardly be used to understand organisations because it questions whether organisations exist in anything but a conceptual sense (Burrell & Morgan 1979, p. 32).

The radical humanist paradigm is based on the idea that consciousness of man is dominated by the ideological superstructure with which he interacts, and making a cognitive separation between himself and his true consciousness.

The radical structuralist paradigm does not focus on the consciousness of man as the radical humanist paradigm, instead it is concerned with structural relationships within a

realistic social world. It emphasises that social relations are conflict orientated by definition, and through these conflicts radical changes occurs.

2.2.2.1 Scientific Paradigm in this Thesis

It is recognized that Burrell and Morgan advocate extreme views in their framework. To define four sharply separated paradigms would be a simplification of the tremendous theoretical work underlying their framework. The borders between the paradigms cannot be defined as sharply as they do. Furthermore, each of the four paradigms contains different theories, and some of these theories cross the borders of the paradigms. This is illustrated in figure 2.6.

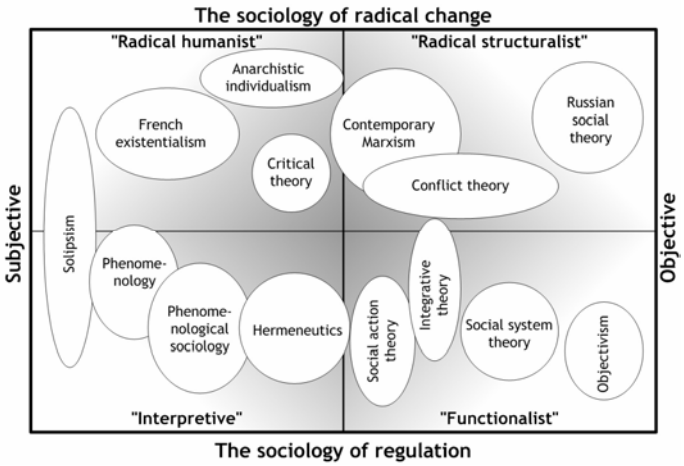

Figure 2.6. Each of the paradigms consists of different schools of thought (Burrell & Morgan 1979, p. 29).

However, for the purpose of making a framework suitable for analysis, Burrell and Morgan's generalization into four separate paradigms is accepted. The functionalist paradigm is selected as the scientific paradigm in this thesis for the following reasons:

- The functionalist paradigm is pragmatic in orientation and seeks to understand society in a way which generates knowledge that can be used.
- The functionalist paradigm is based upon the assumption that society is a concrete real. It encourages an approach to social theory that focuses upon understanding the role of human beings in society.
- Value-Based Management is basically a tool for encouraging a specific human behaviour, and is, therefore, a kind of regulation of society. Opposed to the radical change view, it involves a positive attitude toward why organisations tend to hold together rather than fall apart.
- Regarding the view on nature, the author of this thesis holds a distinguished objective view of nature. The world of building projects exist outside the author's mind.

The scientific paradigm reflects the author's view on ontology and epistemology. It has not been used explicitly in the research, but it has influence on how the research process is carried out, i.e. the operative paradigm.

2.3 Methodology (Operative Paradigm)

A scientific endeavour should always state its methods, otherwise the validity of the research and its goals can be questioned. A statement of the applied methods allow for others to get insight into the scientific process. Furthermore, it opens for reproduction of the research, which can test the reliability of the obtained results. Methodology is the theory of different approaches used in scientific activities for a research study in attempt to investigate and obtain knowledge about the social world, and the consequences that these approaches have for the results (Rigby 1965). Arbnor and Bjerke (1997, p. 16) define this as an operative paradigm, and it consists of:

- **Methodics** is the way to manoeuvre through the research process, often presented by procedures, study plans, research questions, etc. that are normative descriptions (Andersen 1998, p. 18).
- **Methodical procedures** refer to the way the research incorporates, develops, and modifies given techniques.

The operative paradigm emerges in continuation of the scientific paradigm, cf. figure 2.2 and it, thereby, connects the researcher's fundamental view of the world with the actual research methods. Thereby, the scientific paradigm is decisive for the methodology. The logical consequence of the selection of the "Functionalistic" paradigm as the scientific paradigm of this thesis is that the methodology is of qualitative nature. Quantitative methods requires large amount of data, which is hard to get when applying a holistic view on the project organisation, due to long timescale of building projects. When investigating one or few cases a qualitative approach is appropriate. The difference between quantitative and qualitative methods is whether the observation of the dependent variable is associated with either volume or property (Jensen 1980, pp. 64-6).

However, even though the methodics is of a normative character, the actual research process is not. "*People who write about methodology often forget that it is a matter of strategy, not of morals. There are neither good nor bad methods but only methods that are more or less effective under particular circumstances in reaching objectives.*" (Homas 1949, p. 330). With Homas's point in mind, the Methodics will be explained in the following. Since the research mainly is of theoretical character, the methodical procedures will not be given any attention in this thesis.

2.3.1 The Research Process

Based on the scientific paradigm and the research questions described in chapter 1.2, the actual research process of this qualitative research can be illuminated. The research process is illustrated in figure 2.7 and is afterwards elaborated on.

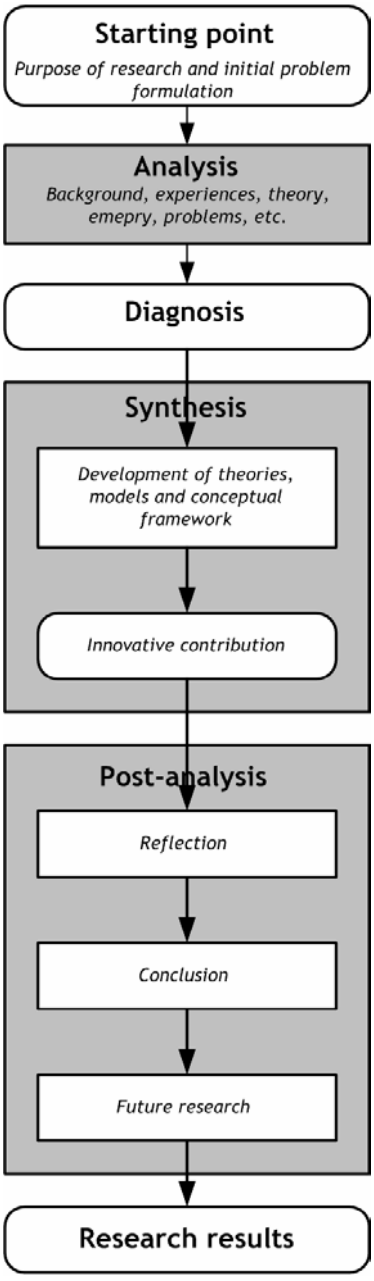

Figure 2.7. Illustration of the research process

The research process can be divided into several phases. Through out the process ideas, results, etc. have been documented in eight papers. The papers have been published in different proceedings of conferences and in scientific journals. More information regarding the papers can be found in appendix A.

The starting point is concerned with defining the research area, the purpose of the research and the initial problem. This stage can be viewed as a preparatory stage for the later stages. This entails the development of the study plan (Wandahl 2003), and the approval of this plan by the doctoral school.

The final study plan indicates the direction of the research and is the starting point for the analysis In this phase problems related to the study are found, and relevant research groups, conferences, journals, experts within the area, etc. are identified. Also in this phase, relevant theory is considered through literature studies, and empery is connected with theory and research problems. As this research is of a theoretical character, the outcome of the analysis (the diagnosis) is a more clear understanding of the different value concept applied in building, their differences, use, pros, cons, etc. Furthermore, a lack of a usable framework for a theory covering soft values used actively in management as means of influencing human behaviour is discovered.

This lead to the synthesis part of the research process. This phase is concerned with clarifying this new concept, which includes theory building of the new concept. An important part is to ensure internal logic relations between the subparts. This kind of theory building does not involve making complete new theory from scratch. It is more connected to existing knowledge in a new way and, thereby, create new theory – a synthesis. Another important part is to define the borders and limitations of the new concept, and to stress the barriers to successful implementation of the new emerging concept. The outcome of the synthesis combined with the emerged knowledge through the analysis phase holds an innovative contribution to the research area. However, through the research process some additional thoughts may have surfaced, which fertilizes a post-analysis phase.

In the post-analysis implications of the research are focused on. These implications and the conclusions thereof are presented in this thesis as well as the generalisation carried out at the end of the PhD research process. Finally, future research topics that surfaced through the research process are described. All in all this is the final research result.

2.3.1.1 Interplay Between Theory and Empery

Scientific theories emanate from the practical world through observations and data collection. Theories should, thereby, describe or explain actions in real life. It is, however, not simple to decide whether or not a theory is a good theory. A theory cannot be characterized as good or bad by placing the theory in a frame or by comparing it to other theories. A theory should be evaluated through its equivalence with reality and its ability to explain real life actions or phenomena (Jacobsen et al. 1999, pp. 46-72). The interplay between theory and empery has, therefore, great importance.

Empery is used in this thesis in various ways. One building project has been follow closely as a case – the renovation and extension of Limfjordskollegiet, a college hall of residence. Descriptions of this case can among others be found in Bejder and Wandahl (2004) and in Wandahl (2002). The Limfjordskollegiet building project was an experimental building project, where elements of Partnering and Value-Based Management were developed and tested. Therefore, that case has been significant for the outcome of this research. This case and sub parts of this case are used in all phases of the research process and in many of the papers. Other case material, which the author has not been involved in designing, is also used to obtain knowledge from real building projects. Among others case materials from BygSol (2005) and the network ‘owners creates values’ (EBST 2005) are used. Throughout the research process, the research and its findings have been discussed with practitioners through different networks. The networks

are primarily BygSol (2005), BYGiNORD (2003) and the Danish section of Lean Construction (LeanConstruction.dk 2005). These networks have emphasis on learning and cooperation between researchers and practitioners. Mostly, the participation in these networks are used as inspiration to the research and as reflection, and the participations has a significant role in the researchers understanding of real building projects. Finally, some experiments and testing of part of the Value-Based Management concept have been carried out with practitioners from the BYGiNORD network. The results of the experiment are described in one of the papers (Wandahl 2004a).

3

Prologue to Value in Building

The progress of this thesis has so far lead the reader through the two first main sections, i.e. description of background, motivation, etc., and the research design. This chapter serves as an introduction to the third section, stressing the main topic of the thesis, value in building.

The third section consists of several chapters, and describes the main findings in the research process. It is hence necessary initially to explain the internal coherence of this third section and, furthermore, to illustrate the links with the published papers derived from the research process. This is illustrated in figure 3.1.

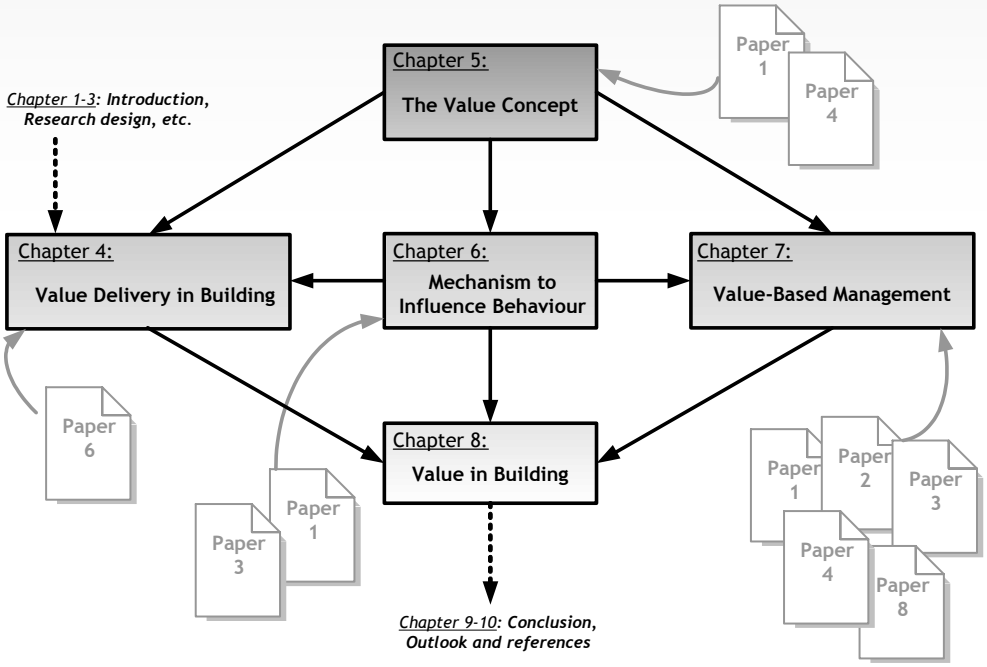

Figure 3.1. An illustration of a perception of value in building, including links to chapters and papers.

Chapter 4 takes its point of departure in the currently most widespread understanding of value in building, value delivery to the client organisation through Value Management and Value Engineering. However, as Value is the main focus of this thesis, value delivery is only a subset of the general value understanding. This is explained in chapter 5, where value is described as consisting of two different paradigms, product value and process values. In chapter 6 these two paradigms are connected to management of building and thereby two meta-management positions stressing value in building occur. One is called Management **o**f Value, and the other is called Management **b**y Values. The first is equivalent to the well known field of Value delivery, e.g. Value Management. The second describes a management position which is currently not widely used in building, Value-Based Management. The Value-Based Management concept is developed and described in chapter 7. Finally, in chapter 8 the two different management positionings are looked at from above to generate a complete picture of value in building.

Chapter 4 to 8 then compiles the main section of this thesis and leaves room for the last section, the conclusion and outlook.

4

Value Delivery in Building

In this chapter two associated concepts for value delivery in building projects are presented through a literature study and followed by a discussion of the concepts. It concerns Value Engineering and Value Management as two slightly different concepts of how to specify the values (the physical product and its attributes) wanted and needed by the client organisation. The first part of this chapter is mainly a literature study concerning the two concepts, whereas the final discussion outlines how this thesis positions itself regarding Value Engineering and Value Management. A brief conclusion is that Value Management is applied in the initial phases of building, where Value Engineering is often seen applied in the late design phase and early construction phase as a cost cutting tool without removing vital functions.

When reading literature concerned with value(s) in management, one will discover that several different concepts regarding theory and application of value(s) in building management occur. A distinction between these concepts is important for understanding the scientific contribution of this PhD thesis. The different concepts are Value Engineering (VE), Value Management (VM) and Value-Based Management (VBM). Their common foundation is that they rely on an understanding of value, even though their understanding differs as shown later. This chapter distinguishes the two value delivery concepts, VE and VM. The concept of Value-Based Management will be explored and defined in forthcoming chapters of this thesis.

The differences between Value Engineering and Value Management have been discussed for a while in a building context by e.g. Green (1994; 1997), Kelly et al. (2002) and BEC (2003b). VE has its roots in the US manufacturing industry in the 40ies and is later adapted to the building industry, first in the US then in the UK. However, at some level the UK building industry further developed the concept and called it for VM. Confusion about the differences between VE and VM is therefore caused. Some argue that the difference only lies in the UK or US application (Kelly et al. 1998, p. 6; Thomson &

Austin 2001, p. 4), while others argue that principal theoretical differences between the two concepts exist. These differences are, firstly, in which phase of the building process VM and VE are applied. "*The restriction of VM to early project stages arises because it addresses construction projects as single complex problems. (...) The term 'value engineering' (...) represents the focused examination of design solutions during later stages.*" (Thomson & Austin 2001, p. 5) Secondly, the basic assumptions about the underlying scientific paradigm, differs as Green (1994, p. 49) states that "*while it is recognized that the terms 'value management' and 'value engineering' are often used interchangeably in practice, it is contended that the existence of two alternative paradigms justifies the development of distinctive definitions.*" The two paradigms are later elaborated by Green (1997, p. 2). He argues that VE takes an objective standpoint which "*assumes that [value] problems are essentially technical in nature and (...) exist independently of human perception.*" VM, on the other hand, is more subjective in its standpoint and "*draws from the philosophy of social science and emphasises that differing perceptions [of value] are an essential ingredient of any real world problem.*" Thirdly, Kelly et al. (2002, p. 34) argues that the difference lies in the view on value. "*Value management (...) is concerned with making explicit the package of whole-life benefits a client is seeking from a project (...) at the appropriate cost. Value engineering (...) is a subset of value management (...) and is concerned with (...) the technical delivery of the project.*"

Based on these standpoints an initial view of how VE and VM could be viewed in relation to the building process is illustrated in figure 4.1. Both VM and VE can have a wide range of applications in the building process. Therefore, the time of use is illustrated as normal curves. VM mainly is applied in the final of the brief or in the early design phase whereas VE mainly is applied in the late design phase or in the construction phase as a cost cutting tool. To further illustrate the confusion about the differences between VM and VE, the two normal curves overlap and interfere with each other.

