Optimising Juridical-financial Flexibility of Corporate Real Estate

Tim Verhoeff MSc
Monique Arkesteijn MSc
Dr. Ruud Binnekamp MSc
Prof. Hans de Jonge MSc

Conference paper European Real Estate Society in Bucharest, Romania, 25-28 June 2014

Department of Real Estate and Housing, Faculty of Architecture, Delft University of Technology,
Julianalaan 134, 2628 BL, Delft, The Netherlands
e-mail: m.h.arkesteijn@tudelft.nl , tel: +31 152788427

Abstract

Societal developments are timeless and occur at an ever increasing pace that affects demand for Corporate Real Estate (CRE). Real estate flexibility, as part of a CRE strategy, enables anticipation on those uncertain societal developments. Many studies refer to real estate flexibility, which could be grouped into physical, technical, organizational, and juridical-financial flexibility (De Jonge & Den Heijer, 2004). The focus in this article is on the latter.

Juridical-financial flexibility is the management’s ability to quickly decrease real estate expenses or to quickly increase real estate benefits if the quantitative demand for space changes (De Jonge & Den Heijer, 2004). The inclusion of juridical-financial flexibility can assure that the risk of redundancy or shortage of space is minimized through short-term reconsiderations of real estate commitments. However, short-term real estate commitments are accompanied with additional costs which makes maximal flexibility unprofitable. Hence, the question is which level of juridical-financial flexibility is optimal in a specific organisation?

An operational model technique has been built to determine the optimal level of juridical-financial flexibility in CRE portfolios, an operational step that is missing in the field of CRE management. The operational model is a linear programming model that formulates a strategic recommendation to CRE management by defining the portfolio compilation with an optimal juridical-financial flexibility level. At this level, the financial investment in juridical-financial flexibility weighs up against the financial implications of mismatches in supply and demand through the guarantee that an uncertain quantitative CRE demand in the future could be anticipated.

Several models have been developed that could be used to differentiate CRE assets into peripheries, based on their envisioned future strategic role (Mather, 2006 in Bruins, 2010; Gibson & Lizieri, 1999; Mather, 2007; Weatherhead, 1997). Based on these existing models, four peripheries are composed in order to link CRE assets to an appropriate juridical format. These peripheries are: the core ownership periphery, the core leased periphery, the 1st periphery, and the 2nd periphery.
To determine the optimal juridical-financial flexibility, the current and the future quantitative demand for space as well as the qualitative demand are important aspects on asset level. Therefore, a peripheral approach is user for different user profiles to combine the two dimensions (Van Ussel, 2010).

The future demand for corporate space is uncertain, which organisations can respond to by adopting the peripheral approach. To determine proportions of the peripheries, three scenarios are developed that use the current demand as a starting point (based on Arkesteijn, 2005 in Volkers, 2006).

To transform a CRE portfolio, the following real estate strategies are available (Den Heijer & Vijverberg, 2004): disposal strategies, retaining strategies, and acquiring strategies. Next to these strategies that are determined by the current juridical format, the operational model uses generic level variables to determine the specific asset interventions.

The operational model can be used to optimise juridical-financial flexibility within a single CRE portfolio or to assess its current ability to anticipate uncertainty. In the single case study, the operational model is used to optimise the level of juridical-financial flexibility of a financial service provider and formulates a CRE strategy that decreases the CRE costs with 8%. In a broader perspective, CRE costs are considered to be the second largest corporate expenditure, after people (Leibson, 2007; Louko, 2004).

**Keywords** corporate real estate management, juridical-financial flexibility, uncertainty, operations research management

**Article Classification** Corporate real estate management

### 1. Introduction

Corporates operate in a dynamic market that is characterised by a high level of uncertainty. This uncertainty is caused by changes in the political climate; undeniable social and economic trends; the increasing impact of information and communication technology; and organisational changes. Corporate managers have to manoeuvre within this uncertain context in the execution of their task.

Context uncertainty leads to an uncertain future demand for CRE, which affects the CRE strategy. A proactive component of a CRE strategy to cope with demand uncertainty is real estate flexibility, which is the ability to make real estate adjustments. It allows managers to respond on a changing demand which increases the effectiveness of CRE management. De Jonge and Den Heijer (2004) distinguished four types of real estate flexibility which are visualised in Figure 1.

1. **Spatial flexibility** represents the spatial and legal abilities to use the surroundings more intensively; the ability to increase the density; and the ability to expand the building vertical and horizontal.
2. **Technical flexibility** is the ability to adjust the construction or technical installations in order to change the building form and its layout.

