

THESIS FOR THE DEGREE OF LICENTIATE OF ENGINEERING

Making sense of and managing energy targets in
public construction-client organisations

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Abstract

The built environment is acknowledged as having a large potential to reduce society's energy use and has a major responsibility to contribute to mitigating climate change. In Sweden, it has been suggested that public organisations should take a leading role, and serve as good examples in the development of energy-efficient building. Thus, there is a strong need and many challenges for these organisations to revise their strategies, practices and behaviours in order to meet national and international energy directives.

The aim of this licentiate thesis is to understand how public construction-client organisations develop management practices in order to meet politically set directives on energy-efficient building. The thesis addresses how a long-term perspective, represented by LCC, and an energy target were dealt with by actors within two Swedish public construction-client organisations, respectively. The empirical data, gathered in two explorative case studies using in-depth interviews, observations and collection of relevant documentation, have been analysed through the theoretical lens of sensemaking and a framework of discursive activities.

This thesis shows that LCC can serve as a pedagogical and rhetorical tool for understanding and discussing the life-cycle perspective of buildings. LCC can, by enabling the conceptualization of the long-term perspective sought in building management practice, be used in negotiation and argumentation among project managers and diverse decision makers. Furthermore, energy-efficiency expertise and experience can provide actors with legitimacy to engage in energy-efficiency work. However, to implement an energy target in building-management practices, involved actors also benefit from knowing how and when to talk to specific stakeholders, how to create and share an appropriate message and how to build and use networks and coalitions. This thesis has shown that an actor who can manoeuvre and make use of discursive competences has an advantageous position when it comes to influencing organisational sensemaking.

Key words: *Energy-Efficient Building; Energy Targets; Managing Energy-Efficiency in Practice; Renovation; Sensemaking; Discursive competences; Actors; Strategic Change; Case studies*

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My PhD research journey can be compared with being on a roller coaster- and I really like roller coasting- mind, mood and temperament go up and down and sometimes take dramatic turns. This journey would have been lonely and not as fruitful without the support from people around me.

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April 2013, Kjerstin Ludvig

Appended papers

Paper I: Life Cycle Costing in construction projects – a case study of a municipal construction client organisation

Kjerstin Ludvig, Pernilla Gluch, Göran Lindahl

In proceedings of Third International World of Construction Project Management Conference in Coventry, UK, in October 2010.

Paper II: Political directives, organisational visions and personal missions: using discursive competence to give an energy target sense

Kjerstin Ludvig, Ann-Charlotte Stenberg, Pernilla Gluch

Submitted to Building Research and Information.

Paper III: The actors and their roles in the meaning making process of an energy target

Kjerstin Ludvig, Ann-Charlotte Stenberg

In proceedings of 28th Annual ARCOM Conference, 2012, Edinburgh, UK, Association of Researchers in Construction Management.

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1. Introduction

Over the last decades much interest and efforts from industry and academia have been paid to energy efficiency in buildings. This has resulted in for example technical solutions (such as improved insulation) and a variety of decision-support tools, such as Life Cycle Costing, aimed to facilitate informed decisions. However, the existence of technologies and decision-support tools does not guarantee that these are used ‘in practice’ or that they lead to energy savings. Several researchers have suggested that to cope with energy-efficiency in buildings is not mainly a question of lack of technical solutions and/or know-how, but a question of policy, practice and management (e.g. Cole, 2011; Guy & Shove, 2000; Häkkinen & Belloni, 2011; Rohrer, 2001).

Fulfilling demands on increased energy-efficiency is not novel for construction organisations (see e.g. Nässén & Holmberg, 2005 for a Swedish example), but the societal interest manifested in new international and governmental energy directives for buildings (see e.g. European Commission, 2010; The Swedish Ministry of Enterprise, 2011) has increased the attention to this issue in the last decade. The time frames in these recent directives often range over several decades. Hence, in order to meet these directives it is required to take a long-term perspective in building management practice.

Cole (2011: 431) argues that merely “*tweaking*” current practices in construction will not be enough to meet the challenge of significantly reducing the energy use in buildings. Instead it is suggested that more comprehensive strategic changes of practices are needed. Cole (2011), for example, stresses the important role of securing commitment of and interaction between different stakeholders involved in delivering energy-efficient building. As shown by earlier research, implementing energy directives and policies into practice is not a straightforward process for construction organisations (e.g. Ryghaug & Sørensen, 2009). The changes in practice need to be first understood by the individuals within the construction organisations. These individuals need to consider what the directives mean for their organisational context and how these relate to other demands, strategies and practices. Consequently, the new energy directives need to cohere with other organisational goals and objectives, which have been found to sometimes contradict a long-term perspective. As shown by Gluch and Räisänen (2012: 134), environmental requisites on building projects are: “*often subject to tensions between the long-term strategies and norms of management and the short-term, time-pressed reality of projects*”. In order to implement the

directives in practice, these need to be communicated within the organisations so that possible tensions are identified and thereby possible to bridge.

The energy directives are of interest for and affect all the organisations involved in designing, constructing and managing buildings. However, public organisations have been suggested to take a leading role and serve as good examples in the development of energy-efficient building (e.g. European Commission, 2010; The Swedish Ministry of Enterprise, 2011). Thus, there is a strong need and challenge for public construction organisations to revise their strategies, practices and behavior in order to meet national and international energy directives. With this as a point of departure, this licentiate thesis explores how actors in public construction-client organisations, such as managers, energy experts, consultants and politicians, develop strategies and management practices in order to meet political directives for energy-efficient building.

In studies of strategic organisational change processes, *sensemaking* (cf. Balogun, Gleadle, Hailey, & Willmott, 2005; Gioia & Chittipeddi, 1991; Rouleau & Balogun, 2011) has been applied as an approach to understand and explain how actors initiate, get acceptance for and implement organisational changes. The theoretical lens of sensemaking (eg. Weick, 1995; Weick, Sutcliffe, & Obstfeld, 2005) helps to increase understanding of how actors in public organisations strategically manage politically set directives on energy-efficient building.

1.1 Research aim

The aim of this licentiate thesis is to understand how public construction-client organisations develop management practices in order to meet politically set directives on energy-efficient building. Taking an interpretative approach, it explores how actors involved in this development manage demands on energy-efficient building and the associated strategic challenges. In its aim to examine the practice of managing such demands, the thesis focuses on people and their interactions.