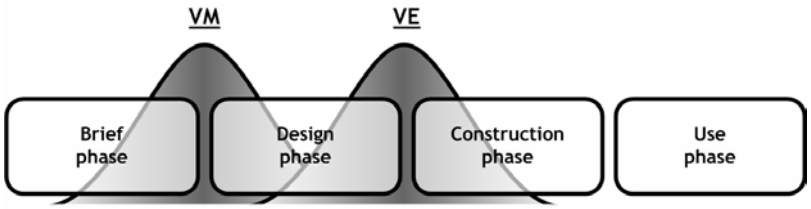

Figure 4.1. Initial distinction between VE and VM, and their relation to the building process.

This chapter offers a summarised literature study of Value Engineering and Value Management. Furthermore, an extension or sub-set of VM called SMART Value Management is presented. The literature study is relevant for distinguishing the Value-

Based Management concept developed in this thesis from traditional Value Management and Value Engineering.

4.1 Value Engineering

VE originated in the US manufacturing industry, where General Electric Company lead by Lawrenc D. Miles developed VE (in the form of value analysis) during the 1940ies (Kelly et al. 2004, pp. 11-2). Their VE method examines the function of product parts in quest of identifying alternatives which could decrease costs without removing the functions (IVM 2005). When mass production appeared, VE optimized product design by directly linking functions required by customers with their corresponding product parts, illustrating their value-adding role. VE was used to increase value by simplifying products and thereby reduce manufacturing costs and increase profit margins. Later with the arrival of e.g. agile manufacturing, VE developed to consider customer expectations as value. Statements of objectives were still systematically reviewed and defined as functions to determine what are needed and what are wanted. This allowed for the removal of the cost of unnecessary functions. Thereby, VE changed from retrospectively reviewing existing design to assisting new design development in response to identified needs (Thomson & Austin 2001, p. 4). The idea spread to the UK in the early 60ies with the establishment of the Institute of Value Management. Also in this period of time the VE concept emerged in the building industry as a way of understanding client requirements at the outset of a project.

Numerous definitions of VE exist, but their meaning hardly differs. All definitions agree that the essence of VE is the relationship between deliveries of product functions compared to cost. One definition is: "*Value Engineering is a proven management technique used to identify alternative approaches for satisfying the requirements of a project while lowering costs and ensuring technical competence in performance*" (Acharya et al. 1995, p. 13). Another similar definition is provided by Crum (1971) "*[Value engineering is] a disciplined procedure directed towards the achievement of necessary function for minimum cost without detriment to quality, reliability, performance or delivery*" (seen in Green 1994, p. 49-50). Most of the definitions also agree that even though the client's requirements and needs are specified in the early project phases VE is applied in later phases, often in the late design and in the beginning of the construction phase. Here VE is used as a mechanism for cutting cost by evaluating substituting products and solutions (Liu & Leung 2002, p. 341; Thomson & Austin 2001, p. 3).

One of the primary techniques applied in VE is Function Analysis[8], which calculates value as a fraction of function over cost (Thomson et al. 2003b, p. 201). Function Analysis is a team based activity where the project team identifies the requirements of the client through diagrams (Crow 2005). Based on the initial identification of the buildings function, a series of "how questions" are used to break down the functions into sub functions. The diagram is used to obtain consensus among the project team and the client, and the breaking down of functions, therefore, continues until all team members are satisfied with their concerns. Through this technique VE is a pragmatic discipline similar to problem trees and work breakdown structures (Green 1994, p. 50). The Job Plan is another method used in VE. The Job Plan consists of the following steps (ALE 2005; SAMI 2005):

- **Information phase**: All possible information regarding the product is collected in this pre-study. The VE team starts to identify the areas that will allow for the most improvements.
- **Analysis phase**: The Function Analysis technique is applied in the effort of identifying all functions and their costs.
- **Creative phase**: Alternatives to the analyzed functions surface through e.g. brainstorming. The alternatives are recorded, but not discussed and selected.
- **Evaluation phase**: The alternatives are evaluated against the analyzed function through e.g. weighted evaluations. The best alternatives regarding function-cost relationship are selected.
- **Development phase**: The selected functions are refined and developed into a value engineering proposal.
- **Implementation phase**: The objective of this final phase is to get the approval of the sponsor to proceed in implementing the recommendations.

Some of the techniques applied within the Job Plan could be used as stand alone techniques, and include among others brainstorming and weighted evaluations. The common factor for all techniques is that workshop is applied as the meeting format.

Especially Green (1994; 1996; 1997) has analyzed and written about the underlying assumptions of VE in his effort of partly criticizing traditional VE and partly explaining the differences between VE and VM. He identifies the main assumptions as follows. VE reflects the optimizing paradigm of hard system thinking. Hard system thinking is

[8] *The Function Analysis is often identified as FAST = Function Analysis System Technique.*

focused on rational processes in problem solving and emphasises goal-seeking that involves scientific methods, e.g. mathematical models, techniques, etc. for eliminating well-defined problems. VE takes for granted that the function of the component being studied has an objective characteristic, which remains constant over time. This emphasises either a static or Newtonian view of the building process, and the product values created. Therefore, it is an implicit assumption that the problems, i.e. client requirements, can be identified, and that they are well structured. Finally, it is presumed that the client is represented by a single decision maker or a coherent group. Further on, it may implicitly be presumed that the client possesses a level of professionalism, indicating that he is able to identifying his needs. However, the client is often far more complex and dynamic in today's building projects, and an understanding of the client as an organisation is fruitful.

4.2 Value Management

In general the idea of Value Management is to increase the value for money relationship from the client's perspective. This is also the goal for VE, but VM admirers advocate that VE is insufficient for defining the client organisation's product values in the complex and dynamic environment of the early phases of a building project (Green 1996, p. 1; Green & Moss 1998, pp. 34-5).

The history track of VM is equal to VE until the 60ies, where for the first time VM manifested itself as a value delivery concept different from VE. The differences root in the focus on the briefing process. Often the briefing process has been characterized as particularly problematic (Barrett & Stanley 1999; Latham 1994), and many problems in the later building process can often be traced back to the briefing process (Shen et al. 2004, p. 213). The main challenge in the briefing process is the identification and representation of the client organisation's requirements, i.e. product values. In that sense VM is considered a promising and important tool in the briefing process (Kelly & Male 2001, p. 2). When looking into definitions of VM, one of the most accepted definitions is stated by Green (1996, p. 3) "*VM is concerned with defining what 'value' means to a client within a particular context. (...) Value for money can then be achieved by ensuring that design solutions evolve in accordance with the agreed objectives.*" However, not everybody perceives VM as only applicable in the briefing process, often VM is viewed as a tool for different phases in the building process. Thereby, VM becomes a mixture of VM in the early phases of building projects and VE in the later project phases. In recent years this mixture of VM and VE is decreasing, and in Kelly et al. (2002, pp. 77-99) VM is defined as a tool for the early phases (Pre-brief, briefing and concept design). In these

phases four opportunities for VM are identified. 1) In the pre-brief VM is used in a strategic manner to set out the broad scope and purpose of the project. In clear terms it should be expressed what is expected of the project from the client. It forms the foundation for the 'decision to build'. 2) In the brief, after the decision to build is taken by the client, VM can be used to explicitly presenting the client's value system in such a manner that it can be understood by the design professionals and the contractor. 3) In the concept design VM is applied to review the initial plans before detailed design and planning are undertaken, and a point of no return is reached. 4) In the detailed design a final review to ensure that the client's requirements and needs are included in the design can be carried out.

Regarding the basic assumptions VM is, in contrast to VE, based on the learning paradigm of soft system thinking (Green 1994, p. 49). A thorough theoretical framework for VM in a soft system thinking mode is carried out by Stuart Green, and he names this framework SMART Value Management.

4.2.1 SMART Value Management

In the UK VM was a hot topic in the 90ies, and a group of researchers and practitioners lead by Stuart Green from University of Reading was at the cutting edge of research with the development of VM. They developed their own theory of VM, called SMART[9]. At some level the SMART VM theory is a countermove to traditional VE, which might seem misleading, cf. figure 4.1 where VE and VM are applied at different phases in the building process. However, Green has discovered that the concept of VE is applied at different phases of the building process, but with the same underlying assumptions concerning methods, etc. Green (e.g. 1996) then advocates that VE applied in the early phases is inappropriate to clarify the client organisation's values. Hereby, at some level he equals VM with VE as tools for the early design phase, i.e. they are both used to identify the client organisation's values. This is substantiated by the following: "*Whilst (...) the current best practice of value management [is different] from the cost-driven tradition of value engineering, it would be a mistake to perceive them as two different concepts. Value engineering is best understood as a special case of the generic discipline of value management.*" (Green 1996, p. 3) Furthermore, Green & Moss (1998, p. 35) state that VE and VM are similar concepts regarding their time of application in the building process: "*(...) while traditional value engineering has often been successful when applied during detailed design, it has been less so during the very early stages of the design*

[9] *SMART = Simple Multi-Attribute Rating Technique*

process." With reference to figure 4.1 Green & Moss state that VE (with less success) can be applied as VM. It is, thus, recognized that Green supports a clear distinction between the VM and VE concepts, and furthermore that he is in favour of VM (soft system thinking) in the early phases of the building process as the most appropriate tool for value delivery. In this thesis SMART VM is, therefore, viewed as a further development of traditional VM and is used in the early design phase to "*develop a common understanding of the design problem and to identify explicitly an agreed statement of design objectives by the project stakeholders*" (Green 1994, p. 49).

The foundation of SMART is the concept of requisite decision modelling (Phillips 1984), which by definition is a process of group consensus to establish a common understanding of the decision objectives and to identify possible solutions. Workshops are used to ensure user participation (Kernohan et al. 1992), and a facilitator is applied to guide the team. The group continues working until they have a sense of 'shared social reality' of the design process, and values to implement in the building. The practical approach of SMART VM consists of two one-day workshops, which in brief consist of the following (Green 1994; Green 1996): The first workshop takes place during the concept phase when the building of a new facility is first suggested. The objective is to ensure that the need for the new facility is thoroughly analyzed before the client is committed to build, and to establish clear project objectives. The first workshop contains of six phases; 1) identification of all the stakeholders, 2) Structuring of design objectives, 3) Construction of the value tree (similar to Function Analysis), 4) Alternative solutions through creativity, 5) Evaluation, and 6) Further development of chosen alternatives. The second workshop takes place in the design phase after the design team has created the first proposals. The objective of this workshop is to ensure that the choice of the outlined design proposal is made in accordance with the appropriate value for money criteria. It contains the following seven stages; 1) Refinement of the design objectives, 2) Reconstruction of the value tree, 3) Assignment of Importance Weights, 4) Evaluation through decision matrix, 5) A sensitivity analysis, 6) Cost/Value compromise, and 7) Marginal value improvement.

The conclusion is that SMART Value Management is a formalized method of how to use VM, indeed the basic function of SMART VM is equal to 'traditional' VM, just with other and specific methods for application.

4.3 VM and VE Used in the Building Industry Practice

Both VE and VM are used in practice in the building industry, but often implicitly and in a non-formalized manner. A report on the use of VM[10] in the UK building industry indicates that the use of VM is not that significant (Hogg 1999). VM is often only used in major projects with high complexity. Furthermore, the quantity surveyors often only apply VM on the client's request, otherwise they tend to think that existing quantity surveying services are adequate (Hogg 1999, p. 136-7). Another survey (Fong 2004) indicates that most practitioners have used VM in 6-10 years, and that the main reason for using VM is cost reduction! More surprisingly the survey indicates that in the eyes of practitioners VM has not a clear professional image and that the use of VM is decreasing.

Lean Construction is one of the new emerging production philosophies of building, which is supposed to manage value. The Lean Construction concept is, however, until now a theory for the construction phase of the building process, and its value delivery method should then be VE. Indeed value is considered the fulfilment of the client's requirements through tight control of the construction phase (Wandahl & Bejder 2003, p. 3). This is supported by Bertelsen & Koskela (2002) "*The Value Management ensures that the construction process generates the value wanted by the client.*" However, Value Management in their sense is what this thesis defines as Value Engineering. The main emphasis in Lean Construction in the value for money relation is the cost reduction side, similar to the extreme point of VE. This is illustrated by Lean Construction's eagerness to reduce non-value adding cost, i.e. waste.

When looking at VM used in practice, it is soon discovered that the brief phase is not an easy phase to work in (e.g. Barrett & Stanley 1999; Kamara et al. 2001). Without intense focus on the capturing of the client organisation's product values in the brief and without suitable approaches to this capture, the final building will most likely not include all the functions and services, i.e. product values, wanted and needed by the client. In Wandahl (2004a; 2004c) a visual approach to VM is suggested, called the Visual Value Clarification technique. Equal to SMART VM, the purpose is to identify the client organisation's product values and to ensure that these values are included in the design. Instead of applying Function Analysis diagrams, the client and the project team use digital photos of reference buildings in their consensus making process, carried out in workshops.

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[10] *The report covers both VE and VM aspects, even though it argues that it focuses exclusively on VM.*

4.4 Discussion of VE and VM

The building industry typically cites Value Management and Value Engineering as its value delivery methods. These two approaches consider value to be delivered when a completed building, through its design, offers an effective response to the client organisation's functional needs (Thomson et al. 2003b, p. 200). The two methods have, however, been used interchangeably in practice, which is illustrated through the literature review presented in this chapter. Both VE and VM represent a spectrum of methods and their time of use in the building process. VE is mainly described as a method applied in late design or early construction to optimize the value for money relation by lowering cost and retaining the functional value. But it is also described as a method applied in the early phases of the building process to capture the client organisation's value, i.e. requirements and needs. VM is mainly applied as a tool for discovering the client organisation's value in the late brief or the early design. But it is also often applied as an alias for simple VE. In the extreme one could say that VE is concerned with cost reduction (often at a late stage), and that VM covers value maximization, both in regard to the value for money relation. Therefore, both VE and VM cover the design phase, cf. figure 4.1, and this is one of the main reasons for the confusion regarding the value delivery methods.

Another reason to the confusion might be the different models that are used to describe the phases of building. A traditional phase model is used in the initial outline of VE and VM as illustrated in figure 4.1. It contains brief, design, construction and use and could be said to be a simplification of the building process. At least in Denmark this simple serial model is being criticized for its lack of overlap and knowledge sharing between the phases. In recent years a new model, called 3K[11] model, which underlines the overlap between the design and the construction phase as important, has gained support. Two different kinds of phase overlap are present. A "physical" overlap where the real activities of a phase begin before the end of the prior phase. For example when construction begins before a complete design is available. The other kind of phase overlap regards coordination and consideration of forthcoming phases. For example when operational concerns are considered in the brief phase, which is the basic idea of Facilities Management (Jensen 2001). The idea of overlapping phases is inspired by the Concurrent Engineering (CE) thinking. CE is a marked-oriented concept aiming at

[11] *3K refers to the names of the three phases, all starting with the letter K (Krav, Koncept and Konstruktion). In English it would be Requirements (Constraints), Concept and Construction, so perhaps 3C would be an appropriate abbreviation.*

integration of product development with the marked and production. The purpose of CE is to optimize consumer needs, quality, cost, etc., from the initial development of the product throughout the product lifecycle – from idea to demolition (TI 1995).

A more saying phase model, including phase overlaps, is illustrated in figure 4.2, which can underpin the purpose of and the differences between VE and VM in a better way.

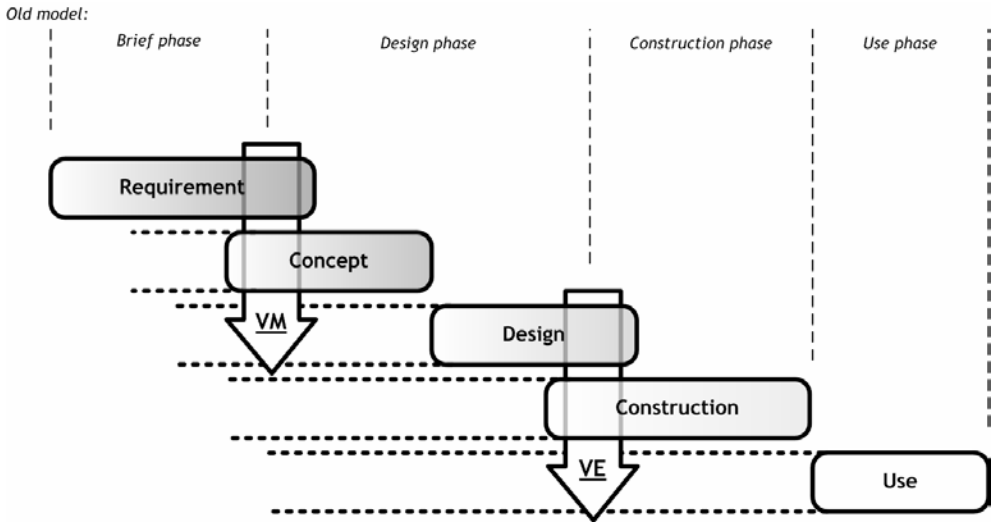

Figure 4.2. The phases of building project illustrating where VM and VE should be applied. It is worth notifying that the time dimension of the figure is out of scale. The figure is made to illustrate the overlap of the phases. At the top the names of the phases in the old model are displayed to illustrate the connection between the old and the new model.

