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End-user Participation in New and Rebuild of a Hospital

CREDIT Case SE05



Danish Building Research Institute
AALBORG UNIVERSITY

CREDIT[®]

Construction and Real Estate -
Developing Indicators for Transparency



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Preface

This report describes the results of a case study undertaken as part of the Nordic/Baltic project *CREDIT: Construction and Real Estate – Developing Indicators for Transparency*. The case study is part of the work in work package 4-6 with respect to project assessment tools, application in firms and national benchmarking systems.

CREDIT includes the most prominent research institutes within benchmarking and performance indicators in construction and real estate, namely SBI/AAU (Denmark), VTT (Finland), Lund University (Sweden) and SINTEF (Norway). Further, three associated partners have joined CREDIT. The three associated partners are the Icelandic Center for Innovation (Iceland), Tallinn University of Technology (Estonia) and Vilnius Gediminas Technical University (Lithuania).

The project has been managed by a steering committee consisting of the following persons:

- Kim Haugbølle, SBI/AAU (project owner).
- Niels Haldor Bertelsen, SBI/AAU (project coordinator).
- Päivi Hietanen, Senate Properties (chair of Finnish steering committee).
- Pekka Huovila, VTT.
- Ole Jørgen Karud, SINTEF.
- Magnus Hvam, SKANSKA.
- Bengt Hansson, Lund University.
- Kristian Widén, Lund University.

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Department of Construction and Health
August 2010

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Summary

This case study presents an end user driven project for creation of a new centre in hospital environment. Hospital projects are in a highly interdependent surrounding and the buildings are technically complicated. This raises the requirements of both the professionals and the end users. One of the special circumstances with this project is that, the end user project leader had to take a much bigger responsibility, than usual in hospital projects performed by the real estate company. The study highlights some difficulties in managing the end users, organisational changes and creating an efficient communication in construction projects.

The initiating ideas for the project came in the middle of the 1980s but the project first started 1997 and will be finished in August of 2009. Though the project ideas had been delayed for a decade, due to the political decision making process, a frustration and scepticism among the end users existed towards the project. A lot of time had to be laid on changing attitudes and make the end users believe in the project. When managing and understanding the end users needs, much of the work, were built on human knowledge and pedagogical skills. It was consider of importance to keep a continual and good communication with them during the whole project. Methods used were; study tours, working groups, weekly letters, different meetings, a strong vision to follow and show rooms.

Aspects to improve were considered to be, for example, a system for knowledge transfer between parts. Better collaboration between project participation and better pedagogical explanation of the construction process to the end users.

1. Introduction and objectives

This case study presents an end user driven project for creation of a new centre in hospital environment. It highlights some difficulties in managing the end users, organisational changes and creating a working communication in construction projects.

1.1 Objectives and work packages of CREDIT

Sir Winston Churchill once said, “We shape our buildings, afterwards our buildings shape us” (28th Oct 1943). This quotation underlines how strong a building can influence an occupier or a user. Providing complex public facilities for example hospitals, schools, universities and libraries that are able to meet both the internal and external stakeholders’ needs and requirements is not without complications. The aims and demands of different stakeholders within a project can sometimes create conflict with each other’s interest. Understanding the needs and requirements of these stakeholders are essential to remain competitive in today’s market. A client that pays attention to the needs of the end-users will be rewarded with a high-performance property. Simultaneously, this shift seeks to solve many ills associated with inadequate building conditions and resulting in poor building function.

Due to the amount of both public and private money being invested in delivering public and private facilities, strong actions must be adopted. Collaboration with the relevant stakeholders will help building owners in identifying the required performance indicators to create high-performance facilities. The project aims to define a model for the implementation of performance requirements, which ensure the fulfilment of the various types of users’ and stakeholders’ needs and demands. The model shall also allow for the continuous measuring of the effectiveness of the used requirements and the model as such so that it may be improved as more knowledge and experience of it is achieved.

Following the themes of the ERABUILD call closely, the aim of CREDIT is to improve transparency on value creation in real estate and construction.

Thus, the objectives of CREDIT are:

- To capture end user needs and requirements in order to identify and quantify – where possible – value creation in real estate and construction.
- To develop compliance assessment and verification methods.
- To define and develop benchmarking methods and building performance indicators in real estate and construction.
- To set out recommendations for benchmarking internationally key building performance indicators.