The starting point of the research project was to explore implications from implementing and using a decision-support tool, Life Cycle Costing (LCC) as a means to incorporate a long-term perspective in building-investment practices. By going beyond tool production, the thesis explores why and with what results a public construction-client organisation chooses to implement LCC. The first research question is therefore:

- *how is a life-cycle perspective on buildings, represented by a LCC tool, implemented and used within a public construction-client organisation?*

An explorative study (**case I**) regarding a design and implementation process of a customized LCC tool was done in order to answer this question. The study raised questions regarding how political directives with long-term consequences influence the management practices of buildings (**Paper I**). To explore these questions further, **case II** focused on interpersonal interaction in the process of managing a long-term perspective. In **case II**, the process of managing a new politically set energy target was explored from the involved actors' perspective. In line with this, the second research question is:

- *how are political directives on energy-efficiency in buildings managed by the actors in a public construction-client organisation?*

Case II addressed how organisational actors in a public construction-client organisation strove to implement an energy target in building-management practices (**Paper II and III**). These actors studied were an energy expert, consultants, managers and local politicians. Focusing on their interactions, the case explored why and how they were involved and how these actors made sense of and managed the energy target.

Examining how organisations make sense of and manage energy-efficiency, the thesis responds to calls for social-oriented studies concerning energy and buildings, focusing on the stakeholders' perspectives and understandings (Phua, 2013; Schweber & Leiringer, 2012; Summerfield & Lowe, 2012; Whyte & Sexton, 2011).

2. Energy-efficient building

This section provides the background to the context in which this research is carried out. Buildings are estimated to account for up to 40% of the annual use of energy in most countries (World Business Council of Sustainable Development, 2009), and as such the built environment has an important role to play in the endeavor to deal with the global concerns of climate change and environmental degradation. The built environment is acknowledged as having a large potential to reduce society's energy use and has a major responsibility to contribute to mitigating climate change (Cole, 2011; Skea, 2012; Whyte & Sexton, 2011; World Business Council of Sustainable Development, 2009). This means that construction organisations need to adapt their current work practices and make large investments in energy-reducing measures in both new and existing buildings.

To stimulate this development, the EU has launched a directive for energy use in buildings which, based on 1995 year's level, stipulates a 20% reduction in energy use in buildings by 2020 (European Commission, 2010). Many countries have set additional national energy targets. The Swedish government for example has set their own additional target of 50% reduction of energy use until 2050 (The Swedish Ministry of Enterprise, 2011). In order to meet these national and international targets, many construction organisations have also set their own energy targets.

Changing current practices to cope with politically set directives in the built environment is a complex process which necessitates changing "*the role that various stakeholders play within this process*" (Cole, 2011: 431). A variety of actors with diverse roles and interests need to cooperate in order to deliver more energy-efficient buildings, but such cooperation seems to be difficult to accomplish (Whyte & Sexton, 2011). Several researchers have identified and discussed barriers to the implementation of energy-efficiency policies (*e.g.* Ryghaug & Sørensen, 2009) and practices (*e.g.* Häkkinen & Belloni, 2011; Williams & Dair, 2007). These barriers are often related to building practices, organisational structures, and lack of and/or split economic incentives between different stakeholders, rather than related to lack of technical solutions. In addition, due to differences between professional discourses, agendas and interests, communication problems between actors in the construction sector seem to become a major barrier (Ryghaug & Sørensen, 2009). Furthermore, according to Ryghaug and Sørensen (2009: 985) energy-efficient building involves "*considerable interpretative flexibility*", which implies that

organisations have to construct their own meaning of what energy-efficiency means for them and in their particular context.

Public construction organisations are often seen as having an important role to play in the transition to an energy-efficient construction sector (*cf.* Ryghaug & Sørensen, 2009; The Swedish Ministry of Enterprise, 2011). The EU directive states that public authorities should set an example and become early adopters of energy-efficient building practices (European Commission, 2010). Public construction-client organisations own, rent and manage a large stock of buildings. In Sweden, for example, more than 50% of the total building stock of premises is owned by public organisations (Bergdahl, 2012; Persson & Bratt, 2010). However, Persson and Bratt (2010) argue that few Swedish public organisations are organised and structured in a way that facilitates long-term energy efficiency work. Reasons claimed are such as that economic incentives for improvements are divided between, rather than shared by clients and users (*e.g.* Nässén, Sprei, & Holmberg, 2008) and that the more comprehensive energy initiatives and measures are done as one-off development projects rather than in the daily operations (Persson & Bratt, 2010). An additional barrier is the structural difficulty to share and disseminate knowledge across organisational boundaries (Johansson, 2012) which hinder dissemination of, for example, successful pilot projects in energy-efficiency (Femenías, 2004). Moreover, many public organisations need to balance being guided by business interests and having a societal responsibility for providing functional premises (Femenías & Lindén, 2012), which can be experienced as contradictory.

In order to support policy-makers and managers in their effort to reduce energy use, several decision-support models and tools have been developed by industry and academia. Such decision-support tools and guidelines aim to help reduce complexity and support the decision-makers to hopefully make informed decisions. An example of such a decision-support tool is Life Cycle Costing (LCC). Initially developed as an economic assessment of the total cost of ownership of a product, *e.g.* a building (Cole & Sterner, 2000; Kirk & Dell'Isola, 1995), LCC has also been used to include environmental considerations in decisions regarding buildings (for an overview see Gluch & Baumann, 2004). The LCC approach has received significant attention also in the context of reducing energy use in buildings (*cf.* Bartlett & Howard, 2000; Bogenstätter, 2000; Buys, Bendewald, & Tupper, 2011), and is often advocated as a viable way to ensure that the short-term and long-term cost benefits are taken into consideration in strategic decisions regarding energy measures (*e.g.* Persson & Bratt, 2010). However, accounts from the Swedish

construction sector indicate limited practical use of LCC (e.g. Cole & Sterner, 2000; Gluch, Baumann, Gustafsson, & Thuvander, 2011; Nässén *et al.*, 2008) and there are few studies of how and with what results LCC is used in practice by construction clients.

3. Sensemaking in strategic change

This section introduces the theoretical lens used in this thesis. Sensemaking is the cognitive process of how we construct meaning of what is going on around us. People in organisations are constantly, consciously or unconsciously, engaged in efforts to understand and explain their situation, i.e. they “*try to make things rationally accountable*”, both for themselves and for others (Weick, 1993: 635). Some of the inherent characteristics of sensemaking as defined by Weick (1995) is that sensemaking is an *on-going, social process* where people search for *plausible*, though not necessarily the most accurate, *understanding*. It is something that all of us are involved in all the time; meaning that sensemaking does not have a start or an end. Drawing on Rouleau and Balogun, this thesis defines sensemaking as “*a social process of meaning construction and reconstruction through which managers [and others, my note] understand, interpret, and create sense for themselves and others of their changing organisational context and surroundings* (Rouleau & Balogun, 2011).