As illustrated in figure 4.2 VM occurs in the initial phases of a building project, more specifically in the overlap between requirement and concept. The purpose of VM in this phase is of a strategic character, and ensures that the product values (the physical product, its functions and services) are captured by the project team and understood by the client organisation. In other words the purpose is 'to make the right product', i.e. effectiveness. VE, on the other hand, should be applied in the overlap between design and construction. The purpose of VE is to optimize the production process and make sure that the product values captured through VM are included in the production planning and execution. VE is then a technical specialisation or in other words 'to make the product right', i.e. efficiency. Both the difference between the strategic character of VM and the technical specialisation of VE and the difference between 'making the right product' and 'making the product right' can be perceived by reading between the lines in Green (1996).

In closing it can be illustrated that the understanding of VE and VM has change over time, but still confusion exists about the concepts. Take for example a book by Kelly & Male (1993) with the title "*Value Management in design and construction. The economic*

management of projects". This title clearly contradicts the definition of VM used in this thesis. 10 years later Kelly et al. (2002, pp. 34-99) defines VM in terms of making explicit the benefits that a client wants, which is applied in the brief phase. This understanding is congruent with this thesis. However, one should not think that this is the end of the confusion, still in present time confusion exists. This chapter is written to illustrate this confusion and to present a clarified view of how VM differs from VE. The purpose is not to argue over names, but rather to separate the two concepts, and, hereby, contribute to the understanding of management of value in building. The description and illustration of VM and VE in this thesis is how the writer sees the concepts. Others may have different perceptions on how to perceive the concepts, but this chapter is a contribution to the discussion and future understanding of Value Management and Value Engineering.

5

The Value Concept

The starting point for this chapter is a distinction between value and values – the two poles of the value concept. Through a literature study both value and values are described and linked with systems. Furthermore, they are separated from related constructs, such as belief, ethic, culture, etc. Both value end values are identified in building management, and in this building context they are associated with concepts defined as product value and process values.

In the past chapter different value delivery methods in building were explored. Both Value Management and Value Engineering are concerned with value delivery to the client organisation. Value in VM & VE definition is always measured in a value for money relationship. Hereby, it can be concluded that value is not equal to money, even though a connection does exist. In VM and VE value is closely related to the product, its functions and accompanied services. The value for money relation comes into play when a customer asks himself 'is the product worth it?' The customer is hence making a value judgment where the monetary sum is held up against the perceived value of the product (Thomson et al. 2003a, pp. 337-8). Furthermore, "*the value delivery activities of the construction industry can be characterized by the prominence of an objective view of value and the use of predominantly quantitative methods, such as Value Management*" (Thomson et al. 2003b, p. 197).

Value has always been used in building projects. Value from the client's perspective is described in the brief in a more or less formalized manner. VM is a formalized method for describing the client organisation's value in the initial phases of a building project. But as this chapter illustrates, the uniform view of value as a judgment related to the product is only half of a general value understanding.

5.1 Value vs. Values

When broadening the value concept, there is initially a basic and important difference between value in singular and values in plural. "*Value is what an individual places upon an object or an outcome, i.e. the value one places on pay*" (Meglino & Ravlin 1998). What Meglino & Ravlin state is that value is related to a product and the price. Value relates to assessments about products and is traditionally of a objective nature (only if the value is expressed), it can otherwise be subjective if the value remains internalized within an individual or an organisation (Thomson et al. 2003a, p. 337). An example of this view can be found in Lean Production, where Womack & Jones (1996, p. 311) state that value is "*a capability provided to a customer at the right time and at an appropriate price, as defined in each case by the customer.*" Values, on the other hand, are the principles by which we live, or one might say that values are our individual bible or the paradigm through which we see the world (Covey 1989). They are the core beliefs, morals and ideals of individuals and are reflected in attitudes and behaviours in society. Some illustrating quotes regarding values can be found in e.g. (Köhler 1966) "*At the bottom of all human activities are values, the conviction that some things 'ought to be'*", Hauen et al. (1999, p. 45) "*Whether a behaviour is morally correct or not is determined by the values that lie behind the decision*" and finally a nice one by Sartre (1943) "*Life has no meaning a priori...It is up to you to give it a meaning, and values are nothing but the meaning that you choose*". Values are inherently subjective because they frame the judgments made by individuals. In other words, values are personal guidelines like "*It is against my values to lie*", whereas value relates to a product and its assets, and it is often connected to monetary relations like "*The new Skoda is of great value*".

5.1.1 Values as a System

Also important when discussing the subjective values (the human guidelines), is the concept of viewing values as a system, i.e. value system. Although values can exist in isolation, it seems more likely that they are grouped in a system (Hebel 1998, p. 395). A system[12] means basically a regularly interacting or interdependent group of items forming a unified whole toward the achievement of a goal (Cox & Blackstone 1998, p. 94). In lay man terms this is a set of components interconnected for a purpose. In this sense individuals' values are the components, and they are interconnected due to cohesion in e.g. an organisation. The purpose is the goals, e.g. in a building project the purpose would

[12] *A value system is also often referred to as value set*

be a finished building at the right time and cost and fulfilling the client organisation's needs and requirements.

A value system is in essence the ordering and prioritisation of the ethical (cf. chapter 5.1.2 for an explanation) and ideological values that an individual or society holds (Wikipedia 2005). While two individuals or groups may share one or more common values, they may differ in their determination of which values have precedence over others. The two individuals or groups are, thus, said to have different value systems, even though they may have many values in common. People with differing value systems will disagree on the rightness or wrongness of certain actions, both in generic and in specific circumstances.

The values contained in a value system are ethical and ideological values. These values are per definition possessed in each individual constituting the group (from one to many persons), holding the value system. Ethical values distinguish between good and bad, right and wrong and moral and immoral. At a societal level, these values frequently form a basis for what is permitted and what is prohibited. Ideological values stress the broader and more abstract areas of politics, religion and social mores. In theory, the broader ideological values should derive logically as natural consequences of the particulars of fundamental ethical values and the prioritization. But although ideally a value system ought to be consistent, quite often this is not the case.

Characteristics of value systems have several dimensions. Firstly, value systems can be personal or societal. A personal system is applicable only to a single individual, whereas societal systems are applicable to a group or society. Secondly, value systems can be characterized as internally consistent or inconsistent. Thirdly, value systems can be characterized as idealized value systems (ideal representations of an individual's or group's value prioritizations) or realized value systems (how such a value system is manifested in reality, not in theory). Furthermore, two elements should be present in a value system, both in individual value systems and in societal value systems.

1. Values should be stated in a clear and understandable manner.
2. The stated values should be prioritized.

However, the case is often that the statement and prioritization are present only implicitly. In a societal value system both point one and two should be common for all members of the group that holds the value system, otherwise the group does not have a value system, but only several individual value systems. The strength of a value system

lies not in the number of common values, but in the degree to which the members share these central values (Wiener 1988, p. 536).

5.1.2 Values and Related Constructs – a way Through the Terminology Maze

Several related constructs to values exist, and it is important to distinguish between these concepts and to relate them to values. Some of the related constructs, which in brief will be distinguished from values in this thesis, are belief, attitude, norm, ethics, moral, ideology, and especially culture[13].

As written above, **values** are personal guidelines regarding one's perception of right/wrong, good/bad, etc. The values possessed by an individual, or common shared values of an organisation, is determining for an individual's actual behaviour. Behaviour is hence a real action based on values among others. In connection with the actual behaviour based on values, **moral** is an indication of how well the behaviour reflects the values (Hauen et al. 1999, pp. 13-32). Thereby, moral becomes a 'measurement' of to which extend persons act in accordance with their values. A moral person is hence a person who knows what his/hers values are and does not intend to act in direct contradiction with them. A moral dilemma is exactly a situation where the obvious behaviour is neither ethical nor in direct contradiction to ones personal values. **Ethics** is the study of right and wrong from an external business viewpoint. Ethics is what the surrounding society defines as right behaviour (Jensen 1998). An ethical behaviour is, therefore, often a deliberate action, due to the existents of ethical codes in the society. That is why several companies include ethical codes in their annual accounts in recent years. With the behaviour a **norm** follows, which is a pattern of behaviour within a particular society in a given situation. Moreover, a norm is the shared beliefs of what is normal and acceptable. Moral, ethics and norm relate to real actions. Belief, on the other hand, is not related to real action, but to individual thinking. **Belief** is a representational mental state that takes the form of a propositional attitude. It is considered propositional in that it is an assertion, a claim or expectation about reality that is presumed to be either true or false, even if this cannot be practically determined. **Attitude** is the expression of one's personal belief toward a specific object, event, action, person, etc. Finally, **ideology** is an organisation of beliefs and attitudes – religious, political or philosophical in nature – that is more or less institutionalized or shared with others (Rokeach 1968, pp. 123-4).

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[13] *Most likely several other related constructs exist, but the selected ones appear to be most important.*

In the past 25 years the concept of organisational **culture** has gained wide acceptance as a way to understand human systems. From an open system perspective, each aspect of organisational culture can be seen as an important environmental condition affecting the system and its subsystems. The difference between culture in general and organisational culture is that the latter is culture in a smaller scale or group. Several definitions of organisational culture exist, e.g. Louis (1980) "*A set of understandings or meanings shared by a group of people that are largely tacit among members and are clearly relevant and distinctive to the particular group which are also passed on to new members*". More known and recognized is Edgar Schein's work on organisational culture, and he defines the concept as: "*A pattern of shared basic assumptions that the group learned as it solved its problem of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relations to those problems*" (Schein 1992, p. 12). As groups evolve over time, they face two basic challenges: Integrating individuals into an effective whole, and adapting effectively to the external environment in order to survive. Many of the definitions of culture give primacy to the cognitive components, such as assumptions, beliefs, and values. This gives rise to the three levels of culture defined by Schein, cf. figure 5.1.

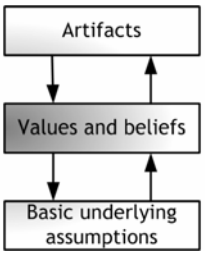

Figure 5.1. The three level of Culture, adapted from (Schein 1992).

Artefacts are the visible things, structures and processes in and around the organisation. Values and beliefs are the expressed values visible in the organisation's strategy, goals, politics, etc. The basic assumptions are the core, or essence, of the culture. They are unconscious and "taken for granted" convictions and perspectives that provide the key to understanding why things happen the way they do.

In theory, a strong culture is conceptualized as a coherent set of beliefs, values, assumptions, and practices embraced by most members of the organisation (Baker 2002). This indicates a connection between culture and values coherent with Schein's three levels. Values can be the foundation for a culture if they are taken care of, and if the organisational parties are gathered around shared values they have a strong unity, and great results can be accomplished (Blanchard & O'Conner 1997, p. 77). All the

definitions of culture state that culture is something which develops and growths over time. It is, therefore, questionable if a complete new culture can be built during a single building project.

The differences between value, values, and the related constructs are worth keeping in mind throughout this thesis.

5.2 Value Used in Building

Value has always been used in building in one manner or another, but not consistently due to the lack of a definition of the term. In most building projects value (needs/goals/expectations) are developed and described in the brief. The achievement of this value, determined by the client and sometimes the users, is always the primary objective of a building project. There are basically two variations of the described value; utility value and market value. Utility value is associated with the technical and aesthetic construction and the use of the building, e.g. brick type, top lighting, colour, usability, flexibility, etc. Market value is closely connected with the utility value. It describes the value of utility, quality measured in money, and is closely related to demand. All private organisations have as their main purpose to gain an acceptable income that can secure their future existence as well as meeting the expectations of the stakeholders, and this is done by supplying a demanded product. This will never change in a world dominated by market economy. Market values will, therefore, always be superior to the others.

Basically, there is nothing new in product value. It has been an object in building management for many years and is actively seen in such management philosophies as Economical Value Added and Value Management. Furthermore, it is described as a job in traditional models of project management (e.g. Anlægsteknikforeningen 2003, pp. 80-112).

5.2.1 Lean Construction and Value

Lean Construction (LC) views construction as a production, and the management viewpoints are among others described by Koskela's TFV concept[14] (Koskela 2000). Koskela (2000) undertakes a historical exploration of the use of the term value, and in his references value can be related to either market value and/or utility value. This perception of value is supported by the following quotes from LC papers.

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[14] *The TFV theory incorporates the well established production paradigms of Transformation, Flow and Value in construction context. According to (Koskela 2000, pp. 13-6) no reel production theory of construction exists until his definition of the TFV theory.*

- In (Bertelsen & Koskela 2002, p. 2) Value Management is described as, "*Conceptualization of production (from value viewpoint): As a process where value for the customer is created through fulfilment of his requirements.*"
- Later in the same paper, "*...the construction process generates the value wanted by the client.*"
- In (Ballard & Howell 1998, p. 5), "*Value is generated through a process of negotiation between customer ends and means.*"
- In (Lindfors 2000, p. 2), "*...products/services that increase profit, decrease time and cost, and improve quality for the company and generate profit/value for the customer.*"

This clearly shows that value is mainly conceived as both utility and market value in Lean Construction. There is, though, increasing tendency in Lean Construction to consider the value concept broader than only value (product related). Leinonen & Huovila (2000) mentions three different kinds of values; exchange value, use value and esteem value. The first two can be translated directly into market value and utility value. The third value has a broader scope than only the product-customer perception. Esteem is related to an emotional axis and, thereby, it seems somehow similar to what is described as values in this thesis.

5.3 Values Used in Building

Unfortunately, it can be concluded that values are not widely and consistently used in building – at least not explicitly. In continuation no real theory of how values in an operational manner can be beneficial applied exists. The purpose of introducing values in an organisation is to increase performance in dynamic environments. Values are motivators of human action. At an aggregate level, values constitute the corporate culture, norms, expectations, and "ways of doing things" in an organisation. Even though values are subtle phenomena, they nevertheless seem to have decisive effects on individual and organisational behaviour and achievement (Collins & Porras 2002; Kotter & Heskett 1992). Nonetheless, values are reflected in the cooperation ideas and strategies, which have surfaced with great magnitude in the building industry in recent years. The somewhat broad spectrum of cooperation ideas is more or less all included in the partnering alias. When emphasizing cooperation, one has moved to an interpersonal level. Perhaps it would be more appropriate to say that cooperation stresses the interface between different value systems. In a partnering cooperation environment, guidelines to good/right cooperation is set up, and these are (or should be) based on common values. A successful cooperation is, therefore, constituted as a single value system. The main critic

in this thesis of the cooperation trends in the building industry is that they only work with values implicitly. In the extreme view it seems that the partnering concept does not realize and purposefully works with the fact that cooperation (equals interpersonal behaviour) is based on personal values. Let's take a short look at the definition of partnering and the main pillars of the cooperation mechanism.

In 1998 the Danish City and Building ministry started a development programme "New Ways of Cooperation" followed up in 2002 by a new network named "Owners Create Values". Several publicly supported building projects with varying cooperation elements were carried out and parallel to this, a growing number of private owners also started building projects headlined Partnering. Some of these variants were later renamed "cutting up"[15] because among others the subcontractors had a feeling that somebody twisted their arms (Bejder & Wandahl 2005). It seems that varying perceptions of partnering were introduced. Anyway, there were some general common traits (EBST 2002b):

- An active owner/client.
- Early (in the building process) cooperation with selected parties, i.e. designers and contractors.
- An open interplay between the owner and the consultants and contractors.
- Client enters into a contract with the parties after having made a cooperation agreement paper.

In 2004 after having collected experiences from several building projects headlined partnering, the most recent and most accepted definition of partnering is put forward as: "*The concept of 'partnering' refers to a cooperation form in a construction project based on dialog, trust, openness and early involvement of all parties*" (EBST 2004b, p. 9). Dialog, trust and openness could be perceived as values. The conclusion is that the partnering concept implicitly entails aspects of values, and that the increased focus on cooperation through the partnering concept has shown to be beneficial for the project effectiveness and efficiency. The partnering concept will be further discussed in chapter 6.3.

[15] *(Cutting up = "Partering" in Danish – very similar to the word "Partnering")*

5.3.1 Lean Construction View on Values

Values as a concept have received little attention in Lean Construction. When looking for the perception of values as human values most is found implicitly in the research, i.e. between the lines. Marosszeky, et al. (2002) describe the importance of working with project culture and values for achieving the desired level of quality. A model for reinforcing the manager's belief is applied, and it is concluded that each organisation tends to view quality from its parochial perspective due to the culture.

Few other authors (e.g. Garnett 1999; Green 2000) are also working with related topics such as culture, human resource management and conflicts. But in general Lean Construction has not yet been working goal-directed with human values.

