Steering to align a public real estate portfolio

A systematic approach for process and product at strategic level

Colophon

Title:

Steering to align a public real estate portfolio
A systematic approach for process and product at strategic level

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Preface

In the end of 2008 during a coffee break I had a chat with Monique Arkesteijn about possible graduation tracks. There were several possibilities to choose from but only one subject would require the approach of corporate real estate management while it was strongly related with the interdisciplinary problem solving of integral urban area development. It was the desire of the Municipal Development Company of Rotterdam (OBR) to steer more explicit on their real estate portfolio.

It occurred that a system was needed to steer (manage) in the desired direction. As a result Peter Paul van Loon, who is specialised in the design of decision supporting systems, became the second tutor. Peter Paul helped me with exact scientific justification and paradigm of the steering problem without getting lost, while Monique, with her extensive experience in corporate real estate management signified the importance of a logical selection and display of variables, while keeping me on the right path.

Together with Monique and Peter Paul it felt like working in a team. I would like to thank Monique and Peter Paul for their extensive guiding and the unique possibility of participation in this team during my graduation process. When I needed support for practical implications I could always "knock on the door" of Ruud Binnekamp, who was extremely flexible despite being busy with his own PhD, thanks.

The Municipal Development Company of Rotterdam (OBR) made it possible to evaluate and validate the system within their organization. Many expert representatives from different departments participated during several workshops. Especially I would like to thank Marco Conijn and Caroline Bosscher for their early participation in this project.

Also I would like to thank the participators of several workshops:
Dion Cools, Peter Zwart, Martijn Troost, José Beumer, Allard de Wolf, Henk de Kok, Richard van Bladel, Gerard van Wijhe, Rob Zee, Marco Conijn, Caroline Bosscher.

Thanks to all people who supported me.

Stefan van de Schootbrugge

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Summary

Depending on the core business of organizations real estate managers handle the real estate portfolio differently. It is one of the reasons that real estate management (REM) has emerged into various specialisations like corporate (CREM) and public real estate management (PREM). They both aim to optimally attune real estate to the organizational demand, in which different disciplines or stakeholders are involved (figure 1). In stead of measuring real estate costs only, CREM and PREM also signify the importance of creating revenues or generate income indirectly, but due to intangible aspects of real estate it can be difficult to address this so called "added value" of real estate.

There is not one ultimate method or approach for the strategic management of the real estate portfolio. In general all real estate strategies can be separated between prescriptive and descriptive ones. The prescriptive strategies focus on how to create a strategic portfolio whereas the descriptive strategies want to find out which steps lead to a strategy. For guiding the process of creating an accommodation strategy an independent (open towards different methods) analytical framework has been designed in which attuning the relatively static supply with the changing demand is essential (figure 2). This is called the Designing an Accommodation Strategy Framework, DAS-frame (Jonge de et al., 2009).

Recent trends and developments in the Netherlands reveal a transformational process in public real estate management (PREM) of the larger municipalities. Due to liberation and professionalism of public real estate management, the rise of market parties as partners in the public domain and an increasing power of municipal policy, it occurs that municipalities are able to position themselves by choosing their real estate management options and related contents.

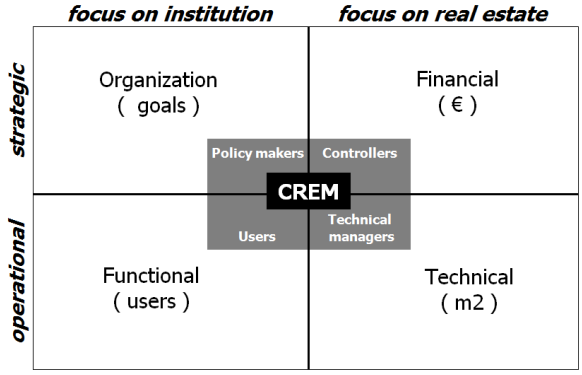

Figure 1: Stakeholder analysis

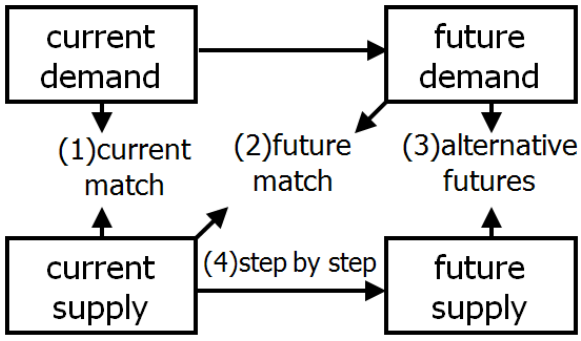

Figure 2: DAS-frame

This project focuses on the municipal development company of Rotterdam (OBR). OBR corresponds with the accommodating municipality which means the organization wants to apply content steering, public development and act like a market leader. OBR chooses to influence the public domain through possession and management of real estate. The Long-Range Perspective Rotterdam Real Estate, the MPRV (OBR, 2009) visions the real estate policy of OBR. It explores definitions, relevant variables and budgets. OBR has the desire to steer more and more explicit on an optimal (strategic) portfolio. Two important perspectives in this context were; (1) how the "strategic" portfolio creation process can be carried out: the instrumental perspective; and (2) the approach of interacting actors: the interaction perspective.

The desire to steer and the MPRV created the spin-off for the development of the Public Real Estate System (PRE-system). The goal of the PRE-system is to make the MPRV operational (in a computer model) to analyze and evaluate strategic real estate decisions and explore the following definition:
"Achieving public goals with minimal means".

The plan of approach for the design of the PRE-system contains three essential elements:

1. The DAS-frame process;
2. The stakeholder's analysis, which provides a global structure of discipline quadrants and is used for displaying (modelling) and exploring variables;
3. The desire to steer on the complex portfolio requires a systematic approach with interdisciplinary problem solving.

A system fits a group of elements that cannot be subdivided in independent elements. Application of the systems approach forced to consider internal elements. It appeared that public goals and means (costs) are influenced by factors like selling real estate (the willingness to invest and the market value), the user relations (user satisfaction) and the technical relations (technical condition). They are positioned in the same "sub aspect system", which means they are interrelated and influence the portfolio. The goal of this project could now be determined:

- *The development of a digital (computer) public real estate decision support system to steer on the complex real estate portfolio;*
- *Steering will focus on the relation between public goals and the portfolio which is influenced by complex selling, user, technical and costs relations;*
- *Steering is essential in order to create strategic real estate interventions;*
- *Which ultimately lead to a strategic portfolio.*

Steering is only possible if the PRE-system is controlled properly. Controlling is about influencing the functioning of the PRE-system in the direction of the goal. Controlling requires decision making (agreements about standards) and forms of information infrastructure (the PRE-system database). Steering affects the information infrastructure in order to fit with the environment.

The DAS-frame is considered a guiding process (a standard to a certain degree) for reaching a strategic portfolio. It provides grip in the complex process towards a strategic portfolio and is therefore integrated in the PRE-system. Schematically the interacting actors (CU) are controlling the PRE-system (CS) in which the DAS-frame is integrated (figure 3).

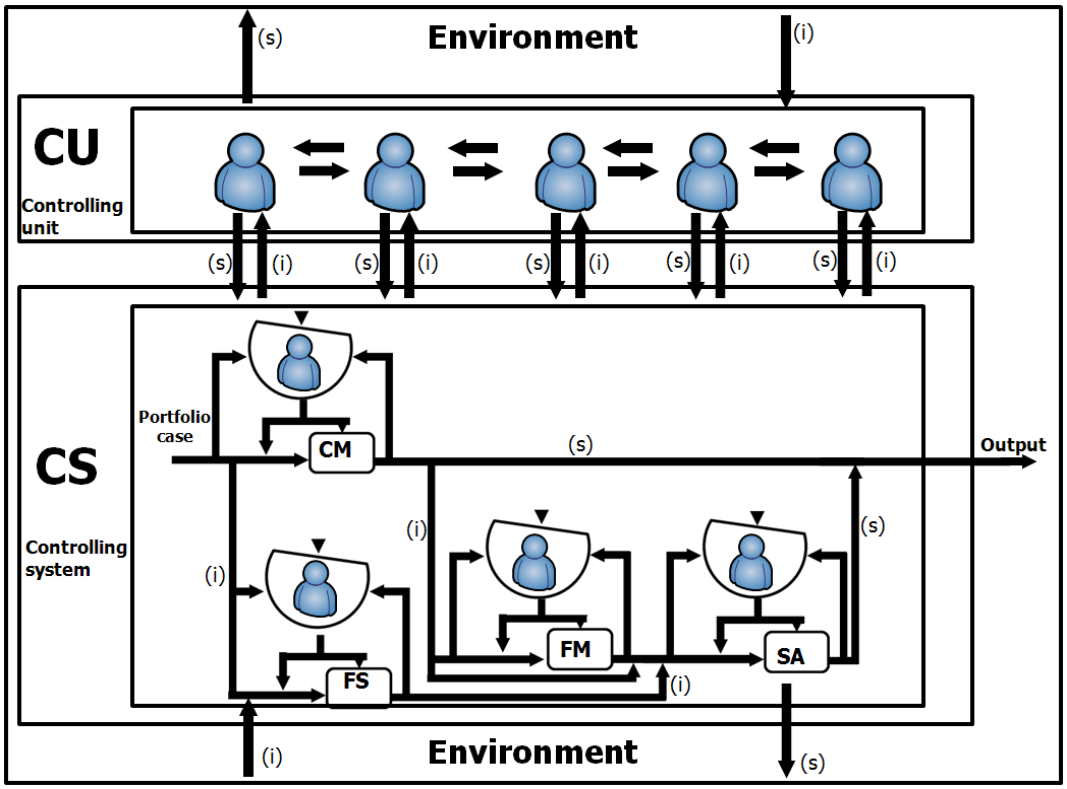

Figure 3: The CU/CS approach adapted for the PRE-system.

The PRE-system uses an "object form" for each object in the portfolio. Such forms provide information of the environment like real estate properties and images, but also demand information which, based minimum requirements, is displayed as sufficient (green) or insufficient (red) in the stakeholder quadrants (figure 4). All objects together result in the current match (CM in figure 3) of the whole portfolio.

The interpretation of the object score is supported by "labels" which suggest interventions (like sell or keep).

During the use of "object forms" the potential was identified as an factor in the strategic weighting process and therefore integrated in the PRE-system. The potential of all objects together results in the future supply (FS in figure 3).

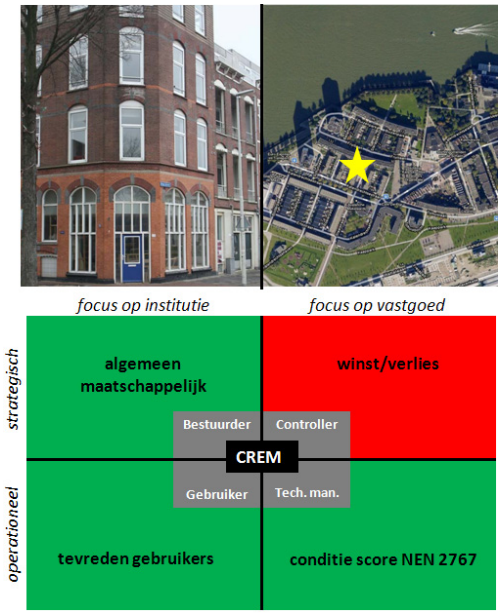

Figure 4: Environment info and object score.

In the DAS-frame (figure 2) the future demand has to be determined and compared with the current supply to address the future match (FM in figure 3). An optimization technique in the PRE-system makes it possible that the future demand is solved within the current portfolio in which objects with multiple problems get a higher priority. Finally all sub processes (CM, FS and FM) provide relevant information for taking real estate interventions like sell, keep or improve. Such interventions are interactively connected to an alternative portfolio database which is the actual strategic portfolio.

The PRE-system creates an extensive strategic analysis of objects and the portfolio. It enables steering on public goals in relation with other relevant variables (including means) possible. It provides the information needed in each stage of the design process and upon standards, the complexity decreases and strategic handling increases. The descriptive character is signified by interacting actors who agreed on standards and identified previously ignorant factors (like the potential). The prescriptive character is about portfolio information which is steered on through standards (in a database). In terms of strategy formation the prescriptive and descriptive strategies are combined.

The PRE-system received a lot of enthusiasm from an organizational wide expert panel of OBR. It occurred that it gains required portfolio insight and helps to determine the core (strategic) portfolio.

The PRE-system can also be further improved. The "added value" aspects from corporate real estate management are not completely integrated. Instead only primarily relevant variables from the MPRV were used. Also selling is chosen as an extreme opposite of keeping which leaves no room for a cooperation form with the market. Public goals were measured with a preliminary sub design in experimental setup which has been questioned. The "improving" intervention can be extended with (1) facilitating the tenants (real estate added value) and (2) improving market attractiveness. In this way the emphasis is more on the tenants independency instead of a doing a mere analysis.

For OBR experts the public goals and supplementary payments felt like the responsibility of the public policy services[1], while they should focus on real estate itself. The definitions and configuration of experts must therefore be reconsidered.

[1] Public policy services, in Dutch: "gemeentelijke beleidsdiensten".

Content

1. Real Estate Management (REM)

1.1. Introduction

This chapter is a brief summary of how real estate managers handle their real estate. In real estate management (REM) one can distinguish various specialisations which handle and compile a real estate portfolio from different perspectives:

1. Portfolio management
2. Corporate real estate management (CREM)
3. Public real estate management (PREM)

The purpose is to explore the differences between CREM and PREM, and the ingredients of strategic handling in PREM.

In portfolio management the investment point of view is taken as a primary point of departure. It focuses on the desires of the investors (investment management) in which a certain balance between risks and return yields is required.

In corporate and public real estate management (CREM & PREM) real estate is seen as the 'fifth resource', i.e. real estate as a facilitator of an organization's primary process (Joroff et al., 1993).

Figure 1: Real estate as production mean, (Joroff et al., 1993 adapted).

1.2. Corporate and Public Real Estate Management

CREM is the management of a real estate portfolio by aligning the portfolio and related services to the objectives of the organization, the needs of the real estate users and other stakeholders. A vital part of CREM is the integration of the various disciplines in the coordination process[1] of supply and demand, at both stock level (i.e. portfolio management) and property/workplace level. The idea is that it will result in maximum added value for the corporation and therefore real estate is measured on factors like employee satisfaction, labour productivity, a positive image and identity, effective and efficient ways of working, and reduction of facility costs [2]. The stakeholder analysis [3] is a frame which separates management forms that share the same goal to optimally attune real estate to organizational performance (Figure 2).

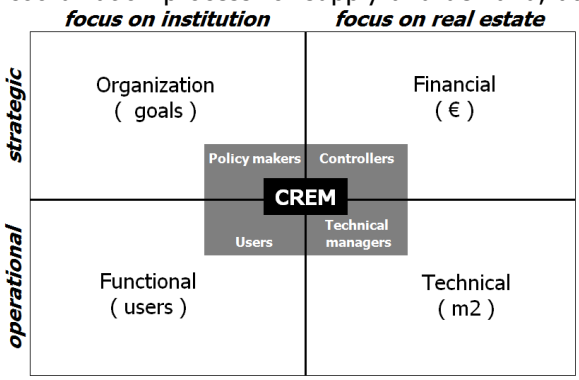

Figure 2: Stakeholder analysis

[1] This process is a match between business i.e. the demand side; and the real estate i.e. the supply side, by connecting the strategic and operational level. It is further described in the DAS-frame (chapter 2.4).
[2] In chapter 2.3 these will be further elaborated as "added value" aspects.
[3] Within the field of CREM the real estate stock is assessed from different management forms also called domains: General Management, Asset Management, Facility Management and Maintenance Management.

In CREM real estate managers distinguish different policy levels, also called levels of handling in which the focus can shift[1]. On the strategic level organizational goals are translated into real estate. The tactical level mainly contains the performance analyses of real estate, and on operational level facility management is forming a key role to emphasize the importance of the users. Again all disciplines share the collective goal to optimally attune real estate to organizational performance.

Public real estate management (PREM) is also management of a real estate portfolio by aligning the portfolio and related services to the objectives of the organization, the needs of the real estate users and other stakeholders. Public refers to the portfolio of public institutions. In the public perspective the mutual tasks of public portfolio managers can significantly differ because public refers to the portfolios of all public institutions such as national governments, regional governments, non-profit organizations, local governments etc. The definition of public real estate management in national governments according to Van der Schaaf (2002) is:
"Public real estate management is the management of a government's real estate portfolio by aligning the portfolio and services to (1) the needs of the users, (2) the financial policy set by the Treasury and (3) the political goals that a government wants to achieve".

For municipal real estate the definition can be different. For example the political goals of the national government can be broader than those of the municipal. Mac Gillavry (2006) did research in municipal real estate and distinguishes four purposes of local governmental real estate:

- Policy supporting (culture, economy, traffic & transport, healthcare, sport, education);
- Process supporting (urban spatial developments);
- Municipal supporting (own accommodation);
- Governmental ownership is not necessary anymore (commercial or dismantling real estate).

We must note that not every municipality is trying to influence the urban spatial developments.

[1] Research by De Vries has revealed that CREM can develop from an operational to a strategic focus.

In theory public real estate management incorporates the same disciplines as corporate real estate management, but there are major differences in managing them. According to Mac Gillavry (2006) differences between corporate and public real estate are that (1) commercial parties primarily focus on return on investment and municipalities also focus on public goals and (2) municipalities are having difficulties to measure performance of real estate because of the unique character.

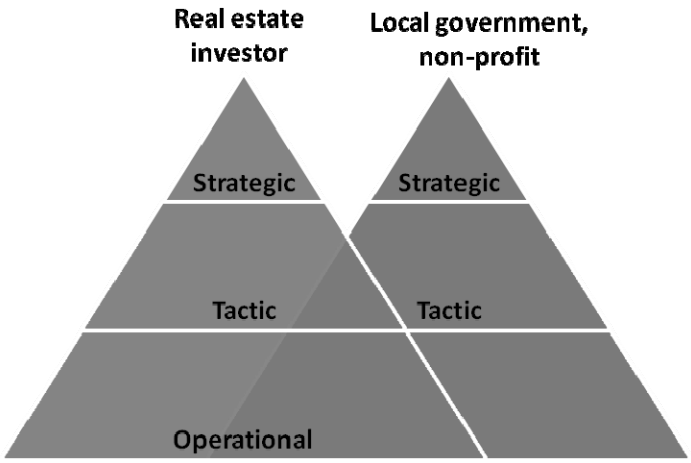

Figure 3: REM and PREM merging on operational level.

Mac Gillavry (2006) has also addressed similarities in corporate and public real estate management. He revealed that they use the same levels of handling (mission, strategic, tactic and operational) and they both have to handle different interests. In addition to these levels of handling, Janssen (2009)[1] revealed an overlap between real estate management and public real estate management on the operational level, which commonly only differs in juridical sense. This overlap creates chances for both market and public parties, because outsourcing is more likely to happen. For municipalities, reasons for outsourcing can be the financial benefits of present market forces on the operational level. In addition they are likely to focus solely on their core business.

1.3. Added value

The previous paragraphs showed that optimal alignment of real estate and organizational objectives is essential. Real estate cost measures, such as cost per square meter, are the most common methods to evaluate the real estate performance by portfolio managers. However, real estate decisions can also contribute to increase revenues or generate income indirectly. This is especially important to recognize in knowledge-based businesses whose values lay mainly in their intangible assets.

In CREM the asset management domain is responsible for quantifying value. An asset is essentially a resource held by the business which has certain characteristics. The major characteristics of an asset are (Atrill and Mclaney, 1997):

- A probable future benefit exists;
- The business has an exclusive right to control the benefit;
- The benefit must arise from some past transactions or event;
- The asset must be capable of measurement in monetary terms.

[1]Janssen, I.I. is PhD candidate at the TU/e. She addressed this relation during a presentation in a congress meeting of De Kopgroep and the Nevap titled "Commercial Management of Societal Real Estate" 14th of October 2009.

In practice it appears difficult to quantify all added value of real estate, which is remarkable because organizations cannot function without real estate. Prof. Hans de Jonge described seven elements of added value for real estate that contribute to the transformation of real estate from mere "costs of doing business" to a true "corporate asset" (Krumm, 1999).

(1) Increasing productivity	Offering adequate accommodation Site selection Introducing alternative workplaces Reducing absence of leave
(2) Cost reduction	Creating insight into cost structure More efficient use of workplaces Controlling costs of financing
(3) Risk control	Retaining a flexible portfolio Selecting suitable locations Controlling the value development of the real estate portfolio Controlling process risk during (re)construction Controlling environmental aspects and labour conditions
(4) Increase of value	Timely purchase and sale of real estate Redevelopment of obsolete properties Knowledge of and insight into real estate market
(5) Increase of flexibility	Organizational measures (working hours, occupancy rates) Legal/financial measures (mix own/rent/lease)
(6) Changing the culture	Introducing workplace innovations
(7) PR and marketing	Selecting branch of locations Image of buildings Governing corporate identity

Table 1: Seven forms of real estate added value (Krumm, 1999).

In public real estate management an additional added value aspect can be identified: achieving political goals (Van der Schaaf, 2002:51). In public real estate management programs do not only have an economic return on investment, but also a social one that is immeasurable in most cases. This makes it difficult to compare alternative investments.

1.4. Design an accommodation strategy (DAS-frame)

Corporate real estate management revealed that the integration of the specialisations in supply and demand is an essential process. For structuring the process to create an accommodation strategy, the department of Real Estate and Housing[1] designed a framework in which attuning the static supply with the changing demand is essential[2]. This framework is called designing an accommodation strategy (DAS-Frame).

Key issues in this framework are four main steering events (Jonge de et al., 2009):

1. Determine "what we have" versus the current demand "what we need" which results in the current (mis)match;
2. Determine "what we might need in the future" versus the current supply and results in the future (mis)match;
3. Design alternatives of "what we could have";
4. Use a step-by-step plan to transform the current supply into the future supply.

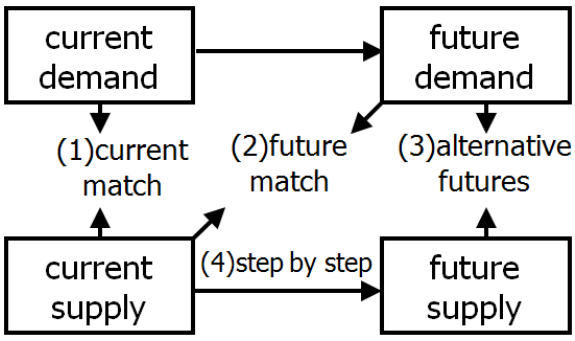

Figure 4: the DAS-framework

To attune this static supply with the changing demand a plan of approach is needed. A "strategy" can be a plan of approach. According to Johnson & Scholes (1998) a strategy is:

"The direction and scope of an organization over the long-term which achieves advantage for the organization through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfil stakeholder expectations".

This is only one definition; literature on organization management is struggling for decades with the definitions of strategy and strategy design. The complexity of the phenomenon does not allow for a straightforward description (Jonge de et al., 2009). Mintzberg (1998) distinguishes ten schools in strategic management; while the underlying idea is that the ultimate 'strategy beast' is not present in any of those, and each school is only representing a partial picture of what strategy is. The ten schools are globally divided into two groups. The first group has a prescriptive character, which is rather normative (pointing out how it should be done); the second group has a descriptive character in which the question is how strategy formation is actually achieved. According to De Leeuw (2002) both perspectives are in accordance with the instrumental (prescriptive) and interaction (descriptive) approach, which will be explored later in the system approach of this report.