Sensemaking is for example generated when people experience (Weick, 1995: 93):

- *vague problem definitions*. This can be due to the ‘problem’ at stake being unclear, shifting and/or intertwined with other messy problems.
- *information handling as problematic*. This can be due to (a) information overload (overwhelming amount) or (b) insufficient data (lack of reliable and relevant information)
- *multiple, conflicting interpretations*. People tend to interpret the same information in different ways, which can generate multiple and sometimes conflicting interpretations.
- *roles as vague or responsibilities as unclear*. Those involved do not have clearly defined roles to play and/or accountabilities.

In order to manage a situation, people strive to develop believable meanings of what is going on. For this, they draw on earlier experiences of events and actions to find cues to create plausible meanings of a situation (Weick, 1995). According to Weick, looking backward on what has already been is a key for understanding and explaining what is happening right now and what will happen in the future.

Though each individual makes sense for him/herself, this is done in a social context. Drawing on Weick, I view organisations as a “*collection of people*

trying to make sense of what is happening around them” (Weick, 2001: 5). It is mainly through talk and interaction that they generate information and find opportunities to construct, reconstruct, and negotiate different meanings. This entails that different individuals will not necessarily understand and act upon information in the same way since they all make their own “sense” of what the information means. Studying organisational sensemaking includes exploring how organisational issues are made sense of, why and what the outcomes are, within an organisational perspective.

Not only do people strive to make sense of their situations, they also strive to influence how others make sense of it by sharing their understandings with each other. By talking and interacting with other people, individuals will influence how others make sense of a situation. Gioia and Chittipeddi (1991) described this process as sensegiving and defined it as: “*the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organisational reality*” (Gioia & Chittipeddi, 1991: 442). Sensemaking, and the related sensegiving, has been recognised as important processes for managers and other stakeholders who are involved in initiating and implementing strategic changes (Gioia & Chittipeddi, 1991; Maitlis & Lawrence, 2007; Rouleau & Balogun, 2011). Managers talk and interact with other actors to influence their understanding of the situation and convince them to commit to the changes. When an actor attempts to influence others, his/her own understanding of the situation develops as well, and thus sensemaking and sensegiving constitute a continuous, iterative and social process.

Gioia and Chittipeddi (1991) studied a strategic change initiative driven by top management in a university organisation, and identified a cyclic process of meaning construction/reconstruction. Based on their study, they suggested that it is relevant to describe the process, from initiation to implementation, of an organisational change in terms of how sensemaking and sensegiving interrelate, which appeared to follow a linear and step-wise process. Their study showed how a top manager first strived to understand, i.e. *envision*, the need for change by relating his former experiences to the current organisational situation (sensemaking), then *signal* to the employees what was needed for delivering the change and why (sensegiving), which made the employees *re-vision* the signals in their context (sensemaking) and then *energise* the change by providing feedback to top management (sensegiving). This linear idea of how sensemaking and sensegiving interrelate has later been questioned by Kezar (2012), who suggested that the process probably occur rather simultaneously, which also agrees with Weick’s view (1995).

Moreover, drawing on studies of strategic change processes over time in universities, Kezar (2012) claims that sensemaking and sensegiving fulfilled different purposes during the various stages of a change process. She also noted that sensegiving in bottom-up driven processes differed compared with Gioia and Chittipeddi's (1991) top-down driven processes, in that sensegiving was highly focused on persuasion and finding support for the change initiative. In the top-down driven process (Gioia & Chittipeddi, 1991) sensegiving was rather focused on sharing of the top manager's predefined understanding and thereby generate acceptance and action related to the desired change.

The ability to tell the right story in the right place to the right people has been argued as critical to influence others, i.e. sensegiving (e.g. Maitlis & Lawrence, 2007; Nordqvist & Melin, 2008). Based on two studies of major organisational restructuring initiatives, Rouleau and Balogun (2011) explored *how* middle managers talk and interact to construct meaning in top-down driven strategic changes. Both studies focused on middle managers' practices, i.e. what the group of actors do and how they do it, during these change processes. Illustrated by the detailed activities of four particular middle managers, Rouleau and Balogun have developed a framework of interrelated discursive activities that middle managers engage in in order to influence others' understanding and acceptance of strategic change. Rouleau and Balogun identified two main sets of activities that middle managers use in order to influence other stakeholders' sensemaking. First, middle managers *perform conversations* with stakeholders. This set of activities, which includes for example using the right words and phrases, customising the communication to the specific receiver and crafting and diffusing the appropriate message, is described as the "*multiple interactions middle managers engage in through formal and informal conversations with their peers, subordinates, superiors, and customers or other stakeholders, to draw others into their agenda*" (Rouleau & Balogun, 2011: 958). The second set of activities regards how middle managers are able to *set the scene*, which includes for example to bring the right people together, to build and use networks and to arrange conversations with and between different stakeholder groups. This is described as "*what is done to set up the context for, background to, and occasion for the conversation performance*" (Rouleau & Balogun, 2011: 958). The success of both sets of activities is dependent on how well the middle managers know and understand the organisational situation.

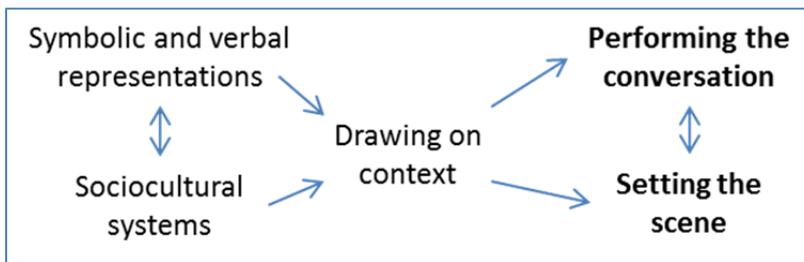


Figure 1 Discursive activities that are used to influence organisational sensemaking (based on Rouleau and Balogun, 2011, p. 972)

In order to set the scene and perform conversations, it is suggested that the middle managers need to “*draw on the context*”, which Rouleau and Balogun defined as having knowledge about the organisational cultures, routines and ways of communicating. This also means that the middle managers need to know the person he/she talks to, their background and interests as well when and how to show emotions. In the figure above this is referred to as “*symbolic and verbal representations*”; i.e. how to talk to specific stakeholders and what metaphors and illustrations to use in the conversation, and “*sociocultural systems*”, i.e. awareness of different stakeholders history, interests and agendas.

Common for these activities is that middle managers, according to Rouleau and Balogun, make use of discursive competences to execute them. Discursive competences are then defined as the “*ability to knowledgeably craft and share a message that is meaningful, engaging, and compelling within his/her context of operation*” (Rouleau & Balogun, 2011: 971). As such, Rouleau and Balogun argue that discursive competences go beyond how language is used to also include how language is adjusted to specific contexts and specific stakeholders.