5.4 Influencing Human Behaviour

As the definition of values has now been discussed, it is possible to continue to investigate how human values influence human behaviour. Values could be explained as your religion or the glasses through which you see the world. In Schmaltz (2003) "The blind men and the elephant" John G. Saxe's poem is used as an analogy to how different people see project management in different ways. In the book the blind men "see" the world (the elephant) through their fingers, and indeed they "see" it differently. More theoretically, it is acknowledged that values directly influence behaviour, because values encourage individuals to act in accordance with their values (Rokeach 1973; Williams 1979). Values are, however, only one of a number of forces that effect behaviour, but in situations of absence of other tasks and situational variables (e.g. incentives, limitations, structures) that influence behaviour, values should have great impact (Meglino & Ravlin 1998). This is often the situation we are dealing with in a building project, i.e. the chaotic and dynamic building process. Human values have implications for the interaction between individuals because they influence each individual's perception and behaviour. Furthermore, when persons share similar values (i.e., interpersonal value congruence), they tend to perceive external stimuli in similar ways. Among other things, this similarity in interpreting and classifying environmental events serves to clarify their interpersonal communications. Individuals with similar value systems also behave in similar ways. This enables them to better predict the behaviour of others and more efficiently coordinate their actions. In effect, value similarity produces a social system or culture that facilitates the interactions necessary for individuals to achieve their common goals (Kluckhohn 1951).

5.5 Product Value and Process Values

A transformation of the value concept into the context of building projects is not straight forward. Some suggest that the two types of values could be identified as product value and process values (BEC 2003a; Wandahl & Bejder 2003). As illustrated in figure 5.2 this thesis operates with product value and process value

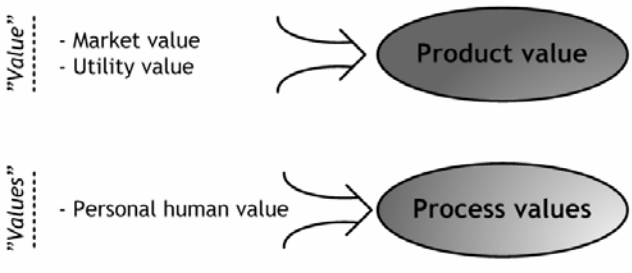

Figure 5.2. Product and process value, as used in this thesis.

The process is where you produce the product wanted by the client. One could, therefore, argue that process value is the main value to stress because it is perceived as a means to the ends (product values). In some building projects the parties may also have process values as goals. The means and end difference will be a topic for further elaboration in the following chapters of this thesis.

Price is not a subset of value, instead it is an expression of how much the market is willing to pay for the value delivered (BEC 2003a). However, price is not equal to cost, cf. figure 5.3.

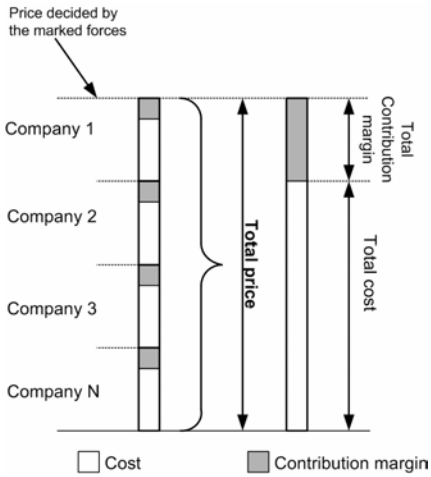

Figure 5.3. Price compared to cost in building project.

Each company / sub contract in a building project has a price consisting of a cost plus a contribution margin. The building project as a whole has a total accumulated cost and a

total accumulated contribution margin. The size of the contribution margin is partly decided by each company and partly by the total price of the building as decided by the marked forces. That is why the cost and not the price is given the main focus by the participating companies, i.e. lowering cost seems the most straight forward road to increase contribution margin.

5.6 Discussion on Value(s)

In the nature of value lie some characteristics, which might not be clearly understandable. These characteristics are both applicable for product and process values. Firstly, value is **subjective**. Value is certain forms of characteristics, not substantive quantities. To create value is not to create products, but products with certain characteristics and qualities in relation to the user of the value. Furthermore, the personal values are also very subjective, what one might find as a good behaviour in a cooperation situation, another might not. Secondly, value is **relative**. This implies that value is essentially comparative. Goods do not have value on their own. Goods only have value in comparison with other goods, e.g. there could not be good houses if there weren't bad houses (Fink 2002). When a person can identify and express what (s)he finds as bad behaviour (s)he automatically, but not always consciously, also knows what (s)he identifies as good behaviour. Thirdly, value is **context dependent**. This is best explained through an example. Let's take a product value example, and think of a simple stone. The stone has no value in itself until you know in which context you should use the stone. If you need a stone for a road barrier, a big stone would have great value. On the other hand, if you need a stone to play ducks and drakes with, perhaps a small flat stone would be of value. Finally, value is **dynamic**, it changes over time. Partly in relation to the building and its use and partly in relation to the building process.

Another peculiarity of value is the difficulty in measuring value. The measurement problem is grounded in at least two factors, the subjectivity of value, and the difficulty in making value statements explicit – you cannot measure something you do not know. In defiance of the problems it is important to be able to measure value, if used in management[16]. The degree of value compliance will fluctuate, as we are humans, but since the values are closely connected, in fact one of the bases for human behaviour, a deflection in the compliance, will affect the behaviour (equal the production) and,

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[16] The work with values within company organizations has become widespread in recent years. However, it is often seen that the company set of values is 'just' formulated and the management then presumes that this will improve the work performance without any further work with the values. This is not identical to the position of this thesis. Values are dynamic, and a continuous effort of active working with the values of the company is needed to obtain real success.

thereby, interferes with the quality level in a broad sense. However, this problem area will be addressed later in this thesis.

The subjectivity of value and perception of value is investigated in Wandahl (2002; 2004a; 2004c). The importance of process and product values for different groups of partners in a building project is shown in figure 5.4.

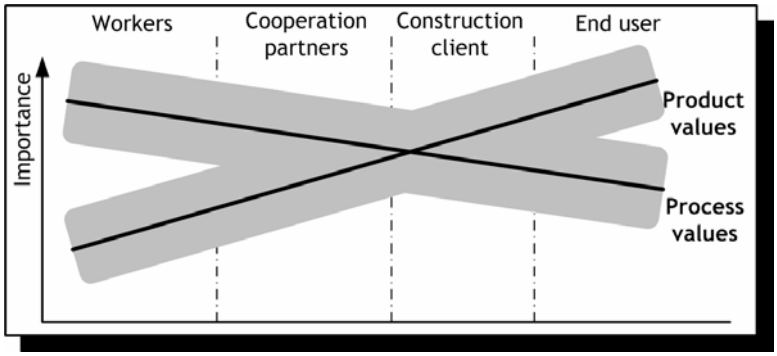

Figure 5.4: Difference in perception of values (Wandahl 2002, p. 64).

The work carried out on the construction site is a main part of the building process, and workers care mostly about the process values, e.g. good cooperation, agreement discipline, communication, etc. and of course also their income. The end users are going to live or work in the constructed building, and they, therefore, care mostly about the product values, e.g. brick type, roof light, flexibility, economy, architecture, etc. This hypothesis is shown in figure 5.4 and has been proven in one building project (Wandahl 2002). It is a paradox that the workers in general care mostly about process values, but at the same time they are the ones who add value to the final product. Thus, the workers do not neglect product values. Basically, workers are proud people and like to make good craftsmanship **IF** the conditions allow it.

The conclusion of this review on value(s) is that the difference between value and values, e.g. product and process value in the framework of this thesis, is relevant. In the literature about building management the concept of product value is the main focus. Only little effort has so far been made to understand how values (process value) can be used actively in management of building projects. This is one of the reasons why this thesis grasps hold on the process value concept.

6

Mechanisms to Influence Behaviour

*In this chapter the value concept is further elaborated. A model illustrating different mechanism to influence human behaviour is introduced, and the model contains both product and process value. Through the model two different management approaches are identified, Management **of** Value and Management **by** Values. Finally, the model is used to describe different management concepts applied in building, e.g. partnering.*

Building is a labour intensive industry, and even though we have entered the 21st century, and a lot of technological innovations have occurred, the main activities in building are still carried out by hands. It is not only in the construction phase of the building process that humans account for the main part of the activities, but also in the programming and design phases. Computers and IT are of course a part of the everyday activities, but they are only to be regarded as supporting tools. In order to ensure successful building, it is important to influence human activity in a desired direction, as much as possible.

6.1 The Behaviour Model

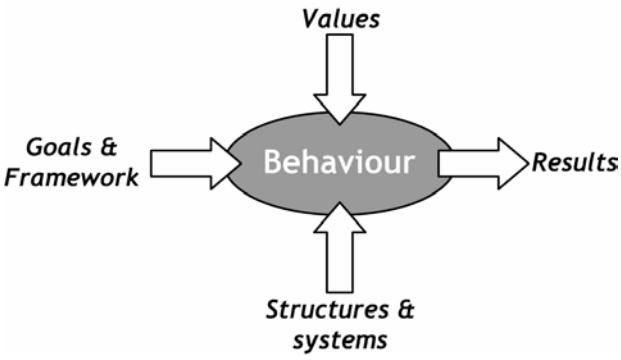

Figure 6.1. Different approaches to influence human behaviour.

The purpose of the model, illustrated in figure 6.1, is to explain how human behaviour is influenced in building. Behaviour covers all aspects of human activities, both work done by the craftsmen and management activities.

At the beginning of all building projects **goals** are outlined. In its most basic form the goals are a completed building. Most often the goal relates to explicit requirements and needs of the client organisation, i.e. the client's brief. In a more advanced form the goals could consist of sub-goals within the following areas: Location, aesthetics, fitness for user's purpose, costs, time, technical performance, environmental impact, and health & safety (Olsen & Bejder 1994). The client organisation's goals become the goals of the project team when contractual agreements are signed. Moreover, the other parties could also have goals stated publicly within the project team, which is seen in partnering, more on this later. But let us start by viewing the goals as only related to the client organisation. All the categories of goals described by Olsen and Bejder (1994) are product value, cf. figure 5.2.

Framework comprises the laws, guidelines, expectations, etc. of the surrounding environment. This framework is viewed as unchangeable from the project perspective and it, thereby, constitutes the boarders and the rules of the "play ground". Some elements of the framework are quite explicit and mandatory like legislation concerning building regulation, working environment, etc. Other elements of the framework are more indirect like media, pressure from interest groups, etc. Anyway, the initial input of goals and framework influence the behaviour of humans performing tasks aimed at creating congruence between the results and the goals.

The outcome of behaviour is **results**, and how well the results reflect the initial goals determines the level of success. This covers both effectiveness and efficiency of the project organisation. The interesting part is then how it is possible to influence behaviour to ensure a high level of correspondence between the results and the goals in this ongoing process of transforming the goals to results. In this model two diametrically opposite mechanisms are available.

Structures & systems are the traditional management tools and consist of systems such as planning, time, quality, finances, etc. Structures are among others the manner in which the parties have organised themselves in the project organisation – the managerial organisation (how to coordinate) as well as the legal organisation (who has a contract with whom). Managing by systems & structures is a rational approach, where it is assumed that it is possible to monitor and to give corrective-action when needed.

Moreover, systems & structures are normative in its approach to managing, i.e. there exists a correct method. Project management in its most widespread form is based on this rational approach. This is clearly evident when looking into literature describing project management and tools of project management (e.g. Mikkelsen & Riis 2005; PMI 2000).

Values are the other mechanism to influence human behaviour. It is in many aspects different from how systems and structures influence human behaviour. In chapter 5 it was explain how and why values and value congruence influence human behaviour. It is only process values, which are used to influence human behaviour. Even though the two described mechanisms for influencing human behaviour relate to two different poles, they are not and should not been seen as competing. Instead they are to be viewed as supplementary management mechanisms, which both might be beneficial but not likely at the same time and with the same strength (Wandahl & Bejder 2003, pp. 300-4).

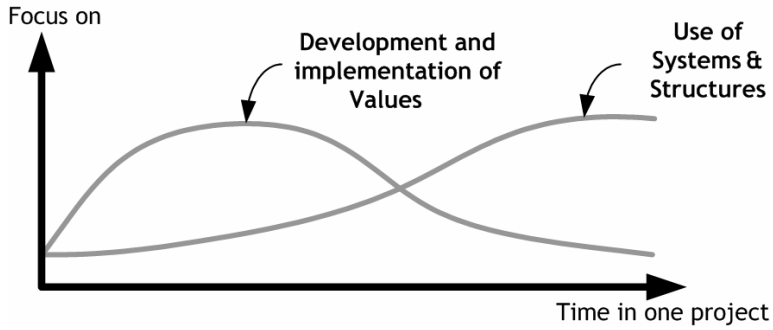

Figure 6.2. The use of values and systems & structures (adapted from Bejder 1989).

The figure above illustrates how the two "management poles" are applied with different strengths at different times in a single project. This supports that both ways should be used in management and that they should not be viewed as competing.

6.2 Management of Value and Management by Values

From the model of influencing human behaviour, cf. figure 6.1, two different approaches to applying value(s) in management are derived. One I call Management **of** Value, and the other I call Management **by** Values. Management **of** Value is the traditional approach where well known systems and structures are applied to ensure that the product value required and needed by the client organisation is realised in an efficient manner. It seeks maximization of the value delivered to the customer plus increased marginal profit for the building partners. Furthermore, it focuses on the goals (e.g. described in the client's brief) and the goals mainly belong to the product value category. The emphasis on "**of**" is because value is not used in the management, other mechanism are applied to obtain value. Management **by** Values applies commonly agreed (shared) values as a

supplementary mechanism to manage and control human behaviour. It uses process values as a means to achieving the main goal of the building project. The main goal is still the delivery of product value to the client organisation. It is called Management **by** Values because values are an element used in the management, not the goal.

6.3 Different Management Theories Explained by the Model

The behaviour model can be used to describe different management theories applied in building. In the following Partnering, Value Management, Value Engineering, Value-Based Management and hybrids will be described with basis in the behaviour model, as illustrated in figure 6.3.

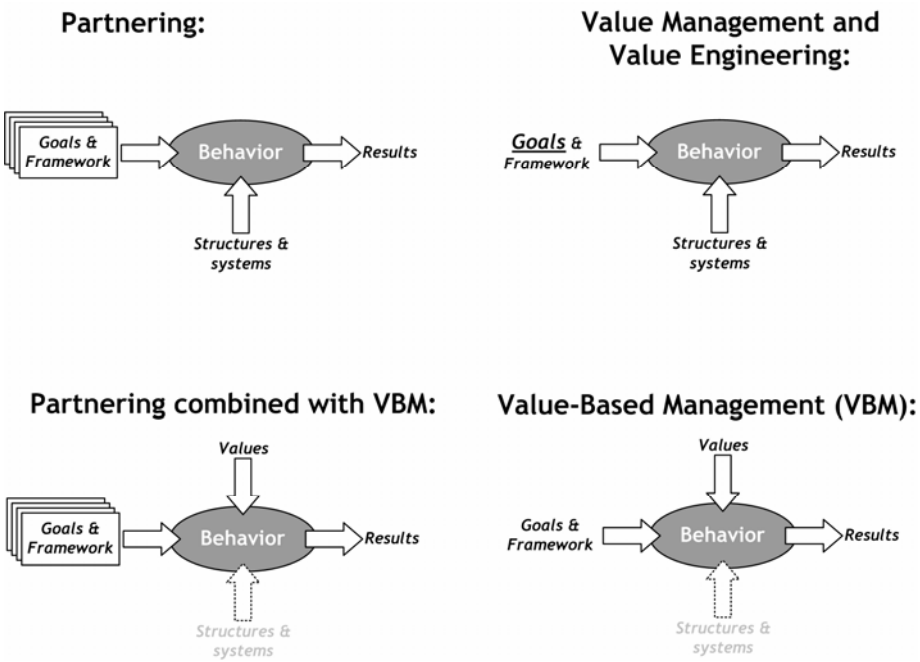

Figure 6.3: Illustration of different management concepts in the building industry.

Partnering is a cooperation form which has become widely used in building projects throughout the world through the last ten years. Partnering is quite a broad concept, which covers different cooperation ideas, and therefore several different definitions exist, like: "*The partnering concept describes the cooperation form in building projects when the project is carried out through common goals expressed by common activities and based on common economical interests*" (own translation from BEC 2003c, p. 7). The main idea of partnering is that not only are the client organisation's goals in focus, but also the goals of the other project participants (Bejder & Wandahl 2005). Partnering, thereby, focuses unilaterally on product value, but the goals include all the parties' different as well as common goals. The management is still mainly performed through

systems & structures, but a tendency to greater openness and community thinking appear. This is supported by EBST (2000b, p. 5), where 11 different elements used in partnering are defined. None of these relate to process values. In 2003 a new report redefined the 11 elements, and now the establishment of common values is one of the eleven elements (BEC 2003c, pp. 7-8). Contrary to what many practitioners believe, partnering only works implicitly on improving the cooperation through e.g. common values.

Value Management and Value Engineering are treated equally in this model because both value delivery methods have their focus on product value and thereby Management **o**f Value. VM and VE are aliases for specific tools (systems) used with the purpose of identifying, communicating and delivering product value to the client organisation. A hybrid of partnering and VM/VE is therefore possible. It would involve VM and VE tools for all the participants' product value.