[1] The department of Real Estate and Housing (RE&H) is part the Faculty of Architecture at the Technical University of Delft.
[2] Research by De Vries (2007) has revealed that CREM can develop from supply to a demand driven approach.

1.5. Strategic public portfolio management

Research in 2007 (Hordijk) points out that the total value of municipal real estate in the Netherlands is between 30 and 37 billion Euros. Investments by private investors are worth approximately 35 to 45 billion Euros. Investments by the central government are valued at 4.5 billion Euro (Hordijk, 2007).

In the Netherlands many municipalities are willing to manage their portfolio more strategically. They become more active in redevelopment of inner city areas in which real estate forms a key role and instrument. Research under municipal employees revealed that 80% of the respondents think that real estate is important as mean in specifying and implementing policies (Bis et al., 2003).

According to Van Leent (2008) the context of local governmental real estate has changed. The following developments are now current: (1) liberation and professionalization of public real estate, (2) the rise of housing associations and market parties as partners in the public domain, and (3) increased policy power of municipalities. Van Leent distinguishes four strategically real estate options for municipalities to consider:

Option	Dominant motive	Place portfolio management	Market share social RE
1. Non Real Estate	clear & transparent	-	zero
2. Economical	costs reduction	facility management	limited
3. Entrepreneurial	strength	development company	important
4. Accommodating	content steering	public development	market leader

Table 2: The transition from marketing to imagineering (source: Van Leent, 2008).

In the Netherlands the non real estate option persists in many smaller municipalities while the accommodating phenomenon is occurring in the larger cities. According to Van Leent (2008) the accommodating municipality is the most emancipated form and chooses to influence the social domain through possession and management of real estate. Real estate contributes to social goals, with its place, representation and layout. A strong aspect of the accommodating municipality is that it can steer on activities and coherence in public amenities through possession and management.

According to Middendorp (2008) departments like city development, public development and portfolio management are struggling to reach a collective approach in steering. A more integral view can result in interesting public and financial returns. The challenge is to interpret the complex field of portfolio management through the following three objectives:

- Adjusting the supply and demand from a strategic, sector exceeding vision;
- Value management of possession. Complying with the real estate demand with the most efficient use of means and a professional and business like role of ownership;
- Pivot in the development issues of the city. Real estate is used to steer in the spatial ambitions of the city.

	Strategic sector exceeding supply and demand	Value management	Pivot in development
New RE	Initiating projects Synergy in space use Synergy in activities Search in commercial functions	Steer on flexible and multifunctional RE Steering on end value Marketable RE Maintenance expertise Owner occupied or rent? Determine development form	Initiating projects Empowering developments Area marketing Determine redevelopment value
Existing RE	Steering on occupancy and use Preventing vacancy*	Steering on costs and quality Maintenance Optimization	

Table 3: The wide field of portfolio management (source: Middendorp, 2008).

This three way objective interpretation of public portfolio management is overlapping with the strategic options displayed in Table 2.

In addition to the portfolio options and objectives Van der Schaaf (2002:179) has identified three extreme strategies for national governments in relation with different countries and contexts, which results in different sets of consequences and risks for each situation. The three strategies to follow are:

- *Strategy 1. Serving political goals*: reaching political goals is essential, goals are only time dependent. This results in high achievement in socio-economic goals, a large owned portfolio, lower operating costs [1], high capital investments and lower user satisfaction.
- *Strategy 2. Users decide:* costumer value is a central issue, added with financial returns. This results in an increase in leased portfolio, less owned portfolio, higher operating costs, higher user satisfaction but also higher rent which decreases user satisfaction, and to achieve socio-economic goals it must be in line with the users.
- *Strategy 3. Act like an investor:* accommodation is seen as investment asset, with an internal rate of return. This results in a higher market value, high capital investments and negative user satisfaction (due to rent rise), socio-economic goals would be achievable similar to "users decide" strategy.

Figure 5: Three extreme strategies (source: Van der Schaaf, 2002 adapted)

Van der Schaaf positioned the different sets of consequences and risks within the three strategies. The sets of consequences and risk depend also on a private or public focus, e.g. what can be carried by the market or the local government. In addition there are differences in control, e.g. is the user the controller or has the public authority a central organization to steer on real estate.

[1] The US definition of operating is used here. Operating costs are higher when buildings are leased, because rent is also included in operating costs. Operating costs further include costs for cleaning, (day to day) maintenance, security, energy etc. Operating costs should not be confused with accommodation costs.

The theories of Van der Schaaf (2002) and Middendorp (2008) overlap each other and are difficult to compare mutually. The political goals of Van der Schaaf are best represented in the strategic supply and demand topic from Middendorp; while both the user and investor approach of Van der Schaaf meet value management of Middendorp. A comparison with real estate options is needed to draw context of each option (Table 4).

	1	2	3	4
Schaaf (2002)	Political goals	User decide	Act like investor	
Middendorp (2008)	Strategic sector exceeding supply and demand	Value management	Value management	Development
Van Leent (2008):				
1. Non real estate	V			
2. Economical			V	
3. Entrepreneurial		V	V	V
4. Accommodating	V	V	V	V

Table 4: The focus of essential strategic ingredients within real estate options.

It occurs that the accommodating municipality does not have a dominant focus, instead it contains a bit of all. This also fits with the remark of Van Leent (2008) that it is the most emancipated form.

Middendorp explicitly mentioned the development of the city. This difference can be clarified by the fact that Middendorp focussed on municipalities in the Netherlands, while Van der Schaaf assessed national governments in an international context. Dutch legislation gives municipalities the opportunity to initiate urban developments, while the national government is involved with large scale spatial planning. The development issue of municipalities receives more attention these days due to the economic crisis. Many believe that municipalities should focus their effort on creating spin off effects and that cooperation with the market is of subordinate importance instead of doing the job alone (Vulperhorst, 2009).

1.6. Conclusion

Real estate management has emerged into various specialisations. In the corporate real estate management discipline, the focus is on property as the 'fifth resource', i.e. real estate as a facilitator of an organization's primary process. Corporate real estate management (CREM) incorporates the business perspective while public real estate management (PREM) incorporates the same but also focuses on the portfolio of public institutions. 'Public' refers to an underlying field of practise like national, regional and local governments. The differences between PREM and CREM are:

- PREM does not primarily focus on return on investment but public goals are leading;
- Performance measurement in PREM can be more difficult because of the unique character;
- Strategic and tactic levels of handling differ while a merge is noticed on the operational level.

In a broad sense real estate cost measurement is the most common method to evaluate the real estate performance. Real estate decisions can also contribute to increasing revenues: the added value. However it is difficult to address the added value in practise. Eight aspects of added value for public real estate are identified[1].

For guiding the process about how to create an accommodation strategy a framework has been designed in which attuning static supply with the changing demand is essential. This so called Designing an Accommodation Strategy Framework (DAS-Frame) is applicable for all types of real estate, relatively simple and complex portfolio cases.

Strategy and strategy design do not have a straightforward description. Mintzberg (1998) distinguishes roughly two strategy groups; the prescriptive and the descriptive strategies. The prescriptive character points out how it should be done, the descriptive how strategic goals are actually achieved and find out which steps lead to a strategy. The ultimate 'strategy beast' is not present in any of them. Further on in this report the 'systems approach' has similarities with the prescriptive and descriptive character in the instrumental and interaction perspective.

Strategic in the local government's context can refer to different propositions; choose a strategy (Van der Schaaf), reach a collaborative approach in steering (Middendorp), choose a strategic option or position (Van Leent), creating spin off effects (Vulperhorst) etc. Both Van der Schaaf (2002) and Middendorp (2008) address overlapping ingredients for strategic public real estate management. They are compared with the real estate options (Van Leent) to see were the focus of each option persists.

The accommodating municipality does not have one dominant focus, instead it contains a bit of all (see Table 4). This also fits with the remark of Van Leent (2008) that it is the most emancipated form. Besides the importance of public goals, the accommodating municipality chooses to influence the social domain through possession and management of real estate.

[1] (1) Increasing productivity, (2) cost reduction, (3) risk control, (4) increase of value, (5) increase of flexibility, (6) change culture, (7) PR and marketing, and (8) 'achieving political goals'. This last aspect emphasizes the difference between CREM and PREM.

2. Rotterdam Development Company (OBR)

Figure 6: Icons collage from Rotterdam (source: OBR website, 2009 adapted).

2.1. Introduction and structure

This chapter elaborates the development company of Rotterdam (OBR) and explores its guiding real estate management document, the Long-Range Perspective Rotterdam Real Estate (MPRV) to come to a selection of variables for this project. The selection of variables is vital for managing the portfolio strategically.

The Rotterdam municipality tries to create an attractive city for its citizens and real estate is used actively to realize this goal. In the end of 2006 the municipality decided to move all its real estate to one body; the sector real estate of the Rotterdam Development Company (OBR).

The real estate sector is maintaining, developing and redeveloping the portfolio. This sector manages all real estate of the municipality. Rotterdam has the largest real estate portfolio in the Netherlands[1]. In 2007 OBR possessed more than 7% of all municipal real estate in the Netherlands. Rotterdam owns offices, museums, art departments, sport complexes, social and recreational spaces, schools and ground. Within the real estate sector a separation is made between portfolio management, real estate development and technical management. Besides the sector real estate two other sectors are incorporated within OBR.

The sector area development of OBR has three goals: (1) facilitating, (2) influencing and (3) participating. Facilitating signifies making the city more attractive for investors, by improving the living and investment climate. Influencing means active participation in spatial and economical developments of the city and participating means participation in commercial development, in cooperation with other parties.

The sector economy focuses on entrepreneurship and innovation to keep Rotterdam competitive and stimulates the local economy. This department is working on visions, plans and several stimulation methods. The sector economy is working together with the field of practice, like prominent entrepreneurs and representatives of (knowledge) institutions, united in the Economic Development Board Rotterdam (EDBR).

[1] WOZ-value is 2.2 billion Euro (2007).

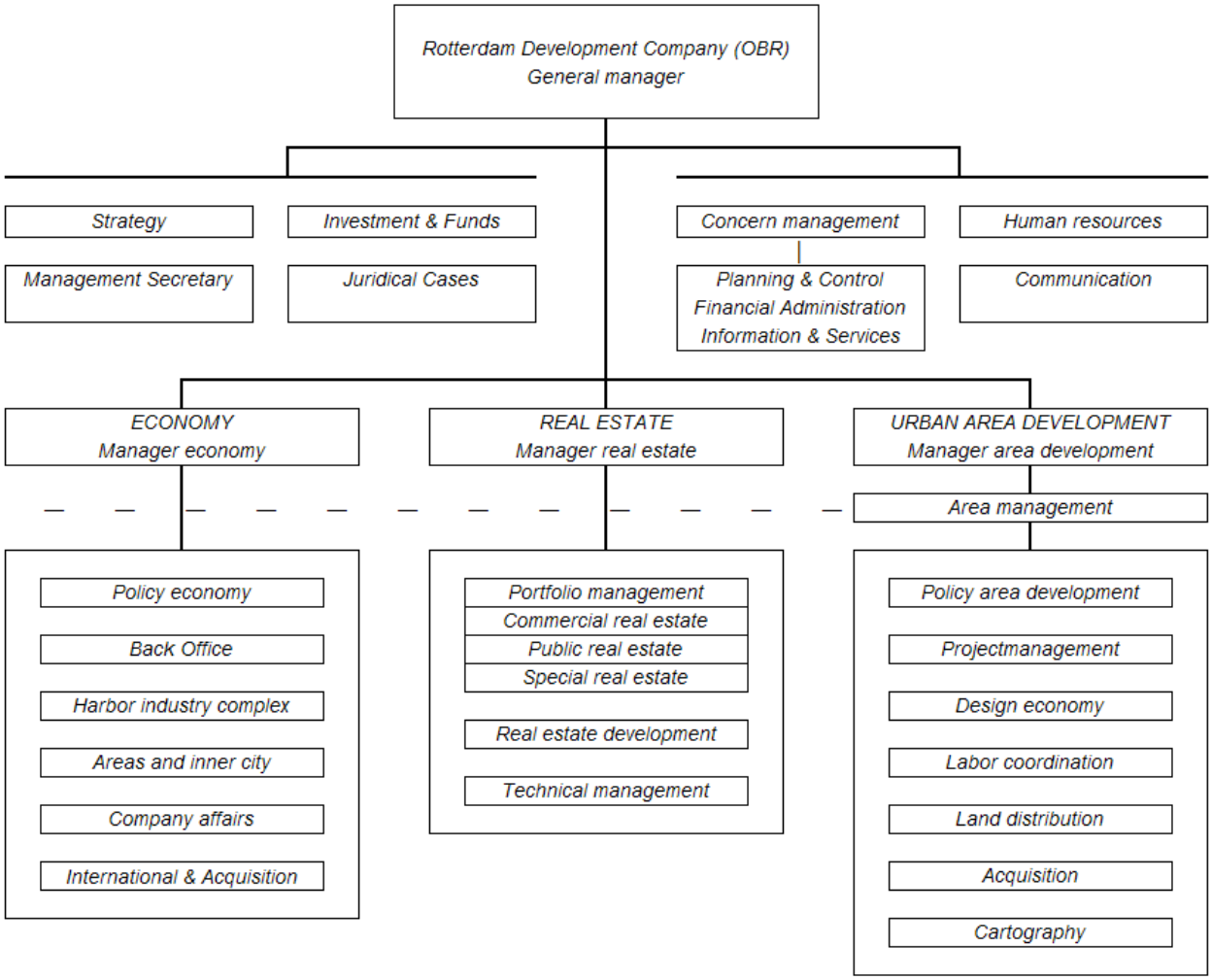

Figure 7: Organization structure of OBR, 2009

Referring to the sector real estate three types of real estate can be distinguished; public, commercial and special purpose real estate. Public real estate is allocated to a social activity. Accommodation examples are sport, school, amenities, theatres, etc. A characteristic of the portfolio is the slow elapse. This portfolio remains stable over time. In this type of real estate it is essential to translate the demand of the council in the right way.

Commercial accommodation contains real estate of which its potential must be able to unfold. It is about developments in which the city has a demand but there are no initiatives from the market. There are many reasons why the 'willingness to invest' is insufficient. In most cases the neighbourhoods in which an object exists must become more attractive, so that entrepreneurs or investors are able to carry the risks. Starting entrepreneurs or entrepreneurs working in sectors which are not immediately independent get the possibility to grow until they are at sufficient strength. In this case the public goals are achieved and the object can be sold.

Special purpose real estate contains temporary real estate and special objects like monuments and the harbour quays. Acquisition is done through departments like area development, safety etc. This portfolio is acquired with the intention to resell as soon as possible.

2.2. MPRV

The introduction revealed that Rotterdam has the characteristics of an accommodating municipality. It is visible through the real estate allocation to a central body, a separate development department, an area development department for urban spatial developments, and an economy department for facilitating entrepreneurship and innovation.

One of the motives behind centralization is to use real estate as a more effective and efficient steering element for the desires of the Rotterdam municipal.

By merging all real estate to one body, the question rises how it will be handled. When is real estate developed by OBR, the market or both? What rent prices are demanded and when is real estate sold? The Long-Range Perspective Rotterdam Real Estate (OBR, 2009) is a result of long term internal and external negotiations and is visioning and directing the real estate policy. It explores definitions, relevant variables and budgets for OBR. For the direction and selection of variables (including measurement) of this project it is regarded as an important document.

Figure 8: Cover MPRV (source: OBR, 2009)

The starting point of the MPRV is:

Rotterdam has its own real estate which is used as an effective and appropriate instrument to contribute to the current means and instruments to achieve public goals (safety, economy, physical). Possession of real estate is not a goal in itself, while increasing the quality of the Rotterdam amenities is (OBR, 2009).

The following chapter will elaborate important real estate aspects of the MPRV like public goals, real estate quality, financial return, acquisition, selling and the position of the market.

2.3. Public goals

In public real estate management achieving public goals is essential. Due to the liberation and professionalism of public real estate management the definition of public goals appears to be influenced by factors like return on investment and market quality. Due to the financial crisis it is likely that a stronger focus on financial return will evolve.

Real estate is only applied if it results in public effects (OBR, 2009).

The MPRV has listed fifteen categories of public goals which are distilled from the city programs. They are added with examples of public goals in real estate and can be found in appendix 2 of the MPRV (OBR, 2009).

Figure 9: MPRV (source: OBR, 2009)

2.4. Real estate quality

More than before, coming years focus on improving the user satisfaction (OBR, 2009).

For offering an adequate accommodation OBR is currently examining user satisfaction surveys. There are no results available yet. The results can gain new insight in how to stimulate users with real estate.

It is important to know what quality real estate has (OBR, 2009).

To prevent obsolete properties OBR is using a technical condition norm, the NEN-2767-norm. This norm contains an arrangement of six conditions on an ordinal scale[1]. Five is the minimum score for an object. This means that a score of five and below should result in demolishing, (re)development or selling.

[1] In an ordinal scale the ranking is clear but the differences are not clarified. A score of "excellent condition" above "average condition" cannot be verified as the same difference as "average condition" and "poor condition". A precise empiric description by each scale reduces this problem but can never eliminate it.

2.5. Financial return

According to the MPRV, Rotterdam will never exploit real estate with only financial goals; public returns are leading. It means that a public costs-revenues analysis (MKBA) can be necessary. OBR, as commercial portfolio manager, maintains the principle of cost-price covering rents. In cases where the tenant cannot pay for the costs-price[1] covering rents, supplementary payments will be made by the concerned policy service (Dutch: beleidsdiensten). This results in transparency. When the commercial rent level is achieved, the object can be sold and there is an aim for maximum revenues.

Real estate is disposed if commercial rent is possible (OBR, 2009)

Recent trends reveal that this policy could change. In Rotterdam the revenue of land exploitation on the long term requires attention. The former growth of the city and related urban area development was an important source of revenues which can be used for urban investments in other places. The current trend reveals that inner-city (re)developments barely create revenues; instead development is depending on subsidies. To preserve the city investments in spatial quality the revenues of land exploitation on the long term is worrisome. The trend reveals that there could be a shift from a focus to achieve public goals towards achieving public goals and acceptable earns wages (Dutch: verdienvermogen).

2.6. Acquisition and selling

The portfolio should be adaptable towards a changing demand from the city; suitable locations must be found for acquisition if needed. The municipality acquires real estate objects for various goals. Such objects are demolished, used as odd job dwelling (Dutch: kluswoning) or overturned to a housing association or market party (MPRV 2009:32).

Instead of acquiring, the municipality is also selling real estate if public value is ensured. Which objects should be sold or acquired is important for value development. The MPRV signifies the importance of achieving maximum revenues when selling. The revenues from OBR are collected in the Investment Fund Rotterdam (IFR). This fund is also used for covering inevitable loss(es)[2] of physical projects, like real estate developments.

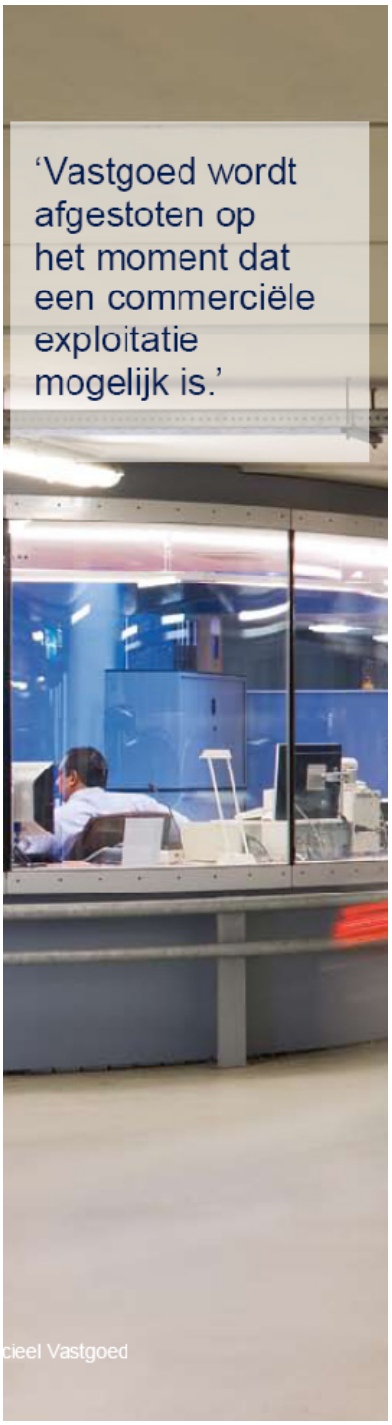

Figure 10: MPRV (source: OBR, 2009)

[1] According to the concept MPRV cost-price rent consists of (1) costs for administration and management, (2) business burdens, (3) vacancy costs, (4) expected value development, (5) maintenance, (6) financing costs, (7) mutation and rent-out costs, and (8) risk charges.
[2] In Dutch this is called the "onrendabele top".

2.7. The market unless…

… there are reasons for the municipal to catch up the development (OBR, 2009).

It appears that the market is preferred to the municipality when speaking of developments for the city. The MPRV lists an illustrative diagram to determine which party should develop real estate; the municipal, the market or a combination of both. The critical path towards market outsourcing is as follows:

1. Does the development support a policy (public) goal?
2. If yes, would it fit within the financial requirements, which means a costs-covering exploitation period (including supplementary payments by the public policy services)? If no, there is no municipal development.
3. If yes, the municipality has to choose between a public or private approach. In a private approach all responsibilities belong to the market. Between the public and private approach partial municipal/market constructions are possible.
4. If the market party is preferred, the question remains if the market wants to do it.
5. If yes, can the risks be carried by the market (financial risks, quality object, on time development and scale advantages)?
6. If this sequence is finished with a "yes" it will result in real estate development by the market.

Developments that stimulate public goals and fit within the financial requirements (of OBR) will always result in development by either the market, OBR or combined (OBR, 2009). If the municipal goals are not guaranteed and the market does not want a share, OBR is carrying out the development.

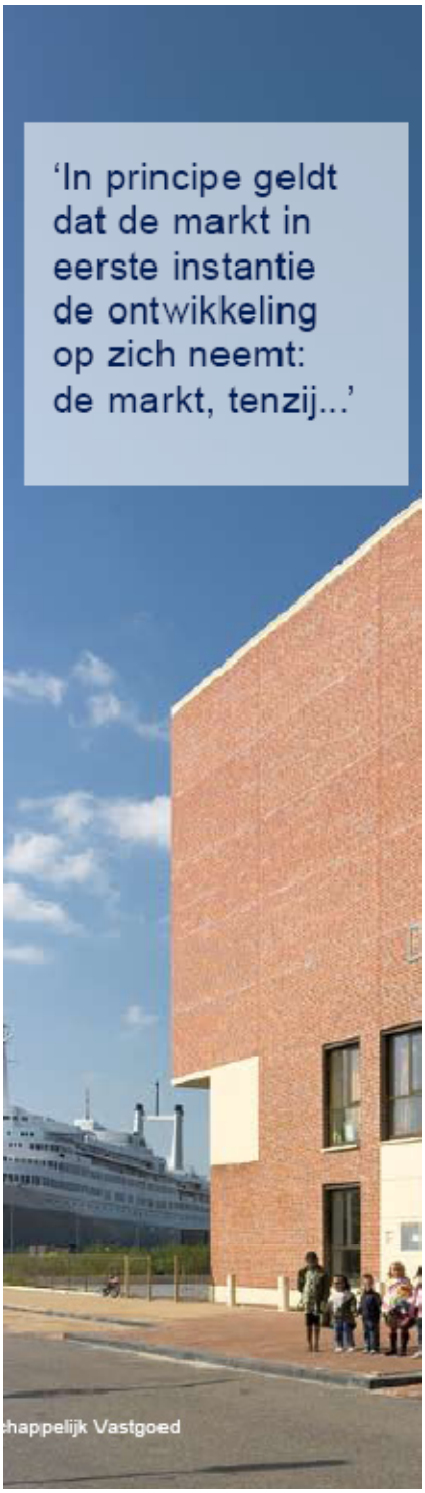

Figure 11: MPRV (source: OBR, 2009)

2.8. Portfolio approach

Managing the portfolio is not explicitly mentioned in the MPRV, it was elaborated during consultations. This means that the definition of the strategic real estate, and "the market unless" must be elaborated.