3. **Organisational flexibility** is the extent to which an organisation is able to adapt itself and hence, the ability to use available space more efficient.
(4) **Juridical-financial flexibility** is the management’s ability to quickly decrease real estate expenses or to quickly increase real estate benefits if the quantitative demand for space changes. It includes short term leases; marketable ownership assets; and flexibility within a lease contract.

Each of these real estate flexibility types are traced in scientific real estate journals in order to further identify its current position in the field of CREM. To find the articles that refer to real estate flexibility, Google Scholar; Emerald Insight website (2013); and the Zicklin School of Business website (2013) have been searched for the following keywords that are used to find references: *flexibility* or *flexible* in combination with *real estate* and *asset(s)*.

For each article, the type or types of flexibility are determined and categorised. Not all the articles use the exact terminology of De Jonge and Den Heijer (2004), in those cases a context analysis has been performed to determine how ‘flexibility’ is used. The results are presented in Table 1, which shows the articles and the amount of articles per journal that include real estate flexibility and the total amount of references per real estate flexibility type.

<table>
<thead>
<tr>
<th>Journal</th>
<th>Articles that include RE flexibility</th>
<th>Spatial flexibility</th>
<th>Technical flexibility</th>
<th>Organisational flexibility</th>
<th>Juridical-financial flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>11</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>International Journal of Strategic Property Management</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Journal of Corporate Real Estate</td>
<td>25</td>
<td>4</td>
<td>10</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Journal of Property Investment &amp; Finance</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Journal of Property Research</td>
<td>6</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>The Journal of Real Estate Finance and Economics</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>The Journal of Real Estate Research</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>63</strong></td>
<td><strong>12</strong></td>
<td><strong>28</strong></td>
<td><strong>18</strong></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

*Table 1: Real estate flexibility references in scientific journals*
In Figure 2, the results are visualised by setting out the type of flexibility to the publication year of the journal. Overall, the most references are related to juridical-financial flexibility and technical flexibility, while the least references are related to physical flexibility and organisational flexibility.

![Figure 2: References to real estate flexibility in scientific journals set out to the publication year](image)

The first article that contains the term flexibility dates back from ‘89 and is written by Miles, Pringle, and Webb (1989). In this article, the capital budgeting/corporate financing framework is combined into a model that is used to review CRE decisions on a regularly basis. The particular real estate flexibility type referred to is juridical-financial flexibility.

Based on the results (Figure 2), it can be concluded that flexibility was a recurring theme in journal articles between 1999-2001. According to Van Beukering (2008), consulting engineer at NLingenieurs, CEO Partners in Vastgoed Management and chairman of the Stichting Vastgoedmanagers, organisational strategies are focussed on efficiency during recessions and in contrast, during a booming period the focus is on effectiveness, flexibility or creativity. In line with this statement, the parabolic trend could be linked to the developments regarding the information and communication-technology that drove economic growth from 1999 (Centraal Bureau voor de Statistiek, 2011). In the period after 2008, the market was characterised by the credit crunch and in this period, mainly juridical-financial flexibility references stand out in the scientific journals.
Saari, Kruus, Hämälainen, and Kiiras (2007) started with an analysis of research findings with respect to real estate flexibility. In this analysis, they identified three main drivers for the growing need for real estate flexibility, which are:

1. structural changes, such as the migration of people;
2. a changing nature of work that desires the modification of existing premises; and
3. real estate ownership has become separated from its use.

This research focussed on juridical-financial flexibility of real estate, which is used to align the CRE demand and supply more efficiently through the inclusion of real estate holdings that are easily disposable. It inextricably links the legal contract to obtains the right to use a real estate asset and the financial consequences that are accompanied with this contract. Juridical-financial flexibility could be linked to the third driver of Saari et al. (2007) expresses the development of leasing abilities caused the fading of the traditional ownership decision. Table 2 presents an overview of the available real estate holdings. Despite the fact that a wide range of real estate holdings are available to acquire a real estate asset, the dilemma is primarily indicated as the own-lease dilemma.