The activities referred to by Rouleau and Balogun (2011) are by no means new or unique for their particular context. Similar competences and activities have also been discussed in literature, though in other terms and contexts, such as regarding organisational change (e.g. Balogun *et al.*, 2005; Kezar, 2012) and strategic planning (e.g. Nordqvist & Melin, 2008). The framework of discursive activities and competences may thus be used to describe strategic change processes in other contexts, as done within this thesis, where the framework has been used to study sensemaking in the context of energy-efficient building in construction organisations.

4. Description of the case studies

This thesis is based on two case studies (Table 1): **case I** was carried out in a municipal construction-client organisation, referred to as *Epsilon*, and **case II** was carried out in a regional construction-client organisation, referred to as *Alpha*. The two organisations are henceforth referred to as public construction-client organisations.

Table 1 Facts about Epsilon and Alpha (the year of the case study)

	Epsilon (2010)	Alpha (2011)
Number of employees	37	350
Administered building area, 1000 m ²	2 150 ¹ (year 2011)	2 307 ²
Building investments, MSEK (~Euro)	710 (71)	1 330 (130)
The studied process occurred in :	2008-2009	Jan 2010- Sept 2011

¹ Whereof 1 700 k m² was owned and 450 k m² was rented by the municipality

² Whereof 1 700 k m² was owned and 670 k m² was rented by Alpha

4.1 Case I: Epsilon

Epsilon was founded in 1999. In 2010, Epsilon had 37 employees and an investment budget of 710 Million SEK, distributed across approximately 40-50 projects per year. At the time of the study, the organisation was divided into three divisions: project management, strategic facility planning and a department dealing with the municipality's rental contracts. The General Manager of Epsilon reported directly to the municipality's executive board.

Epsilon's mission is to manage the municipality's buildings (including schools, pre-schools, housing for the elderly and housing for people with special needs) as cost-efficiently as possible, i.e. to plan and carry out changes in this building stock. Epsilon's responsibilities include having a long-term overview of the buildings' investment needs and the municipality's needs of the premises, and also to execute construction projects such as to carry out refurbishments, modernisations and new construction of buildings. The building stock is owned/rented by the municipality, not by Epsilon.

A large share of the municipal building stock originated from the 1960s and 1970s and was at the time of the study in urgent need of refurbishment in 2008. Not only had many buildings reached their physical lifespan, but the users' demands on buildings and the building standards had also changed over the years. In 2008, the conventional practice to refurbish old buildings was

questioned generally within Epsilon. The concern regarded whether it would be more cost- and energy-efficient for the municipality to demolish old buildings and build new ones rather than to carry out extensive and expensive refurbishment measures. Related to this issue, the discussions concerned how to evaluate and communicate the cost-efficiency of the alternative solutions, i.e. demolition/build new versus refurbishment. In addition, current investment practices in the organisation had not previously been aimed at taking a long-term perspective on building. To remedy this situation, an LCC-tool for internal use in investment projects was developed in 2008/2009.

4.2 Case II: Alpha

Alpha was formed in 1999, as part of a national initiative to decrease the number of regional organisations. Alpha is a merger of four local public construction-client organisations. In 2011, Alpha had 350 employees and an investment budget of 1 330 MSEK.

Alpha is part of a regional public organisation governed by elected politicians. It owns, rents and administers the operation and maintenance of public buildings such as health-care buildings and other public premises. The customers of Alpha are the other units and departments within the regional public organisation, and the largest group of customers are the health-care related units. Operation, maintenance, reconstruction and new construction of buildings sort under Alpha's daily operational activities.

More than 80% of Alpha's energy use is related to operation and maintenance of nine large emergency hospitals. Several of the hospital buildings were built between the 1950s and 1970s. Both the buildings and their technical systems are now reaching the end of their physical and technical lifetime. Moreover, as the operation of health-care develops over time, new user requirements and building standards have developed since the buildings were constructed. Accordingly, a large share of the buildings is in need of major refurbishment.

Since 1999, Alpha has set energy targets for the buildings which have resulted in several energy-efficiency initiatives. These targets had only concerned energy use of the buildings, although the energy used for operations within the building, e.g. by the health-care units, represented a significant share of total energy use for the premises. In 2010, a new energy target was set by the regional politicians (i.e. the owners of Alpha); *"By 2030, we will reduce the energy use in buildings by half"* (Budget document, 2010). The target was formulated in general terms and did not specify whether the energy use for operations within buildings was included or not. Subsequently, an

investigation project was initiated and carried out during 2010-2011, hereafter referred to as the Investigation. The Investigation aimed to develop a strategy and action plan for how the organisation should meet the target and it was carried out by an Investigation team, led by a senior Business Developer of Operation and Maintenance with energy-efficient building as expertise area.

5. Methods

Since my aim is to understand organisational practices, I have used an interpretative approach. As such, I am interested in “*understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world.*” (Merriam, 2009: 13). In order to develop “*a rich description of the social scene and to describe the context in which events occur*” (Dyer & Wilkins, 1991: 615), a qualitative case study approach was applied. The particular approach chosen can be described as basic qualitative research, which aims to find out more about how the respondents understand and view the phenomena in focus (Merriam, 2009).

A case study can be based on one or more cases. Dyer and Wilkins (1991) argue that a single case approach, which has been applied here, generates deeper understanding of the social structures and the studied context, which lead to coherent and credible stories. This approach was chosen since I wanted to acquire understanding of the actors’ interpretations and actions in the studied situations.

Two explorative, longitudinal (**case II**) single case studies were conducted separately. I have sought to understand the behavior, attitudes and values of the respondents by following them in their work practice over several months.

A research design is a flexible set of guidelines that brings theoretical perspectives, strategies of inquiry and data collection methods together. As common in explorative research (Denzin & Lincoln, 2000), the research design was left open during the studies. I “*followed the path of inquiry*”, to cite Denzin and Lincoln (2000: 369). This means that I had an idea of what to study and how, but placed little emphasis initially on defining sampling frames, formulating hypotheses and determining my strategies for data collection and analysis.

5.1 Data collection

To understand the complexity and the context of the particular studied phenomena, several data collection methods, such as interviews, archival material and observations, were applied to gather qualitative data in the case studies (Stake, 2000). In addition, detailed field notes were made of events, on conversations and of my reflections during the case studies.

5.1.1 Interviews

Interviews provided an opportunity to acquire information about people’s attitudes and individual experiences. Moreover, the interview “*is a convenient way of overcoming distances both in space and in time*” (Peräkylä & Ruusuvaori, 2009: 529), which means that past, present and future events can be interview topics, which has been useful in the case studies. All my interviews were semi-structured, which means that open-ended questions were varied with follow-up questions, see Table 2. An interview guide served as a check-point for the interviews to make sure that the desired themes and topics were addressed.