As mentioned in chapter 1.5 the word "strategy" does not hold a straightforward description. In consultation with OBR, the word "strategic" was initially also confusing. "Strategic for OBR" was initially seen as an ownership object which is of public importance. During consultation it appeared that we could better speak of "strategic for the city" which also signifies the importance of public goals, but independent of ownership, because the market is (always) preferred.

Either in most cases the market is reserved to step into real estate because of a low return rate or too many risks. If this is the case real estate can become "temporary strategic" for OBR. This is of course only the case if there is a public effect involved. In addition, "permanent strategic" functions were identified. Those functions are expected to remain forever in the OBR portfolio. In short:

- Permanent portfolio: "this is strategic real estate for the city of Rotterdam, which is in possession of OBR because otherwise the public stimulation is insufficient".
- The market unless: "this is strategic real estate for the city of Rotterdam, which means that public stimulation is present, but it is not yet attractive for market parties, therefore OBR is currently in possession".

The functions "X" represent the first definition while "Y" fits under the second. In consultations with OBR it appeared that probably all real estate will fit in the second definition, however displaying the first definition is important because it is not a static judgment and Rotterdam is currently reviewing its definitions. For real estate that fits in the second definition (Y) the market is not yet willing to invest. Two possible reasons for this phenomenon are: (1) the (intended) tenant is not able to pay market conform rent and (2) the area in which the object is located is seen as risky by market parties. When both receive a "go", disposition is possible with one remark; OBR can also determine that it is still to risky to dispose because they loose their right of say.

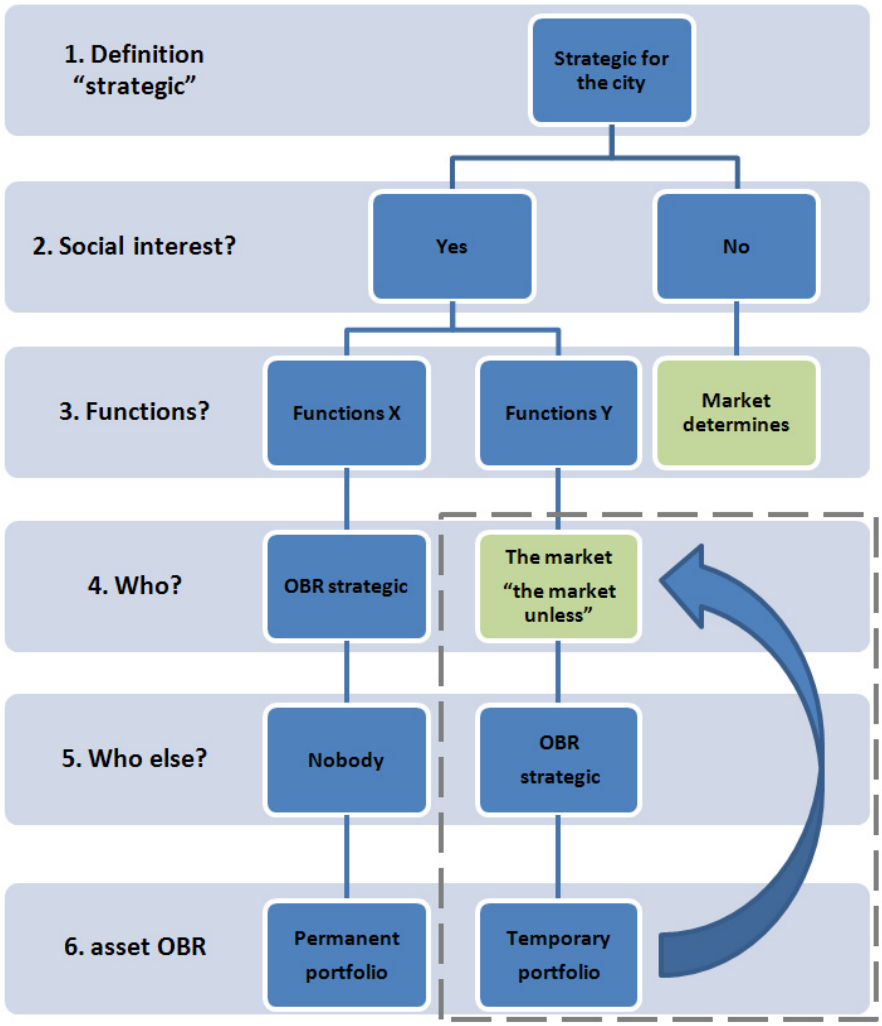

Figure 12: Searching a definition for strategic real estate.

2.9. Conclusion

In PREM the following trend is visible: liberation and professionalization of real estate management, the rise of housing associations and market parties as partners in the public domain, and an increased policy power of municipalities. Rotterdam therefore deployed its own central municipal real estate company, the Development Company Rotterdam (OBR).

OBR wants to steer more and more explicit on strategic real estate in Rotterdam. This steering is visible in the recent processes because OBR created interoperating sectors (economy, real estate and area development) and created the largest municipal portfolio in the Netherlands. OBR should, in this way be able to handle development issues, value management and internal communication more effective and efficient. It will also stimulate towards sector exceeding handling and scale advantages.

The MPRV revealed several variables that are important for managing a portfolio strategically. The most relevant variables are chosen for this project:

1. Public goals
Due to the difficulties of measuring public (social) goals, Rotterdam (and many other municipalities) is dependent of subjective judgements. The MPRV listed fifteen[1] goals of the city and translated examples into real estate examples. It appears that "public goals" is a broad definition; it overlaps with other aspects and is open for discussion. In this project all fifteen fields of the MPRV should be integrated in the system.

- *Variable(s): The fifteen public sub goals.*

2. Real estate quality
The MPRV signifies the importance in insight in real estate quality. Important factors are the user satisfaction surveys and the technical condition norm. The ingredients of the user surveys are not public yet but it should inventory real estate variables. OBR has sometimes no clear view of what influences the user satisfaction, and this differs per user. The added value theory mentioned in chapter 1.3 can help to structure the content of the surveys.

- *Variable(s): User satisfaction and technical condition.*

3. Financial return
Costs price covering rent is demanded by OBR. If the user cannot achieve this level the policy services will add supplementary payments. Those subsidies are bridging the gap between the achieved and cost price rent, therefore both should be measured. The achieved rent level is a variable for the system without the subsidies while the actual costs price rent level should be determined with a discounted cash flow model[2].

- *Variable(s): achieved rent (excluding subsidies) and costs price rent.*

[1] Goals of the city are: stimulation of sport, education, safe entrepreneurship, economical goals, sustainability, urban identity, social insertion, neighbourhood safety, art and culture, accessibility, city development, municipal accommodation, preventing selective migration, leisure economy, amenities.

[2] There are three approaches in real estate valuation: (1) the sales comparison approach; value of subject is prices of comparable properties, (2) the cost approach; value is cost to reproduce (or replace) the improvements as if new and (3) the income approach; value is present value of anticipated income, also discounted cash flow (DCF).

4. Acquisition and selling

The changing city demand is unpredictable and therefore immeasurable. When an object is sold and there is an aim for maximum revenues, the market value at that time determines the selling price.

- *Variable(s): market rent level.*

5. Portfolio approach "the market unless"

In achieving public goals the market is preferred to the municipality. It means that OBR is only in possession of a policy (public) supporting object if the market is not willing to invest and the financial consequences are weighted.

For the market there could be a low expected return rate or too many risks. The market value (rent level) can be quantified with the economic price consideration through a supply and demand analysis. Besides the market value the (more) subjective willingness to invest is important, because it beholds a possible market initiative to achieve public goals of the city, while it is less related to quantity (monetary terms). It is especially useful on places were OBR wants to improve (public goals) prior to revenues, like vacant objects.

- *Variable(s): market rent level & willingness to invest.*

3. Purpose of this project

3.1. Introduction

Rotterdam has its own real estate which is used as an effective and appropriate instrument to contribute to the current means and instruments to achieve public goals (safety, economy, physical). Possession of real estate is not a goal in itself, while increasing the quality of the Rotterdam amenities is (OBR, 2009).

Effective and appropriate implies judgments about good, better, different etc. In this way the organization enters a decision arena. In decision theory this is called goal-oriented handling process (Loon van, 1998). To implement this handling process there is a need for information about what is currently present, what can be changed, what are public goals, what Rotterdam wants to achieve. In a nutshell; data, definitions, judgments (normative and evaluating), (calculation) rules for real estate decisions and known presumptions.

The ultimate goal of this project is to contribute to more optimal (strategic) use of the portfolio by generating an alternative portfolio and simulating portfolio interventions. The portfolio compilation is unique and complex especially with many and differing real estate objects. In terms of public real estate management it becomes more complex because public, financial and other elements are interwoven.

To steer, within this complex process, towards a "strategic" portfolio, a supporting decision instrument will be developed which gives (related) actors grip in reaching a more optimal portfolio. It will contribute to the construction of a working method (methodology, techniques, ICT instruments) with a fitting organizational form (tasks, connections, working processes). Professional literature about information systems speaks of Management Information Systems (MIS) if a specific information system is supporting the steering (managing) in a direction that is desirable, in this case a more optimal/strategic portfolio. Certain systems can do much more than only being an information system; alternative portfolio decisions can be designed, calculated and evaluated.

3.2. System approach

Management literature has developed from a mechanism to a system approach, because today's problems on average are more complex. The mechanism approach first appeared in the Machine Age and was underpinned by two concepts of reductionism and mechanism whereby all phenomena were believed to be explained by using only one ultimately simple relationship, cause-effect. In the mechanism approach problems are seen as a functional machine. Due to increasing complexity in the 21st century, management research has revealed the system approach, a holistic approach[1]. According to the system approach the mechanism approach is not correct. When everything has a cause-effect there can be no space for free choice and synergy.

In the system approach the two concepts of reductionism and mechanism are replaced by expansionism[2] and teleology[3], and cause-effect by producer-product. Russell Ackoff (1999) defines the system approach[4] as follows:

"A system is a group of elements that cannot be subdivided in independent elements. Every element has characteristics which influence the total. This effect on the total influences other elements."

This definition of the system approach (Ackoff, 1999) matches with this project. For example, technical state is a relevant element. This element influences the total because it is part of the whole system (public real estate decisions). The effect of the technical state being sufficient or insufficient also influences other elements like user satisfaction etc.

A system is constructed of several elements or entities, with one or more relations between them. The objects (not to be confused with a real estate object) can have relations, properties or attributes allocated. The system has a border and around it is the environment.

The internal relations are stronger than the external in which the separation between internal and external originated. The collection of relations between objects is called the internal structure, while there are also objects in the environment in which relations exist; this is called the external structure. The interaction with the environment is described by in- and output.

A system can be explored in multiple aggregation levels which are mutually related. This means that there is no interest what so ever in the internal aspects of the chosen aggregation level. This is also called the black box approach. The black box is the lowest aggregation level in a consideration and interest is only focussed in the relations with the environment: input and output, and the relations between them. Properties at the higher levels of aggregation can emerge from relations between the lower levels, these so called emergent properties show that the system as a whole is more than the sum of the parts, also referred to as holism.

[1] Holism is the idea that all the properties of a given system (physical, biological, chemical, social, economic, mental, linguistic, etc.) cannot be determined or explained by its component parts alone. Instead, the system as a whole determines in an important way how the parts behave.
[2] Expansionism is a doctrine (codification of beliefs) maintaining that all objects and events, and all experiences of them, are parts of larger wholes.
[3] Teleology is the philosophical study of design and purpose.
[4] De Leeuw (2002:13) describes the system approach as a box of building blocks for models and theories, in which people try in different ways to describe, analyze and design reality.

3.3. Perspectives

The system approach contains two main perspectives, the instrumental and the interaction perspective. The instrumental perspective focuses on how interventions in the portfolio can be carried out and aims for improving the process of creating this "strategic" portfolio. The interaction perspective looks at the "strategic" portfolio creation process as a whole of interacting actors and focuses on understanding the social processes involved, the subjective interests of actors. This perspective believes that change and improvement is constituted if actors are negotiating.

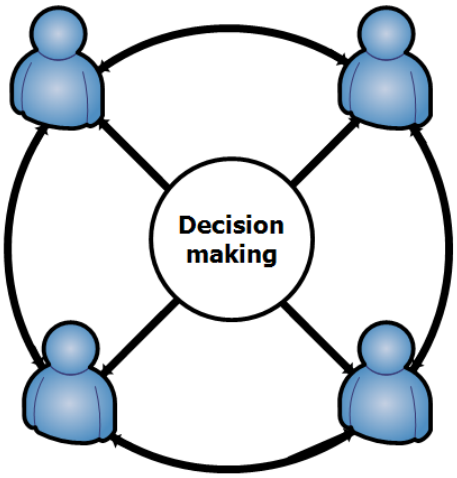

Figure 13: Interaction perspective

The systems approach (including the both perspectives) is considered useful in this project because it approaches the organizational dilemmas as interdisciplinary problem solving. It means that different involved departments, both internal and external (the public service departments for example), are taking part in conversations about portfolio interventions by delivering input to the system and subsequently are negotiating about possible decisions and combinations of decisions.

3.4. Variables measurement

Relevant variables from the MPRV are selected for strategic portfolio management (chapter 2.9) but how to measure those is yet undefined. In short, the organization wants to achieve "public goals", the controller wants "financial return", the technical manager wants a "sufficient condition" and the users want to be "satisfied". In addition the controller part (financial return) should be extended with market variables, because those are important in decisions about what to do with public real estate. It is based on the principle "the market unless" (chapter 2.7).The public goals are further divided into fifteen subfields, added with examples about what such a field means in terms of real estate (OBR, 2009).

For this project the most obvious approach will be to measure all public subfields on a nominal scale. In research activities the yes/no scale is nominal, because it has no order and there is no distance between yes and no. It also means that there is no "maybe" available, which can be a positive thing because one has to choose. Also in a multi actor approach it may stir up a discussion. The nominal scale for public goals helps to create a group view of what public goals mean and can reveal other examples of public goals in real estate. In this project multiple actors are authorized and should decide on public goals; it is open for discussion and the measurement techniques are setup preliminary.

When a nominal scale is used in a multi actor situation, the cognition of actors (on public goals) can be altered because expressing actors (senders) cannot control in which context it is received by the other actors (receivers). For example, one argues that a real estate object complies with sustainability (one of the sub goals) because of a recent redevelopment, while others think sustainability should contain explicit sustainable aspects like a vegetation roof. In this case the actors relate "yes" or "no" to other information. Central negotiations can create a common cognition which can eventually lead to group agreements or suggestions for improving the system. It can also lead to increasing effectiveness and efficiency of the organization itself.

Also in a group discussion about public goals contradictions (possibly deliberate) can occur between received cognitions and the cognitions the receiver already has in his mind. This is called cognitive dissonance and is further explored in psychology studies. For now it is likely that a central decision making setup is needed, at least for deciding on complex nominal scale parts of the system like

the public goals. This setup must be supported by open discussions which is also desired in the MPRV (2009).

The financial goals will be easier to measure because they contain more quantitative data. The key element here is the difference between the achieved rent (also demanded rent) and the cost price rent. It results in the costs or revenues for an object which is of primary importance. To prevent sky high costs or revenues for larger objects it is best to use the costs per square meter indicator. In construction, real estate management and architecture, this ratio is often used; it makes comparing easier.

Two important market indicators[1] were also addressed. First, the "willingness to invest" indicates the (subjective) possibility of selling to the market, and can only be measured best with a nominal scale. Secondly, the ratio between the market rent and achieved (demanded) rent, and the market rent on itself is important because they determine if real estate can be sold and against which price. Real estate valuation theory can improve the accurateness of the market value[2].

The technical condition is described in the MPRV and measured with a norm. A norm is a key between an empiric description and a value. This NEN2767 norm contains a 6 points ordinal scale of which 5 and lower is considered as insufficient (OBR, 2009). In this ordinal scale the ranking is clear but the differences are not clarified, but only minimized with an empiric description. A score of "excellent condition" above "average condition" cannot be verified as the same difference between "average condition" and "poor condition". A precise empiric description by each scale reduces this problem but can never eliminate it. The user satisfaction survey design and possible outcomes are not yet known. For now the method of the technical condition is adapted.

3.5. Project goal

During consultations with OBR the idea rose to make this MPRV operational, in a computer system, in which possible (alternative) strategic real estate interventions can be analyzed and evaluated. The MPRV is used as basis for the computer system. Also the expert delegates[3] of OBR agreed to steer on the following goal of the system:

" Achieving public goals with minimal means".

This definition means that achieving public goals is essential but due to the limited means it must be optimized. Means are referred to as financial and material resources for real estate. The decisions that the computer system should support focus on (real estate) interventions on object level. Such interventions are again connected to (real estate) means, in this way strategic steering on the portfolio becomes possible.

As mentioned in chapter 1.4 the creation process of a strategic portfolio is a common assignment in CREM. The DAS-Framework focuses on the process how to reach an accommodation strategy, by matching supply and demand in time and creating an alternative solution. In this project the DAS-frame is used as a guide for the portfolio creation process. In essence the DAS-frame is used for mapping the design process for the computer model.

[1] Also identified in chapter 3.9.
[2] Three approaches in real estate valuation (1) the sales comparison approach; prices of comparable properties determine the value of objects, (2) the cost approach; value is cost to reproduce (or replace) the improvements as if new and (3) the income approach; value is present value of anticipated income, also discounted cash flow (DCF).
[3] The participators of the workgroup sessions are mentioned in chapter 6.7.

To determine the ingredients for the system approach in this project, three sub segments must be clarified for pointing out on which part of the system this project approach is allocated and focussed on.

- A subsystem is limited to a certain part of the object collection, but does consider all relations within this part.
- In an aspect system the whole object collection is considered but only a part of the relations. It is limited to certain aspects[1].
- A phase system considers the system in a certain time in which the original system was defined.

The system is defined as a public real estate decision support system (PRE-system). Within this system the portfolio case forms the subsystem, which is a limitation to a certain part of the whole portfolio. In consultation with OBR the Katendrecht quarter in the district Feyenoord is chosen as a first case.

The relevant relations of the sub system are positioned in the sub aspects system. In this project they are the public goals, selling possibilities, user satisfaction, technical condition and costs relations. This sub aspect system is different from an aspect sub system. In the sub aspect system the focus is initially on the aspects (like the public goals) and eventually on the system; the portfolio case of Katendrecht. The many different types of relations in the same sub aspects system reveal interweaving, which is a form of complexity[2].

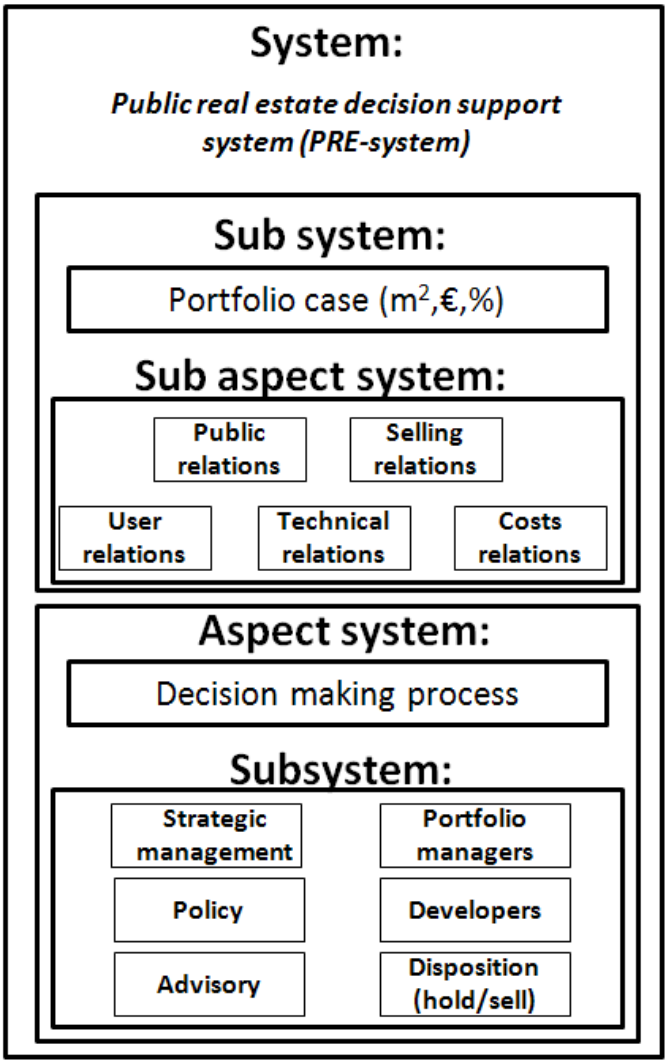

Figure 14: The PRE-systems approach

The decision making process is identified as another aspect system. Within this aspect system the subsystem "actors" can be distinguished which is divided in departments. The interactions between actors/departments determine the collective goals of the organization. Not mentioned is the phase system, while the DAS-frame is also describing the future demand and supply. It is left unmentioned in the system approach because it is difficult to establish explicit years.

[1] Aspects are connected to certain theories like decision theory.
[2] According to De Leeuw (2002) interweaving aspects can be difficult to split apart, such a system is complex. A system that is easily split up in independent sub systems is not complex.

This graduation project mainly focuses on the relations between the sub aspect system; public, selling, user, technical and costs relations which is influencing the portfolio. If this can be done more optimal, a strategic portfolio will be created.

The goal of this research project will be reformulated in terms of the system approach:

- *The development of a digital (computer) public real estate decision support system to steer on the complex real estate portfolio;*

- *This system will stimulate to resolve issues with incomplete, inaccurate and timely data related to the portfolio, which is desired for accurate decision making;*

- *Subsequently the steering will focus on the relation between public goals and the portfolio which is influenced by complex selling, user, technical and costs relations;*

- *Steering is essential in order to create strategic real estate interventions;*

- *Which ultimately leads to a strategic portfolio.*

This project goal has a normative character because it suggests that steering on the relation between public goals and the portfolio, within influences of selling, user, technical, and costs relations can be better. It fits therefore in the instrumental perspective. It also fits with the project goal "achieving public goals with minimal means", because means like money and real estate are interwoven with the sub aspect system.

The PRE-system will also help to determine the collective goals of the organization through interacting actors, the interaction perspective. More elements in which the PRE-system contributes are:
- It simulates a structural approach in the design of an accommodation strategy;
- It forces to look at both supply and demand side;
- It is usable for all types of real estate.