<table>
<thead>
<tr>
<th>Real estate holding</th>
<th>Owner</th>
<th>Commitments</th>
<th>Financer</th>
<th>Balance sheet</th>
<th>Liability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td>Corporate</td>
<td>Indefinite</td>
<td>Corporate</td>
<td>Book value</td>
<td>Costs of capital</td>
</tr>
<tr>
<td>Loan</td>
<td>Corporate</td>
<td>Indefinite</td>
<td>Corporate / investor</td>
<td>Book value</td>
<td>Costs of capital</td>
</tr>
<tr>
<td>Joint-venture</td>
<td>Corporates</td>
<td>Indefinite</td>
<td>Corporates</td>
<td>Book value</td>
<td>Costs of capital</td>
</tr>
<tr>
<td>Financial lease</td>
<td>Lessor/lessee</td>
<td>10+ years</td>
<td>Lessor*/lessee**</td>
<td>Book value</td>
<td>Redemption lease + interest</td>
</tr>
<tr>
<td>Operational lease</td>
<td>Lessor</td>
<td>5*x years</td>
<td>Lessor*/lessee**</td>
<td>Off-balance***</td>
<td>Lease + services</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>Lessor</td>
<td>0-1 year</td>
<td>Lessor*/lessee**</td>
<td>Off-balance</td>
<td>Lease + services</td>
</tr>
</tbody>
</table>

*: direct financer
**: indirect financer
***: the off-balance sheet strategy is expected to be disabled for commitment terms of more than one year (IFRS Foundation, 2012)

Table 2: Real estate holdings (Hoendervanger, Van Der Voordt, & Wijnja, 2012; Van Hermon, 2005)

2. Portfolio proportions in the own-lease dilemma

Gibson (2000a) and Lasfer (2007), provided more insight into the portfolio proportions per real estate holding and commitment terms (see Figure 3). Gibson revealed the current and desired portfolio of 48 corporates in the United Kingdom at the end of 1999. She did this through the conduction of questionnaire surveys with CRE managers in which she asked them to estimate portfolio properties.
Based on her research findings, Gibson drew the following two conclusions:

(1) corporates were committed to long-term lease commitments while a greater proportion of short-term lease commitments was desired; and

(2) the desired proportion of owned real estate was lower than the proportion that was actually owned in 1999.

According to Gibson, the differences in portfolio proportions reflected the impact of shortened business cycles among organisations in general.

---

**Figure 3: CRE portfolio proportions per real estate holding and commitment terms**

In Figure 3, Gibson’s research results are compared to the results of Lasfer’s research, who focussed on the costs and benefits of leasing real estate rather than owning it and the effect on shareholder returns. Over the period 1989-2002, he compared financial characteristics of 2,343 quoted companies from the United Kingdom through pooled time-series and cross-sectional observations with the objective to assess the extent to which companies create value through leasing their real estate.

His research showed three results:

(1) that companies lease their real estate to conserve liquidity in order to finance their growth prospect;

(2) that companies that lease their real estate use it more efficient and this results in higher stakeholder returns through share price valuation; and

(3) that the market also considers costs of not owning real estate due to the loss of collateral.

Based on his observations, Lasfer developed the Donaldsons-Lasfer’s curve to test the non-linear relationship between the ratio of leased assets and firm value and to determine the optimal leasing level. This curve represents a regression of market-to-book against leasing and the squared value of leasing propensity. The top of the curve represents the portfolio percentage that should be leased in order to maximise shareholder returns, which is about 65 per cent.
With qualitative data, Gibson revealed a decreasing desire for owned CRE, while Lasfer concluded that a higher ratio is financially advantageous, based on quantitative data. Based on the different research methods, Lasfer’s findings are considered to be more reliable than Gibson’s portfolio proportions. However, Lasfer did not provide any insight into the portfolio proportions within leased real estate.

CRE managers could consult both researches to formulate their own CRE strategy, but O’Mara (1999) stated that the context is an essential aspect of analysis in real estate commitment decisions. Each corporate has typical uncertainties with unique demand volatilities, which questions the usefulness of Gibson’s findings for a single corporate. Therefore, this article considers the CRE managerial problem:

*How do you formulate a CRE strategy for a single organisation in which the financial investment in juridical-financial flexibility weighs up against the financial implications of mismatches in supply and demand, and is therefore a CRE strategy that optimises the level of juridical-financial flexibility?*

To research this managerial problem, an operational model has been developed with the use of linear programming. This article will first consider the research objective and methodology. This is then followed by relevant aspects that gain further insight into the real estate commitment decisions, which were essential in the development of the operational model that is presented afterwards. The operational model can be used to formulate a CRE holding strategy to support the business, both in the present and in the future. This article is then concluded with research comparisons to analyse CRE trends and presents the usefulness of the model in CREM.

### 3. Research objective and methodology

The objective of the research is to gain more understanding of how CRE managers can implement juridical-financial flexibility in their CRE portfolio. In more general words, it develops knowledge for CREM science and draws empirical lessons for real estate management practice.