Consequently, the deliverables of CREDIT are:

- 1. The establishment of a network of Nordic and Baltic researchers for benchmarking and performance indicators through frequent interactions in workshops across the Nordic and Baltic countries.
- 2. A State-of-the-Art report, that will identify and critically examine a number of existing tools, databases, mandatory reporting, approaches and benchmarking schemes to capture and measure end-user needs, client and public requirements on performance and value creation.

- 3. A strategic management and decision making tool to guide the definition and development of benchmarking methods and building performance indicators in different business cases.
- 4. A comprehensive performance assessment and management tool with associated key performance indicators to capture end-user requirements and to continuously measure and verify the compliance of performance throughout the lifecycle of an actual building project and linked to building information models.
- 5. Recommendations as to how sectoral and/or national indexes for performance indicators can be designed in order to allow for international benchmarking of construction and real estate.
- 6. Dissemination of the lessons learned and tools developed through news articles, press releases, workshops with actors in the real estate and construction cluster etc.

1.2 Background, purpose and focus of the case study

The case study is looking at a construction project on a hospital in the south of Sweden. A number of divisions in the hospital were to be co-ordinated to find a more efficient way to meet the patients' needs of care taking. The initiating ideas for the project came in the middle of the 1980s but the project first started 1997 and will be finished in August of 2009. One of the special circumstances with this project is that, the end user project leader had to take a much bigger responsibility, than usual in hospital projects.

The purpose of the case study is to explore the characteristics of the process of managing participating end-users in the construction process, in other words:

- To explore what methods and tools are used when capturing the end users requirements and needs
- To find difficulties that aggravate learning and fulfilment of the end users requirements
- The use of indicators in the real estate company

1.3 Research design and methods applied in the case study

The case study is focus on a project/building level.

This case study primarily uses one type of data:

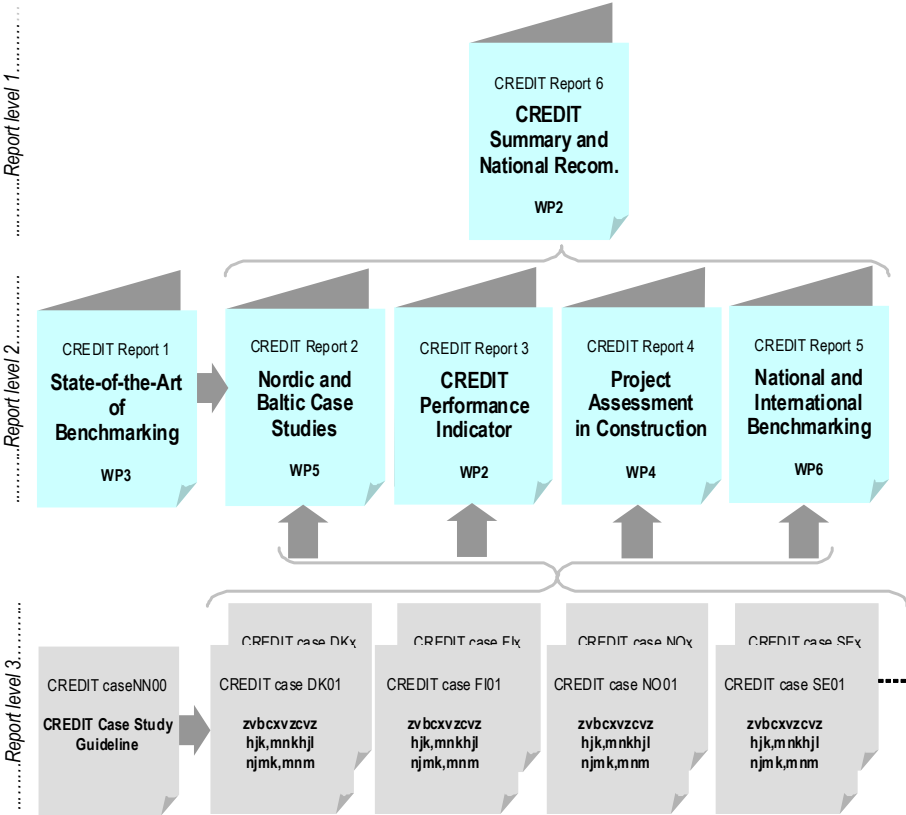
- Qualitative research interviews with 3 persons involved in the project:
 - End user project leader
 - Manager of end user
 - Project leader
- A meeting with a participating end user and a not involved manager of end user

1.4 Reading instruction

Chapter 2 in this report addresses issues relevant to WP4 on assessments at project level. Chapter 3 addresses issues relevant to WP5 on the application of assessments in firms. Chapter 4 addresses issues relevant to WP6 on sectoral, national or international benchmarking systems. Chapter 5 discusses and concludes on the lessons learned with respect to the three levels of projects, firms and systems.