3.6. Conclusion

The goal of this project is to steer to a more optimal (strategic) compilation of the portfolio. Steering refers to a focus on interdisciplinary problem solving. Two perspectives are essential in this context: (1) how the "strategic" portfolio creation process can be carried out, the instrumental perspective; and (2) the approach of this process by interacting actors, the interaction perspective. Management science prescribes the system approach as an effective method to approach organizational problems in such context. A system approaches reality as a system. In such systems the internal relations are stronger than the external (environment) while the interaction with the environment is essential.

Relevant definitions and variables are needed for delimiting the systems approach. Because the MPRV is the result of long term internal and external negotiations it reveals which criteria, variables, and future expectations exists. The MPRV is used as a starting point in this project.

Different measurements techniques are used in this project. In the first place each public sub goal, of which fifteen exist, will be measured for each object according to a nominal scale. This forces to choose yes or no and alters each actor's individual cognition according to certain group cognition. It can help to create group agreements or suggestions for improving the system.

The financial variables are measured in ratios like the profit-loss ratio in square meters. The market measurement contains the (subjective) willingness to invest which will be measured with a nominal scale, the ratio between the market rent and achieved (demanded) rent, and the market rent on itself. This determines if real estate can be sold and against which price. The technical condition and user satisfaction will be measured according to a six point's ordinal scale[1].

In consultation with OBR the goal of the system is to achieve public goals with minimal means. The computer system is defined as a "public real estate decision support system" (PRE-system). Within this system the portfolio case of Katendrecht forms the subsystem. This graduation project mainly focuses on the relations between the very complex sub aspect system; public, selling, user, technical and costs relations which is influencing the portfolio. The decision making process is identified as aspect system where all participated OBR departments (the experts) form the subsystem. They determine the collective goals of the organization through interacting, the interaction perspective.

The goal of this project is the development of a digital (computer) public real estate decision support system to steer on the complex real estate portfolio. This steering will result in a (more) strategic portfolio. This goal has a normative character because it suggests that steering on the portfolio can be better. It fits therefore in the instrumental perspective.

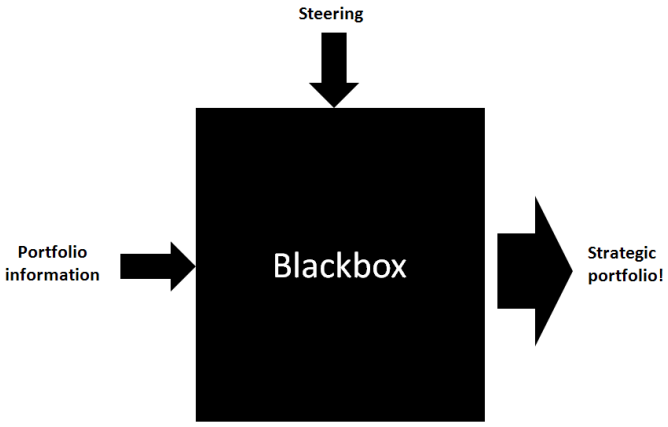

Figure 15: Black box approach

[1] Notice that in the ordinal scale the ranking is clear but the differences are not clarified.

4. Methodology

4.1. Introduction

This chapter elaborates the methodological design phase of the PRE-system. It answers questions like how to approach problems as an engineer, and how to control and steer in this project. It is an intensification based on the point of view elaborated in the systems approach (chapter 3.2).

4.2. Utility function

Engineers are designing solutions for practical problems. Those solutions are fitting with a normative view of the engineer(s) itself. To steer from a non strategic portfolio (the problem) to a strategic portfolio, engineers incorporate relevant variables. Some aspects of those variables can be controlled while others are rather static.

In the decision research scientists agree on the notation of the decision problem in general sense. This notation is known as the utility function. The structure of the decision variables in the utility functions is as follows (Ackoff, 1999):

$U = f(X_i, Y_j)$

In this notation applies:
U: the measure of performance or accomplishment that we seek to maximize or minimize
X_i: the aspects of the situation we can control; the "decision" or "choice" or "control" variables[1]
Y_j: the aspects of the situation (environment of the problem) over which we have no control[2]
f: the relation between U and X_i and Y_j

In this project the *U is* an optimal (strategic) portfolio which we seek to maximize. The X_i is formed by real estate options like; sell, keep or improve which will influence the portfolio. At last the Y_j are representing the norms, goals of the city, financial constraints and juridical constraints, thus relative static information.

[1] In decision systems also known as exogenous variables.
[2] In decision systems also known as endogenous variables.

4.3. Steering and controlling approach

Steering is influencing an organization or design, according to an expected norm which leads to an expected result, without seeing the result as feedback for adapting this influencing process in the organization or machine.

Instead, controlling is about influencing the functioning of an organization or design to obtain supposed results. Such results cannot be obtained if only automatic feedback and correcting (steering) is applied, it requires human interventions. Controlling is therefore the continuous correction of an organization or design in the direction of the goal. Controlling contains forms of decision making and information infrastructure.

Controlling can be seen as decision making on the information infrastructure design by correcting it to norms (standards). A norm (standard) is the key between the design (of processing information infrastructure) and expected impact on the environment (empirical reality). Steering the design (information infrastructure) is needed for fitting the environment.

According to De Leeuw (2002) controlling is all kind of goal oriented influencing like management. Working together can be seen as goal oriented influence because we might presume that it is possible to reach global awareness and it is an aimed appeal to influence the circumstances in a whole organization (the machine).

To make controlling effective the information infrastructure is essential. In an organization the information infrastructure contains all elements for common use by and access to all employees involved with the primary process of the organization. The information infrastructure exists of components like applications, configurations, communication etc. The information infrastructure is regarded as the whole that must be steered, and in such a way that an optimal adaptation between information infrastructure and the environment is realized.

The information infrastructure of a managing system should therefore be adaptable, changeable and in balance, like an open design. The adaptation between system and environment can be realized with steering interventions.

A methodological framework for controlling, steering and information processing the controlling approach is helpful. In this approach (Leeuw de, 2002) the controlling unit (CU) controls the controlling system (CS) in its environment. To be able to control, information from the controlling system and the environment is needed. Figure 16 is displaying this controlling approach. The upward arrows (i) are the information streams, while the down arrows (s) are the goal oriented measures; also steering interventions.

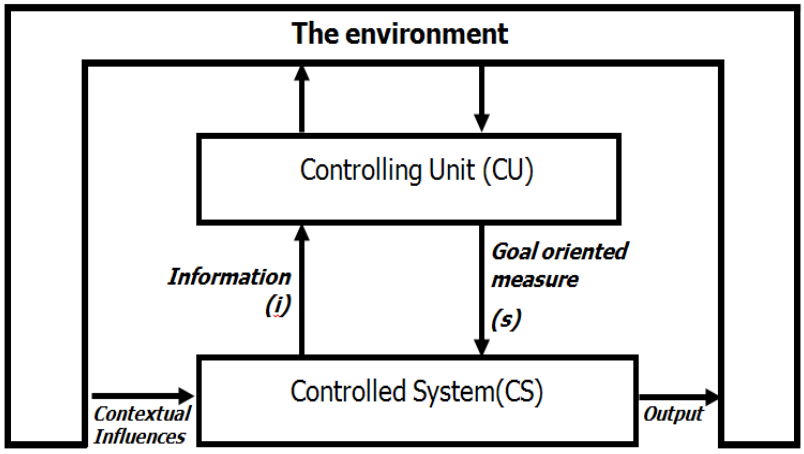

Figure 16: CU/CS approach (source: de Leeuw, 2002 adapted).

It is a conception of controlling and a way how controlling can be applied for creating representations and models. Just like the utility theory it is a paradigm of how to look at problems in this project.

4.4. The DAS-frame, process management

Controlling in management science is often referred to as process management. Process management is one of the essential ingredients to achieve organizational goals. Besides process management Joldersma (2008) also identifies the internal course, which is essential to reach a collaborative approach (like the MPRV in Rotterdam), and meta controlling which should answer questions like: can we continue in this way or do we have to change the organizational course and adjust. Meta controlling is considered very important in this context because it clarifies why organizations are acting the way they act.

Process management is also identified by Van Loon (1998) but within a systems approach context. In this approach an organization is seen as a system of processes which must lead to the achievement of goals. There are three crucial factors in controlling this production process which are similar to those mentioned in management science:

1. The organizational goals
2. The process how to attain these goals
3. The connection between the two

(based on In 't Veld in Van Loon, 1998)

A model (or system) can help to attain organization goals by connection process and goals. If a model must be adjusted on the basis of the results this can be seen as meta controlling.

Van Loon (1998) describes an organization process as "producing designs". In this perspective the input is a task (a commission) to design the product (the strategic portfolio). The idea is that this process can be controlled if the product complies with standards or has certain characteristics which are set in advance. This cannot be achieved unless the process is steered. This design process is also susceptible for malfunctions (defects) which can influence the result. According to Van Loon (1998) this can be dealt with in three ways;

1. Design analysis; measure and compensate in advance (forward linkage);
2. Design evaluation; measure output of the design process and if there is a deviation from the norm, correct input or throughput (reverse linkage);
3. Correct the output by adding missing factors (correct retroactively).

Figure 17 shows this production process schematically.

Splitting a system apart in a network of sub-processes is possible. Each sub process has its sub design commission and is transformed into a sub solution. This methodological approach is primarily focussed on control and steering of activities, and barely on content and implementation.

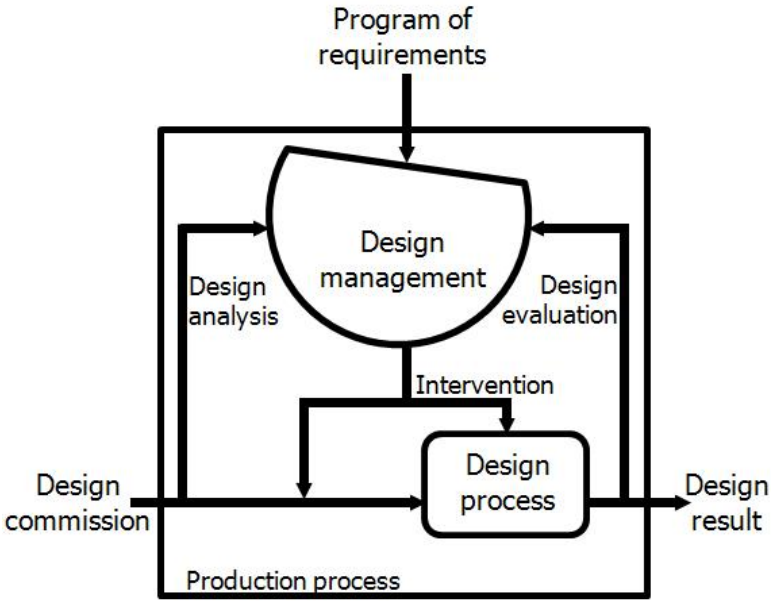

Figure 17: The design production process (source: van Loon, 1998).

Referring to the DAS-frame (chapter 1.4) there are three major matching moments identified which are seen as global sub processes in this project. Controlling and steering within the process is essential in this project.

1. The first process is to determine "what we have" versus "what we need", also the current (mis) match. In this process a real estate object is entering the production process and is reviewed and judged by the design management. While being aware of the minimum requirements (the program of requirements) design management is filling in information about the object which triggers the matching process. This is an operational process because it contributes directly to the transformation of portfolio information.
2. More processes are needed to reach the desired strategic portfolio. The second process which receives information of the first process is called the future mismatch. Without a design result of the first process the future mismatch lacks information. In addition it conducts a common decision language to reach more advanced design results. This is a support process because it provides resources (portfolio information) for the third process.
3. The third process is the design of portfolio alternatives. This process is depending on the before mentioned processes, because interventions (like selling, keeping or upgrading) are actual adjustments of the result of the first process, the current match. In addition the design result of the second process is relevant because it is the bandwidth in which alternatives can be chosen, the future match. This third process ultimately results in an alternative which is the strategic portfolio. This is a controlling process because it ensures that there is harmonisation between operational and support processes and that all internal processes are harmonized with the environment.

Management is successful if each designer of a sub process automatically makes the adjustments that are necessary. They must be able to produce a design that reflects the changes in the requirements for their earlier design.

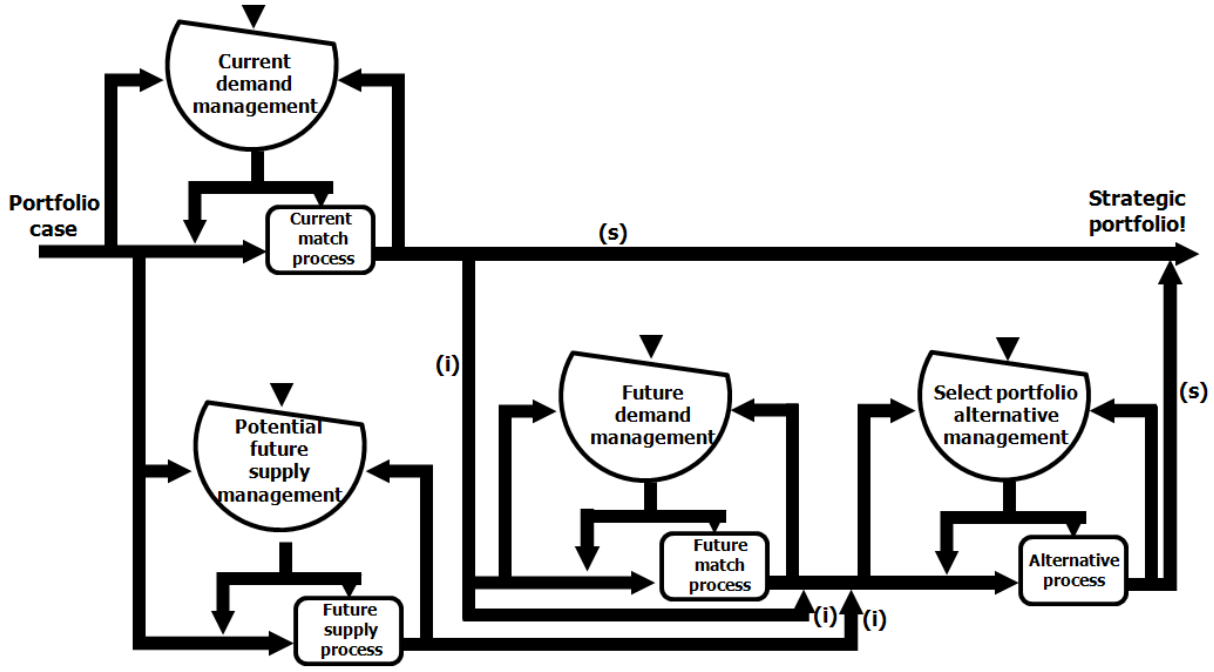

Figure 18: Controlling the DAS-frame process to produce the strategic portfolio.

Some processes are independent of the total information so it can be used by decentralized design units (single actors or departments) for finding solutions.

4.5. Controlling approach in this project

In the systems approach (chapter 3.2) internal relations are stronger than the external, and interaction with the environment (external) is essential.

The DAS-Frame is originated from real estate management literature and gives actors grip in the complex process towards a strategic portfolio and is therefore integrated in the system design. Actors of OBR are not well known with this process neither did they agree on it as a standard. The DAS-frame is considered useful by the engineer. Every phase of the DAS-frame process should therefore be reviewed by the complete group of expert delegates from OBR.

OBR experts can be seen as the controlling unit (CU) in this project. They steer and review the system process and its ingredients. They determine if the integrated standards (measurements) are accurate. The idea is that standards are created by agreements and sub processes can evolve to independent production units controlled by the authorized actor(s). In the CU/CS approach in this project the (multi actor) controlling unit is steering the controlling system. The controlling system contains the DAS-frame process of which sub processes are expected to become independent in a later stadium.

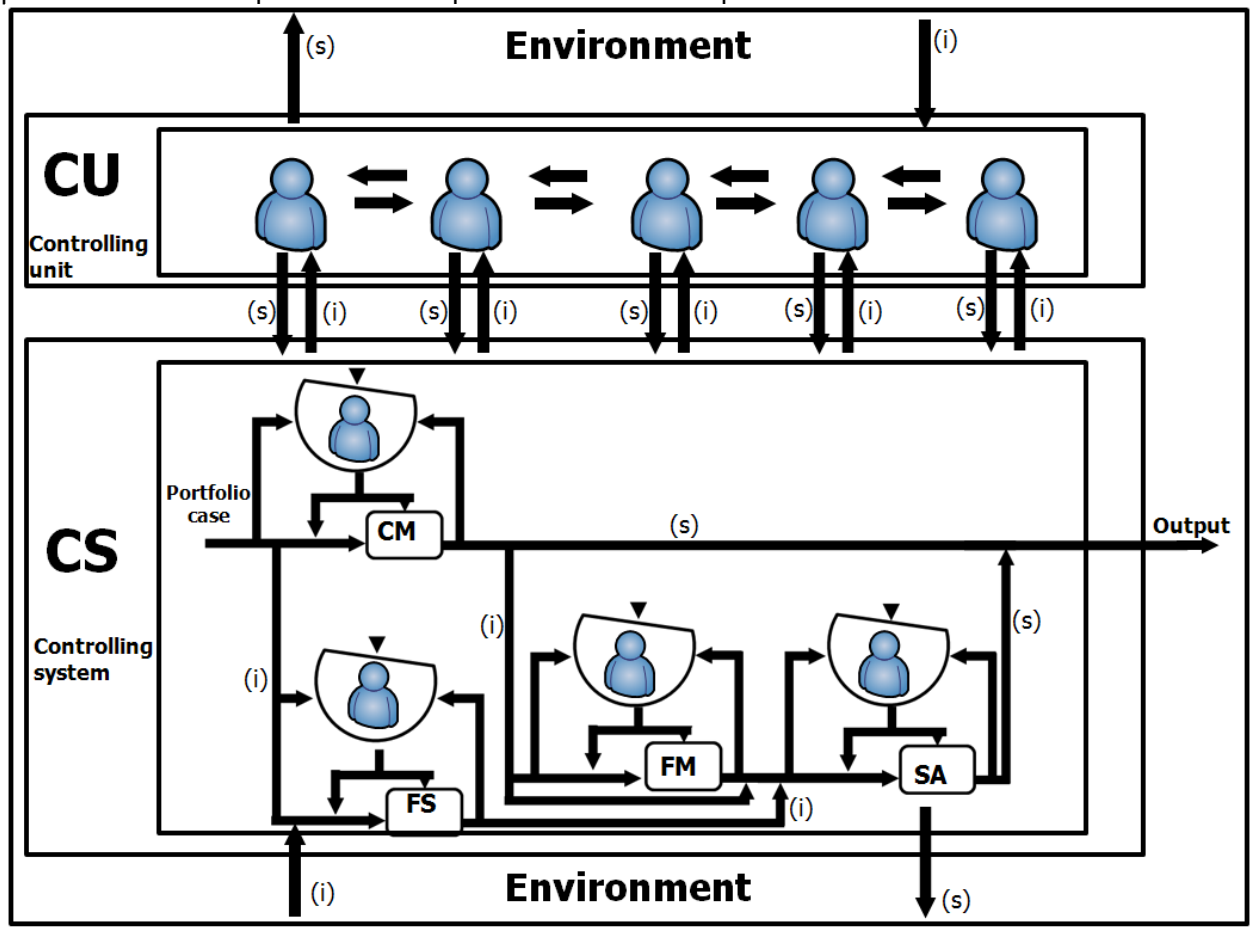

Figure 19: The CU/CS approach adapted for the PRE-system.

4.6. Interorganizational approach

The controlling unit on the previous page reveals that actors are negotiating. It is expected that they are representing themselves from their personal department and operate according their known norm and constraints. They should declare which constraints are possibly negotiable or not from their perspective.

In the sub processes they also address in which degree the sub designs are contributing to their known norm and constraints. In this setting there is no central steering needed, rather it is a bunch of interorganizational (or multi centric[1]) influencing processes.

An interorganizational setup can help to find out about organizational goals on itself (what they are) and how can they be measured (create standards).

In line with the interorganizational approach the public goals are measurement with a standard. A nominal scale method has been setup (chapter 3.4) and is illustrative incorporated as a standard, an agreed on sub-design. Van Loon (1998) mentions that there are several reasons to choose a sub-design jointly. In the OBR case we use this setup for working together in order to find out about the requirements of the organization. An interorganizational approach is essential in this context.

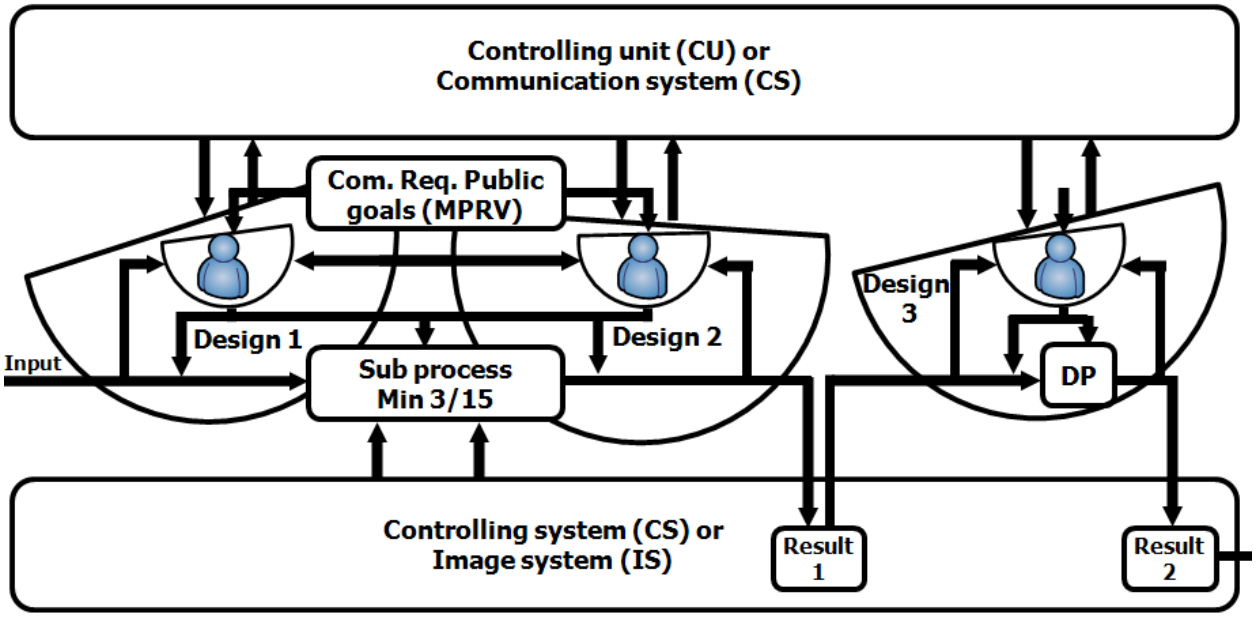

Figure 20: A common design production sub process with a common sub set of requirements (source: van Loon, 1998, adapted).

The MPRV (OBR, 2009) has also listed real estate examples for public goals. They are seen as common requirements by the engineer; a common sub set of requirements valid for all experts.

[1] A pluricentric language is a language with several standard versions. This situation usually arises when language and the national identity of its native speakers do not coincide.