For the first time in this thesis the concept of **Value-Based Management** (VBM) is brought up. It shall here clearly be stated that VBM is a new (still under development) management concept in the building project context. VBM is known and used within singular company organisations, but a transformation into a dynamic project environment with several different legal parties participating in a building project, has not yet been fully accomplished. The concept of VBM will be intensively described later in this thesis. Until further exploration VBM is defined as a management concept which applies common (shared) personal values as means to obtaining a preferred goal. It is identified as Management **by** Values, due to its active use of process values as a mechanism to influence human behaviour. It is not a competing management concept to well known systems, instead it is viewed as a supplementary tool. However, the use of personal process values should decrease the use of rational systems and structures cf. figure 6.2.

Hybrids of VBM and other concepts are possible, like **Partnering combined with VBM** (Bejder & Wandahl 2004). When partnering is combined with VBM, the concept is referred to as Value-Based Cooperation because process values are used for obtaining all the participants' product values, i.e. they cooperate to reach common and individual, but known and accepted by the others, goals. VBM can obviously be applied without a cooperation mechanism such as partnering, but most likely VBM will be applied in situations where good cooperation is the main agenda.

6.4 Reflection

The distinction between product and process value as the two main groups of the value concept is unique and new in the building industry. In the most recent state-of-the-art

report on Value Management in the Danish building industry (BEC 2003b, pp. 6-8), two different approaches to perceive value in building are presented. An external view aimed at the construction client's perception of value and an internal view aimed at the supply chain's perception of value.

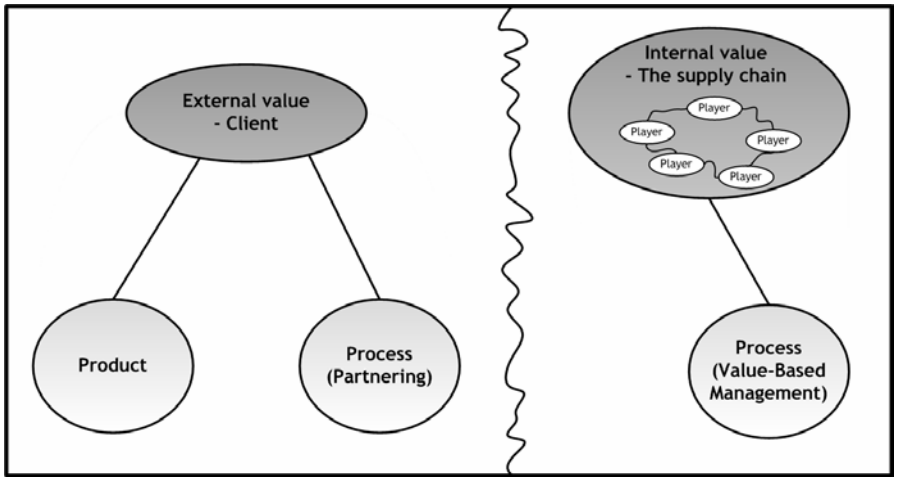

Figure 6.4. Internal vs. external view of value (BEC 2003b).

The external – internal difference is most relevant, but not fully congruent with the perception of value in VBM. Product value has clearly an external scoop, whether it concerns product value for the client or product value of for some of the other project partners. In figure 6.4 process values are also a part of the external view, which implies that the process is of value to the client, i.e. a goal in the behaviour model. Process values are set equal to the use of partnering, which is not consistent with the view of this thesis on partnering as defined in the behaviour model. Partnering does not actively apply process values as a mechanism to influence behaviour, at least not explicitly. It is recognized that some clients may have the process as the main goal, but the majority of clients have their focus on the product. Those who also recognize the importance of the process are those who are aware that the process leads to the product! This is the main philosophy of VBM where the use of process values is viewed as means to the end (=product value).

When reflecting on the model (figure 6.1) illustrating the two different mechanisms to influence human behaviour, it is recognized that the influence through systems & structures is a well described part of the building management theories. Surely, improvements are still possible and are still taking place in the research society. The other mechanism, influence through values, is not paid much attention, which illustrates that this is a new and emerging concept in building. When looking at the value concept (process and product value), the same twisting occurs. Management of product value is a

well known discipline, however still problematic, and has implicitly always been a part of the briefing process of building. In an explicit manner product value has been worked with in e.g. the concepts of Value Management. The other part of the value concept, process value, is on the other hand not paid the same amount of attention in the building management theories. The perception of value as process values and the influence on human behaviour through these values are combined in the thoughts of Value-Based Management. VBM, however, is not yet a fully developed management theory for building. The primary reason for this is the lack of an unambiguous definition of value in building, i.e. product value is the main perception of value in the building industry. The next part of the thesis will explore the concept of Value-Based Management, and further, the expected benefits of using VBM as a supplementary management tool in building projects.

7

Value-Based Management

In this chapter a synthesis of Value-Based Management is developed. The core concept is described followed by an explanation of plausible advantages of using Value-Based Management. The advantages are primarily a more proactive management system and secondly, increased effectiveness and efficiency of the project organisation. Finally, organisational power and individual interest are discussed as possible barriers to a successful use of VBM.

This chapter is concerned with the concept of Management **by** Values as introduced in the past chapter. Management **by** Values, or as referred to from now on, Value-Based Management is one of two different general approaches to applying value in management. The other concept, Value Management is presented in chapter 4.

When focusing on Value-Based Management, it is evident that this concept is not yet fully rooted in the building industry. Taking into consideration that the building industry has always been presumed to be at least 10 years behind other industries regarding innovative development of its products and processes, it is understandable that the building industry has only recently started developing VBM since other industries still are actively developing and implementing VBM.

VBM is defined as a synthesis of already known management ideas, and it is developed to fit into a building project context. Furthermore, plausible advantages of using Value-Based Management as a supplementary management tool are presented, and finally possible obstacles to a successful use are explored. This chapter, along with chapter 4, 5, 6, and 8 are to be understood as a presentation of the main theoretical contribution, and hence are the published papers, cf. appendix A.

7.1 Synthesis of Value-Based Management

The core concept of Value-Based Management is presented as a synthesis because it combines existing knowledge from e.g. psychology and organisational theory into new knowledge in building management. Theory on why individuals possess values and how these values influence individual behaviour is applied from psychology. Theory on how individuals (with values) interact and work together towards a common goal is used from the organisational theory. Moreover, in the interface between psychology and organisational theory, knowledge on value congruence and group theory, are used. An in-debt description on how this synthesis is new knowledge is described in the conclusion of this thesis, cf. chapter 9. The theory of VBM is also described in paper 1 and 3, i.e. (Wandahl & Bejder 2003) and (Wandahl 2004b).

7.1.1 Individuals' Possession of Values

Already manifested in this thesis, a central element is the behaviour model, which outlines two different mechanisms for influencing human behaviour, including process values. Theoretical explanations about individuals possessing values, and that these values unconsciously influence individuals' behaviour are given in chapter 5. However, this is an important point in the core of VBM and is therefore put forward again.

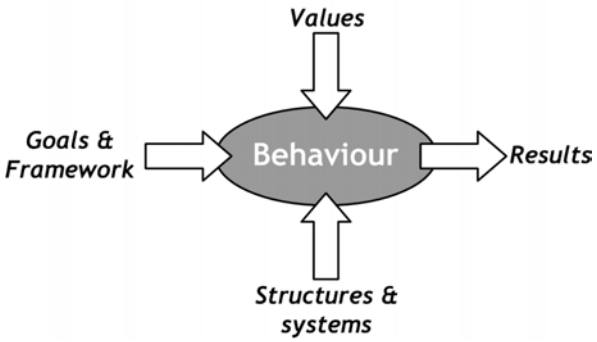

Figure 7.1. Different approaches to influence human behaviour.

The model in figure 7.1, illustrates that process values constitute one mechanism among others to influence behaviour. Supporting arguments for this can be found in other areas, e.g. Neuro Linguistic Programming (NLP), which often uses a model illustrating the logical levels in the human personality, see figure 7.2.

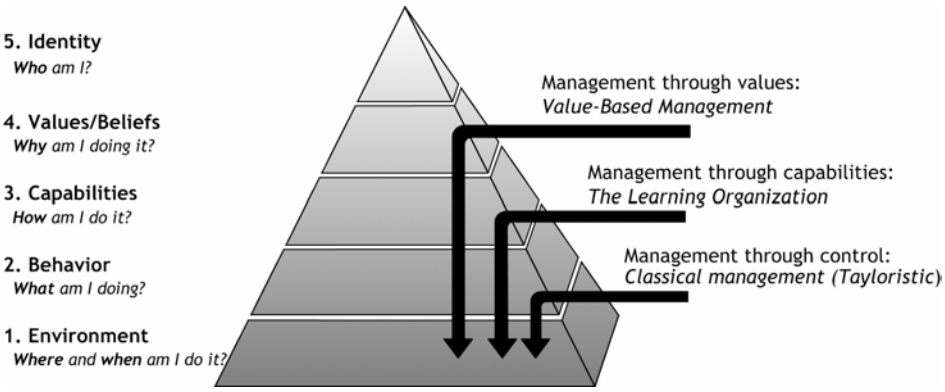

Figure 7.2. Logical levels in NLP. Adapted from (Dilts 1995, p. 40-2; Hauen et al. 1999).

Environment is the setting in which the individual works and is the lowest level in the model. **Behaviour** is what the individual actually does of work. **Capabilities** are the tools and qualifications, which individuals use in their daily work. **Values** are the things that we worship in our lifes. **Identity** is abstract and could be explained as what we would like to stand for and be known for. In general a level influences/controls the level below[17], and a high internal relationship therefore exists in the model. Furthermore, the higher level in the pyramid, the greater is the complexity in the human personality, but still there is coherence between the levels. The different management styles are illustrated on the right hand side of the pyramid. This implies that using VBM (influencing behaviour through process values) will affect the values, which affects the capabilities, which again affects the behaviour. That is why management concepts initiated at level three or higher levels are addressed as holistic.

The conclusion is that if the purpose is to influence the behaviour of the project participants, focus on values of the individual and the common values of the organisations would have great impact, cf. chapter 5.

7.1.2 Communities and Value Congruence

The establishment of organisational values, which are common and shared by the entire organisation, is important because persons sharing similar values (interpersonal value congruence) tend to perceive external stimuli in similar ways. Among other things this similarity in interpreting and classifying environmental events serves to clarify their interpersonal communications. Individuals with similar value systems also behave in similar ways. This enables them to better predict the behaviour of others and more

[17] *This rule is not universal, e.g. if you give a craftsman a truck certificate it is not evidential that he starts driving trucks.*

efficiently coordinate their actions. In effect value similarity produces a social system or culture that facilitates the interactions necessary for individuals to achieve their common goals (Kluckhohn 1951). The achievement of this similarity between value systems is not an easy task in a building project, among other things due to the high number of independent legal parties in the project organisation, see figure 7.3.

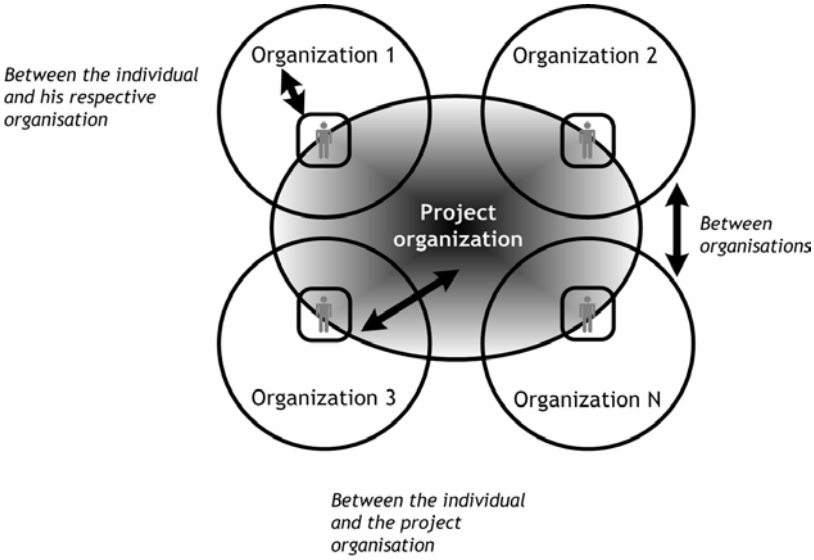

Figure 7.3. Congruity and boarders between different value systems are illustrated by the circles. The double headed arrows illustrate the three kinds of congruity boarders, which are important to break down. Adapted from Wandahl & Bejder (2003).

It is not necessary to obtain 100% congruence between the different value system, as long as the systems are not directly conflicting. A main concern of the congruity issue is when project participants leave or enter the organisation. This is a known problem in the building industry where it is often seen that the general contractor moves his craftsmen around between different sites in different projects. This personnel shifting will undermine the obtained congruity and, thereby, the cooperation on site due to the personal element of values. The congruity should be seen in the light of the theory of community, as described in the following, adapted from Wandahl & Bejder (2003).

7.1.2.1 Community

To understand interpersonal behaviour, a short description of community and its regulation is required. Every building project can be viewed as a community, where the partners participate to fulfil their needs. Most people participate in several communities, e.g. their workplace, family, sport clubs, political organisations, etc. in the quest for fulfilment of needs. Maslow (1968) has categorized the needs in such a manner that Physiological needs must, to some extend, be fulfilled before safety needs, social needs, ego needs and self actualization. The needs are then fulfilled through participation in

communities, e.g. building projects and the companies involved. Every human has precisely one set of values[18], and a congruity between the individual's values and the values of the community, e.g. a building project organisation, can be created.

In communities regulation is present, called the community condition. The purpose of this is to weigh the individual's interest against the interest of the community and the other participants' interests. The community conditions attempt to regulate the fulfilment of individuals' needs without unjustifiably deducting the remaining participants' opportunities to fulfil their own needs (Jensen 1998). To prevent individuals from fulfilling their own needs at the expense of the community's, every action should be regulated to create a net advantage in contribution to the community goods. This leads to the basic condition of community:

> "*As a participant in a community under the framework of an unregulated social space, there can be a short-term individual advantage by acting against the collective long-term interest in the preservation of the common goods and the community itself*" (Jensen 1998, p. 29).

From this at least three serious problems in community regulation can be extracted (Wandahl 2002, pp. 40-1):

- Limited common resources in a community with unregulated access will be abused.
- Project participants get an impression of having rights without a corresponding sense of responsibility.
- Communities exist with the purpose of fulfilling individuals' needs and in that connection there tends to be a problem with measuring the contribution from each individual to the community goods.

These problems are easily recognized in building projects. The problem with the impression of having rights without a corresponding responsibility is known to anybody who has been in touch with management. The problem of measuring the contribution to the community is especially known in partnering projects, where incentive agreements are used in the quest to prevent individual sub-optimization.

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[18] *However, this one set of value may change over time, but only after a kind of paradigm shift or a real eye opener experience.*

There exists no unambiguous proof that shared values should result in higher task effectiveness, and this thesis is not aimed at proving this connection in practice. Instead it is assumed that this connection exists. In the partnering concept this connection is implicitly presumed existing, through the mantra that cooperation and openness minimize the amount of errors, quality slack, and conflicts (Østergaard 2005, p. 16).

7.1.3 Discussion: Active or Passive Use of Values

Two different scenarios of how to use values as a mechanism to influence human behaviour in an organisation can be outlined. One where the common (shared) values of the organisation are defined and the members are then encouraged to act accordingly. Since this does not imply any auditing activities and any measuring activities of the degree of compliance, this way of using values could be said to be passive. In fact, this way of using values is quite often seen in companies, where it has become popular to state the company's values on their website, but often they are not used in the daily work (Petersen & Lassen 1997, pp. 7-12). It is questionable whether this passive use of values will increase the organisational performance at all. The other scenario is a more active use of values, i.e. a continuous work on measuring the daily works compliance with the values, improving and updating the values, reminding each other of the values, using the degree of compliance as input to management activities, etc. Such an active use of values is needed to attaining the full potential of creating and using common (shared) organisational values. In the next part of this thesis an application of an active use of VBM will be explored briefly.

7.2 Active Use of VBM

Data from a case study is used to illustrate how it is possible to use values actively in a building project. The following description is mainly based on paper 2 (Bejder & Wandahl 2004) and (Wandahl 2002). The physical building project involves a thorough rebuilding and extension of a more than 30-year-old student hostel. The project is a public supported development project, where the client organisation decided to use partnering combined with ideas of Value-Based Management.

