



CRERM

Corporate Real Estate Risk Management

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April 2015

TU/e Technische Universiteit
Eindhoven
University of Technology

Colophon

Corporate real estate risk management
Graduation thesis for the requirement of the Master of Science (MSc.) degree at
Eindhoven University of Technology
Faculty of the Built Environment
Department of Architecture, Building and Planning
Chair of Real Estate Management and Development

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Preface

This thesis is the final product for my Master Real Estate Management & Development at Eindhoven University of Technology. During the thesis I looked at the point where Corporate Real Estate Management (CREM) meets Corporate Risk Management (CRM). The exciting research field of Corporate Real Estate Risk Management (CRERM) does not yet belong to our master curriculum but is nevertheless very interesting. Eindhoven University of Technology and AT Osborne B.V. enabled and encouraged me to do research in a new field of expertise with lots of potential.

These are very interesting and challenging times for CRE specialists. CRE is transitioning from its traditional role to a strategic corporate resource that can add bottom line value to an organization. The executive management acknowledges the potential of CRE and proper management of it. This together with the increased focus on risk management due to the recent crisis and terrorist attacks make managers and executives reevaluate their CRE portfolio and the risks involved. CREM divisions will have to deal with these changing circumstances but are at the same time in the position to take the profession of CREM to a higher level.

The few scientific studies available about CRERM are purely theoretical and do not provide insights in CRE risk perception in practice. This thesis takes CRERM beyond its currently existing theoretical boundary and puts it into practice. The research identifies and ranks how CRE specialists perceive CRE risks related to job & company specific characteristics. Besides, it tests which risks are perceived significantly different by certain groups. It provides CRE specialists with the necessary input to identify and qualified CRE risks and provides an external CRE audit for their corporate risk management program.

I would like to show my appreciation and say thanks to Rianne Appel-Meulenbroek and Pauline van den Berg as my supervisors from Eindhoven University of Technology for their constructive comments, critical notes and support throughout the process. I'm also very grateful to my supervisors at AT Osborne, especially Kees Rezelman and Ellen Gehner for their useful comments and a link to the practical field but also all other colleagues for critical notes and corrections. Furthermore, I would like to thank all the experts who participated in the interviews and survey who provided valuable input for this thesis. My special thanks in this context goes to CoreNet Global, a worldwide association for CRE and workplace professionals. They participated in the interviews, sent out the survey worldwide and invited me to present my research to the members of the Benelux chapter.

Finally, I would like to say a special thanks to my family, girlfriend and close friends for their support and faith in me the past year.

I would like to wish all readers of this thesis the same knowledge about CRERM as I have gained during my research. My contact details are stated in the colophon if you have any questions or require additional information.

Ruben Bartelink
Baarn, April 2015

Executive summary

Corporate Real Estate Risk Management (CRERM) is the management field where corporate risk management and Corporate Real Estate Management (CREM) intertwine. These two management fields have in the past century matured and developed into more strategic management fields. Until the nineties they co-existed within organizations without interacting. This changed during the economic boom of the nineties: Companies had to innovate and keep up with the economic growth in order to gain competitive advantages over their competition. Corporate real estate, new workplaces and workplace solutions needed to facilitate this growth. As a result corporate real estate became a direct source of potential risks (Gibson & Louargand, 2002).

From 2000 onwards the profession of CRERM gained momentum because of two events. The first event was the terrorist attack on the WTC on September 11th, 2001. Companies became painfully aware how much they rely on their corporate real estate. CRE managers had to ensure that the company's critical facilities would be restored to operational capacity as soon as possible, independent of the nature of the risk (Rosenbluth, 2011). The second event was the financial crisis of 2008. The crisis resulted in a period of cost reduction and many companies were tied to long lasting expensive rent contracts. At the same time cost reductions made the introduction of new workplace concepts, needed in order to stay competitive, more difficult because they require an investment. This imperative was a risk for the entire organization (CBRE, 2012).

These two catalysts led to a widespread acknowledgement that CRE risk management strategies should be incorporated within the overall corporate risk profile. Corporate management should work together with CREM to integrate CRE asset management and CRE risk management into the firm's overall mission and risk preference profile (Huffman, 2002). However it was unclear how the CRE functions adapted to the changed environment and which risks were most prominent in the eyes of CRE executives (CBRE, 2012). For this purpose more research about CRERM should be conducted. The research objective for this thesis was therefore defined as follows:

Developing a risk ranking list which helps CRE specialists to identify the most important corporate real estate risks that can influence the shareholder value related to job & company specific characteristics.

Corporate real estate risk management

In order to develop a risk ranking and achieve the research objective it was relevant to first zoom out and to find out what CREM and corporate risk management is and how it adds value to an organization and therefore influences the shareholder value. Research question one and two were formulated for this purpose:

1. *What is corporate real estate management and how can it add value to a corporation?*

The definition of CRE management was derived from Joroff's (1992) definition of corporate real estate and Krumm's (2001) definition of corporate real estate management. These two definitions combined provided a definition of CREM used in this thesis. Corporate real estate management is:

“Aligning the land and buildings used for work space, infrastructure and investment to the needs of the core business process, to obtain maximum added value for the business and to contribute optimally to the overall performance of the organization in order to maximize the shareholder value.”

CREM can add value to an organization by, amongst others, reducing CRE costs,

increasing flexibility and increasing productivity. This helps to increase the shareholder value in two ways. It can increase the revenue or improve the profitability of the organization.

2! What is corporate risk management and how can it add value to a corporation?

It was hard to give a single sentence definition that is entirely satisfactory in all contexts. The two separate definitions from McNeil (2005) and Merna & Al-Thani (2010) combined provided a definition which captures most elements of corporate risk management:

“Any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization’s ability to achieve its objectives and execute its strategies.”

Corporate risk management adds value to the organization in two ways. First of all corporate risk management helps to make stakeholders aware of corporate risks, support management decisions and improves planning and business processes. Second, organizations that are actively involved with corporate risk management are on average valued higher by investors. This implies that corporate risk management contributes to the corporate goal of maximizing shareholders value. Combined these two preliminary research questions provided a basis for the third question:

3! What is corporate real estate risk management and how can it add value to a corporation?

The definition of CRERM was derived from the two previous provided definitions of corporate real estate management and corporate risk management. Corporate real estate risk management is in this thesis defined as:

“Corporate real estate risk management is any event or action that an organization takes to reduce the risks related to the land and buildings used for work space, infrastructure and investment that may affect an organization’s ability to achieve its objectives and execute its strategies.”

Gibson and Louargand (2002) suggested four benefits that can help to achieve the goal of maximizing shareholder value. CRERM can help to identify CRE risks, make them visible and understandable for others, implementing plans, procedures & protocols to manage them and help managers to focus their time on the most important CRE risks. These benefits are expected benefits and are not yet confirmed since the management field of corporate real estate risks is relatively new and the research field still has to mature.

CREM, corporate risk management and CRERM are not goals on their own, all three management fields have the same underlying goal: maximizing their contribution to the core business process to enable an organization to achieve its objectives and execute its strategies in order to maximize the shareholder value. According to Lindholm, Gibler & Leväinen (2006) there are two possible ways to increase the shareholder value. CRERM can increase the revenue or improve the profitability of the organization. The underlying goal can be reached by applying the CRERM process. The CRERM process exists of three major steps:

- Risk identification, in which the CRE risks are identified.
- Risk analysis, in which it is determined which CRE risks require a response.
- Risk response, in which the risk is reduced, transferred, retained or avoided.

The CRERM process is an iterative process. Once appropriate risk measures have been taken the cycle starts over and the CRERM process goes back to step one in which the feedback from the previous steps serves as input for the new real estate risk

identification process.

The CRE Risk list

Now that it is clarified what CRERM exactly is and how it can add value to an organization it is time to answer the fourth research question:

4 | Which risks related to corporate real estate may affect the added value of CRE to the shareholder value?

This descriptive research question is answered by using qualitative as well as quantitative research techniques. A literature study to identify potential CRE risks and additional interviews with CRE specialists provided the necessary input to construct a list of potential CRE risks. In total 43 risks divided over six categories that can influence the shareholder value of an organization were identified. The six risk categories are:

- Development risks
- Financial policy risks
- Operational & business policy risks
- Location risks
- Appearance risks
- External & regulation risks

Table 1 provides the CRE risk list. Development risks and financial policy risks were not very well described in the available literature. It turns out that almost half of the risks mentioned in these categories were suggested by the interviewees. Operational & business policy risks, location risks, appearance risks and external & regulation risks were all extensively described in literature and confirmed by the interviewees. Occasionally new risks were mentioned during the interviews in these risk categories.

Ranking the CRE risks

With the finalization of the CRE risk list the first part of the research objective was completed. The potential CRE risks are listed in the final risk list. The second part of the research objective was to develop a risk ranking. For this purpose the last research question was formulated:

5 | Which corporate real estate risks that may affect the added value of CRE to the shareholder value of an organization are perceived as most important and are these risks differently evaluated with respect to job & company specific characteristics?

The first step was to determine what the job & company specific characteristics are. During the

#	Risk
1.0	Development risks
1.1	Zoning plan risk
1.2	Ground acquisition risk
1.3	Tender risk
1.4	Financing risk
1.5	Temporary housing risk
1.6	Nuisance risk
1.7	Planning risk
1.8	Workspace design risk
1.9	Development budget risk
1.10	Social unethical development risk
2.0	Financial policy risks
2.1	Liquidity risk
2.2	Solvability risk
2.3	Cost of capital risk
2.4	CRE budget risk
2.5	Budget cut risk
2.6	Book value risk
2.7	Real estate investment risk
3.0	Operational & business policy risks
3.1	Maintenance risk
3.2	Facility management risk
3.3	Malfunctioning installation risk
3.4	Health and safety risk
3.5	Real estate flexibility risk
3.6	Occupancy rate risk
3.7	Office layout risk
3.8	Relocation risk
3.9	Expansion profile risk
4.0	Location risks
4.1	Preferred location risk
4.2	Uptime of production facility risk
4.3	Stakeholder risk
4.4	Accessibility risk
4.5	Supplier risk
5.0	Appearance risks
5.1	Design risk
5.2	Maintenance risk
6.0	External & regulation risks
6.1	Natural disaster risk
6.2	Terrorism risk
6.3	Political and social unrest risk
6.4	Economy risk
6.5	Exchange rate risk
6.6	Property market risk
6.7	Contracts risk
6.8	Regulation risk
6.9	Real estate data availability risk
6.10	Technology advancement risk

Table 1: CRE risk list

literature study and the interviews suggestions were made for characteristics that can potentially influence how the risks are perceived. The job characteristics put forward were: job position, management level and geographical location. The company specific characteristics put forward were Industry segment, size of the organization and the ownership type of the real estate. In order to rank the risks according to these job & company specific characteristics exploratory quantitative research was needed. The tool best suited for this kind of research was a questionnaire since this tool is able to cope with a large amount of variables and a large amount of respondents needed to rank the risks. The questionnaire was divided into two parts. In the first part information about the respondent's job & company specific characteristics and questions concerning CRERM were asked. The second part contained the corporate real estate risk list as discussed in table 1. For each risk the respondent was asked to rate the likelihood and impact on a five point Likert scale. The questionnaire was sent out by CoreNet, CREME and AT Osborne to approximately 8.150 people worldwide. Besides, the questionnaire was promoted on LinkedIn in the corporate real estate group which at that time had over 125.000 members.

From all these potential respondents 143 responses were generated. 50 of them did not finish the entire questionnaire and were therefore excluded from the data set. After analysis it turned out that from the remaining 93 questionnaires that are entirely filled in, five filled it in showing a clear pattern disqualifying them from the final data set. The final data set contains in total 88 respondents.

Specified for job position, 70 of the respondents were CRE end users and 16 were CRE consultants. The remaining two respondents were academics. Geographically Europe was best represented with over half of the respondents (it has to be noted that almost all European respondents live in the Netherlands and Belgium). North-America was represented with 26 respondents and the remaining eight were from Asia and Oceania. The real estate activities industry was with 18 respondents the best represented industry. This industry included all CRE consultants. According to company size the most common size was between 2.500 and 25.000 employees. Organizations with more than 25.000 and between 250 and 2.500 employees were slightly less represented. The percentage of CRE owned by an organization was evenly distributed over three groups: 0-20%, 21-80% and 81-100%.

The respondents rated their organization's CREM and corporate risk management maturity level on average as 'high' but the derivative CRERM maturity level is 'average'. The most common corporate risk response was reduction closely followed by avoidance. Before a risk response can take place the CRERM process needed to be implemented. Most organizations have a risk identification process in place but still six organization do not have any phase of the CRERM process implemented.

After the data description the risks were ranked according to perceived importance. The importance of a risk was calculated by multiplying the likelihood of a risk with the impact (Coso. 2012). There were two other aspects taken into account when ranking the risks according to perceived importance. The first aspect was the amount of variation within the data. This can be measured by calculating the dispersion from the average. The variation within the data was expressed in one number called the standard deviation. A high standard deviation indicates that there was a low internal group consistency which decreased the representativeness of the data sample. The second aspect taken into account was if a risk was perceived significantly different by different groups (groups being the job & company specific characteristics). If there were two groups that needed to be compared than the significance was tested with an independent samples t-test. If there were three groups or more that needed to be compared than this was done with the Kruskal-Wallis test. An ANOVA test was not possible because the sample sizes were too small and therefore the data was not normally distributed. If the Kruskal-Wallis test indicated that there was a significant difference in risk perception than this means that at least two groups significantly differ. These groups could only be identified by comparing each group separately using the Mann-Whitney U-test.

Corporate Real Estate Risk Management

The first risk list was created when the risks were ranked according to their total risk score without taking the job & company specific characteristic into account. In this risk list each outlier for likelihood, impact or standard deviation was evened out and spread over the large number of respondents. As a result the differences between the total risk scores were small which makes it hard to rank the risks according to perceived importance. Therefore the risks should be categorized related to job & company specific characteristics.

Job specific characteristics

The job specific characteristics taken into account were: job position, management level and geographical location. When the risks were ranked according to job position it seemed that CRE end users focus more on operational & business policy risks while CRE consultants focused more on financial policy related risks. An independent samples T-test showed that two operational risks namely maintenance risk and office lay-out risk were perceived significantly higher by the end users than by the consultants. Regulation risk was the risk which shows the highest significant difference (P-value = 0,002). This risk was ranked at place 6 by the end users while the consultants rank it at place 38.

Ranked according to management level it seemed that CRE managers who operate on strategic level value financial policy risks higher than respondents working on tactical or operational level. All risks in this category were perceived higher by CRE managers operating on strategic level. Liquidity risk, solvability risk and real estate investment risk were perceived significantly higher on strategic level than on tactical or operational level. The other two risks that were perceived significantly higher by respondents on strategic level were design risk and property market risk.