4.7. Conclusion

In addition to the system approach this chapter introduced the controlling approach. It is essential for structuring the controlling problem in this project; how will the design (the system) be controlled, what is steering in this context en how is the DAS-frame integrated?

Steering is about influencing the design (the system) and is subordinate to controlling, which is about influencing the functioning of a design. Controlling is seen as the continuous correction of an organization or machine (PRE-system) in the direction of the goal. Controlling contains decision making and forms of information infrastructure. This information infrastructure should be adapted, changed and balanced with the environment.

It appears that on the basis of decision making the information infrastructure in a design can be adjusted to standards (norms), it is referred to as controlling. The standards must be steered on to interact with the environment. An optimal adaptation between design and environment should be possible with steering.

The process how to attain a strategic real estate portfolio is essential. The system based science explored process management extensively and sees the input as a task, a commission to design the product, the strategic portfolio (Loon van, 1998). The idea is that this process can be controlled if the product (the design) complies with standards which must be steered on. In design processes this steering is often carried out by project managers. The DAS-frame is considered a guiding process (a standard to a certain degree) to reach a strategic portfolio. It is providing grip in the complex process towards a strategic portfolio. From the perspective of the engineer the DAS-frame is therefore integrated into the PRE-system.

The controlling approach distinguishes a controlling unit (CU) and the controlling system (CS) in its environment. The controlling unit (the decision making process) steers on, and retrieves information of, the controlling system. In this project the controlling unit is characterized by the negotiating actors, while the controlling system processes standards. The controlling approach in this project means that:

The experts of OBR (controlling unit) are controlling the information infrastructure, in which the DAS-frame process is integrated (controlling system), in Katendrecht to come to steering interventions for balancing the portfolio with the environment. Such interventions are referred to as strategic interventions.

The interorganizational experts are handling according to their known norms and constraints, and are negotiating. An interorganizational approach can also help to find out about organizational goals on itself (what they are) and how they can be measured (standards evaluation). For the measurement of the public goals in this project an experimental sub process and related common requirements are drawn. This setup is used for finding out about the (public) requirements of the organization.

5. PRE-system design

5.1. Introduction

The PRE-system is designed to be a methodological instrumental answer for steering towards a strategic portfolio. It is a simulation model, an interactive computer model, in which design decisions can be simulated. In the PRE-system the DAS-frame is integrated for the process how to reach a strategic portfolio, while it is also connected to portfolio information to eventually come to strategic portfolio interventions.

This chapter answers the following questions:

- Which forms of controlling are integrated in the PRE-system?
- How are instrumental and interaction perspectives linked in the PRE-system?
- What are the delimitations of the system?
- What are the used techniques?

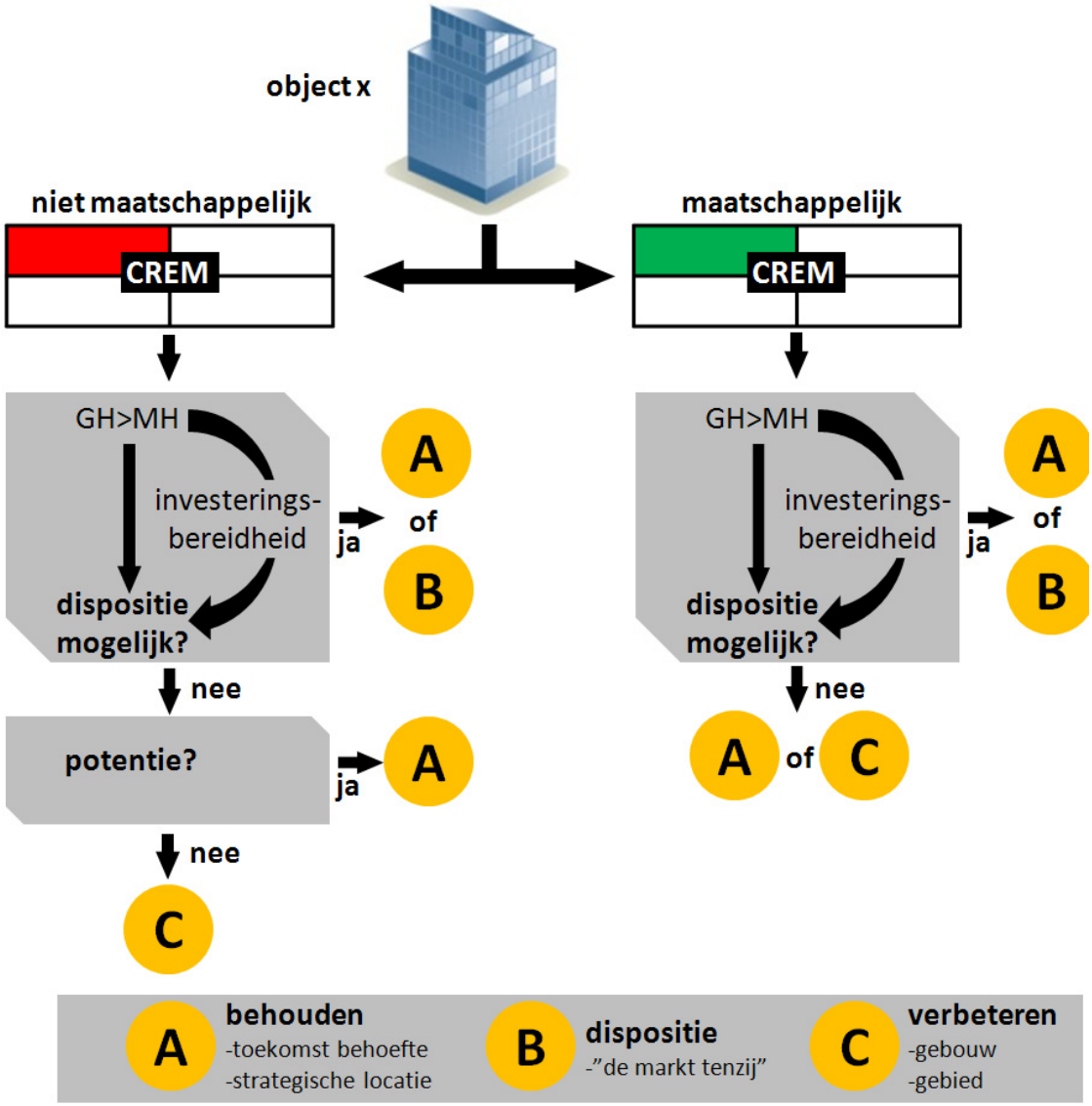

Figure 21: Eventually it will all lead to strategic portfolio interventions.

5.2. Forms of controlling

The PRE-system uses different forms of controlling, depending on the amount of uncertainty.

Open loop and feedback controlling
In open loop controlling the environmental influences are measured within a static pattern. This means that a certain environmental situation leads to the same measure every time. In this project relative static minimum requirements apply for example to the technical condition and the technical state is measured in the environment. The situation below shows that we may speak of open loop controlling in that case.

The relevant environmental influence is measured, in this case the technical state which belongs to category 3. The controlling system is retrieving the input of the technical state of 3 and the minimum requirement (which is 5 in the example) and calculates if this value is sufficient or not.

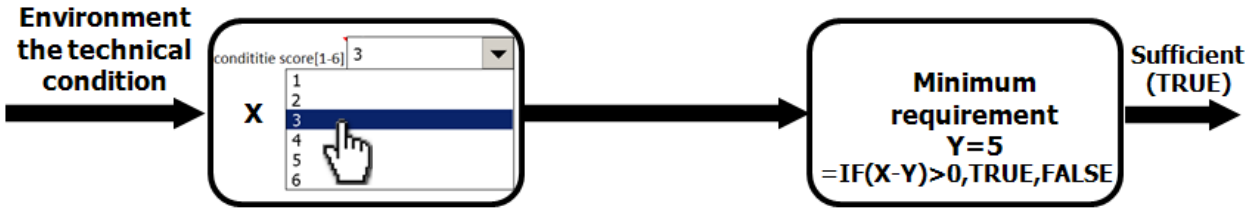

Figure 22: Open loop controlling of the technical condition.

The advantage of open loop controlling is that organizational goals are becoming clear and the decision considerations can be done quickly. A disadvantage is that it only works when everything is predictable. In this case it is depending on a NEN-norm. Normally the open loop system is not so flexible but this has been resolved partially in the model by using overall adaptable minimum requirements. OBR can decide to increase the minimum requirements, and actors will also be confronted with their measurement being sufficient or insufficient. This open loop setup has characteristics of the feedback setup although one of the characteristics of the feedback setup is to adapt the measurement on the basis of the desired effect. In the above example this is not the case because the measurement is static (the environment), although the actors are getting feedback if their measure is sufficient or not.

In feedback controlling the controlling measurements are adapted on the basis of information about the effect that has been reached. In the PRE-system this happens to determine the future match process. For example in the future we want to stimulate 80% public goals instead of 40%, 60% objects with a sufficient technical condition instead of 50% and 70% users that are satisfied instead of 45%.

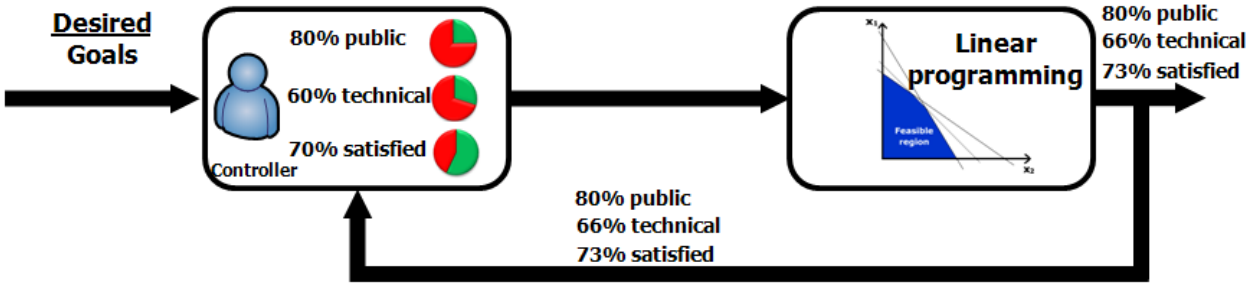

Figure 23: Feedback controlling of the desired situation.

A calculation rule has been applied to the system that this problem solving must take place within the current portfolio. This is also why this process depends on the result of the current match. Actors are determining their desires knowing that it is a deviation from the results of the current match (the zero situations in this case). The optimization process gives a high priority to objects with multiple fields insufficient. This will be further explained in the realisation part (chapter 6.1).

Feed forward controlling

Instead of calling this part of the system feedback, we can also call it a feed forward situation because steering (controlling) takes place to anticipate on the future. On the basis of those future influences, undesired effects are tried to be prevented by the controlling unit, the actors. Examples of influences are the expected program of the city, the expected demand of the local services and developments. In this project it has been identified that there is no static definition that an object must always contribute to public goals (as it fits in the categories of the MPRV) because the earn wages (revenues) can become (or are becoming) more important due to the decreasing revenues of municipalities in these days. With such things in mind we can speak of feed forward controlling.

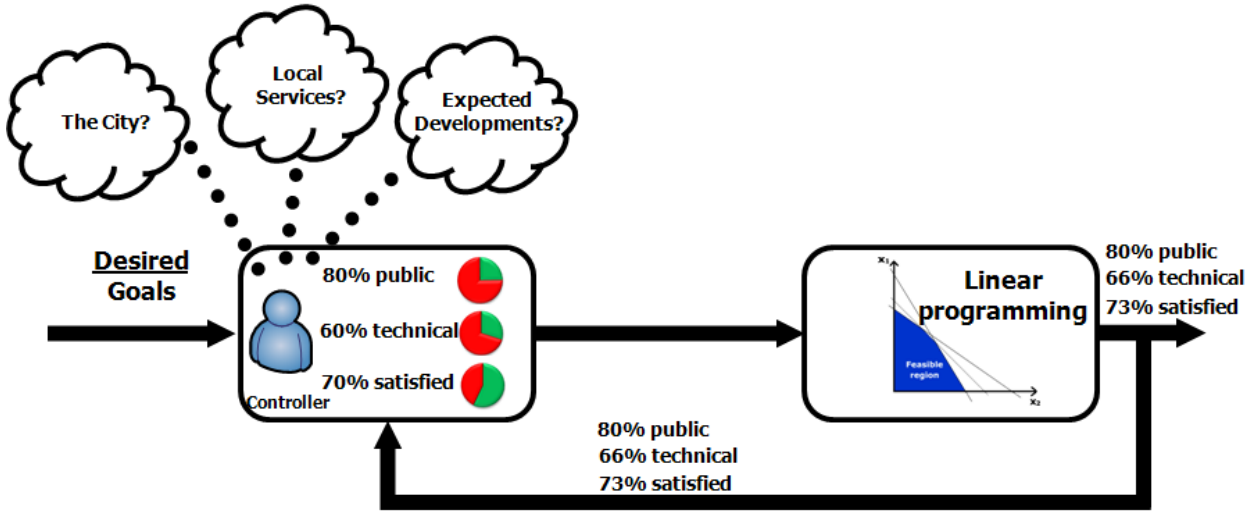

Figure 24: Feed forwards controlling of the desired situation in multiple optimizations.

Intrinsic and meta controlling

In terms of the system approach intrinsic means that the controlling unit is considered an aspect system. In this project that is the case because the controlling unit is the decision making process (also referring to chapter 3.5). Intrinsic also means that all participating actors control without loosing any power by a manager or leader. The decision making process is the "aspect system" in the PRE-system which controls (through agreements) the sub system, in this case the portfolio which has again certain sub aspects like public relations etc.

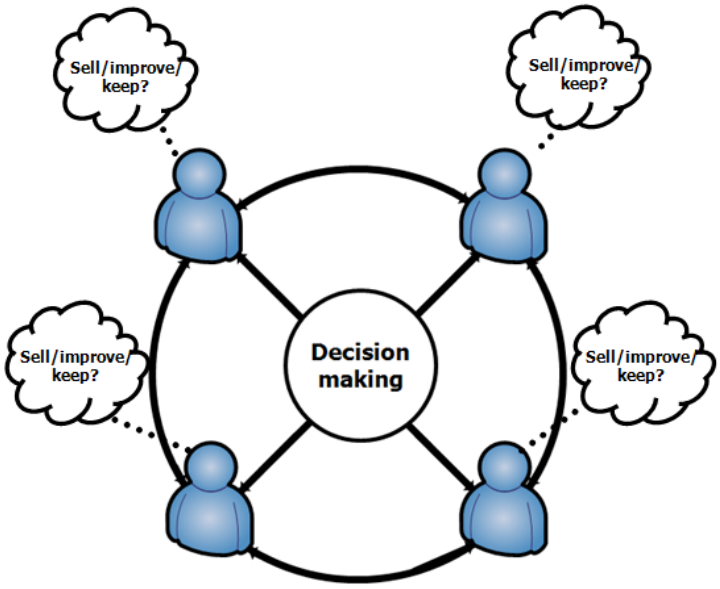

Figure 25: Intrinsic controlling

By choosing interventions in the final part of the PRE-system intrinsic controlling plays a major role. The actors' mutual adjustments together create the final decision; this is referred to as intrinsic controlling. If the output of the system is becoming a controlling unit (for example if Rotterdam adjusts the MPRV on the basis of system results) this is called meta controlling. *One speaks of meta controlling if the controlling system itself is also a controlling unit. Meta controlling is signified as controlling of controlling (Leeuw de, 2002).*

5.3. Representations

The PRE-system is an engineered system. The concept is based on both the instrumental and interaction perspective (chapter 3.3); it is therefore a multiform approach.

The instrumental perspective focuses on how the development process of the strategically portfolio can be improved. The DAS-frame is used as a starting point for the instrumental process while also negotiated calculation rules are integrated, which result in the information infrastructure of the PRE-system. Those calculation rules are agreements determined through subjective views, knowledge and requirements of multiple actors, the experts.

This is a direct linkage to the interaction perspective of the PRE-system because the interaction perspective believes that change and improvement are only constituted if actors are negotiating. Decision making is a fact if the collective goal of the actors is agreed on. Besides this negotiating process actors should also handle from their known norm and constraints and declare which constraints are discussable or not; this is referred to as the interorganizational approach. Actors should also control without losing any power (intrinsic controlling) which also fits the interaction perspective.

The PRE-system is based on the fact that the strategic portfolio creation process requires an integral approach on relatively complex parts. Complex parts are considered where decision making is influencing many internal relations and the environment.

5.4. PRE-system delimitations

Several parts of this report have revealed restrictions for the PRE-system. The PRE-system as an instrument must be delimitated. Delimitations refer to the boundaries in which the PRE-system is developed. They are based on representations (consultations, MPRV etc.) and systematics (for the most important agreements). According to De Leeuw (2002) seven delimitations are identified:

1. *Purpose of the model*
2. *Limits and constraints*
3. *Aggregation levels*
4. *Partial system*
5. *Kind of model*
6. *Model language*
7. *Model- and system reticulation*

1. *Purpose of the model*

The PRE-system must be decision supporting. It must contribute to a portfolio becoming transparent within its most important relations[1]. In addition it must contribute to the decision making about what to do with objects, to create a strategic portfolio. Some objects must be sold, some must be improved, and those decisions are to be considered very complex. The PRE-system is reducing this complexity by applying calculation rules, making the portfolio comprehendible and providing a solution space. OBR must be able to steer on the following definition: *"achieving public goals with minimal means".*

[1] In this project there are public, selling, costs, user en technical relations considered.

2. Limits and constraints

The constraints will be determined by an observing process engineer (PE) who is supporting the negotiating process about the PRE-system and correcting standards if necessary. The process engineer will include the physical boundaries of the portfolio[1], consider the boundaries between the actors, and the environmental necessities like pictures and maps of real estate objects. Calculation rules are distilled from the MPRV but when participating actors do not agree with certain calculation rules in the evaluation, these can be adjusted[2]. If such interventions in the PRE-system are complex this has to be done in a new prototype.

3. Aggregation levels

Aggregation is about the amount of details. The highest levels of aggregation in the interaction perspective is the organization (OBR) and in the instrumental perspective the portfolio compilation.

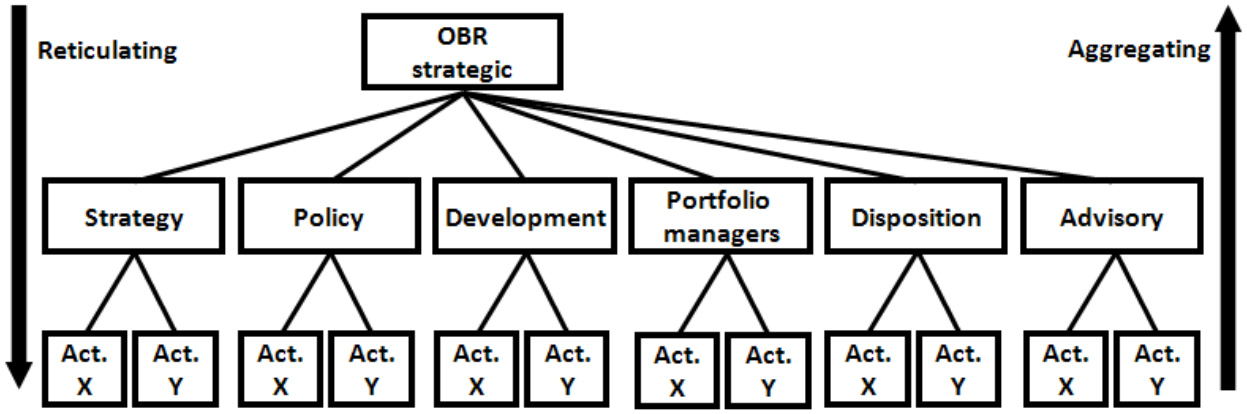

Figure 26: OBR is the chosen aggregation level in the PRE-system.

The lower levels of aggregation of OBR are the departments and their employees. The employees are handling from the third level of aggregation. In this way the strategic demand for OBR as an organization is derived from different views from actors and departments. In the PRE-system OBR (as an organization) is chosen as lowest aggregation level because the focus is on collective strategic implications from interacting actors rather than interpersonal conflicts. If OBR is not satisfied with the results of the PRE-system, zooming into a certain department is possible; this is called reticulating. If OBR can decide more accurate about the strategic portfolio this is called aggregating.

In the instrumental part of the PRE-system the portfolio is created by portfolio variables (the public, selling, user, technical and costs relations). The lowest level of aggregation in the instrumental part of the PRE-system is translating the portfolio variables into square meters, financial data and percentages.

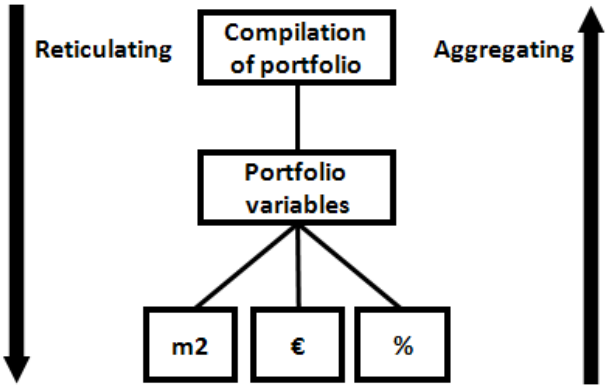

Figure 27: Aggregation levels from the instrumental perspective.

[1] *Yj*: the aspects of the situation (environment of the problem) over which we have no control (Ackoff, 1999).
[2] This is called meta controlling.

4. Choosing the partial system

The PRE-system is assessed with the system approach in chapter 3.5;

System:	Public real estate decision support system
Sub system:	Portfolio case
Aspect system:	Decision making process
Sub system:	Participating departments (strategy, policy etc.)
Sub aspects system:	Public, selling, user, technical and costs relations (the portfolio variables)

In the PRE-system, the actual instrument, the focus is on the decision making process in which a certain alignment of the sub system "the portfolio" on the sub aspect system "public, selling, user, technical and costs relations" is prepared.

5. Kind of model

Instead of a system De Leeuw (2002) is speaking of a model. Models are systems that are used as medium to control other systems. A simple example is an organization structure diagram which is a model (diagram) of a system (global authority relations). The definition of a model according to De Leeuw is:

"A model is a system (instrument), which is a projection of aspects (public, costs, user, technical, and selling relations) from another system (the portfolio), which is used in a particular case (decision supporting process) and of which similarity is related to those aspects (public goals with minimal means) that considering its usage goal (improving the adjustment of the portfolio on the organizational demand) are relevant."

Important is that models are not mathematical models; rather they can be schedules, words, computer language, mathematical symbols. In this project the model is a signature of the portfolio performance to support interventions. Systems can be divided into (1) abstract systems like mathematical formulas, schedules etc. and tangible systems like acting organizations. According to De Leeuw (2002) there are four types of models:

		System	
		tangible	abstract
Model	tangible	1	2
	abstract	3	4

Table 5: The PRE-system is mainly an abstract model of a tangible system.

In the PRE-system the portfolio is seen as an abstract model, it is a schedule (abstract) of portfolio demands matched with supply. This schedule contains public, selling, user, technical and costs relations in relation with the OBR demand (the tangible system). The PRE-system creates a signature of the portfolio (tangible system) and makes accurate steering on public goals with related means possible.

The actual demand of OBR is created by several standards like minimum requirements, labels and optimization agreements, which will be further explored in chapter 6 (realisation).