Table 2 Interviews

Case I	Case II
<p>9 respondents (for 7 respondents the interviews were followed up with additional questions);</p> <ul style="list-style-type: none"> • 3 department managers (whereof one at a sister organisation responsible for operation/ maintenance of premises) • 3 project managers • the former general manager of Epsilon (now retired) • a project coordinator • a consultant <p>1-2 hours/ interview</p>	<p>Set 1: 10 interviews with the main respondent; a Business Developer of Operation and Maintenance with energy-efficient building as expertise area</p> <p>Set 2: 6 respondents;</p> <ul style="list-style-type: none"> • a Business Developer in customer relation • a General Manager • a Director of Development • a District Manager • 2 external energy consultants <p>1-2,5 hours/ interview</p>

The respondents in **case I** were first selected based on their active participation in the studied development of the LCC tool. Thereafter, additional respondents were identified during the interviews using a snowball method, where the respondents were asked who else had been involved or influenced the process. The interviews focused on eliciting past events (e.g. decisions and actions) during the development process of the LCC tool, but also the individuals’ experiences and attitudes towards the model. The interviews were semi-structured, audio recorded, summarised, and transcribed in parts. The interviews were conducted in the respondents’ own office or nearby conference room, with the exception of one interview which was conducted in the home of a now retired respondent.

The interviews in **case II** are divided into two sets (Table 2). The first set of interviews was done with a Business Developer of Operation and Maintenance with specific expertise within energy-efficiency. He was the project leader of the Investigation and he was interviewed on ten occasions from December 2010 to August 2011. I hereafter refer to the main respondent as “energy expert”. He was assigned this label since it corresponds to how the other respondents referred to him in interviews. The focus of the interviews was to map the Investigation process, of which he was the project leader. The energy expert was encouraged to elaborate freely on his actions, decisions, thoughts etc. related to the energy target, the Investigation and energy-efficiency work in general. The recurrent interviews focused on the Investigation process and its progress, but the many interview occasions allowed for follow-up questions.

The second set of interviews in **case II** includes six interviews conducted from February to August 2011. The interviews were done with three members of the Investigation project team and three (of eight) members of the Alpha Management Team. In the second set of interviews, a thematic approach was chosen (Aspers, 2007). This interview approach is suitable when the researcher wants to understand the respondents’ interpretations. The informants were encouraged to elaborate freely on three themes: 1) their understanding of the energy target, 2) their view of activities and decisions taken during the Investigation and their own involvement in the Investigation process, and 3) LCC and a long-term perspective in building investments.

All interviews in **case II** were semi-structured, audio recorded and fully transcribed. Moreover, a detailed summary of each interview was made directly after the event. The interviews in set 1 were conducted in a variety of locations, e.g. conference rooms, meetings rooms, a conference center lobby etc. Locations were chosen based on convenience for the respondent. Interviews in set 2 were conducted in the respondent’s office or a nearby conference room.

5.1.2 Field studies

In **case I and II** all respondents were informed about my position as a PhD student, my research field of interest in general and my role as observer. Over time, a relationship developed between myself and the respondents; however, I did not take an active role in the meetings. Thus, my role is best described as a “peripheral-member researcher” (Angrosino & Pérez, 2000) since I tried to remain as unobtrusive as possible.

The field studies conducted in **cases I and II** are presented in Table 3 below.

Table 3 Field studies and observations

Case I	Case II
Three days a week during two months were spent at the Epsilon office. I had a desk, access to intranet and participated in e.g. department meetings and informal discussions during breaks.	Observations of: <ul style="list-style-type: none">• 8 Investigation project team meetings of 2-2,5 h (a ninth meeting was recorded, but not observed)• 4 meetings of 2-4 h with the Investigation project team and Alpha's management team• 1 reference group meeting of 3 h• 6 other meetings (in total 20 h) where the main respondent was shadowed

Case I

This study which was conducted early on in my PhD work served to introduce me to the field and practice of a public construction organisation. During the data collection, I spent three days a week for two months in the office of the case organisation, studying internal documents such as meeting protocols, management systems and other guiding documents. I also attended formal meetings and had informal discussions with the employees. This gave me valuable insight into formal and informal practices and what issues such an organisation deals with on a daily basis.

Case II

Since the strategy development process itself may influence the organisational legitimacy of a strategy (Denis, Langley, & Rouleau, 2007; Fenton, Gustavsson, Ivner, & Palm, 2012), the Investigation was observed in real-time to explore its progress. In order to capture interaction in practice 19 meetings were observed. During the observations, I studied the interaction between participating actors, but also how non-present actors were presented and discussed by the participants. The meetings were Investigation project-team meetings and the project-team's meetings with Alpha's management team. The Investigation project-team meetings were held at the consultants' office or at any of Alpha's three main offices. In addition, I shadowed the energy expert on five occasions (~20 hours), when he held or participated in individual or group meetings within and outside the organisation.

All meetings were audio recorded. Four of the project team meetings were transcribed, the rest were summarised. The reference group meeting was transcribed. The six other meetings were summarised.

5.1.3 Workshop

In the middle of the Investigation (half way through the data collection in **case II**), the team held an internal one-day workshop (Table 4) in order to “re-energise” the team, as they called it. The workshop was audio recorded. As part of the workshop, I was asked to present my findings so far. Based on my presentation, the participants reflected on and discussed the course of events during the Investigation. Their reflections served as to corroborate the findings from interviews and observations. This session was transcribed verbatim. Additional information given during the reflection and discussion provided a fuller picture of the course of events during the Investigation.

Table 4 Workshop

Case II
1 one-day workshop with four respondents, lasting for 7 hours, whereof 2 hours were a session where I presented my findings.
Participants; the main respondent, the Business Developer in customer relation and the 2 external energy consultants

5.1.4 Documents

In addition to the interviews and the observations, various documents have been collected (Table 5).

Table 5 Written documents

Case I	Case II
Project specific documents, internal policy documents and guidelines, public information as for example annual reports	Project specific documents (presentations, reports, minutes of meetings etc.), internal policy documents and guidelines, public information, e.g. annual reports and brochures

The documents collected in **cases I and II** include formal company documents such as annual reports and policy document as well as project specific documents such as memos, minutes, and project reports. In **case II**, presentations held by the project team throughout the Investigation were collected. The documents have mainly been used as background information and to some extent to support the interviewees’ stories of events, policies and internal procedures/practices.