7.2.1 Development of Common Values and Individual Goals

The foundation for VBM is the development and agreement of common values for the whole project team as well as openness and acceptance of company individual goals. The case is carried out in an early partnering cooperation mode, which includes involving the general contractor before a final design is available (BEC 2005). All the project partners are selected (not the sub-contractors) in the initial phase of the building process. As

described in chapter 6.3, both common values and individual goals are used in this kind of project, Partnering combined with Value-Based Management, also called Value-Based Cooperation. The partnering aspect opens for company individual goals, and the VBM aspect stresses common goals as a mechanism for influencing the participants' behaviour. The common values and the individual goals are developed through three one-day workshops. The three workshops took place during the requirement and design phase. At the first workshop the practitioners discussed former bad experiences with building, i.e. they discussed anti-values. At the second workshop the participants turned the anti-values around to values they liked in the building process, and these values along with the individual values and goals were incorporated in a cooperation agreement in the third workshop. The outcome of the three workshops is a cooperation agreement stating the common values as well as the individual goals. Examples of these are (Wandahl 2002, p. 141-8):

- **Common values**: The common values are all process values, cf. chapter 5.5 and describe how the project organisation perceives good behaviour. The values are described in a best practice manner and could e.g. be honesty & openness, knowledge sharing, agreement discipline, etc.
- **Individual goals**: The individual goals are a mix of both product values (to be perceived as goals) and process values. The goals differ from company to company, which is acceptable as long as individual goals are not conflicting with each other or with the common values. The differences of the goals reflect the roles in the project, e.g. contractor, architect, engineer, etc. (Wandahl 2002, pp. 63-4; Wandahl 2004a, pp. 136-7).

7.2.2 The Daily Use of Values

The common values should then guide the daily work, and the practitioners' compliance with the value is recorded through a project web. The procedure is that every fourth night the project participants fill out a questionnaire where they are asked to consider both their feelings of how well everybody complies with each of the common values and how important they think each common value is. Through the project web the participants then can look at dynamic illustrations of the results of the questionnaires, cf. figure 7.4.

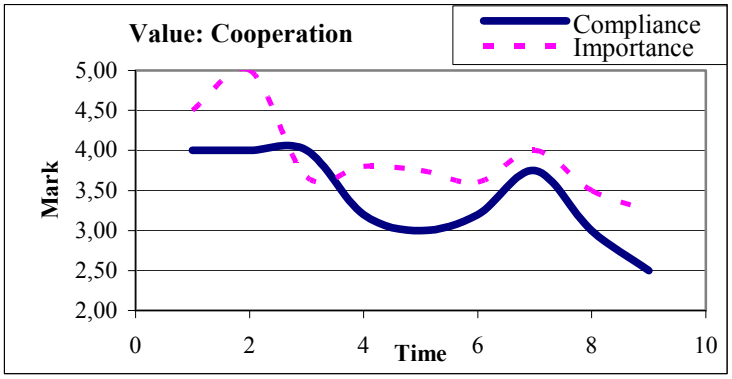

Figure 7.4. Illustration of the development of the common value "cooperation" (Wandahl 2002, p. 153).

Figure 7.4 illustrates that the degree of compliance of perceived actual behaviour with the common values shifts during the process. Several different graphs and tables can be generated through the project web, and the project participants and especially the project management and the active client can use these data to initiate management actions in quest of a good cooperation climate among the project partners. In this case, the client arranged new workshops if the marks had changed dramatically. At these workshops all the participants are involved and problems and concerns are put forward. In that manner issues were taken care of in an open environment.

In paper 2 (Bejder & Wandahl 2004) three concrete examples of events of inappropriate behaviour on the building site, which were caught by the process value measurement before other control systems gave warnings, are provided. In reflection on the case, the project management stated the following: "*If, among others, these events were not caught relatively early via the continuous process-values assessments it must be assumed that the events would have caused a larger perceptible negative effect on the party goals/product values. Remedy of the three problems – together with the ongoing focus on the cooperation in general – has in all circumstances caused a better and more constructive cooperation climate on the building site*" (Bejder & Wandahl 2004, p. 8). This plausible effect is theoretically investigated further in the following.

7.3 Advantages of VBM - Proactivity

As work becomes more dynamic and decentralized, proactive behaviour and management become even more critical determinants for organisational success. For example, as new forms of management are introduced, which minimize the surveillance function, companies will increasingly rely on employees' personal initiative to identify and solve problems (Frese et al. 1997). These proactive actions are based on the individual's perception of and congruence with the common organisational values. Furthermore, "(*...)*

there are an accelerating number of choices available in virtually all situations, and the need for self-management is intrinsic in rising levels of competence and complexity." (Harung & Rieber 1995, p. 19). In relation to building projects the number of decisions to be made to achieve a minimum of errors, waste, and non-value adding activities are numerous. Not only is the decision-making important, but also the time when the decision is taken. The management is using different kinds of systems as support tools in the decision making process, but it is mainly the management, which is reactive (or proactive). However, the systems can implicitly support proactive management decisions by providing more advanced measures. Management systems used in building, e.g. time, quality, budget, etc. are reactive of nature. These systems are reacting on input (measurements, observations, etc.), which have taken place. Basically, a reactionary system provides working orders as outputs and some time later, control inputs are returned to the system, forming a complete single control loop. The system can then inform the management to which extend the control inputs are identical to the initial orders. Some examples:

- Output: at time 1, xx of the cost should have been used according to the budget plan. Input: at time 1, yy of the cost were used.
- Output: from the master schedule we should at time 2 have finished casting concrete for the foundation. Input: At time 2 we had only finished 70% of casting concrete.

In both situations the system is not the one who makes decisions about what to do, it only provides the management with data, which they can use in their decision making (e.g. adjustments, corrective actions, etc.). It lies in the human nature to make mistakes at some point. In building it is, therefore, unimaginable to consider situations with no adjustments (corrective actions). Large adjustments are often derived from errors and thus result in rebuilding and waste. One way to avoid larger adjustments could be to increase surveillance by minimizing the time span between output and input, and thereby, make the system more interactive. Broadly speaking, this is a part of what is the rationale behind the planning system in Lean Construction, called the Last Planner Production System™ (Ballard 2000). It implies that an initial detailed master plan for the whole building project is not reliable, and it introduces, therefore, a 6 week forecast plan and a weekly work plan. The weekly work plan states work that can be carried out in the following week. At the end of the week control inputs returns to the system, and a performance indicator called PPC[19] is provided. The lean construction society argues that

[19] *PPC: Percent Plan Completed*

the PPC increases when applying Lean Construction to building projects, and this should among other things be due to the planning system. If this works well, why not then narrow the final plan down to a daily work plan or an hourly work plan, this would definitely increase the PPC? Furthermore, is this to be considered as proactive?[20]

There are two arguments against this direction of decreasing the time span as a mechanism to increase PPC.

- This kind of tight control / supervision is impossible in the complex and dynamic nature of building projects. The system would be too massive - instead we need to rely on the human capabilities for doing the right task right.
- Theory and practice have shown that intense surveillance is de-motivating and Drucker (1992) presents evidence that work rules and surveillance may drastically reduce productivity.

The reactive management system creates situations where the management is doing "fire fighting" rather than "fire prevention". To empower management in building projects with proactive techniques for decision-making is important in the light of the dynamic and unpredictable environment in which building is taking place. To be proactive is to change things, in an intended direction, for the better (Bateman & Crant 1999, p. 64). With other words, to form the future yourself.

Let us take a closer look at a proactive and a reactive system applied on the same dynamic development. In figure 7.5 an intended plan is outlined by the dotted line, and the actual development is the curved line. It could, e.g. regard budget, percentage complete, etc.

[20] *This should not be seen as a unilateral critic of Lean Construction and its planning and production system. However, it is more a kind of reflection of the benefits of reducing the time span between input and output in the time management system.*

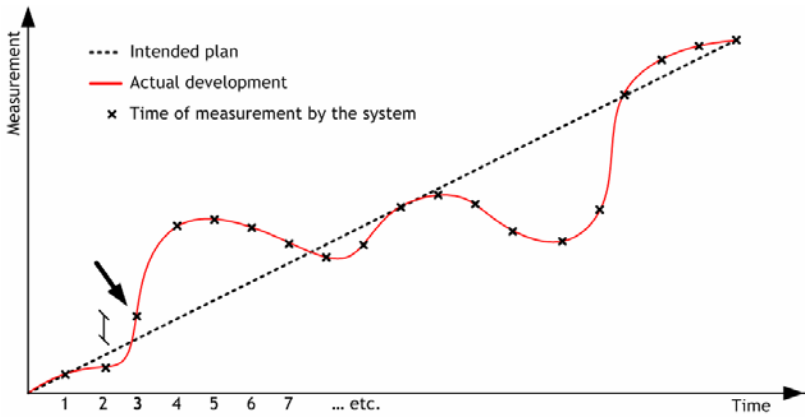

Figure 7.5. A fictive illustration of a reactive system.

At time 3 the reactive system receives an input stating the position on the y-axis, $y_{3,\ real}$, i.e. a bit off track ($y_{3,\ real}$ - $y_{3,\ plan}$ = Δy). The reactive system is concerned with "where we are", $y_{3,\ real}$ and "where we should be", $y_{3,\ plan}$, and on basis of the difference in these two measures, Δy, corrective action can be taken by the management. Since the development is not that much off track, only minor corrective actions are taken. The reactive system is capturing "here and now" measurements. In figure 7.6 the same condition is illustrated, now just with a proactive system.

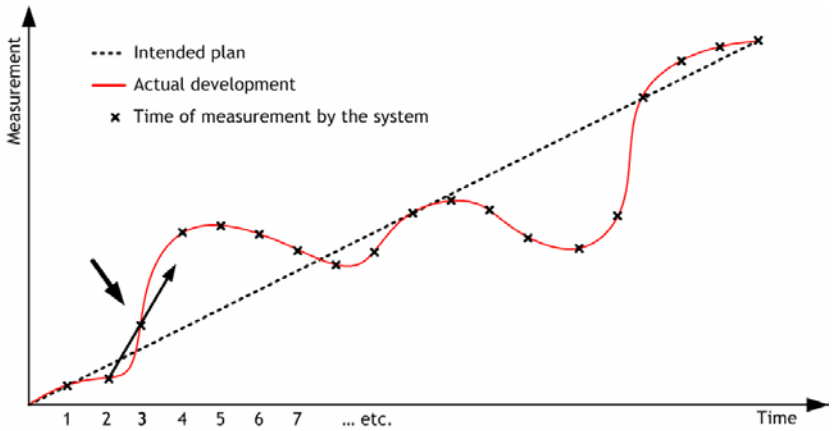

Figure 7.6. A fictive illustration of a proactive system.

At time 3 the proactive system receives an input stating the position on the y-axis, $y_{3,\ real}$, i.e. again a bit off track. Furthermore, it has recorded where we were at time 2, $y_{2,\ real}$. The proactive system is then concerned with "where we are", $y_{3,\ real}$ + "where we were", $y_{2,\ real}$ $\Rightarrow$ "where we are heading", $y_{4,\ intended}$ and "where should we be heading", $y_{4,\ plan}$. In the case of figure 7.6 the development is heading way off track and the management can take the appropriate corrective action at this point. In a mathematical context figure 7.6 illustrates y', the derivative function. This function is equal to eliminating the time gap between two measurements. However, the system should not take measures that often –

there is no logic in doing so because no tasks would have been carried out in such a short time span. There seems to be common sense in using week plans for the time gap.

The difference between the two kinds of systems could be described as following: The reactive system focuses on deviations from the outlined plan at any given time, whereas the proactive system focuses on deviations of future developments from the outlined plan.

7.3.1 VBM as a Proactive Management System

A model of a simple control system, illustrated in figure 7.7, consists of control activities, action activities and connections between these. The system functions in the way that the control part sends information about tasks to the action part, which executes the tasks. Finally, the action part sends information back to the control part, which checks whether the executed task is in congruence with the planned. This results in information, which the management can use in their daily activities. Normally, a system would not consist of only a single loop, but several loops, which make the system interactive.

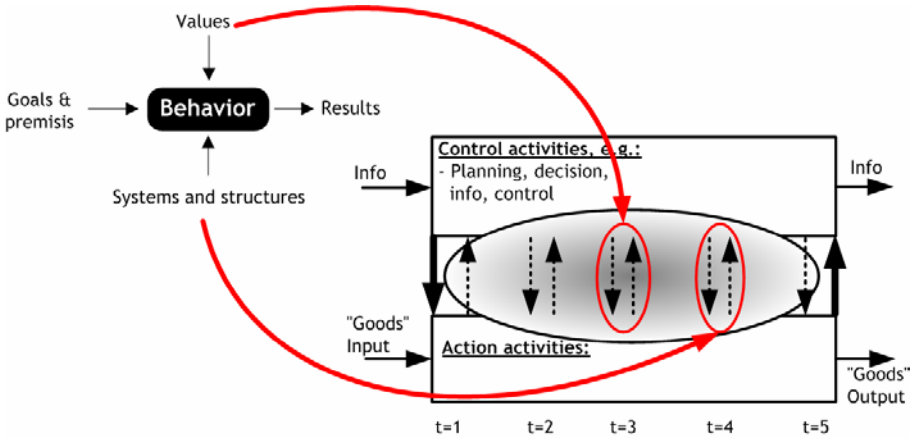

Figure 7.7. Model of a simple control system and an illustration of the proactive element (Wandahl & Bejder 2003, p. 303).

The proactive element lies in that a given situation can be foreseen at an earlier stage than it would with a reactive system. In connection with figure 7.6 and 7.7 the proactive system observes a significant deviation at time 3, whereas the reactive system observes the deviation at time 4.

In figure 7.7 the behaviour model is combined with the model of the control system. The two mechanisms for influencing human behaviour are connected with the interactions between the control activities and the action activities. The use of process values influences a control loop at an earlier stage than systems & structures would.

In chapter 5 theoretical explanations of why values influence human behaviour are given. The main points are that values directly influence behaviour because they encourage individuals to act in accordance with their values (e.g. Collins & Porras 2002; Kotter & Heskett 1992; Rokeach 1973; Williams 1979). Furthermore, Kluckhohn (1951) argues that value congruence makes people perceive external stimuli in similar ways, which enables them to more efficiently to coordinate their actions The use of values seems to enable proactive behaviour due to consensus among shared values and goals.

7.3.1.1 Verification of Proactivity by Means of Empirical Testing

Until now the hypothesis has been that the use of process values creates a more proactive management tool than traditional systems. Theoretical indications verify this connection, as described above. In Bejder & Wandahl (2004) empirical testing also confirms this connection, "*...several events indicate that by using the shared process values the parties had developed an extra control tool/system which was more (...)[proactive]...*". In the case material at least three different situations explicitly verify the hypothesis, cf. paper 2 and chapter 7.2.

7.3.2 Discussion on Proactivity

In the description of how Value-Based Management can be seen as proactive no clear distinction is made between proactive system and proactive behaviour. A system is mainly proactive in the sense that it can discover tendencies (future states), but it cannot shape the future, which was a part of the definition of proactivity by Bateman & Crant (1999, p. 64). A management tool/system provides information to help the management and perhaps also other organisational participants to make the right decisions. Process values are, however, not equal to management systems, cf. behaviour model in figure 7.7. To form and apply common values in an organisation is a way to influence the behaviour in a proactive direction. The proactive element in Value-Based Management lies, therefore, in shaping an organisational culture that enhances proactive behaviour for all the participants, not only the management. The graphical illustrations of reactive and proactive systems in figure 7.6 and 7.7 are therefore put a bit simple and mechanistic. The purpose of these figures are only illustrative, human behaviour cannot be put into such a simple model.

7.4 VBM's Effect on Efficiency and Effectiveness

In the introduction of this thesis (chapter 1) the building industry is described as problematic due to a modest labour productivity development compared to other industries, see figure 7.8.

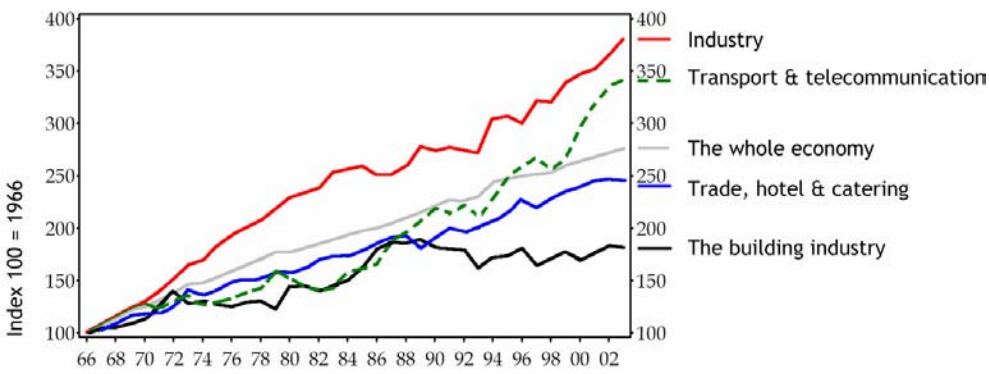

Figure 7.8. Labour productivity for different Danish industries (JyskeBank 2004, p. 6).

Several reasons for the modest development can be put forward. The consequence is perceptible in the general society[21], and a lot of focus and effort is therefore put into changing this tendency and into increasing the yearly productivity development in the building industry. The focus on value(s) in building management is introduced as one of several initiatives for turning the development around, and if these ideas are to be accepted and used in the building industry, it is important that distinct evidence of productivity improvement can be presented. However, as explained below, productivity seems not to be a righteous and objective measurement of development. Efficiency and effectiveness should be applied instead.