The last job specific for which the risks were ranked was the geographical location of the respondents. Three groups were compared with each other: Europe, North-America and Asia & Oceania. The top ten risks for these geographical locations differentiate a lot. This was confirmed by a Kruskal Wallis analysis which indicates that nine risks significantly differentiate between at least two groups. The risk with the highest significant difference was malfunctioning installation risk (p-value = 0,001). This risk was significantly perceived higher by both Europe and Asia & Oceania compared to North-America. The other eight risks which geographically were perceived significantly different were: natural disaster risk, exchange rate risk, planning risk, maintenance risk, stakeholder risk, terrorism risk, tender risk, relocation risk and supplier risk.

Company specific characteristics

The company specific characteristics taken into account were: industry segment, company size and CRE ownership type. The first company specific for which the risks were ranked is industry segment. There were eight industries that have over eight respondents which makes them suited for analysis. There were a lot of difference in risk perception when so many groups were compared. In total 12 risks were perceived significantly different after computing a Kruskal-Wallis test. Some risks were perceived significantly different by two industries, for example budget cut risk, while for other risks the risk perception differentiated up to eight industries. Natural disaster risk was the risk that stood out the most. The difference in natural disaster risk perception was eight times significant. The second thing to notice was that the professional, scientific and technical activities industry differentiated the most in risk perception from all the industries. This industry segment counted eight risks which significantly differentiated with one or more other industry segments. The last noticeable things were the risks belonging to the external & regulation risks category. Some of the risks in this category, such as terrorism risk, showed that there was one risk that can cause most of the significance. Respondents working in the human health and social work industry valued terrorism risk significantly different than respondents working in the information & communication, financial & insurance activities, real estate activities, professional scientific & technical activities, public administration & defense and education.

Maintenance risk stood out when the risks were ranked according to company size. This risk showed a clear trend. It became more important and was ranked higher if the size of the organization increases. But the most interesting thing was that the risk perception based on the company size was not for a single risk significantly different. This raised the question to what extent the size of the organization matters related to CRERM. It seemed that risk perception does not depend on the size of the organization.

According to ownership type there were two risks which show clear trends. Maintenance risk was ranked higher if the percentage of CRE owned by an organization increases. Since maintenance risk showed the same trend if the size of the organisation increases one could wonder if there was a correlation between company size and the percentage of real estate owned by the organisation. additional research was required to prove this theory. Economy risk was the second risk that shows a clear trend. Economy risk decreased in importance if the organization increased in size. The risks which were perceived significantly different were nuisance risk, real estate investment risk, natural disaster risk and exchange rate risk.

Reflection and recommendations

In retrospect, there were two major things that would have been done differently if the research would be repeated with the current knowledge. First of all there would be more focus on partnerships with industry organizations such as CoreNet and CREME. It is expected that a close collaboration with these organizations can increase the number of respondents. Especially a close collaboration with Asian organizations to guarantee a better geographical distribution would be beneficial for this research. Second it was advised to put more emphasis on the independent variables. There are independent variables which contribute and clarify a large proportion of difference in risk perception, while other variables, such as company size, turned out to be less relevant. The independent variables could have been selected and formulated more carefully to make sure that the parameters that could influence the risk perception were all included.

The three most important policy recommendations were:

- 1) Implement and use the CRERM process as described in chapter four. The three steps of the CRERM process (risk identification, analysis and response) provided a foundation to manage CRE risk properly and therefore increase the contribution of CRE to the shareholder value.
- 2) Benchmark the organization's CRERM profile. The organizations can benefit in two ways of a comparison with similar others. First, this comparison can expose risks in your organization that are currently blind spots. Second, if a risk is perceived significantly different by a similar organization one could ask themselves the question how this is possible and why they perceived these risks so differently.
- 3) Provide feedback to the management. Act pro-active and do not wait until superiors ask to do a CRE risk scan within the organization. Make managers aware of the CRE risks in context of the corporate mission, corporate real estate management profile and corporate risk profile.

For further research it was recommended to measure the spirit in time. A survey was a snapshot which does not provide insights in the influence of time on risk perception. It was interesting to see how volatile the risk perception is over time. A second recommendation for further research determining the best risk responses for the risks that are identified in this thesis. The last recommendation for further research is trying to explain what causes the difference in risk perception. It is interesting to determine the variables that explain why respondents rate risks differently.

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List of abbreviations

CRE	Corporate real estate
CREM	Corporate real estate management
CRERM	Corporate real estate risk management
EMEA	Europe, Middle-East and Africa
IDRF	Industrial Development Research Foundation
ISIC	International standard industry codes
CBS	Central Bureau for Statistics
FTE	Full time equivalent
CREME	Corporate Real Estate Management Executives
UN	United Nations
ANOVA	ANalysis Of Variance
PR	Public Relations
HR	Human Resources
IT	Information Technology

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Chapter

1

Introduction

The first chapter serves as an introduction to the subject, describes the problem statement, explains the research design and contains additional information relevant for the introduction of this thesis. In the last section the thesis layout is explained.

1.1 Subject introduction

On April 27, 2013 the Rana Plaza factory in Bangladesh collapsed. 1.127 employees were killed and 2.000 got injured making it the largest industrial accident in South Asia since the Bhopal disaster in 1984 (The Economist, 2013)

On May 22 The Pioneer Business Review (2013) published an article about the impact of the accident on corporate reputation titled: “Factory collapse in Bangladesh takes reputations with it”. The following subsection described the consequences:

“The accident has drawn international criticism of the many multinational corporations that rely on sweatshop labor to keep prices low and stay competitive in the global market. Big names like the Children’s Place, Dressbarn, JCPenney and Primark face decreased consumer confidence and tarnished reputations because of ties to the factory at Rana.” (Kiel, 2013)

In addition, involved retailers reserved over 47 million pounds to compensate the victims and families. Disney decided to stop all their clothing production activities in South Asia. Large western retailers suffered from reputational damage, decreased consumer confidence and reimbursements (Saul, 2013). This could have been prevented if the corporate real estate was managed better. The building was originally designed as an office, apartment and shopping location, not as a factory. It was therefore not calculated for heavy machinery and vibrations. The operators of the Rana Plaza factory were not obligated to improve the situation despite several warnings from the local authorities.

The decision that the retailers took to keep the factory open was a risk resulting in financial as well as reputational damage. Appropriate Corporate Real Estate Risk Management (CRERM) could have prevented this.

Corporate Real Estate Management (CREM) is the management of buildings and land in use by a corporation for workplace, infrastructure and investment with the purpose of aligning the Corporate Real Estate (CRE) with the corporate core business processes in order to maximize the added value of real estate to an organization (Joroff, 1992: Krumm, 2001).

Corporate risk management is any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization’s ability to achieve its objectives and execute its strategies (McNeil, Frey, & Embrechts, 2005).

Corporate real estate risk management is where CREM and corporate risk management come together (figure 1.1). CRE is a corporate asset with corresponding risks. These risks can be controlled by corporate real estate managers which is called CRERM.

One of the subjects a CRE manager has to deal with is looking for proper housing for business activities as illustrated by the Rana Plaza example. Real estate requires large investments and is after pay rolling the second largest corporate expenditure in most organizations making real estate a risky corporate resource (Veale, 1989).

Recently, Heywood, Kenley and Waddell (2009), identified legislative evolution and a broader risk management as one of the seven most important CREM practice issues. However, little is known about CRERM. The literature available until now is limited and mostly based on theoretic research.

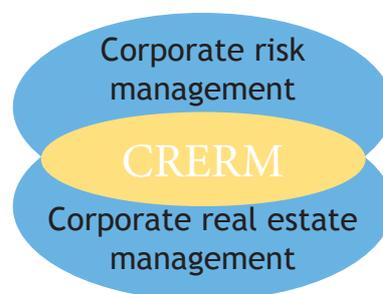


Figure 1.1: Position of CRERM

1.2 Subject motivation

Recent events such as the example given in the previous section show that risks can have far stretched consequences. The retailer was aware of the situation and could have decided to move production to a building that was designed as a factory. Increasing production costs together with a time and money consuming relocation made the retailers probably decide not to move production. The decision to take the risk resulted in financial as well as reputational damage.

The question arises to what extent the management of these retail organizations were aware of their risk exposure by manufacturing textile in real estate that was not designed for this purpose. Maybe they would have reconsidered if they had better understanding of the risks they were exposed to and the impact it could have.

From the 1980s onwards most large companies have a risk manager whose main job is to oversee the company's insurance purchase. But the last ten years the scope and mission of corporate risk management have expanded well beyond insuring and hedging. Nowadays it includes managing all kind of operational and strategic risks (Chew, 2008).

Not only did the scope of corporate risk management expand the last ten years but CREM is getting more management attention as well. CREM is gradually gaining interest from the executive management who realizes that CRE can be used as a strategic asset and can add bottom line value to the organization (Dewulf, Krumm, & De Jonge, 2000).

In 1992 Joroff said that CREM is within the organization 'America's last under managed corporate resource'. Dewulf et al. (2000) point at the increasing importance of CREM although later published sources show otherwise. Only 20 percent of European CREM departments have a real estate strategy against which they are held accountable (Hartmann, Linneman, Pfnür & Siperstein et al., 2009). Almost 200 of the Fortune 1000 companies showed that approximately two third of all organizations do not incorporate real estate activities into their core business strategy. This is because real estate is still not perceived as part of the core business but as a support service (Osgood, 2004).

It is exceptional that so little attention is paid to CRE concerning the large investments it requires. In 2011 the total asset value of the CRE in large organizations can account up to 14 percent of the total value of the corporate assets (Brounen, Verschoor, & Würdemann, 2013).

The total occupancy costs of corporate real estate represents 5 percent to 8 percent of total (pre-tax) gross sales (Hartmann et al., 2009). The combined value of the CRE in the three largest European economies is worth over 2.400 billion Euros, divided as followed: Germany 1.000 billion, United Kingdom 710 billion and France 700 billion (DTZ, 2003).

Large investments mean large losses when the investment does not go as planned. Therefore, one could question why CREM is not listed on top of the corporate agenda. Appropriate management of CRE and involved risk can support the key business processes and can in the end add bottom line value to the corporation. Until now little attention has been paid to how CRE risks affect the corporate performance (CBRE, 2012).

CRE risk management strategies should be incorporated within the overall corporate risk profile and corporate management should work together with CREM to integrate CRE asset management and CRE risk management into the firm's overall mission and risk preference profile (Huffman, 2002)

To increase professionalism of CREM, it requires, amongst others, an increased market transparency and efficient information distribution. If CRE managers want to be entrepreneurs and use corporate real estate to add bottom line value to the organization by supporting and improving core business processes, then there is need for better insights in the risks related to corporate real estate (Van Natterm & Proveniers, 2012).

1.3 Problem outline

Corporate real estate risk management is a relatively new research field. The problem is

Corporate Real Estate Risk Management

that until now there is not much information available. There are five literature sources that address the topic of CRERM. In these studies some CRE risks and CRE risk categories are mentioned but they looked at this subject from a single point of view.

- CBRE (2012), studied CREM risks focusing especially on the banking and financing sector.
- Huffman (2002 and 2004) wrote two articles about CRE risk management in which he looked at corporate real estate risk from an economic point of view.
- Simons (1999) identified three key sources of strategic risk that impact all organizations. The identified key risk sources are applicable to identify corporate real estate risks but are not specific for CRE and are also applicable to other company resources.
- Gibson & Louargand (2002) used Simons' research about the three key risk components as basis to create a framework to identify the risks of a real estate portfolio. They divided the real estate portfolio into several different types according to use, asset type and environment. For each type Gibson and Louargand identified several different risks and control measures.
- The last point of view with regard to CREM risks is put forward by Rasila & Nenonen (2008) who identified CRE risks related to corporate relocation.

Beside the articles that focus on CRERM there is literature available about financial risks and investment risks that at some point interfere with CRE. The risks identified in these papers are financial risks related to corporate real estate.

There are two disadvantages with this. First of all, the available literature provides a premature and incomplete framework which identifies different risk categories and risk types but are in most of the cases based on a single point of view and therefore do not provide an overview which includes all CRE risks. Second, the research about CRERM is solely theoretical and is not tested in practice. It is unclear how the CRE functions have adapted to the changed environment and which risks are most prominent in the eyes of CRE executives (CBRE, 2012).

This conclusion was drawn after the terrorist attack on the world trade center in New York. Corporations became, once more, aware how much their core business processes rely on the physical location of the business activities. Organizations need to revise their business continuity planning to make sure it includes the corporate real estate. In addition, the last financial crisis shifted the focus within organizations to cost reductions. The position of the corporate real estate was evaluated to make sure it contributes as much as possible to the bottom line value of the organization. For this purpose research should be conducted about CRERM to better understand, identify, measure and control CRE risks. Field work to identify how CRE managers perceive CRE risks and how these risks related to job & company specific characteristics has until this thesis not been done.

1.4 Problem statement

The observed problem and already existing theoretical research resulted in the following problem statement:

Which risks related to corporate real estate may affect the added value of CRE to the shareholder value of an organization and how are these risks ranked according to importance related to job & company specific characteristics?

This is a two folded problem statement which can be broken down into two major research questions and corresponding sub questions. In order to answer these two research questions the term corporate real estate management should be clarified and an introduction to corporate risk management should be given. Combined the research questions and additional sub questions will give a plenary answer to the problem statement.

The first research question is:

1 *What is corporate real estate management and how can it add value to a corporation?*

The second research question is:

2 *What is corporate risk management and how can it add value to a corporation?*

Combined these two preliminary research questions improve the knowledge and clarify the added value of CREM and corporate risk management to provide a basis for the third question:

3 *What is corporate real estate risk management and how can it add value to a corporation?*

If it is clear what corporate real estate risk management is and if the added value of CRERM is discussed it is times to identify the CRE risks that influence the added value of CRE to the shareholder value. The fourth question is therefore:

4 *Which risks, related to corporate real estate, may affect the added value of CRE to the shareholder value?*

When the risks are identified and a CRE risk list is constructed it is interesting to see how these risks are perceived according to job & company specific characteristics.

5 *Which corporate real estate risks that may affect the added value of the CRE to the shareholder value of an organization are perceived as most important and how are these risks ranked according to job & company specific characteristics?*

The research objective can be derived from the problem outline and problem statement. The objective of this research is:

The objective of this research is to develop a risk ranking list which helps CRE specialists to identify the most important corporate real estate risks that can influence the shareholder value related to job & company specific characteristics.

1.5 Target group

The thesis is primarily written for corporate real estate specialist (end users, academics and service providers) to increase their knowledge about corporate real estate risks and help them identify the most important CRE risks related to job & company specific characteristics that can influence the added value of their CRE to the shareholder value.

Second this thesis is written for corporate executives and managers to underline the importance of CRE. As explained before CRE is the most undermanaged corporate resource while it has strategic potential with interesting benefits. The awareness of the potential profits and according risks of CRE should be increased and the topic should be on the corporate agenda.