To gain insight into real estate commitment decisions, several aspects were examined. First, the own-lease dilemma is analysed from a juridical and from a financial perspective in order to determine the relevant management variables and to identify their mutual relationship. Second, the three-tier approach of Gibson and Lizieri (1999) is analysed, which is used to differentiate a CRE portfolio into peripheries in order to anticipate a volatile future CRE demand. Finally, the analytical framework is presented that includes the relevant management variables and the role of the operational model.

The operational model that has been developed contains general mathematical elements that are clarified and related to the managerial problem. To test the usefulness of the operational model, it is tested in a single case study at a Dutch multinational banking and financial services company. An interview with the local CRE manager and the analysis of strategic documents resulted in the required qualitative and quantitative data. At the end of the research, the formulated CRE strategy is reflected and the operational model is evaluated to identify its utilisation potential in the field of CREM.
4. Analytical framework juridical-financial flexibility

In this section, the analytical framework is presented that is used to find the relevant management variables that are related to juridical-financial flexibility. This is done through analysing the own-lease dilemma from two perspectives. Then, aspects are determined that are relevant in the real estate holding decision. The analysis is concluded with the analytical framework that is used to attune CRE supply and demand.

*The own-lease dilemma in a juridical perspective*

In the late 1990s, CRE managers in the United Kingdom argued that financial flexibility could only be achieved through real estate ownership (Gibson, 2000b). Their main argument was that owned real estate is accompanied with total asset control which is the freedom to sell, transform or to sub-let the asset. Therefore, it is strongly related to the other types of real estate flexibility.

Golan (1998) argued that asset liquidity also determines the flexibility of owned real estate and that it has a higher relevance than asset control. He defined asset liquidity as ‘the degree to which a corporate can sell or lease its space quickly at a price equal to, or greater than, that which it has financially invested in the asset’. This definition expresses the return on the investment and the ease of disposal.

Liquid assets have the potential to quickly decrease real estate expenses through a sale and will therefore positively influence the level of juridical-financial flexibility. In contrast, illiquid assets will negatively influence the level of juridical-financial flexibility. It may be wise to consider redevelopment or demolition of illiquid assets, because superfluous real estate may be costly as well. A relevant aspect of asset liquidity is that it may vary in time as a result of two aspects. First, asset obsolescence slowly decreases asset liquidity, which may be prevented with small- and large-scale maintenance. Second, the real estate market determines the demand for CRE assets and will therefore influence asset liquidity. As a result, the future juridical-financial flexibility of owned real estate is characterised by uncertainty.

In contrast, the juridical-financial flexibility of leased real estate is characterised by certainty, because it is dependent on the residual lease commitment and the exit costs to prematurely terminate the lease. Short-term leases will contribute to the level of juridical-financial flexibility, while long-term leases do not. However, as time expires, leases will have a shorter residual lease commitment which increases the level of juridical-financial flexibility.

Owned and leased real estate are accompanied with non-financial aspects that result from the real estate holding type, which are compared in Table 3. To summarise, juridical-financial flexibility of CRE from a juridical perspective is dependent on the legal structure, because in case of owned real estate, asset control and current asset liquidity are relevant, while the residual lease commitment and the exit costs are relevant variables if an asset is leased.

<table>
<thead>
<tr>
<th>Owned real estate</th>
<th>Leased real estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset control</td>
<td>Total asset control</td>
</tr>
<tr>
<td>Management responsibilities</td>
<td>Many management responsibilities</td>
</tr>
<tr>
<td>Qualitative demand changes</td>
<td>Easy to implement changes</td>
</tr>
<tr>
<td></td>
<td>Weak bargaining position to change asset</td>
</tr>
</tbody>
</table>
Effectiveness of alignment | Lower efficiency by treating RE as a possession | Higher efficiency by treating RE as a cost asset
Juridical-financial flexibility | (1) Asset control (2) Current asset liquidity | (1) Residual lease commitment (2) Exit costs

Table 3: The own-lease dilemma; a juridical perspective (Gibson, 2000b; Golan, 1998; Lasfer, 2007; Van Hermon, 2005)

The own-lease dilemma in a financial perspective

Next to the differences in juridical aspects between owned and leased real estate, there are also financial aspects that increase the complexity of the dilemma.

From a financial perspective, the corporate balance sheet impacts and the real estate beta are relevant factors to include in the own-lease dilemma. Table 4 compares the financial aspects with respect to the balance sheet implications that are accompanied with both types of real estate holdings. The benefits of one are the costs of the other, but vary per aspect which characterises the complexity of the own-lease dilemma from a financial perspective.

Next to the corporate balance sheet impacts, the real estate beta should also be included in the own-lease dilemma. It represents the risk factor for real estate activities in comparison with other corporate investments. This indicates that the decision to invest in CRE should be weighed with other corporate investments to select the investment with the highest return or lowest risk.