The topic of productivity vs. efficiency and effectiveness and how VBM increases these, are discussed in paper 3 (Wandahl 2004b). The main points and conclusions are shortly provided in this section.

7.4.1 Productivity, Efficiency and Effectiveness

Productivity is often applied as an indicator of innovation and development in an industry and is frequently used in comparative analyses. It is generally described as a fraction of production outcome over production input in a certain period of time. Productivity measurements are often carried out on a broken down level, e.g. on formwork (Thomas et al. 2002), which gives no justification to the holistic approaches, i.e. the effect of positive synergy of "modern management philosophies" such as, e.g. Lean Thinking and Value-Based Management. Productivity stresses the importance of producing with a minimum of resources and the capabilities of adding "value" to the product. However, a discussion

[21] *Especially the condition of the building industry is important for the general welfare because this industry involves a high percentage of the private workforce. In a report from the Danish Agency for Enterprise and Housing (EBST 2000a) it is calculated that approximately 25% of the total privately employed work force is working in the building industry.*

of whether productivity is an appropriate measurement of development in the building industry has begun. Several elements add up to this discussion (Wandahl 2004b):

- Firstly, which kind of productivity is appropriate, i.e. labour, capital, multi factor or total factor productivity? A correct answer is not possible because it depends on the circumstances and the objective of the measurement.
- Secondly, the choices are often limited due to data limitations. Without well-established benchmarking systems the data source is the national accounts, which gather data through company reports and make statistical tables thereof. The validity of the data is hence somewhat questionable[22].
- Thirdly, is it righteous to expect a yearly productivity increase? The productivity level could reach a maximum due to the definition of productivity itself, and the fact that the western world has worked determinedly for continuous increases in productivity since the industrialization began.
- Fourthly, more holistic measurements are needed for comprehending the new management philosophy ideas.

Therefore, the focus now shifts towards efficiency and effectiveness. A model of interested parties is used to explain the difference between efficiency and effectiveness, see figure 7.9. The model addresses all the interested parties' needs, not only the construction client's needs. The interested parties' needs should be perceived broadly, and include both product and process goals. The objective of stressing all the interested parties' needs is inspired by the Supply Chain Management philosophy as well as the fact that the building industry is heavily fragmented and that a high level of sub-optimization occurs (EBST 2000a). Moreover, a holistic view can cause positive synergy due to greater consensus on how to solve the job (Nielsen & Kristensen 2002), i.e. a state of super-optimisation.

[22] *This is not due to the statistical foundation, but concerns more the reports. Companies within the building industry have difficulties themselves gathering the data needed. Partly due to the complexity in the definitions, e.g. how the output or value added of an action is recorded. And partly because of the culture in the building industry, which has no traditions for understanding the important of recording the data, e.g. what the reel consumption per hour for a given activity is. Often all this is based on estimates.*

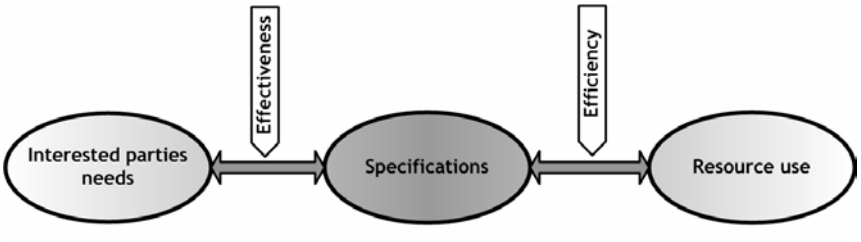

Figure 7.9. Model of interested parties as way of explaining efficiency and effectiveness adapted after Bruzelius & Skärvad (1989).

Effectiveness is an expression of the level of correspondence between the specifications and the interested parties' needs. Efficiency has two dimensions. Firstly, the achieved specifications compared with the needed specifications, and secondly, the production of these specifications compared with the level of used resources. Another way of differentiating the two concepts is to explain effectiveness as "doing the right thing" and efficiency as "doing things right". Of course the main idea is then "doing the right things right", which involves the whole chain in figure 7.9. Finally, it can be ask what the difference between efficiency and productivity is. In productivity the numerator is the gross output described in money. Efficiency has instead the specifications of the construction client and also of the other parties as numerator, which gives a more nuanced, but harder to quantify, picture of the production. It is then possible to achieve high productivity at the expense of efficiency by obviously avoiding fulfilling the specifications. The central element in both measurements is, therefore, the use of resources.

7.4.2 VBM's Effect on Effectiveness and Efficiency

Efficiency and effectiveness were defined by combining three areas, customer needs, product specifications, and use of resources. Theoretical connections between Value-Based Management and an increase in efficiency and effectiveness are described (Wandahl 2004b).

To capture the client organisation's needs and requirements is often very difficult, both for the construction client himself, but also for the planning and production team. This is partly because the construction client does not immediately recognize his needs & requirements, and partly because the needs & requirements will develop, and some will change as the building process progresses, and the construction client and the users thus become more aware of the needs. This briefing-problem is among others described by Barrett & Stanley (1999) and can be illustrated by the Johari Window in figure 7.10.

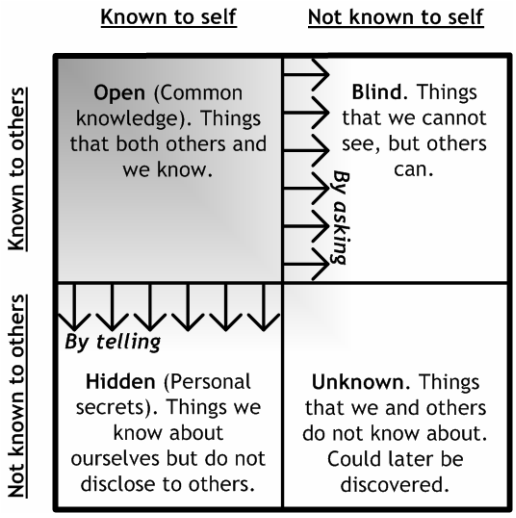

Figure 7.10. The Johari Window (Luft 1984).

The open window illustrates a situation of consensus, where both the client organisation and the rest of the building project are aware of the client organisation's needs and requirements. The open window should be as large as possible, and this as early as possible in the building process. The enlargement of the open window influences the effectiveness in the following way. A horizontal enlargement of the window increases the interested parties' awareness of their needs and requirements. A vertical enlargement of the window illustrates an improved information flow of the needs and requirements, and this is the basis for improved product specification, i.e. greater congruence with the real needs and requirements. Together these two directions comprise an increased effectiveness, or in other word the whole organisation becomes better at producing the right product. In VBM the open window is increased by clarifying the values of the client organisation, e.g. both product and process values, and subsequently also the other parties' needs. The clarifications of the client organisation's and the end users' needs and requirements are carried out through dialog emphasising discussion, text, pictures, sketches, drawings, etc. Values are an excellent platform for this dialog and could be carried out by stressing anti-values and wanted values regarding both product and process in workshops.

Another important aspect of the performance improvement is the degree of cooperation in the project team. The foundation for cooperation is a common background for decision-making. This background is based on personal values, which were recognized in chapter 5, and the personal values unconsciously affect the individual behaviour and, thus, the performance of the project organisation. A description of the "prisoner's dilemma" can be used to explain this, cf. figure 7.11.

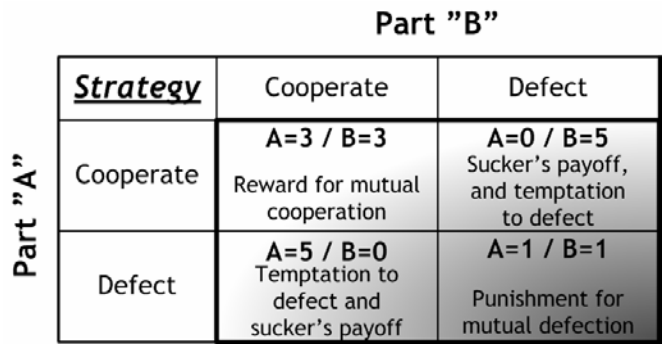

Figure 7.11: The prisoner's dilemma (Adapted from Axelrod 1986). Effect of strategy is dependent of the other parts strategy.

The prisoner's dilemma is all about dependence. It illustrates that in a mutual situation, the outcome of one party's choice depends on the other party's choice. It, furthermore, illustrates the win-win situation, which creates positive synergy. To make the right choice for both parties a shared set of values is needed, and that is what VBM creates. The interested parties should talk the same language, share the same expectations and all feel commitment for the project in total. The effect of positive synergy can occur in all phases of the building process, and VBM therefore increases both effectiveness and efficiency.

7.4.3 Discussion

A theoretical connection between the use of Value-Based Management and increased effectiveness and efficiency of the building project is presented. The root of the increased performance is the improved cooperation situation, but the link between cooperation and improved performance is difficult to explicitly prove, however plausible. The same problem surfaces when talking about advantages of using partnering. A validation of the connection between the use of VBM and increased performance should be observed in data collected from real building projects applying VBM. This has not been included in this PhD research, but it would have slightly increased the validity of the research. Several elements add up to why data from testing VBM in real cases are not an integrated part of this thesis. However, this topic will be further discussed in chapter 9 under future research.

7.5 Power and Diverse Interest - Influential Factors.

Successful use of Value-Based Management in a building project is not to be taken for granted. Several barriers and obstacles can arise. A successful use is measured by its positive influence on the project performance, e.g. effectiveness and efficiency. An obvious barrier lies in the fact that most humans do not like to change the way things are done, i.e. a barrier in relation to tradition or one might say culture of building projects.

Furthermore, in the majority of building projects the organisation is temporary and dissolves when the project is completed. This combined with the tendency towards an increasing number of parties in the project result in a dynamic management environment where power, various interests and values are addressed. Power is the ability of an actor to extract for himself valued output from a system and thereby affect the whole system's effectiveness and efficiency negatively (Wandahl 2005). It is, hence, relevant to examine if the use of power is a barrier to a successful use of Value-Based Management.

7.5.1 Context for Investigating Power

In paper 8 (Wandahl 2005, pp. 4-7) the context for investigating power in building project organisations is described. The main points are summarised here.

- The building project organisation is in focus. It is established to structure and coordinate activities needed to obtain the goal (Daft 2004, p. 11). This kind of organisation has distinguished characteristics, like:

  Temporality. Building organisations are mainly created for supporting a single building project in enabling effective communication and decision making (Kelly et al. 2002). Most projects are carried out in a design-bid-build tender mode with price as the main selection criterion, and the members of the organisation are therefore often not the same as in prior projects. This creates frictions in the cooperation and puts more pressure on the loyalty of deadlines, etc.

  Company external. The organisation of building projects consists of representatives from different legal organisations. Each participant has thus at least two different affiliations. He is allocated as a resource to the project, but his basis organisation is his company. This may raise issues concerning how to define success and measure success (the project organisation vs. participating companies), and, furthermore, success for whom.

  Legal parties. The number of legal parties in building projects is significant and increasing. The fragmentation of the project escalates and projects get more dynamic and complex, i.e. more parallel processes. The feeling of belonging to a group may decline and the responsibility of the project is divided. This results in more participants that have to share the pie, which might increase the use of power (sub-optimisation).

It is within these characteristics that power struggles in building projects.

7.5.2 Perception of Power

Several definitions of power exist (e.g. Dahl 1957; Mintzberg 1983; Morgan 1997; Perrow 1972; Pfeffer 1981), but some of these are however quite similar. When stressing power, different associated concepts surface, like the bases of power (French & Raven 1959), power directions in an organisation (Greiner & Schein 1988), and the connection between power and politics (Pfeffer 1992). A literature study of these topics is described in Wandahl (2005). My perception of power is best explained by an illustration, see figure 7.12.

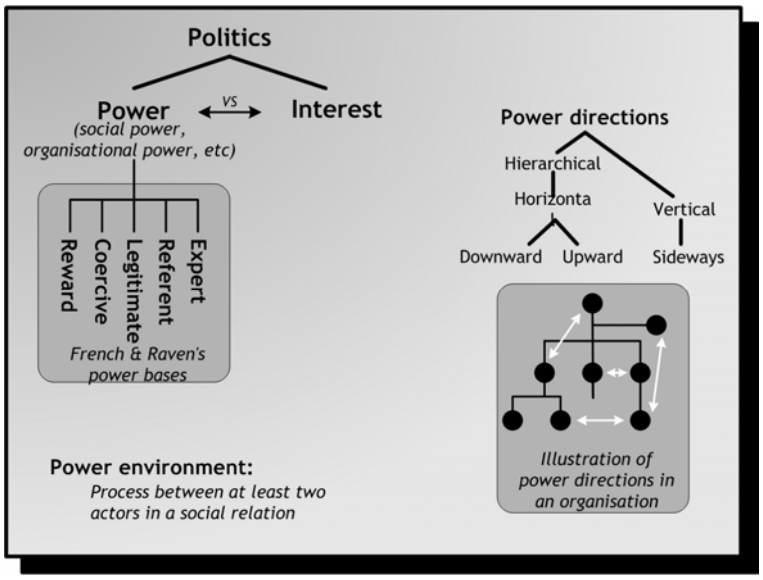

Figure 7.12. Perception of power and associated concepts.

In this thesis the following definition of power is accepted: "*The ability of persons or groups to extract for themselves valued output from a system in which other persons or groups either seek the same output for themselves or would prefer to expend their effort toward other output*" (Perrow 1972, p. 259). Power is, however, a sub-concept of organisational politics. Organisational politics are viewed as actions where actors use their power in their own interest. This statement is supported by Pfeffer "*...organizational politics are the exercise or use of power...*" (Pfeffer 1992, p. 33).

Few of the concepts emerging from the power paradigm have been applied to projects and project management in a rigorous way, even though it is clear that relevant problems occur in multi-organisational environments, like building projects (Newcombe 1996, p. 75). Power is, nevertheless, present in all relations between humans and thereby in all organisations. Power and the bases of power are hence present in building projects (Wandahl 2005). A connection between power and Value-Based Management is therefore now worth exploring.

7.5.3 Power and VBM

To discuss whether or not power is a barrier to successful implementation of VBM, one must look into why people use power. Power is used in one's own interest, i.e. to get valuable output from the system. Power is, therefore, especially widely used in situations characterised by high fragmentation, no common goals, low feeling of belonging to one unit, high risks, and sub optimisation. All these factors are hindrances to management in general. VBM uses soft values to obtain common goals for the project organisation, a feeling of commitment for each participant. Power will, however, still be used, but only with a project as a whole objective (synergy), not for individual purpose (sub optimisation). An intense use of power due to the mentioned characteristics is a barrier to VBM. But VBM actively works to decrease the use of power for individual purposes.

A subsequent barrier to the use of power is the loyalty and commitment to a single project, i.e. the maturity of the organisational participants. In many cases the advantages of a common effort (synergy) will be indistinct and entail a comparatively long time scale. This might get the legal parties to give in to the temptation of pursuing one's own success (sub optimization), because the gains are more visible and obtainable in a short time. Not to give in to the temptation (which most likely will be a single chance due to future reputation) requires a certain degree of maturity. This is necessarily not something all persons have, but it can be developed over time, i.e. through experience. The maturity of the organisational parties can, therefore, be a barrier for not using power. It is hence advisable actively to work with the maturity of players, partly in the selection process and partly during the building process by developing and maintaining common values and thereby creating commitment to the project.

8

Value in Building

This chapter is a reflection of the past four chapters, describing the value concept and its relation to building management. Thus, this chapter provides "a look from above" to describe a coherent picture of how to perceive value in building.

The focal point is an understanding of value in building. This is illustrated in figure 8.1, and described in the following. During the exploration of the value concept two paradigms of value were discovered, product value and process values, cf. chapter 5. They are to be considered as paradigms because they reflect two different general types of value, and because all other descriptions and management concepts related to value can be embodied in these two paradigms. In this thesis two different general positions of management are derived from the two paradigms, namely Management **o**f Value and Management **b**y Value, cf. chapter 6. These general management concepts do not describe pragmatic and specific management tools, procedures, etc. Therefore, they are to be considered as meta positions within building management related to value. Finally, Value Management and Value Engineering are management concepts derived from the one value paradigm, whereas Value-Based Management is a management concept derived from the other value paradigm.

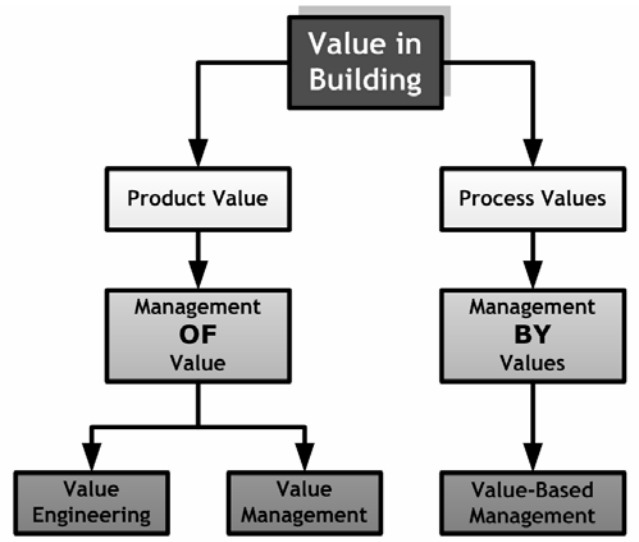

Figure 8.1. Value in Building.