6. Model language

The model language for the PRE-system focuses on a numerical database. It means that information of the objects through so called "object forms" are translated into numbers and saved in a database. For example a technical condition of five (5), or the stimulation of sport (a public goal) which is translated to a 1 (TRUE) or a 0 (FALSE). This nominal true or false is relatively simple judgement but there are also more complex calculation rules like the example below:

=OR(AND(COUNTIF(SUBGOAL_1:SUBGOAL_15,TRUE)>(MIN_REQ-1)),(OVERRULE=TRUE))

This formula is displaying if an object is considered overall public. Those formulas are integrated in the model and are referred to as standards or calculation rules. All standards combined lead to the possible demands of OBR, which is used to determine real estate interventions.

Each separate object is supported by an image and map to support the decision making process. By displaying environmental information it helps to memorize the object and its relevant information. The final real estate interventions steer the black box.

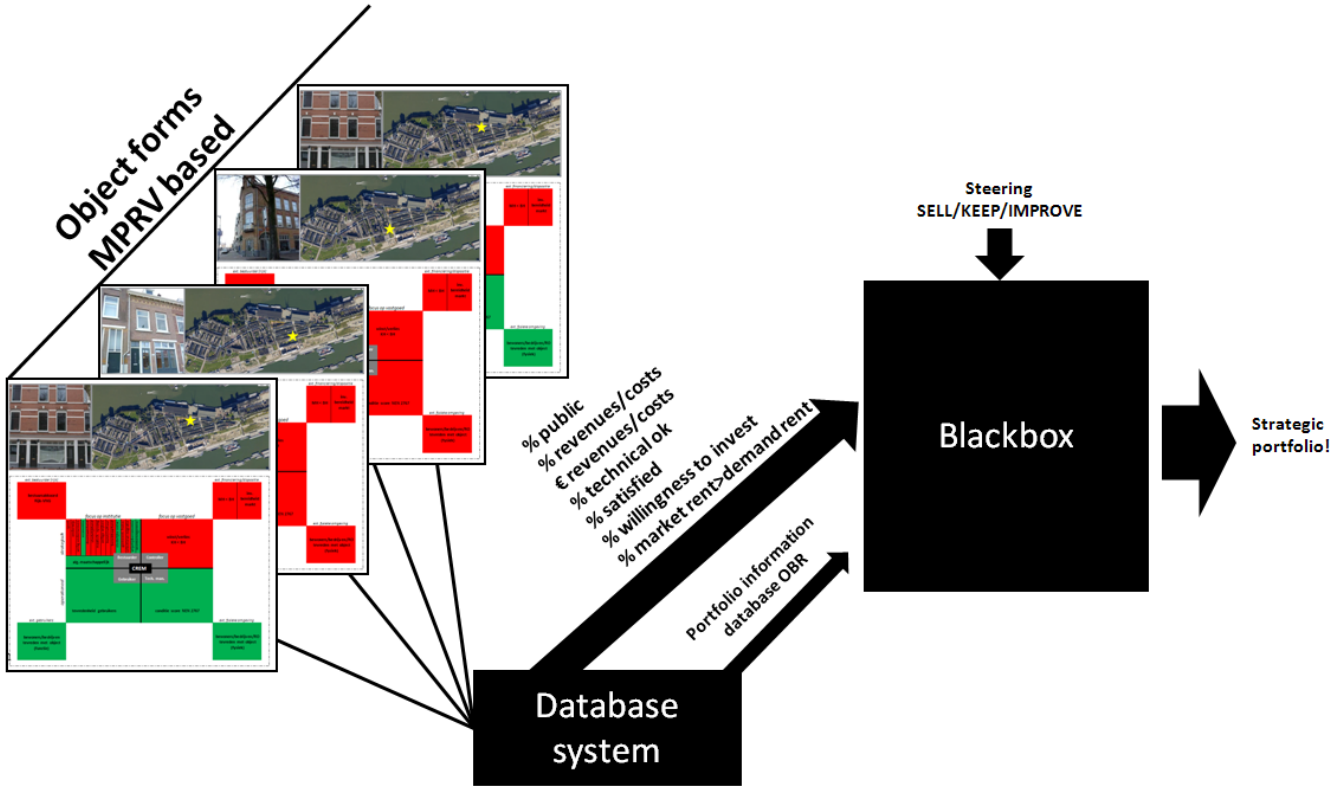

Figure 28: Information structure of the PRE-sytem.

7. Model- and system reticulation

Choosing the levels of aggregation does not mean that we cannot enlarge towards a low aggregation level, because the aggregation levels are not static. During the prototype testing it will become clear if there is any need for further zooming in.

The black box can be opened to look which aspects are influencing each other or if there could be aspects missing. The portfolio variables consist of the public, selling, user, technical and costs relation, while there may be demand for juridical relations. In this case the PRE-system should be adapted.

Also during consultations and literature it appeared that certain calculation rules can be applied in the PRE-system. Those rules are added to before mentioned relations. This is called reticulating.

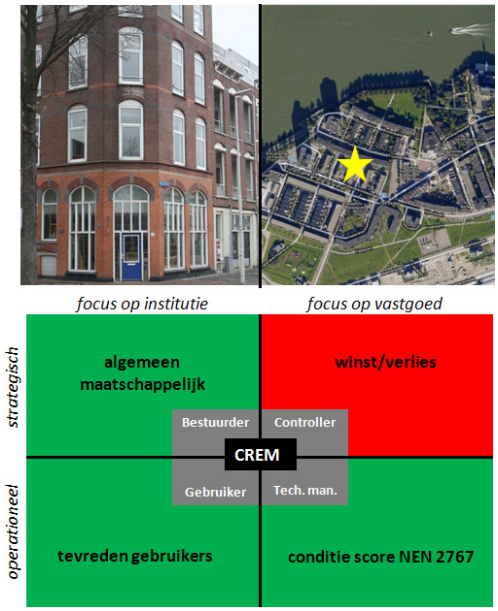

Figure 29: Snapshot of the object form

5.5. Controlling approach PRE-system

The controlling approach for this project is identified in chapter 5.5. It contains an interorganizational controlling unit which steers on, and retrieves information of the controlling system (the standards).

More explicit the object forms on the previous page reveal that the environmental information is provided like an image, map and object data. This can improve the accurateness of decision making on the internal aspects. This information is positioned above the controlling unit.

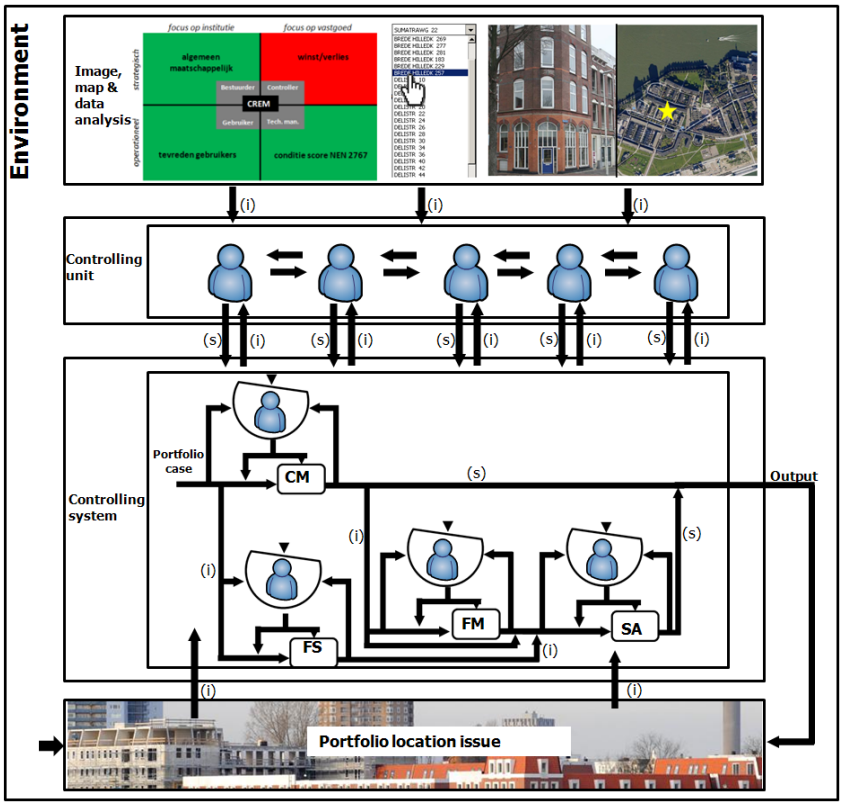

Figure 30: The CU/CS approach in the project.

The results of the sub process in the controlling system (CS) can be negotiated before final interventions are chosen. Such negotiations will mainly involve the used standards, which have to be verified, reticulated, aggregated etc. Because the standards are open for discussion the PRE-system will not choose interventions automatically, it only provides relevant information and advices for interventions. On the basis of the sub results the actors can choose sell, improve or keep. This happens in an interorganizational setup. If interventions are chosen the alternative (strategic) portfolio is created, the result. This result can be the initiative and content for further negotiations about other interventions. This is referred to as meta controlling.

5.6. Techniques

Database and MS Excel
As mentioned in the previous chapter a database technique is used. This is done in MS Excel with advanced functions (like MATCH, OFFSET, VLOOKUP, COUNT, COUNTIF) connected to each other in the "name manager". The database saves the dynamic demand separately of the relatively static supply for each object.

This database technique is also used for saving environmental aspects like object pictures, and the location.

2E KATEND HAVEN 25	3	TRUE	2	TRUE	0	10	0	0	0	0	0	0	0	0	0
ATJEHSTR 100	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	0
BREDE HILLEDK 245	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	130
BREDE HILLEDK 251	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	142
BREDE HILLEDK 263	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	60
BREDE HILLEDK 265	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	60
BREDE HILLEDK 269	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	87
BREDE HILLEDK 277	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	90
BREDE HILLEDK 281	6	FALSE	6	FALSE	0	0	0	0	0	0	0	0	0	0	0
BREDE HILLEDK 183	6	FALSE	4	FALSE	0	0	0	0	0	0	0	0	0	0	0
BREDE HILLEDK 229	3	FALSE	5	FALSE	0	0	0	0	0	0	0	0	0	0	50
BREDE HILLEDK 257	6	FALSE	6	FALSE	0	0	0	0	0	0	0	0	0	0	60
DELISTR 10	2	TRUE	1	TRUE	0	0	0	80	0	0	0	0	0	0	80
DELISTR 14	2	TRUE	1	TRUE	0	0	0	80	0	0	0	0	0	0	80
DELISTR 16	2	TRUE	1	TRUE	0	0	0	100	0	0	0	0	0	0	100
DELISTR 2	2	TRUE	1	TRUE	0	0	0	183	0	0	0	0	0	0	183
DELISTR 20	2	TRUE	1	TRUE	0	0	0	200	0	0	0	0	0	0	200

Figure 31: Fragment of the database

Linear programming
In the future demand an optimization technique is used based on the simplex method. The simplex method or algorithm is used for mathematic optimization. The technique was developed by George Dantzig in 1947. The simplex method solves a linear optimization problem in a limited amount of steps, or addresses the infeasibility of the problem. The name resides form the fact that equitation of a problem describes a simplex, of which the edge of the solution is described.

Linear programming is used for an optimization of the future demand. The edge of the solution is the amount of problems divided amongst categories. Every problem and category is connected to a certain amount of square meters. It has similarities with an allocation model.

In consultation it was decided that objects with multiple problems have a higher priority to be solved. For example if there is a demand to improve the technical condition objects with multiple problems (like no user satisfaction and financial loss) are chosen first.

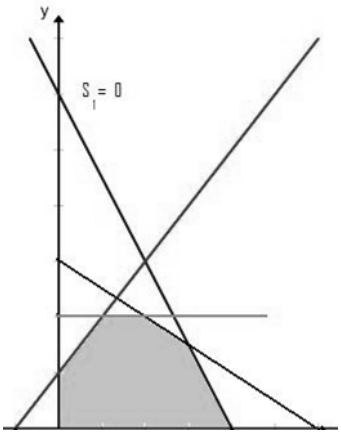

Figure 32: Linear solution space

5.7. Conclusion

The PRE-system is designed as a methodological instrumental answer in steering towards a strategic portfolio. It is a simulation model, an interactive computer model, in which real estate interventions can be simulated.

Forms of controlling are differing in the PRE-system and are depending on the amount of uncertainty. Open loop controlling is used if there is almost no uncertainty, considerations can be done quickly in such a case. In open loop controlling data from the environment is entering a measurement standard. The data input (like the technical score of 2), through the measurement standards, results in a sufficient (green) or insufficient (red). This method is applied for each object and aspect, based on global (adjustable) minimum requirements. Examples of minimum requirements are; at least three public goals, profit required, technical condition and user satisfaction at least 5.

Some parts of the PRE-system also contain feedback- and forward controlling which means that measurements are adapted on the basis of information about the effect that has been reached or the future expectation. This happens with the optimization of the future demand in which the information is returned depending on the weights of goal functions in a linear programming optimization model.

In the PRE-system real estate interventions are characterized by intrinsic controlling. It means that all participating actors control without loosing any power by a manager or leader. The actors' mutual adjustments together create the final decision. If the results (after the decision) influence the actors (experts) new input or organizational policy this can be called meta controlling and meta learning.

The PRE-system is a multiform approach. The instrumental perspective focuses on how the strategic portfolio creation process can be improved, while the interaction perspective signifies the importance of negotiating. Negotiating about what which standards should be adjusted to improve the PRE-system but also to determine the final interventions (intrinsic controlling).

In the PRE-system the object forms are informing about the environment, with images and object data. In the controlling unit (CU) are the (interorganizational) actors who steer the several sub processes. Some sub processes are expected to become independent in a more advanced stage of the PRE-system, which means they can be steered on by independent actors or departments. The sub processes together result in the abstract model (choosing interventions) of the tangible PRE-system (actual OBR demand). This model makes it possible to choose interventions manually based on relevant information and advices from standards. The information and advises are determined and displayed through standards agreed on, sometimes from previous sessions.

If interventions eventually are chosen, the alternative (strategic) portfolio is created. This portfolio is and can be controlled like a dynamic design in which interventions will and can be reviewed continuously (meta learning and controlling).

The PRE-system is a contribution in the process to create a strategic portfolio (the product). It makes steering on public goals possible in relation with other relevant variables (including means). It provides the relevant information needed in each stage of the design process and upon standards strategic handling increases.

6. Realisation

6.1. Introduction

The methodological design elaborated the most important aspects of the PRE-system. The actual design of the PRE-system as used in several workshops will now be elaborated.

The PRE-system has already been adjusted several times on the basis of several consultations and evaluations. The final state of the PRE-system will be explained in this chapter and when relevant also which calculation rules (standards) where integrated during the workshops. The PRE-system is continuously tested with a population of approximately hundred real estate objects in the neighbourhood Katendrecht, which is in the district Feyenoord, Rotterdam.

Many expert delegates of OBR were present in the workshops. They came from different departments, representing all internal levels of handling (operational, tactic and strategic levels). This broad expert panel was steering the PRE-system and had an essential role because decisions have complex internal relations (OBR), external relations (the public policy services, the city) and environmental impact (in Katendrecht). On the other hand the system standards were continuously improved and evaluated by this expert panel. The idea is that steering is becoming more accurate when this happens.

Figure 33: Workshop at the Development Company Rotterdam (OBR).

6.2. Step 1, Current match

For the PRE-system an object form has been designed in which the organization can fill in relevant variables for an object. A picture and map of the chosen object will be summoned from a database to retrieve an impression of the environment. The actor(s) can accordingly answer the form about public goals, financial data, technical condition and the user satisfaction for the object.

On the basis of minimum requirements drawn up by OBR a field displays green "sufficient" or red "insufficient". The layout of this visualisation is done according to the stakeholder analyses diagram which is also used in the real estate management discipline. It forces to think in real estate discipline quadrants.

The public goal is subdivided into the fifteen sub goals and the financial data is divided in achieved rent (demanded rent), cost price rent and market rent. Besides such quantitative financial aspects also the normative "willingness to invest" is integrated.

The technical condition was integrated just as the MPRV prescribed a six point's ordinal scale (a NEN norm) of which a score of 5 and lower is insufficient. During this project OBR has not yet made its satisfaction surveys public so this was ultimately a subjective judgement. The measurement scale was the same as used with the technical condition and was filled in illustrative.

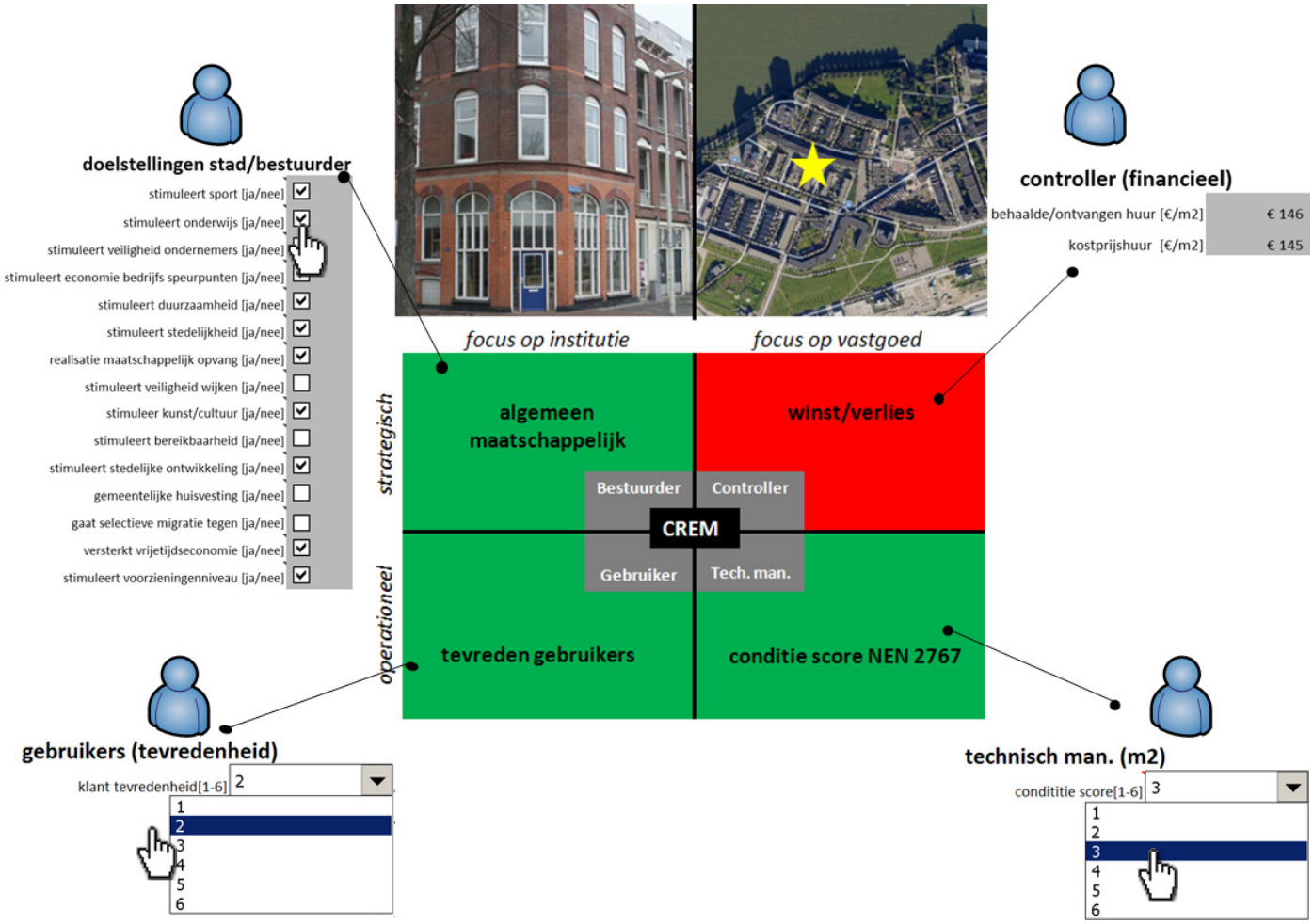

Figure 34: The main structure of the object forms.

During consultation an agreement was made for the measurement method of the public goals. If at least three fields (of the fifteen in total) or one separate overruling field is true, the object is seen as overall public. Subsequently this calculation rule was translated into the system which displays a "green" or a "red". Such rules were also applied for the (ordinal) technical condition and the user satisfaction, in which five or lower were insufficient. For the costs (profit/loss), besides green and red (e.g. profit or loss) also a quantitative value was available (profit or loss per square meter).

Field	Excel formula (standard)
PUBLIC GOALS	=OR(AND(COUNTIF(SUBGOAL_1:SUBGOAL_15,TRUE)>(MIN_REQ-1)),(OVERRULE=TRUE))
TECHNICAL CONDITION	=IF(TECHNICAL_CONDITION<MIN_REQ,TRUE,FALSE)
USER SATISFACTION	=IF(TECHNICAL_CONDITION<MIN_REQ,TRUE,FALSE)
PROFIT/LOSS [%]	=IF(DEMANDED_RENT<COSTPRICE_RENT,TRUE,FALSE)
PROFIT/LOSS [€]	= ((DEMANDED_RENT-COSTPRICE_RENT)*M2_NVO)

Table 6: Some formulas used for the agreements (standards).

The minimum requirements are adaptable by OBR and are initially applicable for all objects of the portfolio.

The next step is to see all the "problems" together in the whole portfolio. In Katendrecht only 28% of the square meters [1] appeared to be public, also almost no profit making objects (on average 17 euro/m2 loss), 25% having a technical condition above the minimum and 32% (subjective judgment) user satisfaction. During consultation it appeared that a selection button for streets and/or functions would be handy, therefore those buttons are integrated. Experts can now see the performance of the "offices" in the "Brede Hilledijk street" and zoom in to separate objects if needed.

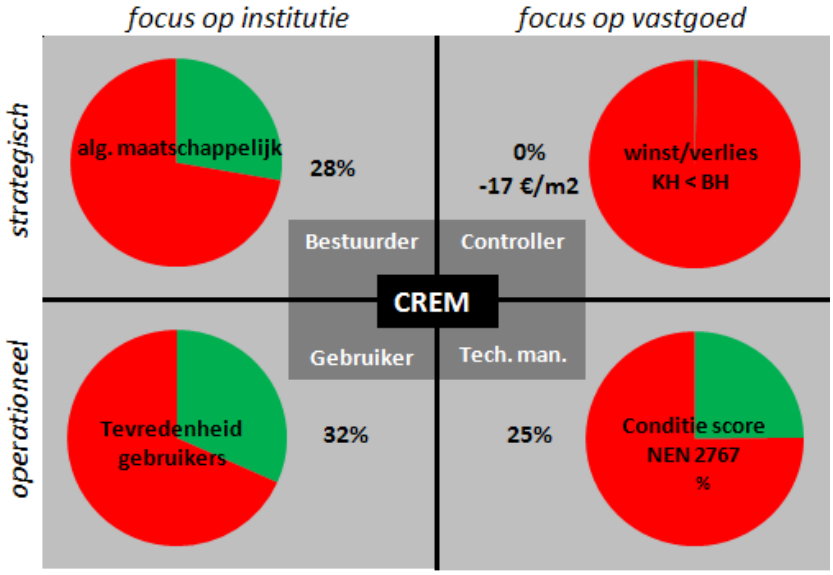

Figure 35: The output of the whole portfolio.