5.2 Analysis

Cases I and II generated a vast amount of data, such as field notes, summaries of meetings and interviews, transcripts and collected documents. In order to keep track of the data sets, documents and recordings were named, listed and stored in digital folders.

The analysis carried out has been an iterative process, where managing the empirical data progressed simultaneously with the development of the theoretical framework and the analysis. In the early analysis of both cases, case reports were produced, presenting for example a chronological order of events and giving an account of the actors involved during the studied processes.

For **paper I**, the interviews and collected documents were analysed, focusing on the activities during the LCC-development process. Moreover, the respondents' views and use of LCC in general and the developed tool in particular were analysed, as well as the implications and results of the LCC development process on the organisations investment practices.

The transcripts of the recordings in **case II** were at first coded in categories following the interview themes, namely the long-term perspective in building investments in general, the energy target, and activities and decisions made during the Investigation. In an iterative process, additional categories were added during the analysis work. The additional coding categories included specific events, activities, particular actors and key words. In **paper II**, sensemaking theory and in particular the framework of discursive activities by Rouleau and Balogun (2011) provided a terminology to understand and describe the interaction and activities. For **paper III**, I searched for patterns regarding how the actors talked and interacted during the Investigation and how they influenced the process. In this paper, the project meetings were analysed in terms of what roles the participating actors played and how they contributed to the understanding of the energy target and the strategy development process.

5.3 Methodological reflections

Research quality is commonly discussed in terms of validity, i.e. how well the findings match reality, and reliability, i.e. how well the findings can be replicable. However, when carrying out qualitative research with an interpretative approach, Denzin and Lincoln (2000) suggest that it is more appropriate to discuss quality in terms of credibility, i.e. how well the findings

represent/match the collected and reported data, and transferability, i.e. how the findings may be transferred to similar contexts.

To strengthen the credibility, I have collected different types of data and taken extensive field notes during observations and interviews, as described above. My data and results have also been continuously discussed with fellow researchers. In the appended papers, I have provided rich accounts of the empirical data, allowing the reader to interpret the results and relate these to other contexts.

One potential bias in **case II** regards the impact on the results of the key respondent, since he was interviewed regularly over several months. In order to balance his influence on the results, his accounts have been closely compared with the other respondents' accounts about events and activities and with internal and public documents.

6. Summary of papers

Paper I: Life Cycle Costing in construction projects - a case study of a municipal construction client organisation

Purpose: The study which this paper is based on aimed to explore the implications from implementing and using a decision support tool, Life Cycle Costing (LCC), as a means to incorporate a long-term perspective in building-investment practices. The paper presents an account of how a customised LCC tool was developed and used, especially related to refurbishment of old premises, by a public construction-client organisation.

Method: The paper is based on a single case study, **case I**, with nine in-depth interviews, follow-up conversations and an analysis of documents.

Result: The paper describes how the actual tool-development process facilitated learning within the organisation. As used by the project managers, the LCC tool facilitated communication and nurtured discussions regarding the long-term perspective on buildings. Working with and discussing LCC also helped them to identify how and when there was a need to argue for a life-cycle perspective in investments. However, the paper shows that the developed LCC tool was only occasionally used and as such did not become part of the every-day project practices. An outcome of taking part in the development process, as claimed by the respondents, was instead that the life-cycle perspective became integrated in the project managers' mindset and as such tacitly considered in their actions. Furthermore, the project managers used the learning from their LCC discussions to rhetorically steer the political decision makers towards what they, i.e. the project managers, saw as the most long-term sound choice namely increased extent of building new instead of refurbishing.

Reflection: This case study was done early in my PhD studies. Due to circumstances (a major re-organisation) within the case organisation, it would have been difficult to carry out the study later. Although based on an early and tentative analysis, the paper gave me a direction for further research. Even though the respondents saw a potential in LCC as a pedagogical and rhetorical instrument, they also speculated whether its usability in the future would be limited due to a new EU directive on energy use in buildings. They believed that the directive most probably would lead to changed prerequisites for building investments. The study raised my interest in how political, long-term directives are understood and managed in practice in construction

organisations. I wanted to explore people's interactions when dealing with a long-term perspective rather than to focus on the use or non-use of decision-support tools in investment decisions. As a consequence, **case II** was initiated. **Case II** gave me an opportunity to explore how specific energy targets, generated by the new energy directives, are managed by public organisations.

Paper II: Political directives, organisational visions and personal missions: using discursive competence to give an energy target sense

Purpose: The purpose of this paper is to study how an energy target, set by local politicians, was managed in practice by a public construction-client organisation.

Method: The paper is based on a single case study, **case II**, with in-depth interviews with seven respondents and on a workshop session. Rouleau and Balogun's (2011) theoretical framework of discursive competences and sensegiving activities was used to analyse how the new energy target was made sense of and communicated. As such, the framework provided a terminology for analysing the empirical data.

Result: This paper presents an account of how discursive competences were used to influence how the energy target was managed within the public construction-client organisation. This was to a large extent orchestrated by one actor; a senior employee renowned within the organisation as being an expert and a driving force within the area of energy efficiency. The results show that the major challenge with managing the energy target was not a matter of developing technical solutions, but rather a matter of convincing others and creating commitment and understanding for the problem at hand. Thus, the energy expert's efforts were focused on creating a shared commitment for the energy target among various actors within the organisation such as top management, the organisational members and local politicians. In his persuasion, it was found that a wide range of discursive competences were used. The paper thus shows that previous experiences, personal networks and communicative skills are key abilities in order to manage and create commitment for the energy target and measures related to meeting the target.

Tentative conclusions made are that discursive competences enable an actor to exert organisational influence since such skills facilitate anchoring and finding

support for issues at stake, in this case energy-efficient building. Furthermore, it was also found that if and how an individual is enabled to exert influence is dependent on others' trust and support.

Reflection: This paper describes how the energy target was talked about and managed within the studied organisation. It showed that the energy expert played a dominant role as key informant to the local politicians when they formulated the energy target and also in orchestrating how the target was subsequently understood and acted upon by the public construction-client organisation. Noticing how much just one actor can influence a strategic change process made me interested in examining who he interacted with, i.e. who he strived to influence and who he was influenced by during the Investigation. Hence, focusing on what was actually said and done during the Investigation, the next paper address who the key actors were in the Investigation and how/why they became/were involved.

Paper III: The actors and their roles in the meaning making process of an energy target

Purpose: Focusing on four actors involved in the Investigation, this paper addresses how and why they were involved and what roles they played during the Investigation process.

Method: The paper is based on a single case study, **case II**, observations of 13 meetings and in-depth interviews with seven respondents.