1.6 Research design

The research design explains the research outline and motivates the research techniques that will be used. In outline the research consists of three phases. The preparation phase, the research phase and the conclusions and recommendations phase.

Phase 1: Preparation

The preparation phase of the research consists of the problem exploration. In this phase

the problem is translated into clear research questions and a plan how to provide the answers for these research questions will be formulated.

Phase 2: Research

Two separate research parts can be distinguished within the research phase. The first part is a descriptive research and the second part is an explorative research.

The first research is a descriptive research. The goal of the descriptive research is to identify the CRE risks as unbiased as possible. This is done by using qualitative research techniques including a literature study to identify potential CRE risks and additional interviews to complete and construct the final CRE risk list. The literature study increases and structures the knowledge about CREM, corporate risk management and CRERM and underlines the added value of these topics to the shareholder value.

The second part of the research is an exploratory quantitative research. This part serves to qualify the identified risks by means of a risk ranking. This is done by distributing a survey amongst CRE managers in which they are asked to grade the likelihood and impact of the risk to determine the risk importance and share basic job & company specific characteristics.

After the data collection the data analysis can begin. The data will be analyzed to determine which risks are most important and to distinguish which risks related to job & company specific characteristics significantly differentiate from each other. This will be done by conducting the parametric independent samples t-tests and non-parametric Kruskal-Wallis and Mann-Whitney U-tests analyses.

Phase 3: Recommendations and conclusions

Results from the data analysis are discussed in the last phase in which recommendations and conclusions are made. This phase is the completion of the thesis and suggests topics for further research.

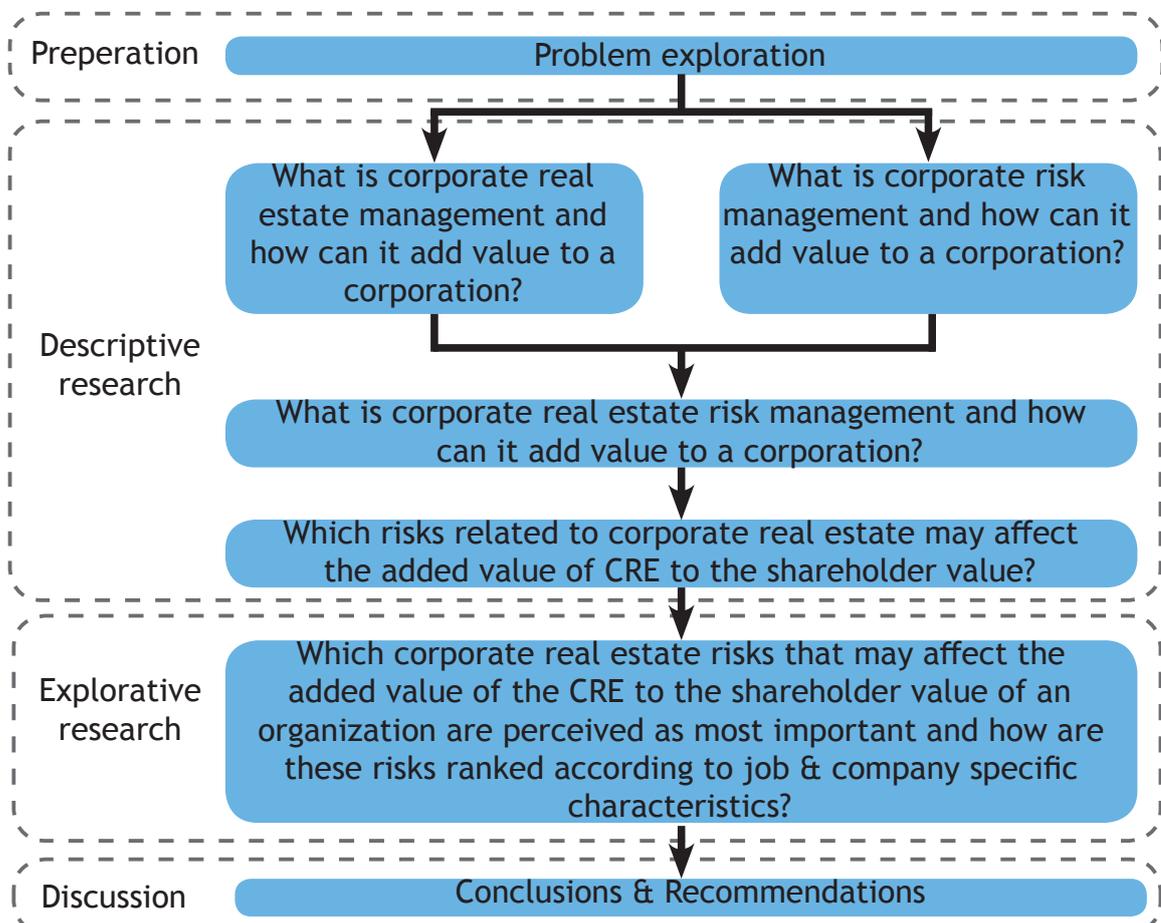


Figure 1.2: Thesis research outline

Figure 1.2 shows a graphical representation in the form of a flowchart linking the different phases and corresponding research questions. This research design is an iterative process, the collected data gives feedback and will continuously require adjustments to earlier phases.

1.7 Relevance

The research has a scientific and a practical relevance. As discussed during the problem outline in section 1.3 the literature available about CRERM is limited to five sources who look at CRERM from a specific point of view. CBRE (2012) focusses on CRE risks in the banking in financing sector, Huffman (2002 and 2004) aims to establish a CRE risk benchmark based on economic variables, Simons (1999) identified three key risks sources for CRE risk, Gibson & Louargand (2002) used the three key risk sources and projected them on CRE portfolio's and the most recent study is Rasila & Nenonen (2008) who identified CRE risks related to corporate relocation. There is no study that includes all these topics by looking at CRERM with a broad scope but instead all these studies analyze just one aspect of CRERM. This literature gap will be covered in this thesis. The scientific relevance of this thesis is to increase the knowledge and understanding of corporate real estate risks that can affect the added value of CRE on the shareholder value of an organization. This is done by identifying which CRE risks there are and testing how they are perceived in practice. This thesis tries to take the research field beyond its currently existing theoretical boundary. The exploratory quantitative research provides expectations and hypotheses that can be verified in hypothesis testing research.

The practical relevance of this research is to provide corporate real estate managers and corporate real estate consultants a basis that helps to recognize the most important CRE risks. This thesis helps with the risk identification within an organization and structures them according to perceived importance. This contribute to the risk analysis by enabling comparison with similar organizations. Besides, this thesis enables real estate consultants and corporate real estate managers to provide the executive management with better corporate real estate advice.

Huffman (2002; 2004) pointed at the importance of a corporate real estate risk index. The Index identifies whether the CRE under- or over-performs in terms of CRERM. This thesis is another step towards a CRERM index and provides a solid base for further research.

1.8 Thesis layout

The thesis layout is explained in this section by giving a short description of the remaining chapters.

Chapter 2: Corporate real estate management

Chapter two gives a clear description of the term corporate real estate management in the context of this thesis. This will be done by giving a short historical overview of the profession. In the following section the purpose of CREM will be discussed and determined whether it is a strategic or operational management field. The added value of CREM will be discussed next. At the end of the second chapter the first research question will be answered and a final definition of CREM will be given with regards to this thesis.

Chapter 3: Corporate risk management

Chapter three provides a general introduction to corporate risk management. It will explain corporate risk management and introduces the risk management process of identification, analysis and response. At the end of the third chapter the added value of corporate risk management on the shareholder value will be elucidated. The second research question will be answered in the third chapter.

Chapter 4: Corporate real estate risk management

The information provided in chapter two and three combined with additional information

given in chapter four will provide an answer to research question three; “What is CRERM and how can it add value to an organization”. Chapter four provides a historical overview, gives a definition of CRERM, discusses the added value of it and in the end the CRERM process will be introduced.

Chapter 5: Identification of corporate real estate risk

This chapter describes the process leading to the final risk list. The final risk list contains 43 different risk divided over six categories. The list is constructed by means of descriptive research and qualitative research techniques including a literature study to identify potential CRE risks and additional interviews to complete and finalize the CRE risk list. The final CRE risk list is the input for the next three chapters which serve to rank the risks according to importance related to job & company specific characteristics.

Chapter 6: Research approach

The final CRE risk list need to be tested to determine the most important CRE risks. This exploratory quantitative research is conducted by making use of a survey. The survey is sent out by different organizations to over 8.000 CRE specialist from over the world. This chapter will also discuss the internal and external validity and discusses the analysis techniques necessary to come to the right conclusions.

Chapter 7: Data description

In total over 140 respondents filled in the questionnaire. Only 88 of them completed the questionnaire and are suited for analysis. This chapter will discuss how the data set is composed. This will be done by looking at the independent variables such as job & company specific characteristics and the CRERM processes implemented.

Chapter 8: Research results

Chapter eight tries to rank the identified risks from chapter five. This chapter will discuss how the risks are ranked according to importance. This will be done by looking at the job & company characteristics.

Chapter 9: Conclusions and recommendations

In the last chapter of this paper the conclusions are drawn. The research questions are answered, suggestions for further research are made and critical notes as well as recommendations are given.

1.9 AT Osborne B.V.

This thesis is realized in corporation with AT Osborne B.V. AT Osborne provides services that cover the full range from strategy to implementation. Their professional fields include commercial real estate & property, infrastructure, spatial development & the environment, Legal and organization & governance.

This thesis is especially supported by the corporate real estate and property division within AT Osborne. This division has in-house specialist on risk management and CREM who contributed to the research for this thesis by means of guidance, knowledge and establishing a link to the professional field of corporate end users.

Chapter

2

Corporate real estate management

This section introduces corporate real estate management by giving a brief overview of the history of CREM, discussing its current position and defining the terms corporate real estate and corporate real estate management. In the end of the chapter the added value of CREM will be elucidated. Corporate risk management is introduced in the next chapter.

2.1 Introduction to corporate real estate risk management

In this chapter CREM is introduced by explaining its origin and discussing its current position.

2.1.1 History

CREM is currently transforming from its original role as an operational asset to a more strategic corporate resource. However CREM has not always been in this position (Msezane & McBride, 2002).

Dewulf et al. (2000) describe the history of CREM. Up to the 19th century almost all buildings had the purpose to house people, the church, the state or the army. Approximately 250 years ago, during the industrial revolution, this began to change. Industrial activities were getting complex and required more space than before. The growing need for suitable accommodation to house core business processes made it necessary for organizations to establish real estate departments.

During the sixties and seventies companies started operating on a global scale, increasing the physical and organizational distance between operational business units. The stimulation of corporate growth required large investments resulting in the corporate desire to allocate financial resources to the core activities. Corporate real estate managers and consultants were for the first time forced to show their added value to the organization. During the corporate recession in the eighties this desire only increased. Back-to-core businesses, downsizing and lean production resulted in outsourcing supporting business units like CREM to specialized organizations. Simultaneously, the focus shifted from analyzing competitive advantages towards internal aspects of the corporation. Corporate real estate managers shifted their focus to the interest of corporate stakeholders as a reaction to these events.

During the last two decades, standardized products and services and the availability of skilled employees are no longer a competitive advantage but more a necessity. The added value of different business activities to the core production process determine the competitiveness of an organization. CRE can add value to the core business activities when managed properly and therefore increase the organization's competitive position.

CREM has the potential to become the fifth resource in addition to human resources, capital, technology and information. This makes the executive management realize that their real estate can be put to use as a strategic asset (Dewulf et al., 2000).

2.1.2 Current position

As mentioned above, CREM has the potential to become a fifth management field on its own (Dewulf et al., 2000). However to become a strategic management field corporate real estate has to go through an evolution first.

Joroff, Louargand & Lambert (1993) presented the five evolutionary stages in the development of corporate real estate units. Figure 2.1 shows these stages.

In the first stage the CRE manager is a

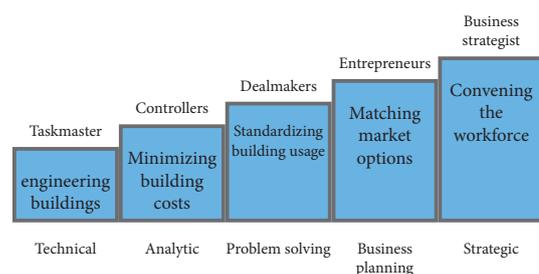


Figure 2.1: Evolution of CREM (Joroff, Louargand, & Lambert, 1993)

taskmaster and he is responsible to supply the corporation's need for physical space. The second stage is the controller stage. The goal of CRE managers in this stage is to satisfy the senior management by minimizing costs. In the dealmakers stage the focus on cost reduction has involved to value creation. The entrepreneur stage is the first stage in which the CRE manager uses real estate as a strategic resource. The focus is on matching CRE with business strategies and operational plans. In the fifth and last stage the CRE manager is a business strategist. The CRE manager tries to add value to the core business processes and therefore increase shareholder value by focusing on the company's mission and strategy rather than on real estate.

The model by Joroff (1993) shows the five evolutionary stages for a single organization's real estate department. It is not possible to display the entire CRE management field in Joroff's model since CREM is continuously evolving and the model is additive by nature (Joroff, 1993). In which evolutionary stage the CREM department of an organization is located, is at the moment still open for debate and differentiates for each organization separately.

Farncombe & Waller (2005) notice a clear trend towards outsourcing of CRE tasks to reduce costs. Van Natterm & Proveniers (2012) came to the same conclusion. According to them the financial crisis of 2008 increased the number of outsourced CRE tasks. "So the main new trend in CREM became higher efficiency through budget cuts and (total) outsourcing of CREM" (Van Natterm & Proveniers, 2012). Both authors believe that the main purpose of CREM is to minimize corporate real estate costs and therefore the CREM department is in most organizations currently at the second stage, which implies that on a whole the CRE management field still is an operational management field.

On the other hand, there are authors who disagree and believe that the CREM departments in some organizations haven already evolved into a strategic management field. Msezane & McBride (2002) argue that most corporate real estate functions are currently transitioning from their traditional role to a more strategic one. This idea is supported by CBRE (2012) and Dewulf et al. (2000) who notice the current shift of CRE management on an individual property, ad-hoc, base to a more portfolio and strategic integrated base. They believe that within most organizations the CREM department is at the third or the fourth stage in Joroff's model.

As indicated in literature the current stage of a CREM department differentiates for each organizations. This means that most of the CREM department are most likely at the second, third or fourth stage in Joroff's model. Where the CRE management field is on a whole is not possible to tell exactly. The CRE manager is depending on the organization a controller, dealmaker or taskmaster.

2.2 Definition

In order to give a meaningful definition of CREM it is needed to determine what CRE is.