[1] The initial idea was to have statistics in numbers of objects, but the output was not perceived as real, because Katendrecht has only a few very large buildings. This is why the square meters now lead the way.

The (likely) poor scorings in Katendrecht are possibly related to the fact that OBR has acquired many objects which are important for the development of the city. Acquiring real estate for initiating development is one of the mentioned public sub goals of the MPRV. In Figure 35 the sub goals are not visible. A button has been built in to flap out the public goals into their fifteen sub fields (Figure 36). It appears that real estate is acquired for the city development (11), some for education (2), safe entrepreneurship (3), economic goals of the city (4), safety of the neighbourhood (8), leisure economy (14) and amenities (15).

Both figures together display the current match; *what we have versus what we want.*

In this match process some more variables were used like the "willingness to invest" and the ratio between the market rent and achieved rent (not displayed).

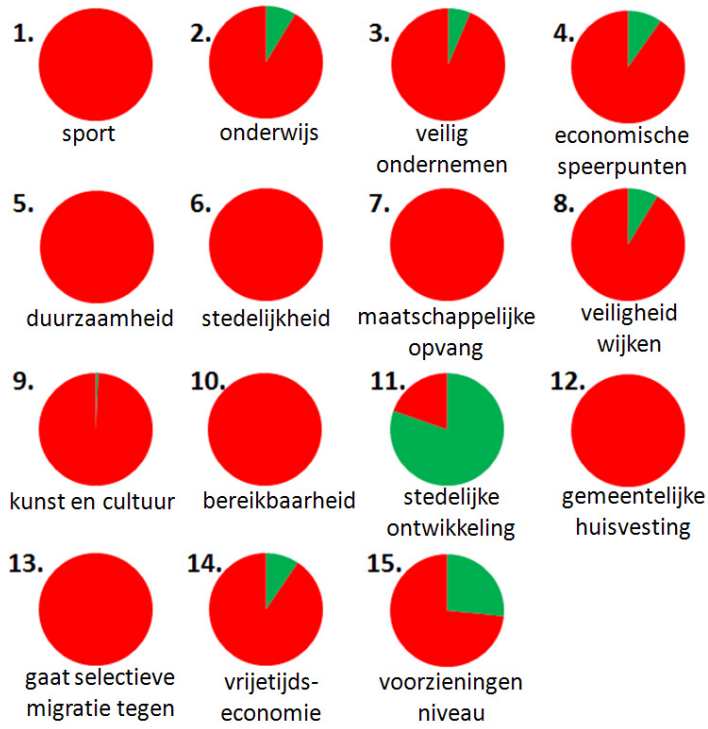

Figure 36: The public goals can be extended.

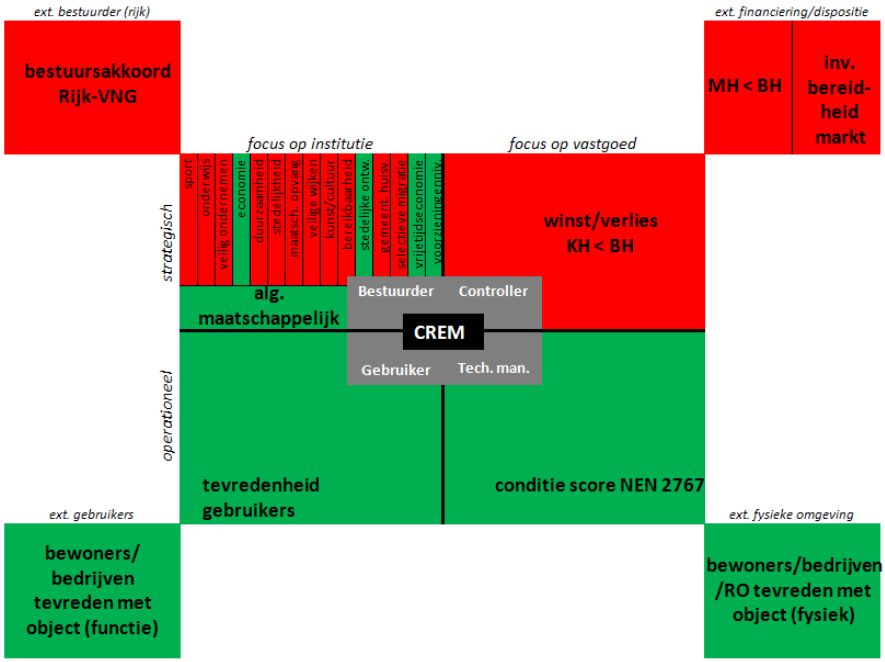

Figure 37: Object form with the external goals.

In the stakeholder analysis of corporate real estate management such variables are referred to as external goals. Some external goals are already programmed in the PRE-system but have no implications yet; no calculation rules connected to them. Examples are being in line with the national government, a satisfied neighbourhood (instead of user), and high spatial quality. External goals of the controller are the "willingness to invest" and the "ratio market-achieved rent".

6.3. Step 2, Labels

In the current match complexity must be reduced. In the PRE-system "labels" are referring to a certain combination of results for each object. It is used to give advice about which interventions should be made, if they can be sold, kept or should be improved. It is based on the principle "the market unless". These labels can also clarify to which department the object should belong. An example: There is no public goal, but the achieved rent is higher than the market rent and there appears to be willingness to invest. In this case the object is put on the selling list (it belongs to disposition).

The calculation rules (standards) are constituted around two main pillars namely the stimulation of public goals yes or no, and the market variables. It makes the insight into the portfolio more accurate.

If an object is public it may be taken over by a market party in which the current function should remain (possible with different juridical forms). As mentioned in previous chapters the object candidates for the selling are determined from two variables; the demanded- and market rent on a ratio scale, and the willingness to invest on a nominal scale (true or false).

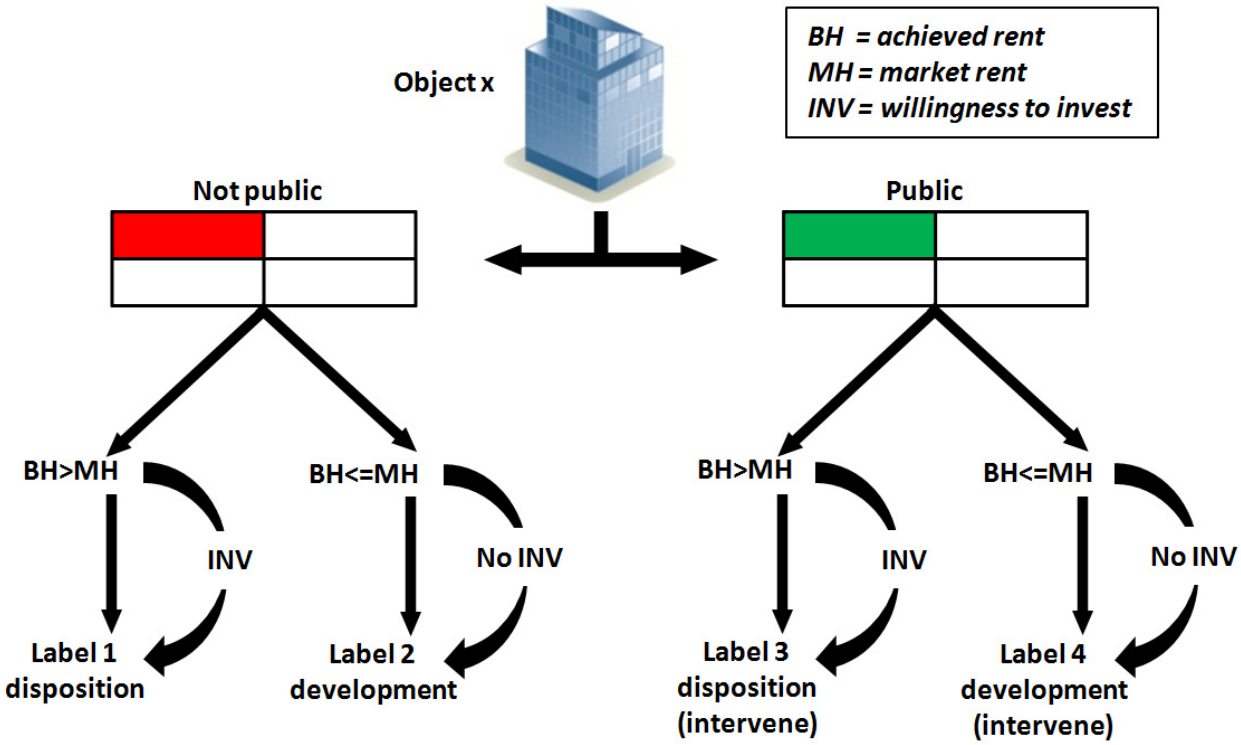

Figure 38: A combination of public goals and market variables determine the labels.

If the function is not public it can go to the selling list despites its current function[1]. The factors of major importance are again; the willingness to invest and the achieved/market rent ratio. If the achieved rent is higher than the market rent it could be possible to sell an object to the market. In addition the market could be willing to invest which confirms the possibility of selling.

[1] Unless it is a strategic ownership.

For consistency in the formulas we chose that the willingness to invest is overruled by the achieved/market rent ratio in all labels (see figure 38). If an object is "not public" one could imagine that solely the willingness can be an important factor for disposition, in case of vacancy for example. It is likely that OBR prefers a tenant above vacancy independent of the market value.
An example: in vacancy objects the achieved rent is relatively low, but there could be "willingness to invest". In the figure on the previous page such an object will end up in "label 2 development". If the "willingness to invest" overrules the rent ratio (in non-public object only) it will end op in "label 1 disposition".

In the PRE-system the whole portfolio is divided into the four labels. When those labels were presented to the working group there was a demand for mostly quantitative specification like:

- What is the percentage of a label on the total?
- What are the m2 in a label?
- What are the other problems in a label?
- What is the turnover in a label?
- Which objects belongs to a label?

A detailed label was designed to fulfil those needs (figure 39). It contains sub labels were other problems can be seen and related quantitative data. The four quadrants of the stakeholder analyses appear again. Above left is the overall public goal, left below the user satisfaction and right below the technical state. Green is sufficient, which means above the minimum requirements and red below it. Also a button (not visible in the figure) was designed to see which objects belong in a certain label.

If there is any particular interest in a certain label the object can be found in the object form. For example label 4b is showing an average loss of 91 euros/square meter. It looks worth to see what that is.

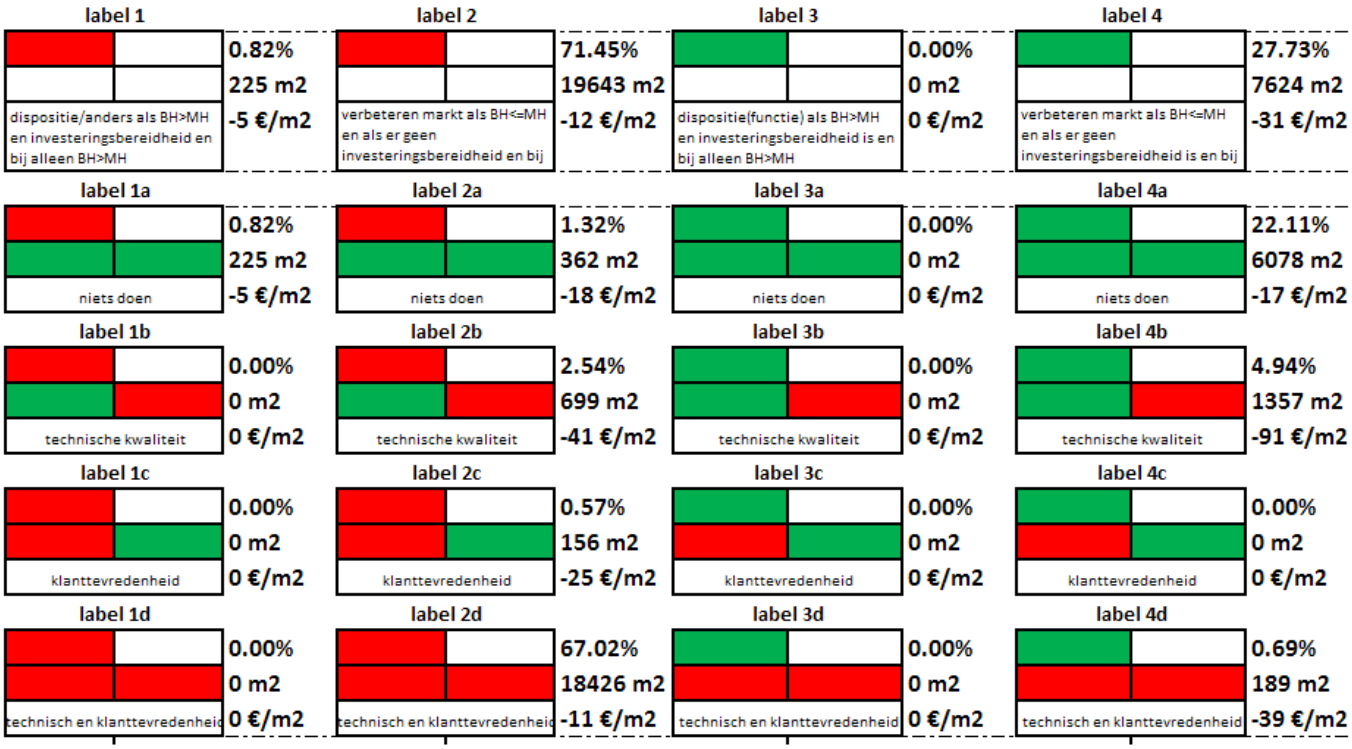

Figure 39: An advanced view of the labels with quantitative data.

6.4. Step 3, Future demand

This step incorporates the future demand of the organization. It has already been mentioned in chapter 5.6 shortly. The idea behind this step was that higher authorities like strategy, policy, local services, and the city determine what the future demand for the portfolio is. It is a global direction of what the portfolio should look like in five maybe ten years. In corporate real estate management the future demand is always uncertain. Globally speaking real estate managers[1] are trying to make decisions today by studying the possibilities of tomorrow, and real estate professionals ask themselves if the future demand is either the same, more or less than in previous situations. This creates a bandwidth which reduces uncertainty.

Due to the experimental setup the bandwidth for the future demand of the PRE-system focuses on a few variables; the public goals (overall only), the technical state and user satisfaction. By using the current match as a reference the actors (strategy/policy) can choose what they expect how the future portfolio should look like. In addition they determine how much "willingness to invest" there must be to anticipate (decrease or increase) on the municipal ownership in Katendrecht.

The PRE-system has an optimization technique[2] built in to achieve the increased demand (if it is increased!) within the current portfolio and first addressing object with multiple problems. The priorities are seen below. The first priority belongs to an object with three problems.

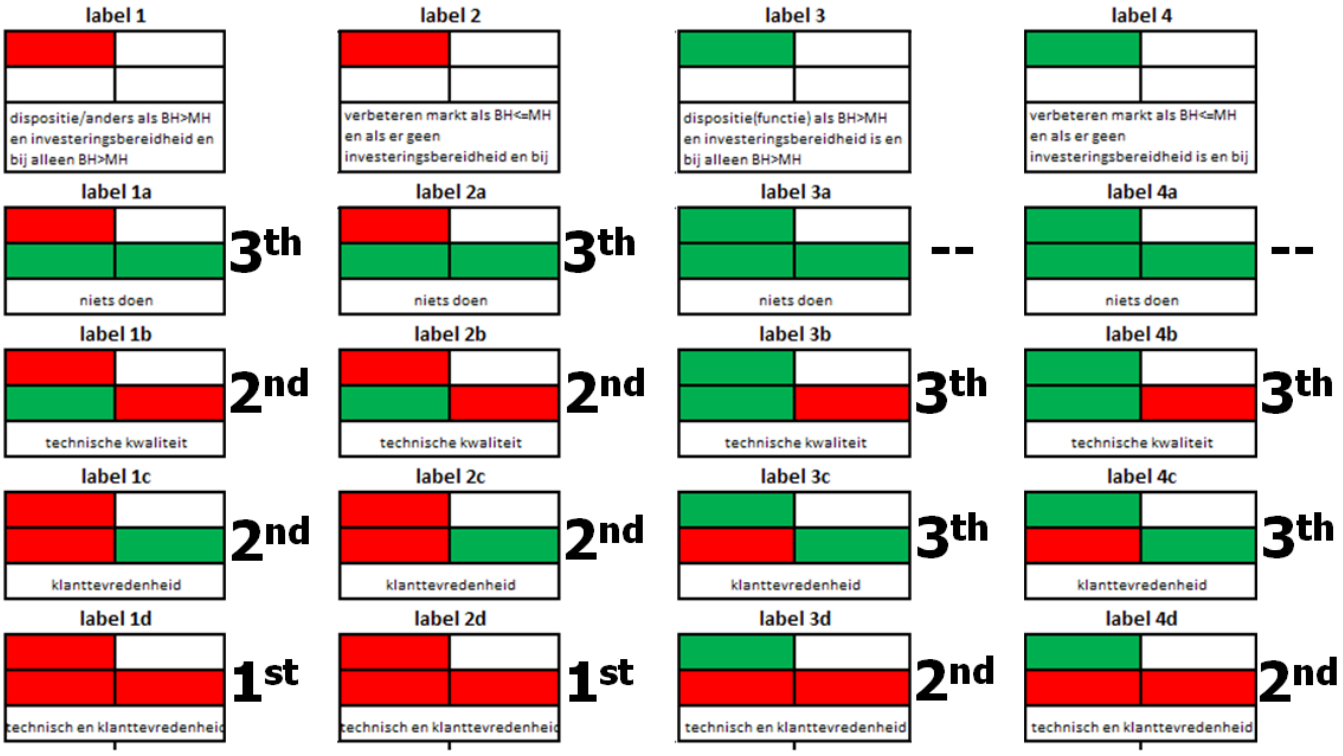

Figure 40: The different priorities in the optimization technique.

[1] Due to the financial crisis expectations for the future are full of uncertainty. Most expect stagnation of production but some are still optimistic. To handle uncertain situations in real estate, scenario planning is a common good.
[2] This is done with linear programming (LP) and explained further in chapter 6.6.

6.5. Step 4, Future supply

During a separate consultation[1] for filling in the object forms it appeared that some buildings were judged on basis of there potential, what the object is becoming. The idea rose to make a button in the object form. When this button is selected the form can be filled in for the potential of the object, based on the expected situation after renovation. Most important variables in this case will be stimulation of public goals (which and how much) and the financial consideration[2] (will there be profit or loss).

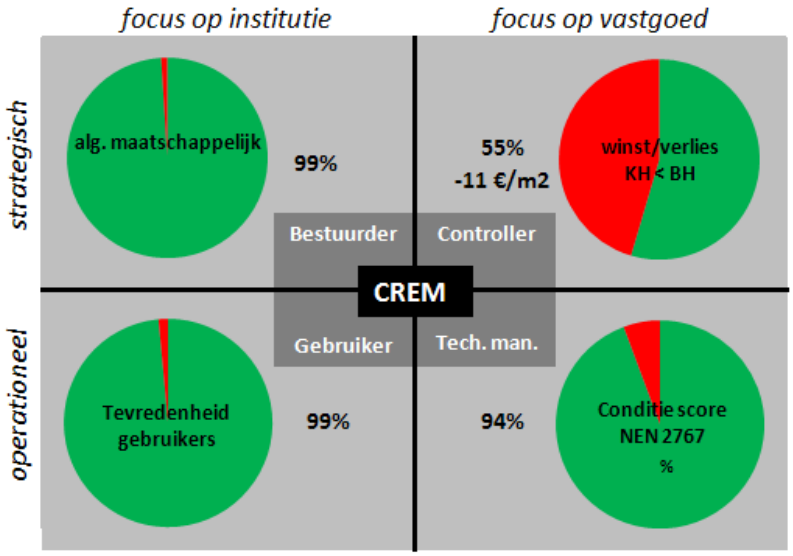

Figure 41: The potential of the portfolio in Katendrecht.

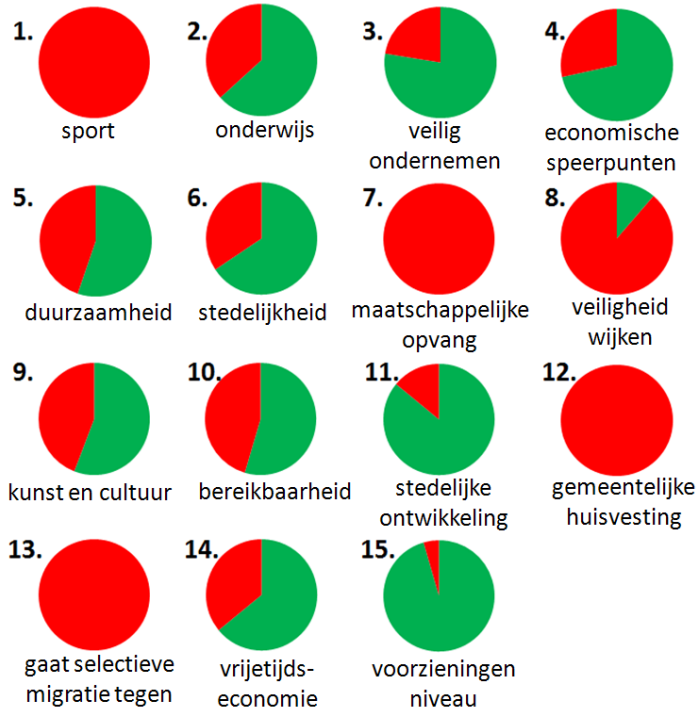

Figure 42: The potential of the sub public goals.

In Katendrecht there is a lot of real estate in possession with an urban development motive, the statistics also show that there is a lot of potential. In Katendrecht half of the total objects have a potential and almost 80% of the total square meter. This means that relatively large objects have potential. The output of all objects is the potential (possible) future supply. "Possible" because not everything has to be developed, those are just possibilities. Most potential objects still have inevitable loss(es)[3].

The result of this process is the future supply. It is also calculated into different labels. As mentioned the labels are useful for seeing how the objects are separated between the two important factors; public goals and market interest.

[1] This object form consultation was carried out with; Peter Zwart (project developer), Rob Zee (portfolio manager societal real estate) and Henk de Kok (asset manager of Katendrecht).
[2] Important is that OBR is trying to achieve cost price rent, if the tenant is not credible supplementary payments will be done by the concerned local services (public departments).
[3] In Dutch this is called the "onrendabele top".

6.6. Step 5, Optimization

This part contains the actual steering model of the PRE-system. All information derived from the sub processes based upon the DAS-framework come together in this step.

The current match, future match, future match optimized and potential are visible on portfolio level.

The future match does not contain object details, while the current match and potential are displaying the complete object list. This list contains relevant information for decision making, like the public sub goals, the labels etc. The labels are functioning as an advising organ and show (on basis of the agreed rules) the most logical destination for an object.

To make final decisions (steering), the departments (in an interorganizational setup) can choose the interventions keep[1], sell or improve for each object.

Examples of relevant questions in this consideration are:
- Achieving public goals: can all public goals be achieved?
- Minimal means: is the budget a limiting factor?
- The market unless: is the market willing to take over?

An example: an object is vacant and the market is not willing to invest. It has potential with a reasonable project return. It can stimulate the public goals that are desired. This object will probably be kept and redeveloped.

In the optimization process (keeping, selling or improving) deciding can be difficult because many in- and external relations are involved. This steering model also contains many aspects that are interwoven.