As stated earlier, Lasfer (2007) defined the optimal lease-own ratio in CRE portfolios. His ratio is implemented in this research to bypass the complexity of the own-lease dilemma from a financial perspective.

<table>
<thead>
<tr>
<th>Owned real estate</th>
<th>Leased real estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financed with</td>
<td>Equity or borrowed capital</td>
</tr>
<tr>
<td>Solvency</td>
<td>High</td>
</tr>
<tr>
<td>Fiscal</td>
<td>Redemption and amortization costs</td>
</tr>
<tr>
<td>Leverage</td>
<td>Mechanism for financing</td>
</tr>
<tr>
<td>Risk</td>
<td>Aligned with upside / downside of the market</td>
</tr>
<tr>
<td>Corporate liquidity</td>
<td>Decreased</td>
</tr>
<tr>
<td>Costs</td>
<td>Investments and operational costs</td>
</tr>
<tr>
<td>Real estate beta</td>
<td>Advantageous if the real estate beta is lower than the corporate beta</td>
</tr>
<tr>
<td>Optimal own-lease ratio</td>
<td>30 per cent</td>
</tr>
</tbody>
</table>

Table 4: The own-lease dilemma; a financial perspective (Buijssen, 2000; Lasfer, 2007; Van Hermon, 2005)

5. Peripheral approach
In 1999, Gibson and Lizieri developed the three-tiered approach which can differentiate the CRE assets into peripheries, based on its envisioned strategic role. With this approach, employee fluctuations could be anticipated within the organisation through implementing a specific type of flexibility per periphery. In doing so, they defined three portfolio peripheries:

1. core real estate that desires functional flexibility;
2. 1st periphery real estate that desires the flexibility to exit in time; and
3. 2nd periphery real estate that desires short-term flexibility.

The underlying idea behind this approach is that it is financially attractive to have long-term commitments if long-term occupancy is assured, while short-term contracts are accompanied with a higher annual lease, but have the advantage that the role of a CRE asset could be reconsidered at a shorter notice. Thus, juridical-financial flexibility is only profitable if it is expected to be necessary to steer the alignment of CRE supply and demand.

The juridical-financial flexibility of owned real estate that optimally represents 30 per cent of the CRE portfolio is determined by the asset control and the current asset liquidity. The juridical-financial flexibility of leased real estate that optimally expresses 70 per cent of the CRE portfolio is determined by the residual lease commitment and the exit costs. These management variables determine the juridical-financial flexibility of a current CRE portfolio. In addition, it is also important to include the acquire ability to quickly increase real estate benefits.

Based on the different juridical and financial implications of owned and leased real estate, core real estate is divided into an owned and a leased periphery. Thus, to differentiate current CRE assets, the peripheral approach is extended with a fourth periphery in this research. In the peripheral approach, each periphery desires typical juridical-financial flexibility, based on its future requisite, to anticipate the volatile demand (see Figure 4). A higher demand volatility desires a greater proportion of peripheral real estate, while a stable organisation desires a greater proportion of core real estate.

**Figure 4: Peripheral approach (based on the three-tiered approach of Gibson & Lizieri, 1999)**

Scenario designs are used to quantify the leased peripheries, which represent approximately 65 per cent of the CRE portfolio. More specifically, three case dependent scenarios should be composed that will determine the leased peripheries as follows (based on Arkesteijn, 2005 in Volkers, 2006):
(1) the core leased periphery is defined by the minimal demand scenario at t=10 minus the core owned periphery;
(2) the 1st periphery is defined by the most likely demand scenario at t=5 minus the core periphery; and
(3) the 2nd periphery is defined by the maximal demand scenario at t=1 minus the core and the 1st periphery.

This approach is visualised in Figure 5. To realise the optimal peripheries within a CRE portfolio, a periphery deviation may be required as a result of the static quantity of current assets. CRE portfolios with little assets require higher periphery deviations since the ability to distribute user profiles among the assets is more limited than CRE portfolio with many assets. These periphery deviations will be expressed as minimal and maximal peripheries.

The main advantage of this approach is that it enables steering of the CRE supply on a yearly basis through new leases or lease extensions. If desired, the moment of steering could be tuned to shorter horizons (e.g. biannual steering) or longer horizons (e.g. biennial steering). However, this will affect the financial implications that are dependent on lease commitment terms.