2.2.1 Corporate Real Estate

In August 1992 the Industrial Development Research Foundation (IDRF) launched a research program to establish new expectations for CREM called 'Corporate real estate 2000'. Although this program is over two decades old, it contains a core-description of corporate real estate which is still in use today:

"Corporate real estate - The land and buildings used for workspace, infrastructure and investment" (Joroff, 1992).

This comprehensive description shows the broad spectrum of what is called corporate real estate and leaves out some details on purpose. It does not contain any information about the size of the real estate, the location and the ownership type, but does capture the essence of CRE.

The location and size does not really matter as long as the land and buildings are used for work space, infrastructure and investment according to Joroff (1992). The type of ownership on the other hand does matter. The lease versus purchase discussion is often

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the first decision that has to be made when it comes to CREM.

In this thesis corporate real estate encloses the whole range from company owned real estate to leased real estate and all forms in between. It is likely that risks differ for different ownership types so ownership type can be an independent variable and should be taken into consideration when the fieldwork is conducted.

According to Joroff (1992) CRE includes the land and buildings used for, among others, investment. This means that CRE can be used to achieve long term objectives if financial resources are allocated to corporate real estate.

2.2.2 Corporate real estate management

Now that it is clear what corporate real estate is, it is time to elucidate the term corporate real estate management.

With the definition of CRE given in previous section taken into account a simplified definition could be given to CREM: Managing the buildings and land in use by a corporation for work place, infrastructure and investment. However this definition does not include a meaningful description of the term management. In order to understand what management means in CREM it is important to know the purpose of CREM.

The ultimate goal of a commercial organization is to maximize shareholders value. Therefore the ultimate purpose of CREM is to maximize CRE's contributions to the corporate bottom line and the long-term health of the corporation (Huffman, 2002).

In other words, the goal of CREM is to manage CRE in such way that its contribution to the company's overall performance is maximal. Krumm (2001) describes CREM as:

“The management of a corporation's real estate portfolio by aligning the portfolio and services to the needs of the core business processes, in order to obtain maximum added value for the business and to contribute optimally to the overall performance of the corporation“ (Krumm, 2001).

The next section explains how CREM can add value to an organization.

2.3 Added Value

Challenges in globalization, changes in technology, moving towards a service economy, and innovations in workplace design force organizations to stay competitive in order to be financial healthy. To do so, the corporation needs to optimize all resources and make sure to contribute as much as possible to the company's overall performance. CREM is evolving into a more strategic corporate resource therefore the corporation should implement a corporate real estate strategy in order to become and stay on top of the game (Lindholm et al., 2006).

In 1996 De Jonge made the first effort to pinpoint the added value of CREM. He argues the transformation of CREM from a mere “cost of doing business” to a true corporate asset. In this first attempt De Jonge identified seven elements of added value:

- Increasing productivity
- Cost reduction
- Risk control
- Increase of value
- Increase of flexibility
- Changing the culture
- PR and marketing

The third element mentioned by De Jonge (1996) is risk control which in this thesis will be subject to study. Van der Voordt, Prevosth and Van der Zwart (2012) studied the added value of CREM in Dutch hospitals and they identified eleven fields of added value. Ranked at the seventh place is risk control with regard to time, costs, health and safety, and coping with a changing context. Facility managers of general hospitals rank risk control as the most important field of added value. Risk control and steering on safety of patients and staff is a core issue according to these facility managers.

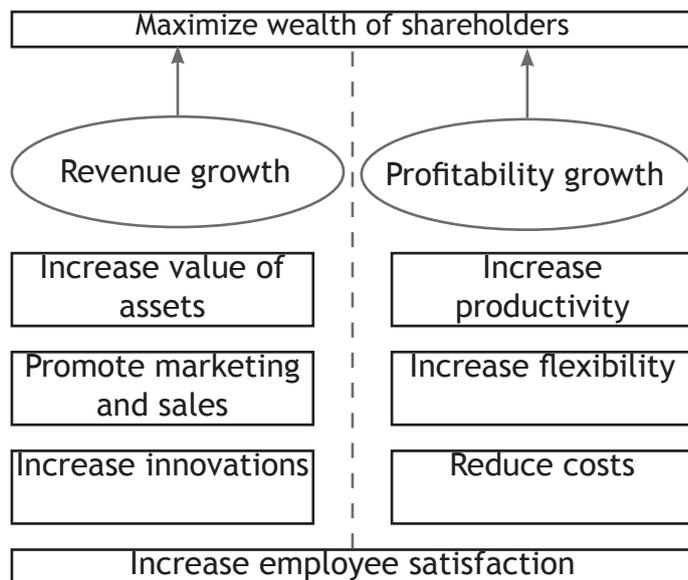


Figure 2.2: Added value of CREM (Lindholm, Leväinen & Gibler; 2006)

Lindholm et al. (2006) developed a model to capture the added value of CREM based on the research done by De Jonge which is shown in figure 2.2. The figure shows that there are two ways in which CREM can contribute to the corporate goal to maximize shareholder value. This can be done by increasing the revenue or by increasing the profitability of the organization. The revenue growth can be realized by increasing the value of the assets, increase innovation or by promoting marketing & sales. The profitability growth can be realized by increasing

the productivity, increasing the flexibility or reducing the costs. Increasing the employee satisfaction can result in revenue as well as profitability growth.

According to Lindholm et al.(2006) 38 percent of the interviewed CRE managers suggested that CREM can add value by attracting a world-class workforce. Study shows that the physical workspace is just after compensation and benefits the third most important factor whether to take a job or not. 41 percent of the American workforce confirmed Lindholm’s finding and said it would influence their decision (American Society of Interior Designers - ASID, 1999). The second most mentioned way CREM can add value is with 27 percent the timing of the purchase rent or sale of the real estate. Another 27 percent mention financial or physical flexibility and 26 percent mention CRE promotion and marketing activities as a way to add value (Lindholm et al., 2006).

The added value of CREM described by Lindholm et al. (2006) focusses on maximizing the wealth of the shareholders. However, the shareholder is just one stakeholder. More current authors incorporate the interests of all stakeholders, including policy makers, controllers, technical managers, clients, customers, end users and society (Jensen, 2014). Jensen et al. (2012) for example mentions that the focus has changed from economic value towards a more holistic value concept.

The benefits of CREM are often expressed in a monetary value while the added value of real estate to the primary processes and the organizational objectives are usually not referred to at all (De Vries, De Jonge, & Van der Voordt, 2008). According to Van der Voordt et al. (2012) adding value includes also functional and emotional benefits as perceived by the consumers relatively to the competitors.

2.4 Conclusion

By mentioning The CREM origin, current position and added value it is possible to give an evident and all-embracing definition. For the context of this thesis corporate real estate management will be described as:

‘Aligning the land and buildings used for work space, infrastructure and investment to the needs of the core business process, to obtain maximum added value for the business and to contribute optimally to the overall performance of the organization in order to maximize the shareholder value’.

The definition does on purpose not include the term portfolio because this might implicate that the corporation has to own the real estate. CREM is independent of the ownership structure whether this is lease, purchase or something in-between.

CREM can add value to an organization by amongst others, reducing CRE costs, increase flexibility and increase productivity. This helps to increase the shareholder value in two

Corporate Real Estate Risk Management

ways. It can increase the revenue or improve the profitability of the organization.

Chapter

3

CORPORATE RISK MANAGEMENT

This chapter serves as an introduction to corporate risk management the same way as the previous chapter gave an introduction to CREM. The history, current position, and added value are discussed as well as a definition of corporate risk management is given. In the next chapter CREM and corporate risk management will jointly be discussed as corporate real estate risk management.

3.1 Introduction to corporate risk management

In this section historic background information about corporate risk management is given and its current position is discussed.

3.1.1 History

The history of corporate risk management is described by Merna and Al-Thani (2010). Corporate risk management can be tracked back for at least 2000 years. Back then tradesmen could obtain a loan to finance cargo freight. The owner was not obligated to pay back the loan if the ship was wrecked during the journey.

The corporate risk management profession developed alongside the professionalization of the insurance industry. In the eighteenth century the first insurance companies were founded by businessmen who combined their resources to insure potential losses for their clients involved in sea transportation. Some of those companies such as Lloyd's and First American still exist today.

Risk was until the 1970's seen as the negative side of doing business. Risks were only accepted if there was no other possibility, in general companies preferred to take zero risk. Managers slowly begun to realize that in some cases taking risks resulted in large rewards. The first risk management methodologies and processes were designed and implemented at corporations. In the beginning the process was only focused on achieving time and cost objectives.

In the 1990s another shift happened. Corporations shifted their focus from concentrating on quantitative risk analysis to the current emphasis on understanding and improving risk management processes. Many organizations are adapting a much more holistic approach concerning corporate risk management. The fragmented way of the seventies and eighties did not longer work.

3.1.2 Current position

The corporate risk management team is concerned with protecting the company's main sources of future earning powers. Often the senior risk manager reports directly to the executive board (Chew, 2008). Bob Anderson, executive director of the committee of chief risk officers says:

“Corporate risk management is no longer just a series of isolated transactions. It is a strategic activity that encompasses everything from operational changes to financial hedging to the buying or selling of plants or new businesses - anything that effects the level of variability of cash flows going forward. When viewed in this light, risk management is clearly a senior management responsibility, one that requires input from and coordination of the company at all operating levels” (Chew, 2008).

The practice of corporate risk management has evolved from a fragmented practice of insuring potential financial losses to a more strategic and holistic approach. Corporate risk management distinguishes itself from project risk management or other risk management types by its long term and strategic focus.

In 2010 Bodnar, Giambona, Graham, & Harvey, (2014) conducted a survey to determine how many companies have a corporate risk management practice in place. The survey included 690 non-financial companies in the private and public sector with at least a turnover of 1 billion dollar. 52 Percent of the surveyed companies had a formal risk

management program in place. An example of a formal risk management program is actively reducing risks by hedging.

Hedging is reducing the financial risk of an investment by investing in derivatives. Derivatives are investment instruments that derive their value from another underlying entity such as oil or stocks. The way derivatives work is best explained by an example: The highest operating cost of an airline company is the jet fuel. Fuel prices are very volatile and differ on a daily basis. In order to reduce the risk of rising fuel prices airline corporations buy 'fuel derivatives'. This particular derivative gambles on raising fuel price. If the actual fuel price rise, the derivative was correct and compensates the loss. If prices on the other hand drop, your derivative was incorrect and the cost of the derivative is compensated by the actual fuel price. This system is called hedging, reducing risks by investing in derivatives.

There is a significant variation in region and ownership type with regard to a risk management program. 71 percent of the European company's hedge compared to only 45 percent in North-America. Regarding ownership type the difference was even bigger. 74 percent of the public companies have a formal risk management program in place versus only 38 percent of the privately owned companies (Bodnar et al., 2014).

Today corporate risk management is a strategic practice that has past the period of fragmented insurances. It is concerned with protecting the company's main sources of future earning powers and becomes more generally accepted by the executive board. However there are still big steps to be made especially North-American and privately owned companies have challenges ahead to better implement corporate risk management into their organization (Bodnar et al., 2014).

3.2 Definition

It is hard to give a single sentence definition that is entirely satisfactory in all contexts. McNeil et al. (2005) combines two separate definitions that captures most elements of corporate risk management:

"Corporate risk management is any event or action that may adversely affect the quantifiable likelihood of loss or less-than-expected returns to secure the organization's ability to achieve its objectives and execute its strategies" (McNeil et al. 2005).

Merna and Al-Thani (2010) define corporate risk management as:

"Any set of actions taken by individuals or corporations in an effort to alter the risk arising from their business" (Merna & Al-Thani, 2010).

Corporate risk management is an integrated part of management which aims to predict and prevent undesirable actions to take place that affect corporate returns.

According to Meulbroek (2002) the ultimate goal of corporate risk management is maximizing shareholder value. This is the same goal as defined by Lindholm et al. (2006) for CREM. In the context of this thesis risk management can be described as:

"Any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization's ability to achieve its objectives and execute its strategies."

3.3 Added value

It is very difficult to measure the added value of risk management. According to Merna and Al-Thani (2010) it is important to keep in mind that the task of risk management is not to create a project or business that is entirely free of risks. The task is to make the stakeholders aware of the risks and help them to take well calculated decisions to appropriately manage them. This means that risk management is hard to express in a single number.

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Smithson and Simkins (2005) tried to value corporate risk management by comparing the use of derivatives with the company value. The research of Smithson and Simkins analyzed ten other studies who compared Tobin's Q, which is the ratio of the company's market value to the replacement value of all assets, with the use of derivatives. It turned out that corporate risk management has a positive relationship with the value of the firm. Overall firms who had active risk management policy, and therefore were involved with derivative trade, were 4,8 percent more valuable than comparable organizations who did not. In the airline industry this number was even up to 16 percent due to the high risks associated with fuel costs.

The research from Smithson and Simkins illustrated that corporate risk management can increase the value of the company and therefore succeed in the goal defined by Meulbroek to increase shareholders value. However, Fatemi & Luft (2002) points out that there is a risk in hedging corporate risks. Hedging all variations in the net cash flow may be consistent with management's aversion to risk, but is inconsistent with maximizing shareholders value. According to the value maximization hypothesis it is not beneficial to hedge all risks due to the investment it requires to hedge a risk. There is a corporate risk optimum when exactly the right amount of risk is hedged compared to the investment it requires. The added value of corporate risk management is to find this optimum in order to maximize shareholder value.

Chapman and Ward (1997) believe that corporate risk management can have multiple other benefits besides maximizing the shareholder value. The benefits of corporate risk management are:

- It identifies risks
- It supports management decisions
- It improves planning processes
- It monitors business processes
- It provides alternative plans

Overall the added value of corporate risk management is to make stakeholders aware of corporate risks, support management decision and improve planning and business processes. By hedging the right amount of corporate risk the goal of corporate risk management to maximize shareholder value can be accomplished. In the next section the risk management process is introduced to explain how companies can reach their goal.

3.4 The corporate risk management process

The corporate risk management process is an iterative process which was introduced by Smith (1995). Over the years the risk management process has developed. The University of Vermont (2012) for example published a guide for risk assessment & response. This guide provides a risk management process existing of seven steps. The first step is to understand the context. Step number two, three and four are together called the risk assessment and contain identification, analysis and evaluation. After the risk assessment the risk response step takes place followed by monitoring and the last step reporting and communication. More recent team FME (2014) identified six processes in the corporate risk management process. The first process is to plan risk management followed by risk identification. The third and fourth process are qualitative and quantitative risk analyses. Process number five is a risk response and the last process is monitor and control. There are three stages that are the same in most of the corporate risk management sources and are still used in corporate risk management today:

- Identification of risk
- Analysis of implications
- Response to minimize risk

The first stage is the risk identification stage. In this stage it should be determined which risks are likely to affect corporate business performance. Risk identification should be performed on a regular basis and should be carried out in a similar manner at both operational and strategic business level.