The work of each work package (WP) is documented in various other reports, articles etc. Below, a graphical illustration of the hierarchy and linkages between the individual reports is given.

Figure 1. Graphical illustration of the hierarchy of the CREDIT reports.



The study is mainly contributing to WP3 and WP4 but also a list of the indicators the real estate company are using (WP 5)

2. Buildings – assessments in construction or real estate processes

This case was chosen to illustrate a building project where the end users had to take a bigger responsibility than normal. The project is in a hospital and the operation was ongoing during the whole project, which makes the surrounding circumstances quite complicated.

2.1 The actual building, building parts and processes

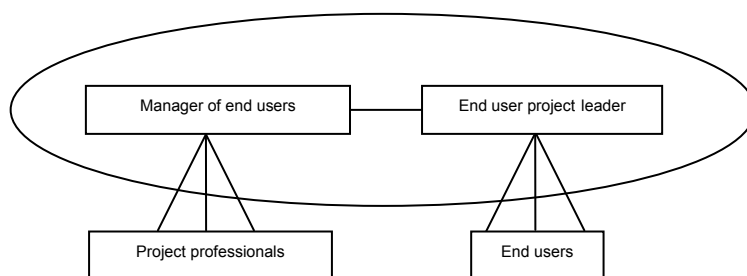
Description of the building and project

- The project is located in the south of Sweden.
 - o New build 7 000 m², construction start August 2005
 - o Rebuild 11 700 m², construction start March 2007
- The building is a hospital with the following functions
 - o Casualty department, care institutional rooms, research centre, operation theatre, sampling rooms, offices
- The first thoughts of the project were born in the mid 1980s but was delayed, due to political prioritizing and started first in 1997.
- Opening ceremony will be in September, 2009
- Project cost 350 MSEK

The study covers the following phases; needs analysis, briefing, design and construction.

2.2 The applied assessments and tools in the processes

The project were organised in the early phases like figure 1 shows.



In the later phases the end user project leader had to manage without a manager of end users.

Briefing and design

Though the project ideas had been delayed for a decade, due to the political decision making process, a frustration and scepticism among the end users existed towards the project. "It is no use, nothing will happen" was a common point of view. The first goal for the manager of end user was to make people believe in the project, to enthusiasm them and make them understand that their contribution matters. The manager of end user has noticed that if the end user are enthusiastic over the project and "own" it they are talking in terms of "this is what we thought and this is how we did". Otherwise they tend to blame others and have difficulties in accepting minor incorrectness's.

“The best method in these early phases is human knowledge and pedagogical skills. I try to be accessible for the end users and talk frequently with them. I am supporting by asking questions about their organisation and work today and in the future. People in hospitals are though, in general, positive towards physical changes” explains the manager of end user. The project leader explains that the end users have to participate in hospital projects that are an absolute condition. The end users have to be managed though their needs are constantly changing. “Though the end users and the professionals have different backgrounds and end users often are novices in their role; communication gaps have to be crossed. This requires a lot of time; the end users and the designers have to sit down and discuss and take minutes of what is decided. Time is though a critical factor though the end users often have to manage their ordinary job on 100 % and besides this manage the involvement in the project on 25 %. End users are often misjudging the time consumption the project requires. In hospital project the end users tend to be very engaged,” explains the project leader and further: “To find an optimal interaction between participants, it is very important that the designers have experiences of designing hospitals. The end users do not often know what they want and then the designers have to make them understand what they need. Hospital projects are though prevailing under the law of public procurement which leads to that you can not pick the persons with the best skills.”