In summary Value Management is a name for practical management concepts aiming at defining what product value means to a client organisation within a particular context, and to ensure that the value defined by the client organisation is embodied in the design solution in such a way that it maximizes the client organisation's value for money relation. This mainly entails workshop-alike-approaches in the briefing process and enforces a focus on the brief-design interface. Value Engineering is also concerned with the product value, but Value Engineering focuses on cost optimizing the design solution and on ensuring that all elements in the design solution is buildable and carried out during construction. Value-Based Management on the other hand is based on the soft management approach of applying process values as a means to increasing the product value delivered primarily to the client organisation, and secondly to the other project participants. This involves a definition and description of common values for the whole project organisation, which unconsciously influence human behaviour in a more proactive manner, i.e. an empowerment of all the project participants to improve their background for decision-making and coordination of these actions mutually.

An overall view of value in building related management approaches and their connection to the building process is illustrated in figure 8.2.

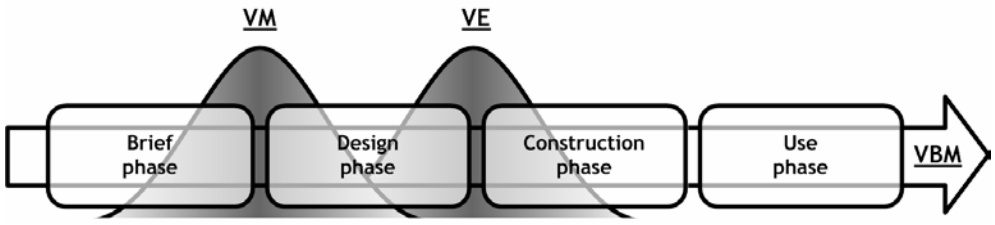

Figure 8.2. The different management concepts' (concerning value) relation to the building process.

As illustrated in figure 8.2 the use of VM, VE, and VBM will result in value concepts covering the whole building process, however with different purposes and approaches. The Development objective[23] of Value Management is to create a better value for money relation from the construction client's view point. The Immediate objective[23] is that the client's brief reflects the real needs, wishes, and requirements of the client organisation. The Outputs[23] of VM is the collection of the client's and users' needs, wishes, and requirements and an embodiment of these in the design solution. The Background is the dynamics and complex environment in the early phases of building. As described VM focuses on the interface between the brief phase and the design phase, inspired from Concurrent Engineering thoughts, cf. chapter 4. Value Engineering is to be perceived as a subset of VM, and the objective is thus the same, i.e. the value for money relation. The output is though an increased value obtained through simplification of the product and thus a reduction of the production costs. The background is a narrow focus on function compared to cost, and components/products with functions that the client organisation has not requested are removed or substituted. Value engineering, therefore, focuses on the interface between design and construction. In the extreme the difference between VM and VE lies in that VM ensures that the client organisation's values come into play, and VE attempts to optimize the client's values in regard to the price, cf. figure 8.3.

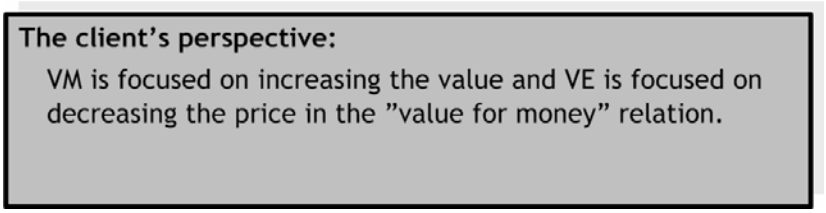

Figure 8.3. Differences between VM and VE in an extreme view.

Moreover, Value Management is a formalization of methods to obtain already known goals in the building project. In one manner or another VM has always been used in building – the client organisation's description of needs and requirements – but the systematic and focused attention on value is new.

When shifting focus to Value-Based Management, the objective is an enhanced building for the client and an improved process for the project participants. The output of Value-Based Management is a common value system and thereby a more proactive management

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[23] *Development objective, Immediate objective, Outputs, and Activities are terms taken from Danida's Logical Framework Approach, LFA (Danida 1996). Development objective is the long term goal, which may not be fulfilled by this project/technique alone. Immediate objective is the short term goal, which the project/technique most certainly should achieve. Outputs are the products the project/technique creates. Activities are tasks needed in the output for achieving the immediate objective of the project/technique.*

tool. The background is the dynamic and complex environment of building projects with cooperation between many humans. Value-Based Management is to be perceived as a means to the ends, whereas VM is to be perceived as tools for obtaining the goals. In this manner, Value-Based Management should facilitate and improve the output of other management tools like Value Management. Therefore, VBM is illustrated horizontally, covering all phases of a building project in figure 8.2, whereas VM and VM are illustrated vertically.

9

Conclusion and Future Research

In this final chapter the collective findings of the research project are summarised and discussed, and the contributions to knowledge are presented. Furthermore, suggestions to important future research areas are suggested.

The objective of this research is "*to contribute to the emergence of a theory of value in a building context. This could increase the effectiveness and efficiency of the industry in the long term.*", cf. chapter 1.2.

The objective is achieved, but many roads lead to Rome, and hence this contribution should not been seen as the only right one, other pieces of the "puzzle" should be connected to provide a completely clear picture of value in building. Nonetheless, this thesis is a contribution to the emerging understanding of the value concept in building.

9.1 Research Findings

The detailed findings are left behind to leave space for a more relevant discussion of the research contributions. However, the research questions stated at the beginning of the research will briefly be answered. The indebt answers are found in the main chapters of this thesis, chapter 3 to 8, and in the papers in appendix A.

Are values used in different manners in the management of building projects? Yes. This thesis has identified three different management approaches applied in building, Value Management, Value Engineering, and Value-Based Management. These three management concepts are founded on two different value paradigms. VM and VE are primarily based on an understanding of value as product value, i.e. delivery of products, functions, services, etc. to the client organisation. VBM is on the other hand based on an

understanding of value as process values, i.e. where values are the beliefs of individuals, which should be in congruence with the other participants' values and the project organisation's values. These soft human values influence human behaviour, and by working actively with common values it is possible to influence the behaviour of the project participants positively. Process values are hence a means to the ends of any building project, a structure that satisfies the client organisation's needs and wishes and that provides an acceptable contribution margin for the involved companies.

If so, how does the different management approaches relate to the value concept and to the building process? To further elaborate on how the three management approaches relate to the value concept, a distinction between Management **of** Value and Management **by** Values is given in this thesis. Management **of** Value is based on product value, and the emphasis on "of" is because value is not used in the management, other mechanism are applied to obtain value. Management **by** Values applies commonly agreed (shared) values as a supplementary mechanism to manage and control human behaviour. It is called Management **by** Values because values are means used in the management, not necessary ends. The three management approaches relate differently to the building process. Value Management is used in the initial phases of building to ensure that the project team captures the real needs, wishes, and requirements of the client organisation. Value Engineering is used in the late design and early construction to cost-optimize the design solution and to ensure that the design solution is buildable and included in the final construction.

How should a theoretical model of Value-Based Management in building project organisations be developed in order to increase the organisational effectiveness and efficiency? The research has revealed that at least two different approaches to influence human behaviour exist, cf. figure 6.1. Firstly, traditional systems and structures, which in this research are concluded to be reactive of nature. Secondly, values are the core of VBM, and the research study concludes that the use of values would create a proactive environment. The reason why values influence behaviour could e.g. be illustrated by the different levels in Neuro Linguistic Programming, see figure 7.2. Another main concern in VBM is to use values actively. This involves partly a thorough work of defining and describing common values for the project organisation, and partly an ongoing work of measuring and following up on the values. Only in this way the full advantages of VBM will be achieved.

9.2 Contributions to Scientific Knowledge

The main contributions in this PhD thesis to scientific knowledge can be divided into three different areas as illustrated in figure 9.1.

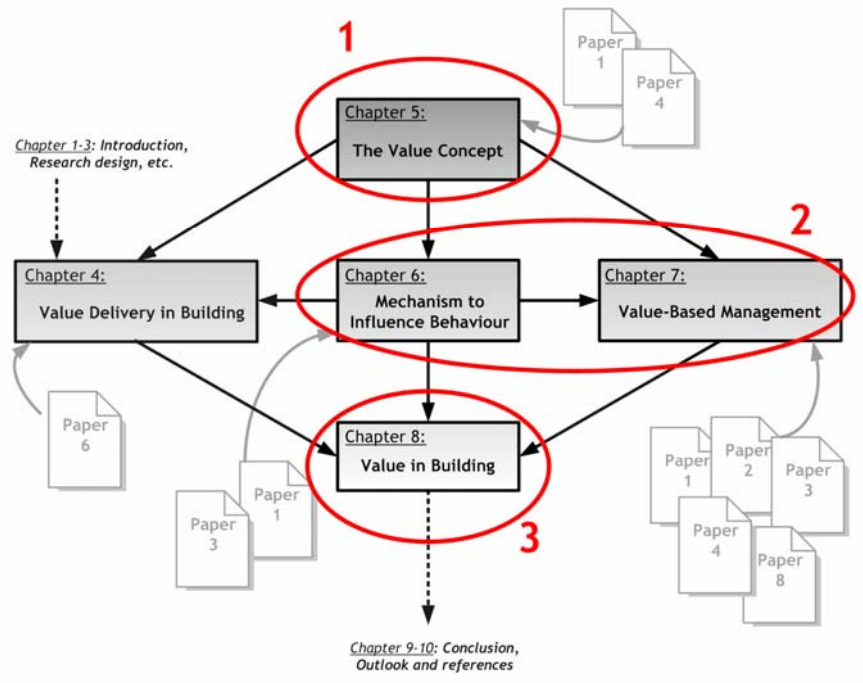

Figure 9.1. Illustration of the main research contributions.

The three contribution areas are explained in the following as separate entities, but they should be seen in connection with each other. The third area, value in building, could also be perceived as a general understanding of all the contributions. However, the chapters one to four have not been wasted. Chapter one (Introduction) and chapter two (Research Design) are necessary and important contributions to this thesis. Without these chapters the thesis would be unfocused, hard to read, and the validity of the contributions presented could be questioned. Chapter three (Prologue) and four (Value Delivery) are needed to present a coherent thesis, and without these chapters the thesis would appear without logic.

9.2.1 The Value Concept

This thesis has provided a frame for understanding the value concept. This embodies a nuanced distinction between value and values, which could be perceived as two different paradigms, cf. chapter 5. These two different paradigms are identified as product value and process values in a building context. This distinction is new in building. Based on product value and process value, two different management directions can be derived:

Management **of** Value which leads to concepts like Value Management and Value Engineering, and Management **by** Values, which leads to the concept of Value-Based Management. This is illustrated in figure 9.1.

It is important to obtain a fairly uniform understanding of the value concept if the building industry is to succeed in applying different management concepts based on value(s). This common understanding of the value concept is yet not present in building (research), but this thesis contributes to the process of achieving a common understanding.

9.2.2 Value-Based Management

The development of the management concept Value-Based Management was one of the initiating factors for this research, and is hence a recurrent topic in this thesis and in the associated papers. Value-Based Management and its plausible advantages are primarily described in chapter 7. The core of VBM is the influence on human behaviour through process values. The literature study on values in chapter 5 reveals that values influence behaviour. VBM is a way of influencing the cooperation in a project organisation positively and is thus viewed as a supplementary tool to traditional management issues like quality, time, finances, etc. The main advantage of increasing the use of values and thereby adjusting the use of traditional systems is that values provide a more proactive environment, where the management and the workers are more proactive. This enables the project organisation's participants to discover possible errors and mistakes at an earlier stage compared to traditional management, which all in all increases the total value of the product delivered to the client organisation – which means increased effectiveness and efficiency.

9.2.3 Value in Building

Value Management, Value Engineering and Value-Based Management interact with each other, and in relation to the building process they now cover all the phases, cf. figure 8.2. The way that the management concepts interact, is that Value-Based Management could be viewed as a kind of facilitator to Value Management and Value Engineering. VBM is a way of achieving improved cooperation in the organisation, which will have tremendous impact when Value Management is used to define and capture the client organisation's needs and requirements and when Value Engineering is used to optimize the design solution.

This comprehensive view of value in building is new, and hopefully it will trigger a discussion of value and value concepts in building, and finally a common view of value in building will emerge.

9.3 Future Research Areas

Even though contributions to knowledge have emerged through this research process, unanswered questions and possible opportunities still exist, which require further research. This thesis contributes to an understanding of value in building, but the process is not finished yet, more research and discussion are needed. Future areas of research are therefore suggested in the following, and other researchers are encouraged to contribute to the future understanding of value in building. Some of the suggested research areas have been developed from present ideas in this thesis. Other research areas are not directly further developments of present ideas in this thesis, but inspired by other research areas.

9.3.1 Proactive Project Management

One of the advantages of applying VBM should be a more proactive management, cf. chapter 7.3. The achievement of proactive tools, ways of doing things, etc. can improve the performance of the building project significantly. More research work needs to be carried out about how to understand proactivity in a project context, and how to build proactive procedures. In this thesis a mathematical mindset is used to understand proactive management, however this way of thinking could be further elaborated. In that connection relevant inspiration can be found in production forecast theory as well as in Total Productive Maintenance. Furthermore, the area of proactive management has not been paid much attention to in research, measured by articles in relevant scientific journals like International Journal of Project Management, Construction Management & Economics, etc.

9.3.2 Application of Value-Based Management

In this thesis plausible effects of applying VBM are theoretically provided. One of the next steps in the development of VBM is to make the concept operational and then to apply it through testing and obtain empirical data. Further experiences are needed about the process of defining common values as well as measuring the compliance with the values. This should, through iterative development processes, help develop procedures and tools for these essential tasks in the VBM concept. Both defining and measuring values are difficult tasks. It is important that the common values are defined in such a manner that they can guide the project participants in their daily work both consciously

and unconsciously. Values should not just be written words. They should mean something to each participant so that everybody "Walks the talk". The process of defining and describing common values could thus be a research topic. If the values are to be used actively, some kind of management system has to be built to measure the value compliance. How to build such a system that provides the project management with data, which they can use proactively is also a relevant research topic.

9.3.3 VBM and Strategic Long Term Cooperation

Another relevant aspect in the application of VBM is whether it is possible at all to use VBM successfully during a single building project only. It is possible to define common values during a single project, but it is not given that then the project will benefit as positively as suggested in this thesis (proactive and increased effectiveness and efficiency) due to the temporariness of single building projects. Often the work with personal values takes time, and VBM would perhaps be more suitable in a strategic environment, e.g. in constellations where the same companies work together on several projects in a more permanent manner. Danish research within this area has just started (Bejder & Wandahl 2005; Hellmers et al. 2004; Møller 2003) and further inspiration to such research could be found in the Supply Chain Management theory (e.g. Bhote 1989) and in 2nd and 3rd generation Partnering (Bennett & Jayes 1998).

9.3.4 Values and Quality (Culture)

In the last decade a lot of focus has been put on the development of labour productivity in the building industry. The effort seems to have succeeded to some extent, but indications are beginning to surface that the quality level has not been increased equally. Almost no week passes without a new story in the media of unacceptably low quality in new residential buildings. Often the quality errors are nothing but shoddy workmanship, where workers, managers, designers, etc. simply do not care about the final product. It seems that this kind of mindset is rooted in the culture of many building companies. A close connection between personal values and the quality of work exists, and emphasis on values could thus be a road to improved quality. It would, therefore, be relevant to look into the possibilities for improving the quality culture in building projects by working with values.

9.4 Final Thoughts

Standing almost at the end of the PhD research period and looking back at what has happened during the last three years, the first thing that comes to my mind is that the three years went very fast. For sure there are small things that I would have done

differently, but this recognition is an important part of the PhD learning process. I have enjoyed the process, and I am quite satisfied with the outcome, including the highlights and the things which maybe could have been done differently or just needs further research.

The research process has started a lot of thinking, and a dozen thoughts for future research projects, which I would like to start, have surfaced. In the building research communities and especially among the practitioners of the building industry, the understanding of value in building is still fragmented and incongruent. Clearly, the full potential of working with values will not be achieved as long as the parties (practitioners, researcher, clients, users, etc.) do not have a congruent understanding and acceptance of the value concepts and the management concepts based on value(s).

Value in building is, in my opinion, an important part of the future understanding of the building process. Especially, I see a great potential in using soft process values to improve the building culture and thus improve the quality of building in its broadest sense. Unfortunately, many researchers and practitioners do not share this opinion or they may not yet have seen the light!

This slightly provocative statement ends this thesis.

10

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