The second phase in the corporate risk management process is the risk quantification

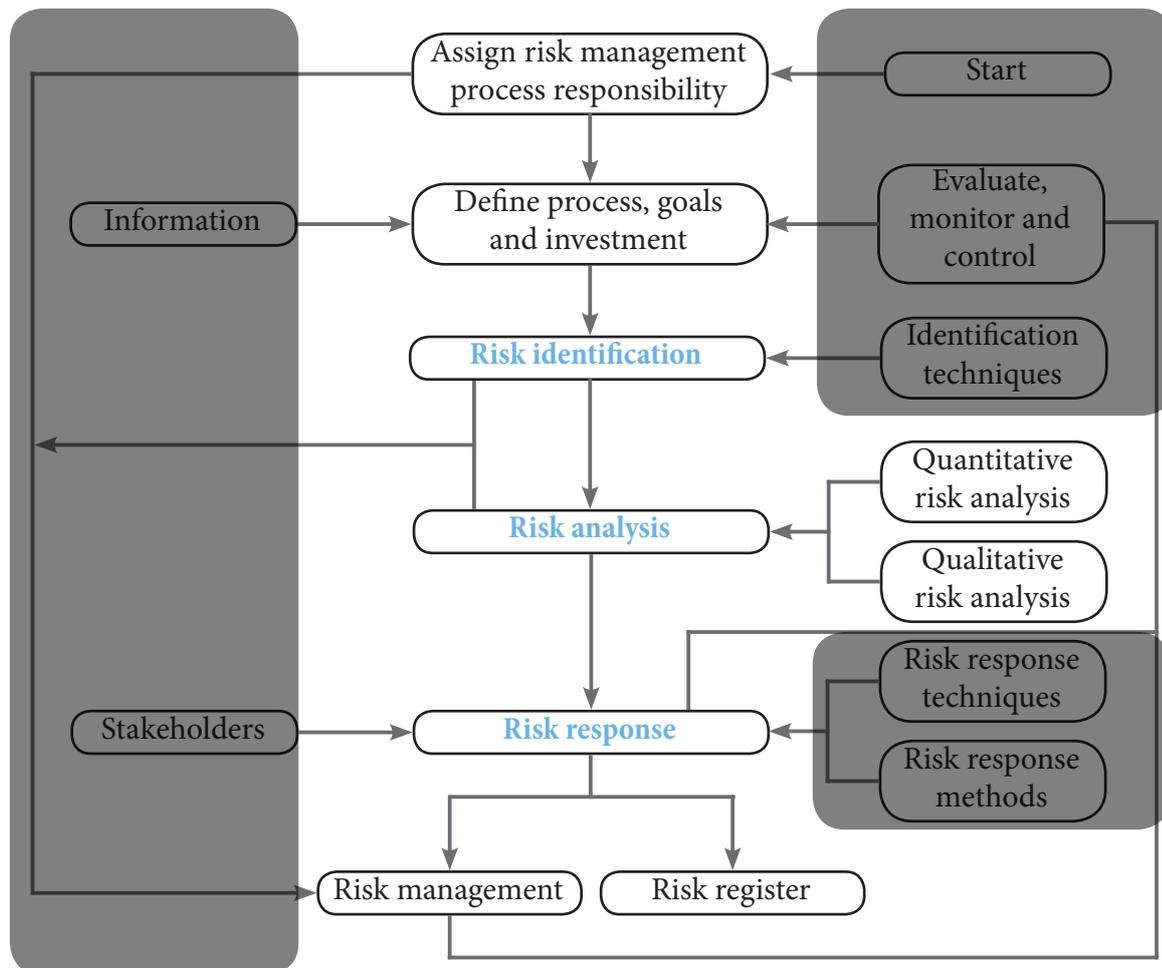


Figure 3.1: Simplified version of the corporate risk management process (Merna & Al-Thani,2010)

and analysis. It involves evaluating risks and risk interactions to assess the range of possible outcomes. It is primarily concerned with determining which risk events warrant a response.

Qualitative risk analysis techniques result in a list of risks and a description of their likely outcome. It does not result in a numeric value but instead it describes the nature of the risk to improve the understanding of it. Quantitative risk analysis techniques result in a numeric value of the risk. Often computer models are used to analyze statistical data to assign a potential likelihood and value to a risk.

The third and last phase in the corporate risk management process is the risk response. Risk response involves defining enhancement steps for the opportunities and threats resulting from the risk analysis process. There are four major risk response options. The first response that is commonly used is avoidance. The second risk response is risk reduction. The third option is risk transfer. The last risk response option is risk retention, this means that the risk is intentionally or unintentionally accepted and retained.

Figure 3.1 shows the simplified version of the risk management process by Merna and Al-Thani (2010). The grey areas are added to highlight the most important parts for this Thesis. The model has the same three stages as introduced by Smith (1995). The first phase can only start with information input such as a definition of the goals, process and investment together with the right identification techniques. In the risk analysis phase the identified risks will be analyzed. There are two main risk analysis techniques, qualitative and quantitative risk analysis techniques. The Outcome of the risk analysis requires a risk response from the risk manager. For each risk the required response, responsible person and so on are listed in the risk register.

If corporations use risk identification techniques on regular basis, they will be able to identify risks in an early stage. This allows companies to analyze the risks and decide what the required risk response is such as risk reduction or avoidance. The risk

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management process enables managers to make other stakeholders aware of corporate risks and their impact on the core business process. The model helps to secure future cash flows and contribute to the shareholders value (Merna & Al-Thani, 2010).

3.5 Conclusion

Corporate risk management is no longer a profession of ad-hoc insurances. It is a holistic approach to secure future cash flows of the corporation to reduce the risks arising from business practice that may affect an organization's ability to achieve its objectives and execute its strategies.

Corporate risk management will in this thesis be defined as:

“Any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization's ability to achieve its objectives and execute its strategies.”

Corporate risk management adds value to the organization in two ways. First of all corporate risk management helps to make stakeholders aware of corporate risks, support management decision and improves planning and business processes.

Secondly, organizations that are actively involved with corporate risk management are on average higher valued by investors. This implies that corporate risk management contributes to the corporate goal of maximizing shareholders value. However big steps are yet to be made since slightly more than half of all companies have a formal risk management program in place.

Chapter

4

Corporate Real Estate Risk Management

This chapter introduces CRERM, provides a definition and discusses the added value by combining the previous two chapters with addition of new literature. At the same time it serves as a basis for the next chapter in which the actual corporate real estate risks are identified.

4.1 Introduction to corporate real estate risk management

The first section of this chapter provides an introduction of corporate real estate risk management by giving historical background information and discussing its current position.

4.1.1 History

The history of CRERM is relatively new. By only looking at the available literature one can tell that publications in academics journals about corporate real estate risk management started to be published from 1999 onwards. Simons (1999), Gibson & Louargand (2002) and Huffman (2002 and 2004) are authors that in a relative short period of time published four articles dedicated to CRERM. Almost ten years later CBRE (2012) published an article about CRERM in their monthly periodical and not in an academic journal.

The history of CRERM probably started in the 1980's. Corporations needed to shift their focus back to the core business during the corporate recession. Standardized products and services and the availability of skilled employees were no longer a competitive advantage but more a necessity. The added value of corporate assets to the core production process determines the competitiveness of a organization (Dewulf et al., 2000).

CRE is a corporate assets that can lead to corporate real estate cost reductions and therefore be beneficial to the core production process provided that it is managed properly (Dewulf et al., 2000). Simultaneously the corporate recession also resulted into a renewed focus on corporate risk management. The first risk management methodologies and processes were designed and implemented at corporations (Merna & Al-Thani, 2010). Both CREM and corporate risk management started to mature and evolved into a more strategic management field during the 1990's.

Even before the nineties corporate real estate managers have long understood the concept of risk. Workplace developments forced CRE managers to deliver projects on time and within budget taking all sorts of risks into account. Nevertheless there was no focus on risks on portfolio level and how that portfolio interacted with the wider property market (Gibson & Louargand, 2002).

During the nineties the economy was booming and companies had to keep up with the growth in order to gain competitive advantages over their competition. Corporate real estate had to be integrated with the strategy. New workplaces and workplace solutions needed to facilitate this growth. Corporate real estate became a direct source of potential risks (Gibson & Louargand, 2002).

CREM and corporate risk management started to intertwine with each other. On the one hand corporate real estate managers needed to be aware of CRE risks because of the large financial investment involved. On the other hand corporate risk managers needed to control CRE risks because it is a company asset. It is not hard to imagine that for instance fire insurance was beneficial for both management fields.

But when the period of fast economic growth came to an end so did the interest in CRERM. Corporate real estate risk management disappeared from the corporate agenda. Managers needed to be remembered once more about the importance of it (Gibson & Louargand, 2002).

4.1.2 Current position

It is not exactly clear when CRERM regained interest from the corporate management

and academics, but there are two important events from 2000 onwards which CRERM literature frequently refers to.

The first event is the terrorist attack on the World Trade Center on September 11th, 2001. Rosenbluth (2011) called it the game changer. Companies became painfully aware how much they rely on their corporate real estate. Business continuity plans needed to include more than ensuring a resilient IT infrastructure. According to Rosenbluth CRERM has as task to ensure that the company's critical facilities will be restored to operational capacity as soon as possible, independent of the nature of the risk. Rosenbluth is not the only one who points to the terrorist attack on 9/11. More authors point at this event regarding increasing importance of CRERM:

“Issues such as terrorism or civil unrest and, increasingly, cyber threat, are major potential risks to corporations in many parts of the world. The resilience of physical and human infrastructure to such issues, including the robustness of IT platforms, is focusing attention on business continuity” (CBRE, 2012).

“Organizations insure themselves against many of these risks but it is the corporate real estate manager who must develop contingency plans for re-housing the critical operations. The terrorist attacks in New York in 2001 drove this point home permanently” (Gibson & Louargand, 2002).

The second event is the financial crisis of 2008. CBRE (2012) mention that the increased visibility of CRERM is a result of the global financial crisis. Corporate real estate has not gone unaffected by this recent event. The crisis resulted in a period of cost reduction and many companies were tied to long lasting expensive rent contracts. At the same time cost reductions made the introduction of new risk processes more difficult because they require an investment. According to CBRE an appropriate balance between these two imperatives is a considerable challenge where CRERM can be a solution.

4.2 Definition

There is no universal definition of risk as it relates to CRE. There is only widespread acknowledgement of the need to identify a broader range of risks than would traditionally have been the case, and implement processes to manage them (CBRE, 2012). The studied literature does not provide an exact definition of what CRERM is. Yet by taking the definitions of corporate real estate management given in chapter two combined with the definition of corporate risk management given in chapter three a definition of CRERM can be given. Corporate real estate management is defined in chapter two as:

“Aligning the land and buildings used for work space, infrastructure and investment to the needs of the core business process, to obtain maximum added value for the business and to contribute optimally to the overall performance of the organization in order to maximize the shareholder value.”

Corporate risk management is identified as:

“Any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization's ability to achieve its objectives and execute its strategies.”

A definition of CRERM can be given by combining the previous two definitions stated above:

“Corporate real estate risk management is any event or action that an organization takes to reduce the risks related to the land and buildings used for work space, infrastructure and investment that may affect an organization's ability to achieve its objectives and execute its strategies.”

4.3 Added value

To understand the added value of CRERM a clear defined goal should first be given.

Huffman (2002) argues that the goal of CRERM is controlling the risks originating from corporate real estate to maximize the contribution to the corporate bottom-line and long term health of the corporation. But despite the organization's CREM philosophy the ultimate goal of each organization, except nonprofit organizations, is to maximize shareholders value.

This goal is familiar since it is exactly the same goal as Meulbroek (2002) defined for corporate risk management as described in chapter three and the same goal as Lindholm et al. (2006) described in chapter two for CREM.

According to Rosenbluth (2011) risk management as it applies to corporate real estate is based on two principles.

- 1) Identification and possible mitigation of unacceptable risks to a property's operational availability during a variety of adverse situations.
- 2) Establishment of plans, procedures and protocols to ensure the continued operational availability of the property and in worst case scenario bring the property back to operational status as soon as possible.

Gibson and Louargand (2002) add that a methodology for evaluating the corporate real estate risk level is not only essential to decide which risk should be dealt with in what way but also to help corporate real estate managers to focus their efforts and resources on the corporate real estate risks that contribute the most to the corporate strategic risk.

Gibson and Louargand (2002) suggest some benefits that can help to achieve the goal of maximizing shareholder value. These benefits are expected benefits and are not yet confirmed since the management field of corporate real estate risks is relatively new and the research field still has to mature. Expected benefits of CRERM are:

- Identification of CRE risks
- Making CRE risks visible and understandable for others
- Enable CREM to implement plans, procedures and protocols to manage CRE risks
- Help managers focus their time on the most important CRE risks

If corporations want to be able to control the risks resulting from corporate real estate they need to implement some kind of CRERM strategy that is in line with the corporate strategy and the corporate risk policy. If a corporation wants to implement such a CRERM strategy they are made aware of potential risks and therefore need tools to determine when these risks become unacceptable (Gibson & Louargand, 2002).

4.4 The corporate real estate risk management process

As said in chapter one the objective of this thesis is the same as pointed out by Gibson and Louargand (2002) above and is creating a rank list that helps to recognize the most important risks related to corporate real estate. In order to create such a list it is important to understand how the CRERM process works within an organization.

For this purpose a CRERM model has been developed as displayed in figure 4.1. This model is in essence a combination of the corporate risk management process as described by Smith (1995), the corporate risk management model (figure 3.1) and the added value of CREM model (figure 2.1). The three steps of risk identification, analysis and response were introduced in section 3.4 and combined with the effect on shareholder value discussed in section 2.3.

The executive board formulates a corporate mission which in turn serves as input for the CREM strategy and the corporate risk acceptance profile respectively discussed in chapter two and three.