Result: Examining the roles of four individuals involved in the Investigation and their contributions to how a strategy to meet the energy target was developed, it was found that each of the four played specific roles in the group. The roles they played seemed to have been already set out by the energy expert when the respective actor joined the Investigation. These roles were: *the strategist* (the energy expert himself), *the doer*, *the one who knew the language of economy* and *the reflective one*. The actors became involved at certain points in time when the roles they played were considered, by the energy expert, as necessary for the progress of the Investigation. In playing their roles, they together composed a friction free and committed team, which jointly focused on developing and implementing a new energy strategy. The ideas brought forward in the discussions were seldom challenged as no one played the role of *critic*. As seen in the paper, the energy expert had the

dominant role of *strategist*. This was for example seen in that he framed the scope of the energy target as an issue for the whole public organisation, and not only for Alpha. Consequently, the energy expert foresaw a need to work across the organisational boundaries within the public organisation. Therefore he strived to influence and create action among actors outside his formal area of responsibility (i.e. Alpha).

Reflection: This paper explores the actors and their roles during the process of turning an energy target into a strategy and organisational practice, The paper tells us little about which other stakeholders are included in or excluded from energy strategy discussions, which would be an interesting path to explore. This study would need to be extended before any firm conclusions may be drawn concerning role ascription in strategy teams.

7. Discussion and suggestions for further research

Departing from slightly different grounds the two studied organisations had in common that they needed to adopt a long-term perspective in investment and management practice, in order to meet energy demands when refurbishing existing buildings. In Epsilon, the concern was related to the cost- and energy-efficiency when refurbishing old buildings and in Alpha, the main concern was how to meet a specific politically set target for energy use in buildings. The research has been guided by two research questions: how a life-cycle perspective was introduced in investment practices, and how a political target on energy-efficient building was managed and strategised.

7.1 LCC as a conceptual idea in investment practices

In the literature, a suggested way to address the long-term perspective is to apply Life Cycle Costing (LCC). LCC has been advocated as useful for making more informed decisions regarding a long-term perspective, in particular for energy-efficient building (*e.g.* Bogenstätter, 2000; Persson & Bratt, 2010). However, *how* and *to what extent* LCC is used is still unclear (*e.g.* Gluch *et al.*, 2011; Nässén *et al.*, 2008). This thesis shows that “by-the-book-use” of LCC as calculation tool (*e.g.* Kirk & Dell’Isola, 1995) might be of less importance for the industry. By actually working with and verbalising LCC in rather general terms the involved actors instead learnt how and when to argue in discussions regarding building investments practices. In these discussions the resulting figures were of less importance. Instead, LCC was used as a conceptual idea, representing a long-term view on buildings. Moreover, the LCC concept was found to stimulate discussions and voicing more critical views on, energy-efficient building and its related problems.

Hence, when discussing building investments, LCC served as a pedagogical tool for the project managers to gain better understanding of the complex decisions of when and how to refurbish or when to demolish and build new. Moreover, LCC was also found to serve as a rhetorical tool in external discussions with for example political decision makers. That is, LCC enabled discussing a long-term perspective in investment practices across organisational boundaries. The findings presented in **paper I** thus confirm what others have suggested earlier, namely that working with LCC may generate learning, knowledge and insights, which then may be diffused within and across organisational boundaries (*e.g.* Gluch & Baumann, 2004; Gluch, Johansson, & Räisänen, 2012).

Even if the sensemaking lens was not applied as such in the analysis of **case I**, the way that LCC was used indicates that LCC can play an active role in sensemaking and sensegiving processes in organisations. By representing a perceived rational method for identifying the plausible “best” decision among alternatives, a decision support tool such as LCC can provide a “*feeling of order, clarity and rationality*” (Weick, 1995: 29). Moreover, by referring to a tool as ‘responsible’ for a choice, a decision maker give the choice legitimacy, and thereby can avoid taking full responsibility for the decision (Brunsson, 2007; Gluch, 2005). As such, a rhetorical use of the conceptual idea of LCC can be compared with what Rouleau and Balogun (2011) referred to as “*crafting and diffusing an appropriate message*”, implying that LCC can be used as a tool for project managers for “*performing the conversation*” with for example decision makers. Drawing on these findings, I therefore suggest that LCC can be used as a pedagogical and rhetorical tool in discussions, negotiations and argumentations. Consequently, the conceptual role of LCC provides an interesting route for further research.

7.2 Making sense of an energy target: bridging communicative barriers

Drawing on Weick (*e.g.* 1995), the Investigation in **case II** is discussed in terms of sensemaking and sensegiving, since this lens enabled me to explore how involved actors understood and communicated the energy target. In line with Gioia and Chittipeddi’s (1991: 446) description of a strategic vision, an energy target may be seen as a “*symbolic foundation for the stakeholders to develop an alternative interpretative scheme*”, aimed to facilitate the creation of meaning in the process of changing practice. Due to the inherent uncertainties and the interpretative flexibility (*cf.* Ryghaug & Sørensen, 2009) related to energy-efficiency, an energy target can stimulate organisational sensemaking. Such a sensemaking process in the management of an energy target was seen in this research.

Industry as well as scholars state that improved communication between diverse stakeholders in the construction sector is a prerequisite for implementing energy-efficient building practices (*e.g.* Häkkinen & Belloni, 2011). That diverse and sometimes contradictory professional discourses, agendas and interests create communicative barriers has been identified as a potential obstacle for implementing energy policies into practice (Ryghaug & Sørensen, 2009). Exploring the interaction between actors involved in making sense of an energy target, I have in this thesis depicted a number of attempts where individuals use various means to manage and bridge such

communicative barriers: the use of LCC as a rhetorical tool was one, and the skilled use of discursive competences was another. In the study of what the actors *actually did* during the Investigation (see **paper II**), a number of what Rouleau and Balogun (2011) called discursive competences were highlighted as keys to bridge the communicative barriers. Discursive competences have been described as comprehensive and generic communicative skills, such as network building, adjusting language to the situation, understanding the agendas and needs of others and arranging the occasions for communication. The use of such competences was identified in how the energy expert worked in practice to set up and carry out the Investigation, and therefore the energy expert was described as a “*skilled networker, who knew who to influence, how and when*” (see **paper II** and **III**). These skills, in combination with his energy-efficiency expertise and professional experience, were also given as rationales by the management team as to why the energy expert was given the mandate to initiate the Investigation and rather free hands to orchestrate how the energy target was to be interpreted and managed.