The approach described is a method that is useful to align the quantitative demand. Therefore, the use of the peripheral approach for each user group is more effective. User groups unites business processes with identical real estate quality demands (Van Ussel, 2010). The combination of user groups should support the entire range of business processes and will therefore combine the quantitative with the qualitative demand. An important aspect of this approach is that each business process requires a certain real estate quality, but several business processes may desire identical real estate qualities.
Thus, the peripheral approach is applied per user group and the peripheries are quantified with the expected demand volatility per user group and the optimal lease-own ratio of Lasfer (2007). Demand volatility is inextricably linked with uncertainty that could be anticipated by the design of scenarios. These scenarios should present the potential future space demand per user group.

6. Analytical framework

To formulate a CRE strategy, the DAS-frame (Designing an Accommodation Strategy) (De Jonge et al., 2009) is used as an underlying method. This analytical method is developed by the department of Real Estate & Housing at the University of Technology in Delft and in general, it is used to attune the static CRE supply with the dynamic CRE demand, now and in the future.

The DAS-frame serves as the basic structure of the real estate juridical alignment model that is presented in Figure 6. The analytical framework is characterised by two axes; a vertical axis that distinguishes current and desired real estate holdings and a horizontal axis that distinguishes the current and future real estate holdings in the CRE portfolio. Through comparisons, the (mis)matches can be defined, both in the present and in the future, and with available strategies, an operational model will formulate a recommendation to transform the current portfolio into the future portfolio. The mismatches are determined by variables that can be categorised among three levels. These variables are presented in Table 5.

![Figure 6: Real estate juridical alignment model (De Jonge et al., 2009; De Jonge & Den Heijer, 2004; Den Heijer & Vijverberg, 2004; Dewulf & Den Heijer, 1999; Gibson & Lizieri, 1999; Van Ussel, 2010)](image)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset level variables</td>
<td>(Den Heijer &amp; Vijverberg, 2004; Golan, 1998; Nourse &amp; Roulac, 1993; Van Hermon, 2005; Van Ussel, 2010)</td>
</tr>
<tr>
<td>- Location</td>
<td></td>
</tr>
<tr>
<td>- Juridical properties (asset control if owned; residual lease commitment and exit costs if leased)</td>
<td></td>
</tr>
<tr>
<td>- Building quantity</td>
<td></td>
</tr>
<tr>
<td>- Building quality</td>
<td></td>
</tr>
<tr>
<td>- Juridical liabilities</td>
<td></td>
</tr>
</tbody>
</table>
Optimising Juridical-Financial Flexibility of Corporate Real Estate

- Current asset liquidity

Organisational
level variables
- Corporate balance sheet strategy
- Corporations size and growth pace
- Geographical distribution
  
  (Lasfer, 2007; Singh, 2010)

Generic level
variables
- Real estate and construction cycle
- Benchmark lettable floor area per employee
  
  (Geltner, Miller, Clayton, & Eichholtz, 2007; Van Ansem, 2011; Van Beukering, 2008)

Table 5: Juridical-financial flexibility variables

7. Operational model

With the use of linear programming, an operational model has been developed that operationalises the transformation step in the real estate juridical alignment model with the application of the peripheral approach. In general, linear programming (LP) is a mathematical technique that is used to solve managerial problems and in this case, it is used to optimise juridical-financial flexibility in a single CRE portfolio. The operational model requires context related data of asset-, organisational-, and generic-level variables to enable the formulation of a CRE strategy.

An LP-model can be presented in a canonical form:

\[
\text{Minimise } Z = \sum_{j=1}^{n} c_j x_j
\]

subject to:

\[
\sum_{j=1}^{n} a_{ij} x_{ij} \geq b_i \quad \text{for } i = 1, \ldots, m
\]

and

\[x_j \geq 0 \quad \text{for } j = 1, \ldots, n\]

In this canonical form \(x_1, x_2, \ldots, x_n\) are non-negative decision variables and the \(c_1, c_2, \ldots, c_n\) are contribution coefficients that represent the marginal contribution to \(Z\) for each unit of their respective decision variable. It is used to seek a single objective of minimising the objective function with outcome \(Z\). The objective function is subject to a set of \(m\) constraints, the \(a_{ij}\), where \(i = 1, 2, \ldots, n\) and \(j = 1, 2, \ldots, m\) are technological coefficients that represent the per unit usage of the \(x_j\) of the right-hand-side coefficients of \(b_i\). In this model the \(n\) decision variables are required to be non-negative. "In architecture (and real estate management), contrary to classical linear, programming, the constraints are not considered to be fixed but negotiable" (Binnekamp et al, 2006).