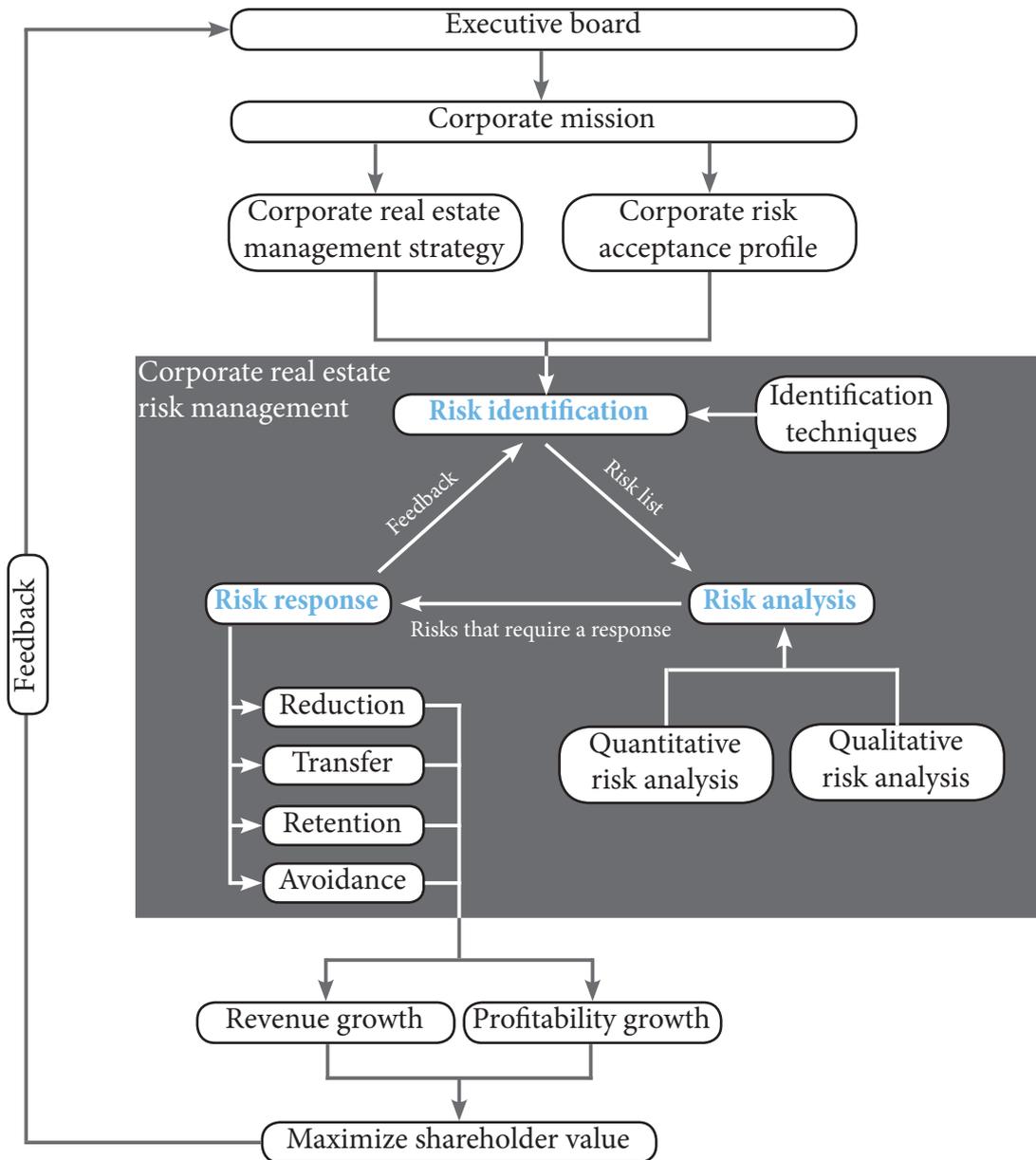


Figure 4.1: Corporate real estate risk management process

The corporate risk acceptance profile and the CREM strategy together serve as input for the actual CRERM process. The CRERM has the same three steps as the corporate risk management model from Merna & Al-Thani (2010) displayed in figure 3.1.

The first step of the CRERM process is to identify the CRE risks that can influence the core business process. The identification should be conducted at a regular basis and should result in a list of potential risks. Risk identification techniques are analyzing the required data including: historical information, planning output and current business information such as product or service descriptions. The corporate real estate risk identification phase results in a list of potential risks (Merna & Smith, 1996).

This list serves as input for the second step, the risk analysis. By means of qualitative and quantitative analysis techniques, as discussed in section 3.4, it is determined which risks require a response. All the risks and risk interactions are evaluated to assess the range of possible outcomes. The required response will be determined in the last step.

Step number three is the corporate real estate risk response. In this step the risk response method which is most in line with the CREM strategy and corporate risk profile is chosen. The potential risk responses have already been introduced in section 3.4. For each risk the response should contribute to the goal of CRERM to maximize shareholder value. This can be done by securing revenue growth or increasing the profitability.

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Once appropriate risk measures have been taken the cycle starts over and the CRERM process goes back to step one in which the feedback from step three serves as input for the new real estate risk identification process. Step three together with the shareholders provide feedback for the executive board who can if required adjust CRERM strategy or risk acceptance profile.

This thesis contributes to step one by identifying corporate real estate risks. It serves as a risk-foundation for CRE managers, facility managers, the corporate management and other stakeholders. Increasing the knowledge of CRERM contributes to the second step as well. It enables CRE managers to compare their corporate risk perception with those of colleagues employed at similar organizations.

In the next chapter the corporate real estate risks will be identified. This is done by means of a literature study and additional interviews with CREM experts to complete the list of potential CRE risks.

The appropriate risk response depends on the company's risk acceptance profile and their corporate strategy and will therefore be different for each company. Since this research does not contain a specific case study it is not possible to assign an appropriate CRE risk response or discuss the response options in more detail.

4.5 Conclusion

Since the beginning of this millennium there is an increased interest in CRERM due to the 9/11 terrorist attacks and the global financial crisis.

Corporate real estate risk management is defined as:

“Corporate real estate risk management is any event or action that an organization takes to reduce the risks related to the land and buildings used for work space, infrastructure and investment that may affect an organization's ability to achieve its objectives and execute its strategies.”

CRERM can add value to an organization and contribute to maximize the shareholder value by means of:

- Identification of CRE risks.
- Making CRE risks visible and understandable for others.
- Implementing plans, procedures and protocols to manage CRE risks.
- Helping managers focus their time on the most important CRE risks.

The CRERM process exists of three major steps risk identification, risk analysis and risk response. This thesis contributes to the first and second step of the CRERM process by developing a risk list to identify the most important CRE risks.

Chapter

5

Identification of corporate real estate risks

This chapter provides an answer to the question which risks related to corporate real estate may affect the added value of CRE to the shareholder value. The chapter consists of three sections. In the first section all CRE risk mentioned in the current existing literature are identified. In the following section an interview risk list is constructed in addition to the literature risk list. The two risk lists resulted in a final risk list which is discussed in the third section.

5.1 Literature risk list

There are a couple of studies dedicated especially to CRERM. These sources, together with literature about corporate real estate investment will provide the necessary input for the literature risk list. Appendix 1 displays the literature risk list.

5.1.1 Risks in literature

Five studies are dedicated to CRERM and serve as input for the risk list. All the CRERM studies look at the subject from a specific point of view:

- CBRE (2012), studied CREM risks focusing especially on the banking and financing sector.
- Huffman (2002 and 2004) wrote two articles about CRE risk management in which he looked at corporate real estate risk from an economic point of view.
- Simons (1999) identified three key sources of strategic risk that impact all organizations. The identified key risk sources are applicable to identify corporate real estate risks but are not specific for CRE and are also applicable to other company resources.
- Gibson & Louargand (2002) used Simons' research about the three key risk components as basis to create a framework to identify the risks of a real estate portfolio. They divided the real estate portfolio into several different types according to use, asset type and environment. For each type Gibson and Louargand identified several different risks and control measures.
- The last point of view with regard to CREM risks is put forward by Rasila & Nenonen (2008) who identified CRE risks related to corporate relocation.

Besides these five CRE risk sources there is a lot of literature available about the risk of investing in corporate real estate as a tradable asset. These risks do not directly influence the shareholder value of the organization that uses the real estate and are not risks a CRE manager has to deal with. However, the investment value of corporate real estate assets are often directly influenced by the corporate real estate performance. Besides, literature about CRE investment risk is better developed and at a more mature stage than CRERM literature. The literature about real estate investment that has been studied is alphabetical order: Chen & Hobbs (2003), IPD (2002), Liow (2010), Sharp (2013) and Voicu & Seiler (2011). The amount of relevant risks put forward in the CRE investment literature is limited. Therefore the most important risks are not separately discussed but jointly listed under the term 'investment literature'.

5.1.2 Inconsistencies

Using different sources with their own point of view provides a wide range of risks related to corporate real estate that might affect the added value of it to the shareholder value. However, using different sources is inherent to inconsistency which makes it hard to compare and merge the sources into one list. The inconsistencies between the sources need to be evened out.

Often different sources mention almost the same risks but in each source they have another meaning. An example is flexibility risk. Gibson & Louargand (2002) mention flexibility risk as, 'lack of flexibility in the physical structure hampering business operations'. While Rasila & Nenonen (2008) mention flexibility risk as 'the risk that

the office layout is not flexible and functioning at its full potential'. It turns out that flexibility risk can be physical or functional. This example shows that two separate sources mention flexibility risk but they both mean something different. One of these risks needs to be renamed to prevent any confusion. In this example the functional flexibility risk is redefined as "office-layout" risk.

The opposite is possible too. Risks that have the same meaning but are slightly different formulated. 'Data risk' for example, data risk is described in three different sources: once as a risk during development, once as financial data transparency and once as operational data availability. These three risks are slightly different formulated but the actual risk behind them all is the lack of data available. For the purpose of this thesis it does not matter if the data is on financial, operational or development level and therefore the risk is renamed as one risk; 'data risk'.

The third inconsistency was the level of abstraction. Some risks were more umbrella terms and others went into detail. There are a couple of risks that have sub-types but for this thesis this is just too detailed and not necessary. For example 'physical appearance risk' had three sub-types; employee, customers and suppliers. It is true that the physical appearance can differentiate for all three of them. However, in the end the physical appearance is a product of the design and maintenance of the building. These risk sub-types are too detailed and are left out of the risk list.

The last and most complicated inconsistency is the risk dimension. This inconsistency does not only appear between different studies but even appears within the same study. Some risks and risk categories do not have the same dimension leading to duplicates. Development risks for example are caused by a development. The dimension of the category is a cause. On the other hand there is for example reputation risk. The dimension of this risk is a result. Each risk has a cause and a result:

Cause -> Risk -> Result

This can best be explained with an example, a corporation decides to build a new headquarter and leaves behind their former headquarters. Because of the size the old office can not be absorbed by the market. The new development is not exactly environmentally justifiable which is not beneficial for the organization's environmental reputation. The risk in this example is that the organization encounters reputational damage caused by the new development. The question arises what the dimension is of this risk. It can be a development risk, in this case the dimension will be a cause because the reputational damage is cause by the development but it can also be a reputational risk, in this case the risk is a result namely the reputational damage. Not having the same dimension can cause the same risk to be listed multiple times. To prevent this from happening the risks and risk categories should have the same dimension.

According to the problem statement given in chapter two, one of the goals of this thesis is to find out how CRE managers perceive CRE risks, what is the chance that the risk occurs and if it occurs, what is the effect of it on the shareholder value? The result is already provided in the problem statement by means of the impact on shareholder value Therefore all risks will in this thesis be rewritten to a cause that influences this shareholder value.

All these inconsistencies needed to be dealt with in order to construct a risk list from the literature sources that contain all risks mentioned in the available literature.

5.1.3 Risk categories

The literature review provided 30 different risks. Risks originating from the same cause should be listed together to make the list well organized and better understandable.

The problem is that the different sources put forward different risk categories. The seven categories mentioned most in literature are displayed in table 5.1.

These risk categories originated in a natural way during the literature study. Different sources often use the same risk categories. Sometimes new categories were introduced because the sources were written from a specific point of view. If this happened the

category was added resulting in a total of seven different categories that are frequently mentioned in literature. However these risk categories can not be used in the literature risk list. This is mainly because not all risk categories have the same dimension. This can cause duplicates because of the in previous section addressed problems. Therefore the risks should be rewritten to make sure that that they all have the same dimension. The categories development risk and external & regulation risks can be maintained because they have the right risk dimension.

Risk category	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment	Interviews
Development risk			x				x
Financial Risks	x	x	x	x	x	x	x
Operational & business Risks	x	x	x	x	x	x	x
Reputational risks	x		x		x		x
External & regulation risks	x	x	x		x	x	x
Competitive risks					x		
Future risks		x			x		x

Table 5.1: Risk categories

The financial policy risks category was first called financial risk and was thus defined as a result. The risk was renamed to financial policy risk to make it a cause. Sources tend to mix up financial and financial policy risks within the same source making no difference between them.

The name of the risk category operational & business risks slightly differs between the sources. CBRE (2012) calls it Operational & business continuity risk. Huffman (2002 & 2004) calls it physical risk. Gibson & Louargand (2002) refers to it as business risk and Simons (1999) mentions operation risks. Despite the different names all sources describe the same thing: Operational & business policy risks.

The risk category reputational risks has been renamed as the category appearance risks. Reputational damage is a result and not a cause. Therefore this risk category has been renamed to appearance risk.

The competitive risks category is replaced because competitive advantages are often a result of locational or operational advantages. All competitive risks are divided over the risk categories operational & business policy risks and the new created risk category location risks. The risk category location risks is not in a single source mentioned as a risk category on its own. Rasila & Nenonen (2008) that focus on relocation risks do not mention it as a risk category but they do say that location can be a source of risk, it can cause a company to relocate. Huffman (2002) mentions location risk as a physical risk. CBRE (2012) does not explicitly mention it at all and neither does Simons (1999). The papers about real estate investment do mention it but only in the context of the value of the location and locational advantages. For example, ‘Uptime of production facility risks’ is a risk that was usually categorized under operational & business risks. However the uptime of the production facility is not caused by the operational or business policy but by the place where the facility is located.

The total number of risk categories went from seven to six because the risk category ‘Future risks’ disappeared. All risks mentioned in this category are also mentioned in one of the other categories. ‘Future risk’ is actually not a category but is depending on the timeframe that is taken into account. All the risks experienced today will still be there in the future but the order of magnitude can differentiate over time. For this reason the risk category ‘Future risks’ will not be included in the literature list.

The new risk categories are:

- Development risks
- Financial policy risks
- Operational & business policy risks
- Location risks
- Appearance risks
- External & regulation risks

The entire literature risk list can be found in appendix 1. This list contains 30 different risks in six risk categories.