Rouleau and Balogun (2011) studied middle managers’ sensegiving activities when these tried to influence others during strategic change processes, but Rouleau and Balogun did not explore how others may have enabled the middle managers to do so. Addressing how professionals can be enabled, Maitlis and Lawrence (2007) observed that they can be empowered to exert influence on how a strategic issue is managed within an organisation, when in possession of organisational legitimacy due to their role. Similar to the professionals studied by Maitlis and Lawrence (2007), the energy expert was dependent on, and given opportunities due to, others’ perception of him as a legitimate person. These opportunities strengthened him in his role. This thesis shows how the energy expert, due to his role, both created and was given opportunities to exert influence regarding how the energy target was formulated and managed (see **paper II** and **III**). By adding the perspective of how others’ trust and support can enable an actor, this finding can provide a route for further studies and adds to Rouleau and Balogun’s (2011) framework of discursive activities.

The needs and benefits of having and using communicative skills has been addressed in other research regarding energy-efficient building (*e.g.* Häkkinen & Belloni, 2011; Johansson, 2012). Drawing on a survey regarding environmental management, a trend identified in the Swedish construction sector is also that communicative skills seem to be increasing in importance (Thuvander, Gustafsson, Baumann, & Gluch, 2013). Rohracher (2001) suggests that using rhetoric in a strategic manner can enable actors to influence others regarding sustainable building practices and to build useful

alliances. However, not all organisations and/or individuals can mobilise the kind of force that the energy expert appeared to have done in Alpha. It has been recognised that the construction industry lacks actors with relevant skills and experience to transform energy-efficiency policies into practice (Ryghaug & Sørensen, 2009). Ryghaug and Sørensen even questioned whether organisations in the construction industry can provide necessary prerequisites for someone to take on this responsibility.

It has been suggested that a prerequisite for implementing changed practices is wide-spread and shared understanding of why the change is needed and what it would mean for the organisation (Kezar, 2012). Similar suggestions can be found in the context of implementing energy-efficient building (e.g. Cole, 2011). This thesis supports these suggestions, since it was found that managing a new energy target was primarily a matter of influencing and creating commitment among various stakeholders. The discussions during the Investigation project meetings, for example, often concerned either what the energy target *actually meant for Alpha*, or *how and when* to communicate with different stakeholders in order to create wide commitment for the energy target.

In order to achieve an energy-efficient built environment, it is often suggested that current organisational structures and practices need to be changed (e.g. Cole, 2011; Persson & Bratt, 2010). The barriers that current organisational structures and practices constitute have been described using the *silos* metaphor or that of *silo mentalities* (see e.g. the empirical accounts in Balogun *et al.*, 2005; Denis *et al.*, 2009) in many public organisations. Silos are referred to as communicative barriers that hinder cooperation and sharing of experiences in organisations. Such silos were mentioned by the respondents in **case II**. For example, the respondents experienced that the current silo-like organisational structure with autonomous districts within Alpha delayed implementation of top-management decisions. Silos were also used to describe the cooperation and communication within the public organisation. Framing the energy target as a cross-organisational responsibility within the public organisation, the energy expert foresaw that he had to work across these silos to influence and create action among various actors in order to secure and speed up the future implementation of the energy strategy. Considering his proactive behaviour, it would be of interest to continue to explore how the developed strategy and action plan actually are implemented within the organisation.

Working across while at the same time striving to change the organisational structures has been described as “*shaking the organisational boundaries*”

(Balogun et al., 2005). Balogun et al. argue, based on their study of strategic change management, that actors who are given the task to manage strategic changes across, and, at the same time, shake the organisational boundaries, become “*conscious and deliberate manipulators of their organisational contexts and those they work with*” (2005: 276). Drawing on their claim, we can ask whether the energy expert manipulated his organisational context and colleagues. As a skilled user of discursive competences he was able to influence his surroundings in his preferred direction, which can be seen as a form of manipulation. The approach of sharing the responsibility for energy use in buildings between all parts of a public organisation might require some manipulation of the context and actors. As such, the ability to manipulate might be a beneficial or even necessary ability in the case of implementing long-term targets across organisational boundaries. Possible consequences of this are interesting to study further.

Reducing the energy use in buildings has traditionally been an issue for the construction clients, whereas for example the operators of health care have different organisational goals and targets which might contradict an organisational focus on energy use. As we have read, implementing long-term energy-efficient building requires changes of current practices and improved communication between diverse stakeholders. Maybe a prerequisite for construction organisations is, at least initially, that some actors have the courage, interest and legitimacy to take on a responsibility which reaches outside their own formal area of responsibility in order to manipulate their context and colleagues to accept and take on such a shared responsibility. In that case, discursive competences will be useful to those actors.

8. Conclusions

The aim of this licentiate thesis has been to understand how actors in public construction-client organisations develop strategies and management practices in order to meet politically set directives for energy-efficient building. In line with a call for social-oriented studies concerning energy and buildings (Phua, 2013; Schweber & Leiringer, 2012; Summerfield & Lowe, 2012; Whyte & Sexton, 2011), this thesis has focused on the perspectives and understandings of particular actors, i.e. for example managers, energy experts, consultants and politicians. That is, I have studied how the long-term perspective, represented by LCC and an energy target, was dealt with by actors within two Swedish public construction-client organisations.

This thesis has showed that working with LCC can serve as a pedagogical and rhetorical tool for understanding and discussing the life-cycle perspective of building. As such, LCC can be used in negotiations and argumentation among project managers and diverse decision makers. A conclusion drawn is therefore that LCC can, by enabling conceptualisation of the long-term perspective sought for in building management practice, serve this function as well as that of facilitating calculations and providing figures. In line with for example Gluch (2005), LCC may facilitate knowledge sharing among diverse actors. Whereas earlier research on LCC has focused on calculations and methodological aspects (e.g. Bogenstätter, 2000; Kirkham, 2005), this study supports the relevance of also exploring how the concept of LCC is implemented and used in management practices. Hence, I suggest that, beside the instrumental benefits of carrying out LCC calculations, the sensemaking process stimulated by the use of LCC should be emphasised.

People are likely to make sense of the need for and content of organisational changes differently, due to their earlier experiences and knowledge (Weick, 1995). Therefore, *who* an organisation gives the responsibility to manage and implement strategic changes influences the outcome of the process of change (Maitlis & Sonenshein, 2010). This has been evident within this research. Energy-efficiency expertise and experience can give actors the legitimacy to engage in energy-efficiency work, but to implement an energy target in building-management practices, the involved actors also benefit from knowing who, when and how to influence others. This entails knowing how and when to talk to specific stakeholders, how to create and share appropriate messages, and how to build and use networks and coalitions. Hence, not surprisingly, personal characteristics and attributes are likely to impact project performance (Phua, 2013) also in the context of implementing energy directives. It is

concluded that discursive competences will play an important role in these changes. This thesis has shown that an actor who can maneuver and make use of discursive competences has an advantageous position when it comes to influencing organisational sensemaking.

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