Table 6 presents the operational model format that is largely based on the standard LP-format. Basically, it is composed of the following five elements:

1. decision variables are used to select the optimal combination of CRE strategies and to differentiate assets into peripheries (\(x_n + \text{periphery}\)), based on the objective function and the formulated constraints;

2. contribution coefficients \((c_n)\) represent the first year financial implications of CRE strategies;
(3) *the objective function* minimises $Z$ to find the combination of strategies that is financially advantageous; and

(4) *constraints* ($m$) are non-fixed coefficients that are determined by asset- and organisational level variables.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Decision variables</td>
<td>CRE strategy 1</td>
<td>CRE strategy 2</td>
<td>...</td>
<td>CRE strategy n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>$x_1 +$ periphery</td>
<td>$x_2 +$ periphery</td>
<td>...</td>
<td>$x_n +$ periphery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Objective function</td>
<td>$c_1$</td>
<td>$c_2$</td>
<td>...</td>
<td>$c_n$</td>
<td>$Z$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Constraint 1</td>
<td>$a_{11}$</td>
<td>$a_{12}$</td>
<td>...</td>
<td>$a_{1n}$</td>
<td>$&lt;=$</td>
<td>$b_1$</td>
</tr>
<tr>
<td>5</td>
<td>Constraint 2</td>
<td>$a_{21}$</td>
<td>$a_{22}$</td>
<td>...</td>
<td>$a_{2n}$</td>
<td>$&lt;=$</td>
<td>$b_2$</td>
</tr>
<tr>
<td>6</td>
<td>Constraint m</td>
<td>$a_{m1}$</td>
<td>$a_{m2}$</td>
<td>...</td>
<td>$a_{mn}$</td>
<td>$&lt;=$</td>
<td>$b_m$</td>
</tr>
</tbody>
</table>

*Table 6: The standard LP-format*

Figure 7 visualises the operational model. The variables, scenarios and the desired own-lease ratio are required as input to formulate a CRE holding strategy. The constraints are composed of asset and organisational level constraints and are indicated as non-fixed since they may change in time. The operational model can be used to formulate CRE asset strategies, but a more specific CRE intervention is dependent on organisational and generic level variables. All together, the operational model is used to formulate a CRE holding strategy.

8. **Empirical results**

The utilisation potential of the operational model is tested in a single case study at a Dutch multinational banking and financial services company. The case study is conducted at a local level in order to perform an in-depth analysis into the relevant management variables (see Table 5), which are extracted with quantitative and qualitative research methods.

In the case study, two user groups were distinguished that together support the entire business, which are the front office group and the back office group. The greatest uncertainty applies to the
future quantitative demand for the front office group, mainly caused by the virtualisation of society. Corporate respond to the virtualisation of society turned out to be critical in the determination of the peripheries and therefore, in the formulation of a CRE strategy. This corresponds to the statement of O’Mara, who stressed the importance of the context in the formulation of a CRE strategy.

The final design of the operational model is assessed as a model that professionalises the management of CRE by processing the large set of available data into a CRE strategy. It is praised for its objectivity, while it can also integrate subjective elements (e.g. emotions) that may be accompanied with a CRE asset.

From a financial point of view, the costs of the formulated CRE holding strategy are compared with the current CRE holding costs. The single case study results show that the first year costs are higher, mainly caused by higher costs for short-term lease commitments. However, if the ten year costs are analysed, the formulated CRE holding strategy will decrease the total CRE costs with 8 per cent.

9. Conclusions

The research findings of the single case study could be compared with the researches by Gibson (2000a) and Lasfer (2007). Figure 8 presents a comparison in which the peripheral approach facilitates the comparison. In the analysis, the following differences and equalities are observed among the three researches:

(1) Gibson used qualitative data and Lasfer used quantitative data to determine portfolio proportions per periphery, while the developed operational model combines qualitative and quantitative data to determine the future demand and emphasizes on the relevance of the future with respect to the formulation of a CRE strategy;

(2) Gibson and Lasfer applied a multiple case study to define the portfolio proportions per real estate holding, while the operational model provides proportions for a single organisation’s context through the inclusion of asset-, organisational-, and generic variables;

(3) Gibson showed that in 2000, it was desired to own less CRE than actually owned, while Lasfer showed that it is more advantageous to have a higher own-lease ratio than actually owned in 2000. The recommended portfolio in the case study proposes a significant larger part of 2nd periphery in comparison with Gibson’s peripheries.