5.2 Interview risk list

The literature sources give a good initial overview of the CRE risks. However, there are two reasons why additional interviews are required to make sure that all possible risks are addressed and listed. The first reason is that almost all risks put forward in the CRERM literature are theoretical. From the studied sources only Rasila & Nenonen (2008) provided fieldwork. They conducted interviews with organizations about risks related to corporate reallocation. The limited amount of fieldwork available in CRERM literature is on the edge of the research field and might therefore be insufficient to construct a CRE risk list. There is more field work available in the investment literature but this is not sufficient because it is not dedicated to CRE risks but merely risks related to investments in CRE. The second reason is that the most recent source is from 2012. Risks that are related to recent developments might not yet be included. For these two reasons interviews with CRE managers took place to make sure that the CRE risk list provides a complete overview, including the risks experienced in practice. The interviewed people are, in chronological order:

- Ton van de Beek (Radboud University)
- Pieter Foekens (FloraHolland)
- Henk Koster (Ministry of defense)
- Peter de Winter (Philips)

The interviews took place in July and August 2014. The interview setup was intentionally not structured according to a strict predefined interview script. The interviewees were first asked to introduce themselves, their position, the company they work for and the CRE portfolio they work with. After this general introduction the interviewees were asked to start describing the CRE risks they experience in practice. No suggestions of categories were made and no examples were given to keep the interviewees as unbiased and open minded as possible. After some time the interviewees ran out of ideas. At this point they were introduced to a risk category without mentioning an exact risk. This small hint resulted in more risks. When all categories were discussed and no new risks were put forward, then the risk placemat was introduced. The risk placemat is an overview of all the risk categories and risks identified in literature. These risks are presented in list as well as in mind map format. The placemat used during the interviews can be found in appendix 2. The interviewees were asked to mention the risks that they recognized or missed. The average length of an interview was approximately 1 hour.

The interview risk list can be find in appendix 3. This list contains a more detailed description about which interviewee suggested what risk. In total 31 risks were identified by the interviewees, most of these risks were already mentioned in literature but 13 new risk were put forward. Six out of those 13 risks are development risks. This is because the study from Huffman (2002, 2004) is the only study who acknowledge development risks while during the interviews three out of the four interviewees mention development risks. The other 7 risks that were put forward during the interviews but were not mentioned in literature are distributed over the categories and recognizable in tables 5.2 to 5.7 when there is only an X below the risk source interviews'.

More information about the interviews can be found in appendix 4. This appendix provides interview reports of all four interviews.

The literature study completed with the risks identified during the interviews provide a comprehensive list of in total 43 risks in 6 different categories. This risk list is called the final risk list. In the next section each category of the final risk list will separately be discussed. An overview of the final risk list, including risk descriptions can also be consulted in appendix 5.

5.3 Final risk list

Table 5.2 to table 5.7 show the final list after merging the literature risk list with the interview risk list. Each risk category will be separately discussed and for each risk the sources will be mentioned. Some risk names differ from the names in the literature sources because of the inconsistencies mentioned in section 5.1.2.

5.3.1 Development risks

The first risk category is development risk and is displayed in table 5.2. The risks are arranged according to the moment when they occur in the development process. Development risk was only mentioned in literature by Huffman (2002, 2004). In the first paper Huffman published about corporate real estate risk in 2002 he specifically mentions CRE development risk. According to Huffman (2002) only corporations with the highest risk acceptance profile will engage in developing their own real estate. This risk is easily eliminated by outsourcing your developments to professional construction companies.

If only one source mentions the risk the question arises if this risk should be included in the CRE risk list. The interviews confirmed that development risk should be in the list, three out of four interviewees confirmed the presence of development risk and added six more to the development risk category.

The first development risk mentioned is zoning plan risk. This risk was mentioned by two interviewees. Zoning plan risk is the possibility that regulations do not allow the development or the development is not allowed anymore due to (changed) regulations. The interviewees encountered problems with new developments that were not in line with the zoning plan and thus caused delays. In some sources this risk was categorized as an external risk. However, the interviewees mentioned that the cause of the risk was not the government but the development itself. The decision to categorize zoning plan risks as a development risk and not as an external risk is because the risk is caused by a development and not by the government. The risk will only occur if the development takes place.

The second risk is the ground acquisition risk and was only mentioned in the interviews by one interviewee. The company he works at needed large pieces of land to develop new transportation terminals and processing plants to secure future growth. The risk is the possibility that the required ground can not be acquired and therefore the company will not be able to keep up with the growth.

Tender risk is mentioned by the CRE director of the Radboud University in an interview. It is one of the most important risks the Radboud University faces with new developments. The interviewee even defined several different sub-types of tender risk such as the risk that the tender is not of good quality, it is too expensive, it causes delays etc.

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
1.0	Development risks			X				X
1.1	Zoning plan risk							X
1.2	Ground acquisition risk							X
1.3	Tender risk							X
1.4	Financing risk			X				
1.5	Temporary housing risk							X
1.6	Nuisance risk							X
1.7	Planning risk			X				X
1.8	Workspace design risk			X				X
1.9	Development budget risk			X				X
1.10	Social unethical development risk							X

Table 5.2: Development risks

However these sub-types go in too much detail and are therefore not included in the final list.

Risk number four is mentioned by Huffman (2002). Financing risk is the risk that the new development encounters problems with the financing because internal departments or external organizations do not want to invest in the development.

The next risk is called temporary housing risk and was brought up in the interviews. New developments or renovations cause the Radboud University to facilitate temporary housing to keep lectures going. Temporary housing risk is the possibility that suitable temporary housing can not be provided during the development or is too expensive.

Nuisance risk is the risk that new development causes nuisance for the ongoing business process or surrounding and neighboring stakeholders. For example noise pollution or transportation nuisance. This risk was put forward in the interviews.

Risk number seven is planning risk and is mentioned by Huffman (2002) as well as in the interviews. Huffman (2002) mentions that delays in construction can endanger deadlines and therefore put the planning under pressure. Deviating from the planning may result in financial losses. Planning risk is the possibility that the development process gets delayed.

Workspace design risk is mentioned by Huffman (2002) and in the interviews by one interviewee. Poor workspace design or inadequate design (functional obsolescence) can result in decreased productivity and/or increased real estate operating expenses. Workspace risk is the possibility that the workplace design of the new development is not suitable for the organization.

Two of the interviewees and Huffman (2002) all mention the development budget risk. If the development is not within budget it can affect the company's financial performance. Development budget risk is the possibility that the development will not be within budget.

The last development risk is mentioned in the interviews. It is the possibility that new developments are not ethically justifiable. For example constructing a new office and leaving behind your former office which can not be absorbed by the market. This can put the integrity of the organization at risk. Social unethical development risk is the possibility that the development is social nor ethical justifiable or puts the company's integrity at stake.

5.3.2 Financial policy risks

Financial policy risks are risks that are a result of company's financial policy that effect the company's overall performance and shareholder value. Table 5.3 distinguishes only seven different risks in this category despite that almost every source except Simons address financial policy risks. This is because a lot of financial risks have another dimension and resulted in financial losses. These risks can be found in other categories. The risks are categorized from operational activities (on daily basis) to strategic activities (on yearly basis or longer).

The first financial policy risk is liquidity risk. CBRE (2012) describes this risk as capital allocation and constraints. This is the financial decision to assign scarce financial resources to real estate. Investments in real estate usually have a long life span and once money is allocated it will be stuck for a long time and not be available for other investments. Huffman (2002) adds that the liquidity risk is not necessarily reduced by leasing. Long-term lease contracts are budgeted as well and therefore accounting wise spent. This is confirmed by Rasila & Nenonen (2008) who underlines that long-term leasehold obligations are accounting wise a risk to the financial ratios of a corporation. This risk was confirmed in the interviews as well. Liquidity risk is the possibility that the money that is stuck in real estate is needed for other purposes.

The second financial risk is solvability risk and is suggested in the interviews. Solvability risk is the possibility that the organization will not be able to fulfill its long term financial obligations due to the amount of debt equity invested in corporate real estate.

The third financial policy risk is cost of capital risk. In some sources this risk is called financing risk but this description does not exactly cover the risk it tries to reflect.

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
2.0	Financial policy risks	X	X	X	X		X	X
2.1	Liquidity risk	X	X	X				X
2.2	Solvability risk							X
2.3	Cost of capital risk	X	X	X	X		X	
2.4	CRE budget risk							X
2.5	Budget cut risk							X
2.6	Book value risk		X		X			
2.7	Real estate investment risk						X	X

Table 5.3: risks

Remarkably, financing or cost of capital risk is mentioned in almost all papers (Simons excluded) but not mentioned in the interviews. Rasila & Nenonen (2008) mentions cost of capital risk as the long and short term financial impact as a result of the decision how to finance your CRE. Huffman (2002 & 2004) and Gibson & Louargand (2002) refer to cost of capital risk as financial costs risk which include all risks associated with how a company finances their CRE. Literature about CRE investment defines financing costs as the cost of capital' or 'access to cheap debt' (Brounen & Eichholtz; 2005). The best description for cost of capital risk is the same as CBRE and investment literature; the possibility that the cost of capital for corporate real estate increases.

Financial risk number four is only mentioned in the interviews and is called CRE budget risk. It is the possibility that the CRE budget is not sufficient and negatively influences the CRE performance.

The fifth risk is budget cut risk and was put forward in an interview. Budget cut risk is the possibility that CRE budget cuts lead to declining CRE performance. This risk substantially differentiates from the CRE Budget risk. Where the CRE budget risk is structural risk that the budget is in general not sufficient a budget cut is incidental risk that the CRE budget was sufficient once but this, often unexpected, changed.

The next risk is book value risk. This risk was mentioned by Gibson & Louargand (2002) and Rasila & Nenonen (2008). According to Gibson this risk is the possibility that the total valuation of the corporation is not as high as expected due to the substantial presence of real estate on the balance sheet. Rasila & Nenonen (2008) on the other hand mention book value risk in a different context. Book value risk is according to Rasila & Nenonen the valuation risk arising when relocating. If the corporation relocates and the value of the real estate is lower than expected a financial gap could lower the company's financial ratios. Both sources might give a slightly different meaning to book value risk but they actually say the same. The value of the real estate is in reality not the same as accounted for on the balance sheet. Book value risk is the possibility that the real estate book value is not the same as the actual real estate value according to valuation. This is a financial policy risk because systematic valuations of the portfolio could have prevented this.

The last financial risk is real estate investment risk and is mentioned in the interviews. Real estate investment risk appears when your corporation invests spare corporate resources in real estate that is not for own usage. The risk is the possibility that the investment in real estate does not give you the required return on investment. This risk is also mentioned in literature about real estate investment risk.

5.3.3 Operational & business policy risk

Operational & business policy risks is the most mentioned risk category in the sources. Every source except literature about real estate investment mention it. Table 5.4 provides an overview of the different risks within this category. This category contains risks that arise from decisions about common operational business practice. The risks are categorized according to the responsible management level, from operational to strategic management.

The first risk discussed is maintenance risk. Maintenance risk is listed three times within the final risk list. Twice in the operational & business policy risks category and once as appearance risk. Maintenance risk is mentioned once more in this category as part of facility management risk which will be discussed next. Maintenance risk is in this context the possibility that the CRE does not function at its full potential due to deferred maintenance. This risk is put forward in the interviews.

The second operational & business policy risk is facility management risk. This risk is mentioned multiple times in literature and in the interviews. It is a collective term for risks concerning energy, cleaning, catering, surveillance, maintenance and so on. CBRE (2012) and Gibson & Louargand (2002) call it operational real estate costs and refer to the risk of escalating operational CRE costs, especially energy and maintenance. Huffman (2002) calls it property management risk. According to Huffman it is the risk of rising property expenses. Simons (1999) calls it operational risk with which he means the risk associated with increasing costs to keep your CRE operational. In general facility management risk is the possibility that facility management (i.a. energy, cleaning, surveillance, catering, and maintenance) costs rise. This risk is mentioned in the interviews as well.

Malfunctioning installation risk is the next risk on the list. This risk is only mentioned by CBRE (2012) and calls it ‘the application of CRE technology systems’. With which they mean the possibility that the installation technology does not meet the requirements and negatively influence the core business process.

Health and safety risk is also only mentioned by CBRE (2012). In the literature source it is called ‘health and safety incident performance risk’ with which they mean the risk that the CRE does not score well on or does not meet the health and safety requirements. This risk is therefore the possibility that employees get sick or injured due to the CRE.

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
3.0	Operational & business policy risks	X	X	X	X	X		X
3.1	Maintenance risk							X
3.2	Facility management risk	X	X	X		X		X
3.3	Malfunctioning installation risk	X						
3.4	Health and safety risk	X						
3.5	Real estate flexibility risk		X	X				X
3.6	Occupancy rate risk	X						X
3.7	Office layout risk		X		X			
3.8	Relocation risk		X	X	X			X
3.9	Expansion profile risk			X				

Table 5.4: Operational & business policy risks

Real estate flexibility risk has nothing to do with the ownership type flexibility of an organization, this is included in liquidity risk. Flexibility in this context is best described by Gibson & Louargand (2002) as, 'lack of flexibility in the physical structure hampering business operations'. Huffman (2002) mentions the real estate flexibility as a potential risk as well. He describes it as the ability of the physical structure to adapt to new ways of working. This can be seen as a functionality risk but the cause of this risk is not the functionality but the flexibility of the physical structure. Two interviewees mention this risk in the interviews as well. Flexibility risk can best be described as the possibility that the physical structure of the CRE can not cope with CRE demand changes. It is the physical flexibility of the office.

Occupancy rate risk is mentioned by the interviewees and in literature by CBRE (2012). CBRE looks at occupancy rate risk as a risk that the CRE occupancy can influence CRE costs. They believe occupancy rates are sources of financial risk. However the interviewees believe CRE occupancy rate risk is an operational & business policy risk. It is the possibility that a low CRE occupancy rate causes corporate real estate costs per FTE to rise. Foekens gives in an interview an example, occupancy rates usually drop if vacancy rises. Vacant CRE space generates no turnover but fixed operating costs do not reduce accordingly. Occupancy rate risk is the possibility that a low CRE occupancy rate causes corporate real estate costs per square feet to rise.

Office lay-out risk is in the original list called functionality risk. In order not to mistake functionality risk with flexibility risk the name has been changed to office layout risk. Office lay-out risk is the functional flexibility where real estate flexibility risk is the physical flexibility. Office layout risk is the possibility that the office setup is not optimally functioning and therefore not supporting the core business process at its full potential. Rasila & Nenonen (2008) and Gibson & Louargand (2002) give examples of office lay-out risk. The office layout can reduce productivity or the layout is for example not suited for new ways of working.

The next risk is relocation risk. Rasila & Nenonen (2008) wrote an entire paper about relocation risk and the corporate consequences. This thesis does not go into too much detail and will discuss relocation risk only superficial compared to Rasila & Nenonen their study. They say that relocation risk is the influence of a relocation on inter-organizational relations. Huffman (2002) explains relocation risk as a financial risk, namely the enter and exit costs associated with a relocation. Gibson & Louargand (2002) and some of the interviewees look at relocation risk the same way. It is the possibility that the operational business activities require a relocation leading to high enter and exit costs. The last risk in this category is the expansion profile risk and is only mentioned by Huffman (2002). Huffman mentions that if corporate management is aggressively pursuing expansion possibilities they might make forced or agitated CRE decisions meaning that if there was more time to evaluate the local real estate market they probably would have made another decision. Expansion profile risk is the possibility that the corporate real estate policy can not adequately respond to the company's expansion profile.