A well formulated description of the organisation should exist before the architect is involved, though people tend to lock their thoughts when a sketch exists, consider the manager. The description of the organisation is, as well, important when new participants enter the project. If the project has a solid vision through the whole project the result usually becomes successful. To spread the vision to all participants were a “24 hours kick-off meeting” held. A hired consult was holding the meeting and the participants were architect, consults and representatives from the end user organisation and the real estate company. When the contractor was involved was a similar meeting held. The meetings gather the people and make them start working in the right direction.

The project should have a comprehensive, cross functional representation of the end users. The end users were organised in eleven working groups to delegate the work and the responsibility. It is important that the groups involve chiefs, though the questions discussed have to be accepted in the line organisation as well. “It was of importance that the end users got time to sit down and start thinking. People in hospitals are working very intense and do not have time to reflect over how to work differently”, explains the end user project leader. The end user project leader arranged, on own initiative, so called “floor meetings”. The purpose with the meeting was to make people that worked on the same floor to understand each others situation and thereby be able to coordinate some functions. Earlier the end users did not know what was going on, on the other side of the wall explains the end user project leader and further “it was a lot ‘we have to have’ – think before, the meeting helped to start a dialogue and to solve the situation more efficiently.”

The end user project leader holds everything together to ease the work load was a companion (a secretary) employed. The end user project leader considered it to be necessary, to have a companion, to be able to really understand what happened during a meeting and to have someone to ventilate ideas with. Along the space related questions were moving related questions discussed. A lot of time had to be laid on making the end users see the bigger picture of their situation. The working groups were supported by the end user project leader and the architect and when needed experts were con-

tacted to give advices and opinions. The end user project leader found it very helpful to have the architect connected in an early phase, “the architect really understood our situation. We felt believed and we got the opportunity to think free and to question, no presumptions, nothing was locked.”

Other methods used were study tours (nine performed). The manager explains that “before a study tour, it is very important that the end users get a picture of what they want and have a vision. The study tours have to be adapted to where in the process you are, first tour, the goal can be to get a broader view of the organisation. For example, see how others are co-ordinating different functions. Later in the process, it can be fruitful to see details like interior solutions. It is very important to have concrete questions to get an answer to.” Study tours were experienced positively among all participants. The end users experienced it as the organisation was investing in them; which made them feel important. The end user project leader experienced it fruitful with study tours at different points in the project, though, “it is a learning process and your eyes see different things at different times.”

During the whole project, the end user project leader has written weekly letters to the end user organisation. The information in the letters was not always understood and sometimes it becomes chaos, experience the end user project leader. The end user project leader was, as well, informing concerned part in a more detailed mail.

A showroom was built up so that the end users could try and evaluate its functionality in a questionnaire. The end user project leader felt it great to have the result of the questionnaire to refer to, when people came with new opinions during the project.

The manager considers that the organisational changes have to be done before any physical changes are discussed. To make people discuss organisational question is though much harder than to make them talk about physical ones. The manager further describes the importance of understand and see other hospital projects in Sweden and abroad to broaden the frame of reference. But points out that it is important that you have to hold the same speed as the organisation; “you can not be 20 steps ahead the organisation, you have to be half a step.”

Politicians have to be managed as well in these early phases and this is often done by the manager, though it takes a lot of time to learn how to manage them. “Politicians consider a budget to be a Lutheran thesis” explains the manager and further “thereby should both time and budget be set as late as possible in the process.” In 2003 did the politicians’ announce stop of procurement. “We could not work with the architect or consults for six month,” explains the end user project leader. After this was the first building stage procured. The politicians then decided that a new centre was to be involved in the new and rebuild project. This lead to that more money had to be applied for and more time spent on designing.

The patient and the visitors are not involved or consulted in the project. The hospital employees are concerned to manage it. The real estate company is not either asking the patients or visitors of their satisfaction of the result, explains the project leader.

Construction

During the project were information meetings held with the end user organisation. They were well visited in the early phases. “When the end users experienced that the project was well managed and they got used to that it

have to sound during construction, they stopped coming to the meetings,” explains the end user project leader.

Meetings with the steering committee were as well held during the construction. In the meetings were questions, concerns and changes discussed. In the steering committee were represents from the hospital leading involved.

The end user project leader participated in site meetings during the whole process. The end user project leader experienced that barriers had to be crossed to understand the social and cultural nature of the meetings. The end user project leader was, of some of the professionals, met with negative attitudes when asking questions. This provoked the end user project leader to ask even more questions. This can be considered as a sign of that a full understanding of the needs of the other part, were sometimes lacking.