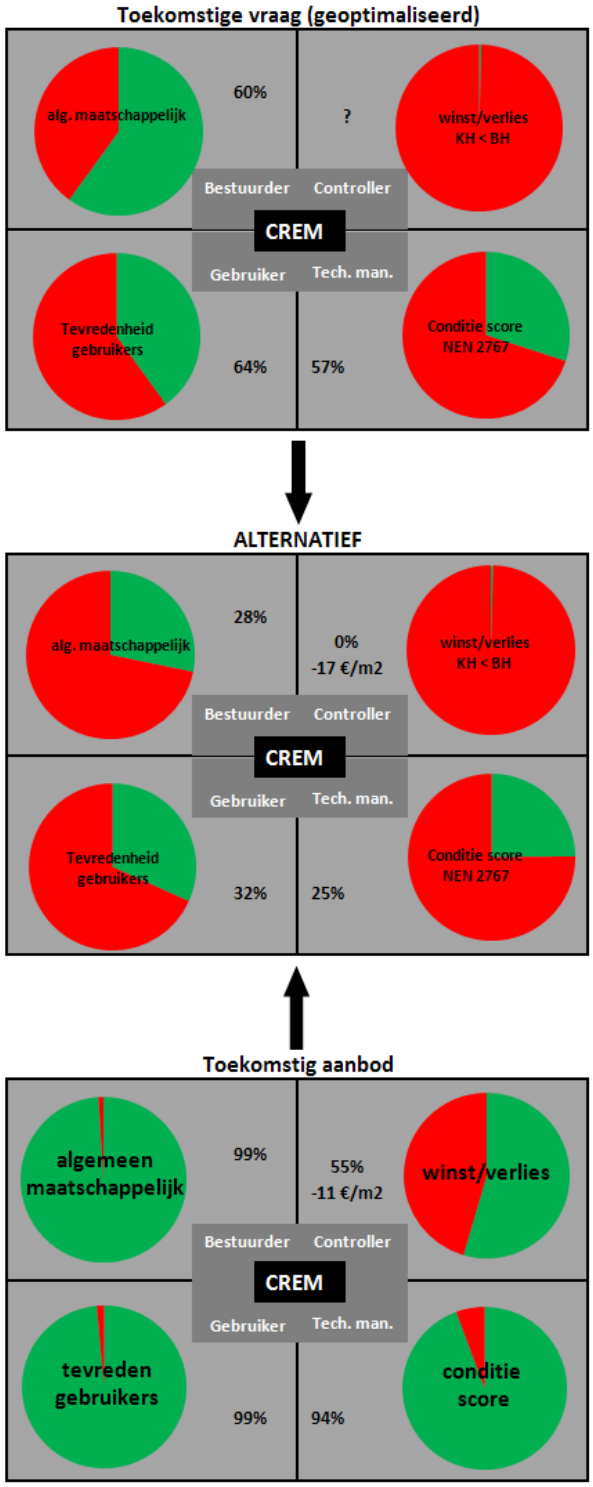

Figure 43: The portfolio information of the final optimization; choosing interventions.

[1] In keeping redevelopment is also considered while improving is including renovation and restoration.

6.7. Evaluation

In each workshop an updated version of the PRE-system was presented, used and evaluated with a group of experts and departments of OBR. They represented different levels of handling; operational, tactic and strategic.

Figure 44: Expert meeting

Expert representatives[1] and positions in the workshops:

Dion Cools	*Advisory and support*
Allard de Wolf	*Commercial real estate*
Peter Zwart	*Developer Katendrecht*
Martijn Troost	*Policy coordinator real estate strategy*
José Beumer	*Disposition manager*
Henk de Kok	*Asset manager Katendrecht*
Richard van Bladel	*Developer Katendrecht*
Gerard van Wijhe	*Portfolio manager special real estate*
Rob Zee	*Portfolio manager public real estate*
Marco Conijn	*Advisory and support*
Caroline Bosscher	*Policy coordinator real estate*

[1] From the TUDelft Dr. Ir. P.P. van Loon, Ir. M.H. Arkesteijn and Dr. Ir. R. Binnekamp were assisting.

Workshop I – 28th January 2010 and Workshop Ib – 1st March 2010

In the first workshop the current match (step 1) was elaborated and a part of step 2. The PRE-system was received positively by the expert group but it appeared a bit complex. It needs more exploration. The question rose if the system is taking over control without room for creativity and if the same criteria were always leading (as a reaction on the labels). Besides those remarks it was clear that filling in the objects form for every object is essential and that the PRE-system contributes to more optimal "strategic" portfolio insight. To fill in all ca. hundred object forms a separate session (1b) was held with a project developer, asset manager and a portfolio manager who has a lot of experience in practise and in the current case location; Katendrecht. In both workshops the following headlines appeared:

- It became clear that the PRE-system indeed contributes to the desired effect meeting of OBR which results in a more optimal "strategic portfolio".
- The database system of OBR (Horizon) was not always accurate. Sometimes the square meters were not available or the function did not exist anymore.
- The potential of an object was determined as important in this session. It created the potential button in the object form.
- The minimum requirements for public goals were extended with a button "object per definition public" because the fifteen criteria of the MPRV do not weigh equally.

Reflection citations (translated)	**Expert**	**Interpretation engineer**	**Improvements PRE-system**
1. *Model is seen as a factor in weighting process for disposition.*	José Beumer	- PRE-system adds to a more optimal "strategic" portfolio insight.	- Object potential included. - Object per definition public (policy supporting). - Engineer: also integrating the process of the DAS-frame further.
2. *Step 1 and 2 help to determine the core portfolio.*	Caroline Bosscher		
3. *In the beginning I was sceptical, but the use of the model is imaginable.*	Peter Zwart		
4. *Monitoring all objects is essential, exceptions must always be possible.*	José Beumer		
5. *Intelligent model well thought out, wondering how it should be used. In our department (strategy) I am wondering how it can be connected to current processes.*	Martijn Troost	- Central decision making setup for now.	
6. *The general applicability must be thought out. Can it be used for all types of real estate in all cases?*	Marco Conijn	- Next workshops should elaborate those subjects more. - To calculate the public goals more flexible an overrule function is needed. This also adds to the subjective desires.	
7. *We should have used this in an earlier organizational phase.*	Dion Cools		
8. *Testing is needed. The parameters of keeping must be further elaborated. Public goals questionable.*	Rob Zee		
9. *Subjective part feels like missing. The market handless with subjective feelings. The potential of objects should be very useful.*	Peter Zwart	- Interventions should not be done "automatic" - Potential of objects is needed. - To calculate the public goals more flexible an overrule function is needed. This also adds to the subjective desires.	
10. *We should separate the current situation from the plans/ideas.*	Rob Zee / Henk de Kok		

Table 7: Important citations, interpretations and improvements for the PRE-system.

Workshop II – 11th march 2010

In this workshop the results of the object potentials were very interesting for the experts. By evaluating the PRE-system the following extensions and improvements have been put up by both OBR and TUDelft:

- The PRE-system must calculate in square meters instead of amount of object.
- By viewing the labels it should be possible to call up the considered objects with a button.
- Step 3, the future demand is optimized in such a way that it gives a higher priority to objects that have multiple issues.
- In the fifth step (the optimization) objects must be able to assign to an "alternative" portfolio in the database. The driving question is with what interventions will the goals be achieved?

Reflection citations (translated)	**Expert**	**Interpretation engineer**	**Improvements PRE-system**
1. *Now that the potential is realized it is much more interesting. The renewal signature of Katendrecht is visible.*	Peter Zwart Richard van Bladel	- PRE-system adds to a more optimal "strategic" portfolio. - In the PRE-system quality is a combination of quantity.	- Changing the PRE-system to work in m2 instead of objects. - Button to call up object at the labels. Still remaining: - Juridical constraint that selling is not always possible. Button "cannot be sold" and time period. - Costs price rent including subsidies? - New case locations were relatively much is unknown.
2. *The model looks very quantitative but is qualitative.*	Dion Cools		
3. *User satisfaction is related to the rent level. A lower rent level means a higher user satisfaction.*	Peter Zwart	- This has to be worked out in the user satisfaction surveys. It is related to rent, but how exactly is left open (also in the systems approach).	
4. *Objects cannot be sold within a certain time period according to agreements.*	José Beumer	- Adding button "cannot be sold" and time period.	
5. *A zero measurement is interesting. Should use this system earlier.*	Dion Cools	- A new case without a master plan is needed.	
6. *Curious how this should work out in for example the Old North of Rotterdam.*	Peter Zwart		
7. *In some projects there are subsidies, we must decide about the definition of costs price rent, including or excluding subsidies.*	Peter Zwart	- Must become clear during negotiations.	

Table 8: Important citations, interpretations and improvements for the PRE-system.

Workshop III 15th April 2010

The third workshop is the most recent. The extensions and improvement were received positively and the optimization was partly operational for the first time. The use of the PRE-system raised a discussion about the measurement of the public goals. Furthermore selling real estate was put in more detailed perspective.

Reflection citations (translated)	Expert	Interpretation engineer	Improvements PRE-system
1. *We should distinct the municipal (public policy services) from the real estate approach in public goals.*	Gerard van Wijhe	- Public policy services should be added to the decision room to elaborate this.	- Actors control the buttons like keeping, improving or selling (interventions) and not the system itself. It means that there is room for missing or subjective factors. Still remaining: - Earn wages. - How to measure public goals exactly. - Connection with location visions.
2. *The model addressed of developments will evolve.*	Dion Cools	- PRE-system adds to a more optimal "strategic" portfolio.	
3. *The pressure increasing to make decision and the system supports.*	Gerard van Wijhe		
4. *Earn wages are interesting to integrate.*	Caroline Bosscher	- Further elaboration in quantifying those needed.	
5. *Selling is not always possible, the policy services can have a (dynamic) changing demand, fragile location etc.*	Peter Zwart	- Subjective information should be able to process in the actors minds.	
6. *A connection with location visions is interesting because the policy services are integrated in their (quantified).*	Rob Zee	- Interesting aspects for the potential and future demand.	

Table 9: Important citations, interpretations and improvements for the PRE-system.

Public goals

In the discussion about the measurement of public goals it appeared that the public policy services play a major role. The initial idea of the PRE-system is that all employees are working for the city council and therefore have the same goals. During the evaluation the approach of the portfolio became twofold:

1. The municipal approach: the public goals originated from the public policy services who determine if it is public or not.
2. The real estate approach: the return rates, willingness to invest, user satisfaction and technical condition etc. originated from OBR which determine if an object should be kept or sold.

In the first definition OBR is more an employee of the public policy services while it can also be seen as employer of its internal real estate goals. In generally it appeared that this issue should be elaborated further.

It also appeared that there are two views for public goals; (1) the public policy services have a dynamic demand and OBR (seen by its own experts) is a more static (than the council) organization therefore judgement of public goals can also be done by OBR itself, while (2) on the other hand OBR is an employee of the public policy services, who determines to which degree public goals and subsidies are applied, by demanding object locations and covering the inevitable loss(es). The added value for OBR should be in public goals which are in accordance with both views (1&2).

Selling real estate

The evaluation revealed that OBR was reserved towards selling because:

1. They may think that in a later time the city policy services (Dutch: diensten) show interest in a certain object and/or location which must be bought back against a high price.
2. It is a strategic location. This can be a location of which the potential is fragile if the object is sold.
3. There can be a juridical constraint like a period in which the object may not be sold or an involved subsidy.

This means that the "market unless" definition is not as static as initially thought. In decision making the OBR also weights the (subjective) possible moves of the public policy services, the vulnerability of the neighbourhood and the (objective) juridical constraints.

7. Conclusion and recommendations

7.1. Conclusion

The goal of this project was:

- *The development of a digital (computer) public real estate decision support system to steer within the complex real estate portfolio;*
- *Steering will focus on the relation between public goals and the portfolio which is influenced by complex selling, user, technical and costs relations;*
- *Steering is essential in order to create strategic real estate interventions;*
- *Which ultimately lead to a strategic portfolio.*

This project goal has a normative character because it suggests that steering on the relation between public goals and the portfolio with related aspects, (which are derived from the MPRV) can be better. It fits with the project goal constituted in consultation with OBR *"achieving public goals with minimal means".*

The PRE-system is a decision supporting instrumental[1] concept which allows, on the basis of accurate and relevant data, to steer on the relation between the public goals and the portfolio implications in relations with important real estate management variables. This eventually leads to interventions like, selling, keeping or upgrading to reach the desired strategic (optimal) portfolio. The PRE-system contributes to well considered decisions for portfolio interventions. Because there are so many interests, choosing interventions (the optimization) is complicated. A database technique in the design makes it possible that all considered relevant elements are weighted and different interested parties are able to see which desires can or cannot be realised in a certain alternative. It makes a transparent working method and responsibilities possible. During PRE-system tests it appeared that it helps to manage the portfolio more strategically because:

- Its suitable for all kinds of real estate.
- For municipalities the pressure to decide increases, the PRE-system helps by creating insight and transparent decision making.
- It stimulates to resolve incomplete real estate data and signifies the importance of real estate management. An example is the integration of a strategic alignment process on the basis of the DAS-frame.
- It combines the instrumental and interaction approach. This means that it focuses on the organizational primary process (collected in the systems approach) while continuously translating separate departments desires to collective steering measurements (standards). In terms of strategy formation the prescriptive and descriptive strategies are combined.
- It stirs up the discussion about how public goals should be measured while the PRE-system has a build in escape "object per definition public". The discussion can result in accurate feedback for the MPRV (meta learning).
- It makes advantages of previously unknown or unclear information like the unexpected potential of an object. It has been identified that the PRE-system prevents selling objects mistakenly.
- While the PRE-system initially looks like a deterministic model which is taking over control it is only providing relevant information on the basis of deterministic relations (calculations rules, standards determined by the organization) and advises (such as the labels) while the final interventions can still be made by the actors.

The PRE-system strives for synthesis, real estate interventions in which all actors agree on, a group optimal result.

[1] Instrumental also means that it focuses on the primary process of the organization.

7.2. Recommendations

Corporate real estate management
This project started with the fundamental idea to make the MPRV operational (in a computer model). Choosing the MPRV has many advantages; data is easier to gather and it is a result of long term negotiations, although not all data or results are available. Important to note is that the MPRV is just a preliminary document and requires elaboration and discussion. The "added value" theory of real estate management (chapter 1.3) also explores more aspects than currently integrated, reasons are:

- Quantification was taken as a primary point of departure in this project and relative many subjective aspects are therefore underexposed. In this project quality is a combination of quantitative means.
- The added value aspects focus on corporations of which the performance directly derives from the employees. In this project OBR is seen as an emancipated investor which can only influence the user indirectly.

New aspects of "added value" should be integrated into new builds of the PRE-system. Examples are the juridical possibilities which were not integrated. Kappers (2009) has addressed juridical possibilities in municipal real estate. The PRE-system handles possessed (ownership) objects of which the possibilities for selling were investigated. Selling is therefore chosen as extreme opposite of keeping in the first place. It leaves no space for a form of cooperation with the market. The evaluation of the latest prototype revealed that integrating juridical possibilities becomes more likely now.

Systems approach paradigm
In the PRE-system calculation rules are incorporated based on human appreciations. In line with the systems approach agreements about how to come to agreements are adapted to the system. A group of experts was chosen to decide about dilemmas. It was assumed that this structured group of experts can make the right decisions. Another method that approaches problems in this way is Delphi[1]. It is based on the principle that forecasts from a structured group of experts are more accurate than those from unstructured groups or individuals.

In sociological studies such statements are questioned. The PRE-system is therefore not an expert-sociological system which fits real society (empirical reality). Rather it is about appreciation and choices which determine the solution. The portfolio design is made as a fit of those appreciations and choices. Those are two completely different things which should always be separated in system design:

1. Analyses of how the design is used. For example backwards responsibility of what is done.
2. Appreciations and choices with a fitting design. For example adjusting the PRE-system.

A norm can be a key between those two. For example the technical condition norm is a key between a number (a score) and the empirical description. Verification of the PRE-system in the empirical reality can be possible instead. In this way the system is tested in reality to see if relations must be adapted. The PRE-system can therefore only be verified backwards if it is mirrored (the verification) on what really happened with the portfolio. This project was an innovative and experimental setup in which verification with empiric reality was not (yet) possible.

[1] The Delphi method is a systematic, interactive forecasting method which relies on a panel of experts. The experts answer questionnaires in two or more rounds. After each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel.

Strategic public goals
Public goals were measured with an agreement on sub design in experimental setup, and the cognitions (interpretation) of public goals (as described in the MPRV) appeared different for each actor. Both can be improved by accurate empiric descriptions and agreements. During the last evaluation it appeared that OBR feels responsible for the real estate management approach and states that the policy services have a leading role in determining the public goals with related budgets (supplementary payments). While using the PRE-system the public policy services and area development actors were not (yet) participating. Several improvements are imaginable; (1) OBR can make agreements with those departments and keep on experimenting with the PRE-system with the current actors, or (2) the PRE-system can be improved with the information infrastructure, standards and multi actor participation of those departments.

Disposition to the market
The MPRV has drawn its "market unless" definition for the development of real estate and this project placed it in the perspective of the portfolio. In the PRE-system it appeared that if the market is willing to invest an object can still be kept for other reasons. The "market unless" definition is therefore not as static as it initially looks.

Chapter 2.7 explored the definition of "temporary strategic" for OBR. In Katendrecht many objects fitted this field, combined with losses (not able to pay rent) and no willingness to invest. In figure 44*: intervention scheme* such objects end up with an "A" (keep) or "C" (improve).

If the PRE-system end up in category "C" (improve) it is possible to see if there is a technical or user satisfaction problem but it does not (yet) explores solutions.

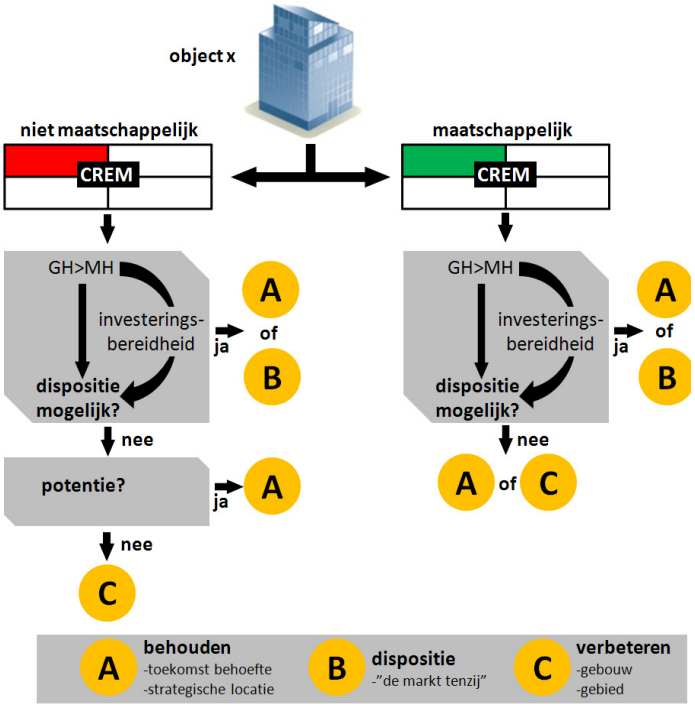

Figure 45: intervention scheme

Because in most cases (like commercial accommodation) the achieved rent level is expected to grow, option "C" can be extended with options to facilitate users with real estate so that they can perform better and be able to pay costs price covering rent earlier. Subsequently improving the willingness to invest in the location to attract the market is important. Both steps can stimulate to reach option "B"; disposition. For these steps a preliminary PRE-system extension has already been made but not (yet) integrated.

Interventions
To make the portfolio strategic this report speaks of selling, improving and keeping while acquiring is not mentioned. Early in the process we determined that all acquirements are seen as "strategic" and there is no predictable method for acquiring, it is done spontaneously in most cases. In this project the challenge is to optimize the current portfolio while acquirement's strategies should be further elaborated in public real estate management. Interventions and statistics in the PRE-system are also solely focussed on OBR portfolio while their demands are commonly based on the location. It means that the integration of the location can add significantly to the interpretation of information in the PRE-system.

8. Literature

ACKOFF, R. L. 1999. *Ackoff's Best: His classic writings on management,* New York Wiley

ATRILL, P. & MCLANEY, E. 1997. *Accouting and Finance for non-specialists,* Harlow, Prentise Hall.

BIS, N. D., VERKERK, B. G. & MAUSSEN, S. J. E. 2003. Gemeentelijk vastgoed ingezet als bedrijfsmiddel. *Real Estate Research Quarterly.*

HORDIJK, A. 2007. ROZ en Vastgoedmarkt-onderzoek naar gemeentelijk vastgoed. *Vastgoedmarkt,* April 2007**,** 3.

JOHNSON, G. & SCHOLES, K. 1998. *Exploring Corporate Strategy,* Harlow, Prentice Hall Europe.

JOLDERSMA, F., MOUWEN, C. A. M., OTTO, M. M. & GEURTS, J. L. 2008. *Strategisch management voor non-profitorganisaties; Koersbepaling, procesregie en metabesturing*, Koninklijke van Gorcum.

JONGE DE, H., ARKESTEIJN, M. H., HEIJER DEN, A. C., PUTTE VANDE, H. J. M., VRIES DE, J. C. & ZWART, J. 2009. *Corporate Real Estate Management: Designing an Accomodation Strategy (DAS Frame),* Delft, Delft University of Technology (TUD).

JOROFF, M., LOUARGAND, M., LAMBERT, S. & BECKER, F. 1993. Strategic management of the fifth resource: corporate real estate.

KAPPERS, J. 2009. *Alternatieven voor eigendom van beleidsondersteunend vastgoed.* Master Graduation thesis, Amsterdam School of Real Estate.

KRUMM, P. J. M. M. 1999. *Corporate Real Estate Management in Multinational Corporations,* Nieuwegein, ARKO Publishers.

LEENT VAN, M. 2008. Waarom hebben gemeente vastgoed. *Real Estate Magazine.*

LEEUW DE, A. C. J. 2002. *Bedrijfskundig management: Primair proces, strategie en organisatie,* Assen, Uitgeverij van Gorcum.

LOON VAN, P. P. 1998. *Interorganizational Design; a new approach to team design in architecture and urban planning.* Professor PhD, Technical University Delft.

MAC GILLAVRY, S. D. G. 2006. *Verantwoord vastgoedbezit door gemeenten.* Master Graduation Thesis, Amsterdam School of Real Estate.

MIDDENDORP, M. 2008. Strategisch portefeuillemanagement bij gemeenten. *Real Estate Magazine.*

MINTZBERG, H. L., J AHLSTRAND, B 1998. *Strategy Safari: A Guided Tour Through The Wilds of Strategic Management* New York, The Free Press.

OBR 2009. Vastgoed Katalysator voor Ontwikkeing: Meerjarenperspectief Rotterdams Vastgoed (MPRV).

SCHAAF VAN DER, P. 2002. Public Real Estate Management Challanges for government: An international comparison of public real estate strategies. Delft TUDelft.

VRIES, D. J. C. 2007. *Presteren door Vastgoed,* Delft, Eburon.

VULPERHORST, L. 2009. Blindeman of Coproducent? Nieuwe marktordening in de vastgoedsector door schaarse financieringsmogelijkheden. *De Vastgoedlezing 2009.* Amsterdam School of Real Estate.