(4) the operational model uses the Lasfer’s own-lease ratio to define the separation between the core owned and core leased periphery and applies the peripheral approach to define the other leased peripheries, this is not included in Lasfer’s research; and

(5) Gibson compared the revealed and desired portfolios and observed a desire for shorter lease commitments, which is an ongoing trend, based on the single case study findings. However, Gibson linked it with shorter business cycles, while the operational model links it with demand uncertainty.
**10. Evaluation**

The end-product is an operational model technique that operationalises the peripheral approach with the use of linear programming in order to formulate a CRE holding strategy. More specifically, this technique is useful to test the ability of the current CRE portfolio to anticipate uncertainty; to determine which real estate holding should be selected for a new asset; or to determine a new CRE strategy that has the objective to optimise juridical-financial flexibility. In this technique, the formulation of the strategy depends on context related data, which will result in an operational model design that is unique in each case. With the distinction between core leased and core owned real estate, the operational model defines four peripheries and therefore, the peripheral approach could be seen as an extended version of the three-tiered approach of Gibson and Lizieri (1999).

In the field of CREM, the operational model technique professionalises this management layer that is responsible for the second largest corporate expenditure, after people (Leibson, 2007; Louko, 2004). It provides a technique that can be used to formulate or to assess CRE strategies. It requires an extensive context, but it processes the large set of data in which CRE managers may be drowning.

In the single case study, the operational model is used to formulate a strategy that aligns the supply and the volatile demand of CRE, both in the present and in the future. With respect to the costs for CRE, the formulated strategy showed 8 per cent lower costs in comparison with the current strategy, caused by the minimisation of superfluous space and the implementation of juridical-financial flexibility. In a broader perspective, CRE costs are considered to be the second largest corporate expenditure, after people (Leibson, 2007; Louko, 2004). Next to these financial implications of the operational model, it is assessed as a tool that professionalises CREM through its ability to operationalise managerial problems that are related to real estate commitment decisions.

**11. Recommendations**
OPTIMISING JURIDICAL-FINANCIAL FLEXIBILITY OF CORPORATE REAL ESTATE

(1) The primary focus in this research was optimising juridical-financial flexibility. However, this is automatically linked to other types of real estate flexibility, although these types are minimally addressed as a result of the research delineation, which leaves the potential for in-depth researches into the other types of real estate flexibility and how they could optimally be implemented.

(2) A subject that is underexposed in this research is the balance sheet consequences of owned and leased real estate. This should be included in future research?

(3) Per user profile, three scenarios are used to determine the peripheries. The scenario design could be replaced with another method that includes probability, such as the Monte Carlo method in which one runs simulations many times over in order to obtain the distribution of an unknown’s probabilistic entity.

Sources


Singh, R. (2010). *Organisations'location choices; The Demand Drivers for Clustering and Dispersal of Functions Across Geographical Area.* Delft University of Technology, Architecture, Real Estate & Housing, Real Estate Management: Delft, the Netherlands.


Van Hermon, N. I. (2005). *Financiering van Corporate Real Estate: Gestructureerd Vastgoedfinancieringsbeleid of een Sluitpost van de Begroting.* Amsterdam School of Real Estate; University of Amsterdam, Amsterdam, the Netherlands.


Biographical Details

Tim Verhoeff graduated in 2014 at Delft University of Technology, master Real Estate & Housing. His graduation research was focussed on the optimisation of juridical-financial flexibility in corporate real estate portfolios. As a graduate intern at a multinational financial service provider, he conducted the empirical part of this research. In 2014, he started as a junior consultant Development Services at CBRE.

Monique Arkesteijn is assistant professor real estate management at the Delft University of Technology (DUT) at the Faculty of Architecture and the Built Environment, department of Real Estate and Housing since 2003. Monique teaches and researches corporate and public real estate strategies. In 2008-2009 she organized a Think tank ‘envisioning the future university campus’ for the DUT. She heads the Real Estate Management section and works on her Phd about CRE alignment and Preference-based Accommodation Strategy (PAS). Monique is part of the ERES board and chairmen of CoreNet Global chapter Benelux.

Ruud Binnekamp graduated at the Faculty of Architecture of Delft University of Technology in 1993 on the application of Open Design methodology on the renovation of the former Koninklijke Luchtvart Maatschappij (KLM) head office in The Hague. He was employed by two different consultancy firms in the construction industry. Since 2000 he is Assistant Professor in the Chair of Computer Aided Design and Planning of the Faculty of Architecture of Delft University. In 2010 he finished his PhD on a preference-based design methodology.

In 1991, Hans de Jonge was one of the founders and the chair of the department Real Estate and Housing at the Delft University of Technology and since a professor of Real Estate and Development at the faculty of Architecture and the Built Environment. He is closely involved with the post-doctoral course Master City Developer (MCD). De Jonge is also chairman of the board of the Brink Groep, a group of businesses in the building, housing and real estate sector.