Changes within the hospital organisation affected the project as well. In 2007 was decided that, the divisions included in the project, should start working with lean production. This working procedure requires different space solutions than the buildings were designed for. But the end user project leader believes that the locals are so flexible designed that they can manage the new working procedures quite well.

Exchange of knowledge was done in monthly project meetings during the project. During the meetings were end user changed requirements and operation management questions discussed. Though hospitals are very complicated buildings, the designers were involved in meetings during the construction phase as well. This can be seen as a form of knowledge sharing among the participants. “It costs but is worth it,” explains the project leader. The end user project leader does not consider that there has been any exchange of knowledge to talk about. “The co-review of the sketches did not work between different parts. People tend to blame ‘one’,” believes the end user project leader.

2.3 Cost and performance indicators applied in the processes

Not included in the study

2.4 Relation to different enterprises and national benchmarking

Not included in the study

2.5 Visions and innovation for future improvements

A systematically exchange of knowledge is on the wishing list. The knowledge exists in the head of the people, explains the manager of end users. The end user project leader think it would be interesting with an evaluation system as well “what is it people really say when they say that something is not good?”

The end user project leader experience that the structure of the role and responsibilities of different participant were sometimes fussy. As well to have a continuous contact with one person in the real estate company, many people come and went during the project. The end user project leader believes that a full understanding of the consequences of savings and changes were often lacking.

The project leader considers that too many end users often are involved in projects; "When too many people are involved it becomes hard for them to make decision about what the real needs are. They need support continuously during the project. To have an end user as the link between the end users organisation and the project organisation is positive. If a professional inform them they often got an attitude like; "the builder" is making a mess. The end users tend to accept the message/circumstance better if an end user delivers the message."

Important words to succeed with end user participation are: engaged participants and good communication. It is also important to have a well structured project organisation, the project do not work without it, explains the project leader. Decision paths and rights have to be clear and followed. Informal decision making paths should not exist.

The project leader believes more in goals than in visions though goals have to be obtained. And further that the professionals have to be better to explain the construction process for and better to support the end users.

3. Enterprises – assessments and indicators internally applied

The enterprise company is a real estate company for hospitals in the south of Sweden. This chapter reports on the company's use of indicators.

3.1 The actual enterprise, company and firm

The company is a part of a larger cooperation with the assignment of being a strategic partner in building related questions. Their main customer is care taking activities like hospitals.

3.2 Applied assessments and tools in the enterprise

3.3 Costs and performance indicators applied in the enterprise

The company does not measure the proposed items like indicators. A real estate manager have studied the list and pointed out a couple of indicator of interest (see figure below).

- For calculating number 32-35 the company is involved in a national hospital program called "Teknisk standard" (see the CREDIT chapter on methods and tools for further information) for room technical standardisation issues.
- Number 51-53 are considered in the early phase (pre-study).
- Point 62: The company follows-up, when needed, how much time the project manager is putting on the projects.
- Point 65: The end users are always involved in steering committees, reference groups and trade union.
- Point 71: they are mainly concerned about the media consumption. They use an "Excel media" tool for every building in use. The data is used both in property management and when designing new buildings.

The real estate manager is though missing one point that they are very concerned about: The project account of economical issues. The company can analyse the projects on a monthly basis and four times a year forecasts are performed of the project budget. This is very important for the company though the process to initiate a project is quite long and involves a number of stakeholders like politicians and diverse end users.

The company is following up costs at project closure and after 6 months of occupancy they are making some kind of customer evaluation. They though need a new questionnaire/follow-up procedure. In the customer evaluations softer issues are discussed. The former used questionnaires were considered inappropriate to use. Partly because many questions were irrelevant and partly because there is a huge difference between new building and rebuilding, and the questionnaire did not catch that.

The company is following governmental requirements on noise, air quality etc.

CREDIT Indicator Classification

Company:

Role:

Project:

Country:

Date: Sign:

To which degree are the following indicators preferred?

Please use the following scale when answering:

2 Always - strategic and very important

1 Sometimes, depends upon the project

0 Not at all, unimportant

	Public demands	Internal project demands	Measures during building process	Measures when finished project	During facility management	Comments and other indicators recommended
Cost and performance indicators						
1. Cost, price and life cycle economy (LCE)						
11 Capital, investment, construction, commissioning cost						Interesting
12 Building services related to operation and maintenance						interesting
13 Business services related the activities in the building						interesting
2. Location, site, plot, region and country						
21 Location and address						
22 Plot opportunities						
23 Spatial solution and property aesthetics						Interesting
24 Surrounding services						
25 Social values						
3. Building performance and indoor environment						
31 Category of building, quantity, size and area						
32 Safety and security of burglary						Interesting
33 Usability and adjustability						Interesting
34 Thermal comfort						Interesting
35 Air quality and health						Interesting
36 Visual climate						
37 Acoustic climate						
38 Aesthetics of building and indoor spaces						
39 Feelings and sensations						
4. Building part and product performance						
41 Category of building parts, quantity, size and area						
42 Safety						
43 Durability						
44 Thermal quality						
45 Impact on air quality						
46 Lighting quality						
47 Acoustic quality						
48 Aesthetic quality as form, surface, colour and details						
49 Feelings and sensations						
5. Facility performance in operation and use						
51 Category of tenancy and operation and area of space						Interesting
52 Applicability of the facility						Interesting
53 Operation						Interesting
54 Services						
55 Social performance						
6. Process performance in design and construction						
61 Category of process, supplier and organisation						
62 Resource control and project management						Interesting
63 Health and safety and work environment						
64 Quality management						
65 User involvement and cooperation						Interesting
7. Environmental impact						
71 Resource use						Interesting
72 Emissions						
73 Biodiversity						

Table 1. Questionnaire to evaluate CREDIT Indicator Classification.

3.4 Relation to building cases and national benchmarking

3.5 Visions and innovation for future improvements

4. National benchmarking – indicators and organisation

Not included in the study

5. Discussions and conclusions

This case study investigates end user participation on a project level and discussing the use of indicators on an enterprise level. This chapter aims to answer the objectives of the study:

- To explore what methods and tools are used when capturing the end users requirements and needs
- To find difficulties that aggravate learning and fulfilment of the end users requirements
- The use of indicators in the real estate company

5.1 Lessons learned in construction and real estate processes and recommendations for WP4

Used methods and tools

Methods used when involving end user were; study tours, working groups, weekly letters, different meetings, a strong vision to follow and show rooms.

Difficulties that aggravate learning and fulfilment of the end users requirements

Hospital projects are in a highly interdependent surrounding and the buildings are complicated as well. This makes the decision making process quite complicated and requires professionals with good skills on managing, both this circumstances and the end users, for project success.

When involving end users, it is of importance, that the prerequisites are known to the end users. The organisational questions, like decision making rights and the role of different construction participants, have to be clear to the end users. The end users prefer to have one contact person to follow during the whole project. It is of highly importance that person with human knowledge and communicational skills are managing the end users. The end users involved should represent different parts of the organisation and it is of high importance that the decisions are founded in the line organisation as well. It was found to be of importance to be half a step before the end users and not 20. Otherwise it is hard to be able to find efficiently and functional space solutions for them.

To succeed, when involving the end user, it is of importance that all parts understand of the needs of the other part and to enthusiasm the participant to perform their best. When the end users were met with a negative attitude, they respond in the same way, which highlights the importance of creating an environment filled with respect.

Things to improve were considered to be, for example, a system for knowledge transfer between parts. Better collaboration between project participation and better pedagogical explanation of the construction process to the end users.

5.2 Lessons learned in enterprises, companies and firma and recommendations for WP5

The use of indicators in the real estate company

The company is not measuring indicators on a regular basis but is considering some aspects. The company follows governmental requirements on air quality and noises etc. The company follows-up, when needed, a number of cost and media related issues. The company needs better end user /customer satisfaction questionnaire (none is in use today though the former were considered inappropriate).



This case study presents an end user driven project for creation of a new centre in hospital environment. Hospital projects are in a highly interdependent surrounding and the buildings are technically complicated. This raises the requirements of both the professionals and the end users. When managing and understanding the end users needs, much of the work, were built on human knowledge and pedagogical skills. Methods used were; study tours, working groups, weekly letters, different meetings, a strong vision to follow and show rooms. The real estate company is not measuring indicators on a regular basis.

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