5.3.4 Location risks

The next risk category is location risk. location risks are risks that influence the shareholder value caused by the physical space, location and its surroundings. Table 5.5 lists all the Location risks from the most influenceable to least influenceable location risk.

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
4.0	Location risks	X	X	X	X	X	X	X
4.1	Preferred location risk		X	X	X	X		
4.2	Uptime of production facility risk	X				X		X
4.3	Stakeholder risk							X
4.4	Accessibility risk				X			X
4.5	Supplier risk	X						

Table 5.5: Location risks

The first location risk is called ‘preferred location risk’. This is the possibility that the location choice for the CRE is not the preferred and best location possible. Huffman (2002) describes the risk as “poor location choices will increase the risks of employee hiring, turnover and increase shipping and distribution costs to the corporation”. Simons (1999) refers to the availability of skilled employees especially for IT companies. The location of the company is critical if it is not located near skilled employees it might lose competitive advantages. Investment literature mentions that the location can influence the value of the CRE. Liow (2010) for instance did research about the influence of CRE on the corporate valuation for retailers. The location can be key to success for an organization and determining the right location is a huge risk. Rasila & Nenonen (2008) does not explicitly mention the location choice risk but says that the wrong location choice can be a reason to relocate. Several authors have a different interpretation of preferred location risk but they all agree that it is very important to choose the right location. Preferred location risk is the possibility that the location of the real estate is not the best possible.

The second risk is the uptime of production facility risk. This risk is mentioned by CBRE, Simons and in the interviews. CBRE (2012) mentions uptime of critical facilities as an Operational & business continuity risk. Simons (1999) mentions the impairment risk of key processing or production facilities. He mentions for example power failure or an unreliable energy grid. During the interviews, almost all interviewees mentioned this risk. One of the interviewees even believes it is the most important risk. According to this interviewee it is the CRE managers function to make sure that production can continue and that the CRE supports the core business process. If a production facility is not operational he failed his task. Therefore the uptime of the production facility risk is formulated as the possibility that the core production facilities are not available for production due to locational aspects i.e. power failure, inadequate supply, etc.

The next location risk is stakeholder risk. This risk is mentioned in the interviews. For example, the Radboud University sometimes experience nuisance from other tenants on the campus. These tenants can be internal faculties as well as external organizations. Stakeholder risk is the possibility that other stakeholders (external or internal departments) cause nuisance.

Accessibility risk is mentioned in the literature by Rasila & Nenonen and during the interviews. According to Rasila & Nenonen (2008) accessibility risk is the possibility that employees do not want to travel too long to the company. The interviewee on the other hand believes that accessibility has to do with the infrastructure surrounding the location. Accessibility risk is in this thesis formulated as the possibility that your location is not properly accessible by car or public transportation for suppliers, employees or customers.

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The last locational risk is the supplier risk this risk is only mentioned by CBRE (2012). This risk is the possibility that there are no suitable suppliers available near to the location of your corporate real estate. Whether the supplier has never been there or that the supplier went bankrupt does not matter neither does it matter what product or service it provides.

5.3.5 Appearance risks

CBRE (2012) calls it reputational risk just as Simons (1999). Huffman (2002 and 2004) call it design risk. Whether it is called design or reputation risk it is the possibility that the shareholder value will be negatively influenced by the CRE appearance. This risk was mentioned during the interviews as well.

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
5.0	Appearance risks	X	X	X	X	X	X	X
5.1	Design risk	X	X	X	X	X	X	X
5.2	Maintenance risk	X						X

Table 5.6: Appearance risks

The first appearance risk is the design risk. As said above, Huffman (2002) calls this risk design risk or physical risks. Huffman splits design risk in workspace design which has already been discussed and the physical design of the real estate. CBRE (2012) and Simons (1999) mention the possibility of reputation damage due to the appearance of the corporate real estate. Interviewees confirm this risk. At Philips N.V., job interviews take place in representative offices even if they will eventually be employed in a different office. Design risk is the possibility that the corporate real estate design negatively influences the organizations reputation or attracts less/no new employees or customers.

The second risk in this category is maintenance risk. Please do not mix up this risk with maintenance risk mentioned previous under operational & business policy risk. Maintenance risk is mentioned multiple times in the sources because it can negatively influence the shareholder value in two different ways. Deferred maintenance can negatively influence the business performance or negatively influence the company's reputation. Maintenance risk in this context was put forward in the interviews and by CBRE (2012). Two of the interviewees especially mentions the risk of the flora on site that is not well maintained and therefore negatively influences the corporate appearance. CBRE (2012) brought up that deferred maintenance can make the real estate look deteriorated and therefore it could have a negative influence on the corporate appearance. Maintenance risk is the possibility that the real estate and site are not well maintained and thus negatively influence the organizations reputation or attract less/no new employees or customers.

5.3.6 External & regulation risks

The last risk category is 'external & regulation risks'. This risk category is mentioned in each source except by Rasila & Nenonen. External & regulation risks are not mentioned by Rasila & Nenonen because they believe that it can not be managed. Other sources disagree because an organization can insure itself against external risk. CBRE (2012) calls this risk category external and geopolitical risks, Gibson & Louargand (2002) talks about political risk, Huffman (2002) calls them regulatory risks and Simons did not mention it as a separate risk category but categorizes the external & regulation risks

#	Risk	CBRE	Gibson & Louargand	Huffman	Rasila & Nenonen	Simons	Investment literature	Interviews
6.0	External & regulation risks	X	X	X		X	X	X
6.1	Natural disaster risk	X				X		
6.2	Terrorism risk	X				X		
6.3	Political and social unrest risk	X				X		
6.4	Economy risk	X	X			X	X	X
6.5	Exchange rate risk							X
6.6	Property market risk		X	X		X	X	X
6.7	Contracts risk							X
6.8	Regulation risk	X		X			X	X
6.9	Real estate data availability risk	X						X
6.10	Technology advancement risk	X				X	X	X

Table 5.7: External & regulation risks

under different impairment risks. External & regulation risks are risks that influence the shareholder value caused by external or regulatory sources. Table 5.7 shows the identified external & regulation risks. The risk are ordered from short incidental risks to risks that are more likely to occur in a wider time frame.

The first external risk is natural disaster risk and is mentioned in literature by CBRE and Simons. CBRE (2012) mentions natural disasters and acts of god as risk. Examples given are tsunamis, storms or other unforeseen natural disasters. Simons (1999) mentions natural disasters as part of physical impairment. Natural disaster risk is the possibility that a natural disaster strikes an organization's corporate real estate.

Risk number two in this category is a terrorist attack. This risk is the possibility that an organization's CRE is subject to a terrorist attack. Simons (1999) and CBRE (2012) recognize this risk. It is interesting to mention that Simons' paper was published before the terrorism attack on the World Trade Center in New York on September 11th 2001. According to CBRE other security threats are also part of this risk category.

The next risk in the list is the political and social unrest risk. This risk is mentioned by CBRE (2012) as well as by Simons (1999). It is the possibility that political or social (called civil by CBRE) unrest reduces the performance of the corporate real estate. This can have all kind of result which in the worst case leads to physical vandalism or demolition of the CRE.

Risk number four is economy risk and is mentioned by four different sources. CBRE (2012) calls this risk economic shocks and recession risk and categorizes it under external risks. Gibson & Louargand (2002) say that the value of real estate assets is driven by both the property market and its regional and national economy. Stable, emerging and mature economies have different economic risks. Simons (1999) mentions almost the same as Gibson but he categorizes economic risk under asset impairment risk. The economic situation can affect the CRE performance direct or indirect. A direct effect is that in an economic upswing material and labor costs increase, and thus increasing your CRE expenditure. An indirect effect is that during a recession usually vacancy rates increase and therefore rent prices are likely to drop. Lower rents mean that the CRE generates less turnover and its value will decrease. The book value of the CRE assets will therefore be lower. Economy risk is defined as the possibility that due to the economic situation CRE income drops or CRE expenditures rise.

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Exchange rate risk is in close relation to economic risk, the economic situation influences exchange rates. Exchange rate risk was mentioned in the interviews. It is the possibility that rents increase due to fluctuating exchange rates. If for example the company currency is Euro but CRE rents in the contracts are in dollars, fluctuating exchange rates can make the dollar compared to the euro more expensive increasing rents in Euro's. Especially large organizations with lots of offices in foreign countries are subject to this risk

Risk number six is property market risk, this is the possibility that developments in the property market increase real estate costs. According to Gibson & Louargand (2002) the property market is just as the economy continuously on the move. The property market risk has two different effects on CRE. The first effect is that owner occupiers usually want to dispose their surplus real estate assets in an economic downturn. The available space on the property market increases, leading to reduced CRE value. The second effect is the effect on the market rent. Simons (1999) and Huffman (2002) acknowledge the influence of the property market on real estate value and rent heights. CRE rents tend to fluctuate making the timing very important. The interviewees added that property market risk is not only a function of time but also, to less extend, of the location.

The next risk is contracts risk and was put forward in one of the interviews. Contracts risk is the possibility that contractual obligations cause conflicts and negatively influence your real estate performance. The contract can cause a conflict due to non-beneficial obligations to other entities, time consuming law processes and or being tied to expensive contracts.

Regulation risk is mentioned in a couple of sources. CBRE (2012) speaks about regulatory compliance. This means the compliance of the CRE with the regulations. Huffman (2002) defines regulation risk as regulatory risk; Regulatory risks are those risks incurred as a result of governmental oversight, legislation and new regulation". During the interview a whole spectrum of regulation risks was put forward including, fire regulations, health and safety regulations, environmental regulations, zoning plan regulations and so on. All these risk have been merged together and are called regulation risk. Regulation risk is the possibility that regulations or changing regulations negatively influence your real estate performance.

The second last risk is technology advancement risk. CBRE (2012) calls it obsolescence risk due to technological advancement. This risk is the possibility that technological advancement changes the company's real estate demand. An example is the automation in the financing sector that will probably reduce the required real estate demand since tasks are taken over by computers.

The last risk is real estate data availability risk. This risk was mentioned in a couple of different other risk categories in literature. The sources mention data transparency (interviews), financial data transparency (CBRE, Simons, investment) and CRE data transparency and skill gaps (CBRE, Simons, Investment, interviews) in respectively the development, financial and operational & business risk category. All these risks could be merged into one single risk namely real estate data availability risk. An interviewee clarifies that this risk is not only an external risk but also an internal risk. Often the CRE department does not exactly know their own numbers concerning exploitation costs, cost of employment per square meter, etc. For this thesis the real estate data availability risk means the possibility that the required real estate information, such as information about operating costs, rental market developments, etc. is not available.

5.4 Conclusion

This chapter provides an answer to research question four: which risks related to corporate real estate may affect the added value of CRE to the shareholder value?

In total 43 risks that can influence the shareholder value of an organization divided over six categories are identified. Each of these risks can influence the shareholder value by reducing revenue growth or decreasing profitability.

Literature sources completed with interviews provided the input for the risk list as

displayed in tables 5.2 to 5.7. Appendix 5 provides the final risk list, an entire overview of all risk categories, CRE risks, risk descriptions and sources. Development risks and financial policy risks are not very well described in the available literature. It turns out that almost half of the risks mentioned in these categories are suggested by the interviewees. Operational & business policy risks, location risks, appearance risks and external & regulation risks are all extensively described in literature and confirmed by the interviewees. Occasionally new risks pop-up in these risk categories during the interviews.

Chapter

6

Research Approach

This chapter describes the process from the final risk list as in previous chapter to an answer on the last research question: which corporate real estate risks are perceived as most important? First, a short recapitulation of the previous research questions will be given, followed by the research method, data collection, analysis techniques, validation and conclusion. In the next chapter 'data description', the response composition is described. The research results are discussed in chapter eight.

6.1 Recapitulation

In section 1.4 the problem statement was given: Which risks, related to corporate real estate, may affect the added value of CRE to the shareholder value of an organization and how are these risks ranked according to importance related to job & company specific characteristics? As said, the problem is two-folded. The first part of this problem has been answered in the previous chapters.

Chapter two, three and four looked at respectively corporate real estate management, corporate risk management and corporate real estate risk management. The ultimate goal of CRERM is to optimize the added value of corporate real estate to maximize the shareholder value of the organization.

CRERM can contribute to this goal by reducing the risks arising from the land and buildings used for work space, infrastructure and investment that may affect an organization's profitability or revenue as explained in figure 2.1.

In total 43, Risks in six different categories are identified as potential risks that may influence the corporate real estate's contribution to the shareholder value.

All the risks are identified, but the input needed to answer the second part of the problem statement, "Which corporate real estate risks that may affect the added value of CRE to the shareholder value of an organization are perceived as most important?" is not yet provided. The correct research method should be chosen to gather the required data which enables a risk ranking

6.2 Research method

It is likely to suppose that risks may differentiate for certain job or company specific characteristics. It is not hard to imagine that for example the type of ownership can influence the respondent's perception of the risks. For example, organizations that have full ownership of their corporate real estate are exposed to the 'cost of capital' risk and less to the 'exchange rate' risk. For organizations that rent all their corporate real estate this is expected to be the other way around. The fifth and last research question takes these company characteristics into account: "*Which corporate real estate risks that may affect the added value of the CRE to the shareholder value of an organization are perceived as most important and how are these risks ranked according to job & company specific characteristics?*"

The job & company specific characteristics are called the independent variables. They can influence the rank of the risk and are discussed in section 6.3.2.

Research needs to be done to establish a ranking and to determine how CRE managers perceive these risks; which risk they believe is most important. The determination of the correct research technique is key to answer the last research questions.

Qualitative or quantitative

Research methods can be roughly divided into two main types, quantitative and qualitative research.

According to Baarda and De Goede (2006) qualitative research is research in which the problem is described and interpreted by means of data of qualitative nature like experiences and perceptions. The data is usually gathered with interviews, observations or a literature study.

Quantitative research is structured research in which the required information is gathered

with concrete questions and/or direct observations. The data is usually gathered with a survey. This can be face-to-face, online, by phone or with pen and paper. Other data collection methods often used in quantitative research are a direct observation with registration or a case study.

Baarda and De Goede (2006) state that qualitative research is an unstructured way of data collection that result in a 'list of interest' for further research. The final risk list introduced in the previous chapter is the 'list of interest', which has been constructed with descriptive qualitative research techniques such as a literature study and additional interview.

The final risk list serves as a basis for further exploratory quantitative research which is needed to rank the risks.

Risk tool

According to Baarda and De Goede (2006) the next step is to gather information in a structured way. Exploratory quantitative research can take the 'list of interest' to expectations and hypotheses that can be verified in hypothesis testing research. There are several tools suited for this kind of research; observations with registration, case studies or a survey.

There are two important factors that determine the tool that can best be used. These factors are the number of variables and the sample size. First of all, the tool needs to be able to gather information in a structured way concerning a large amount of variables. There are 43 dependent variables and a yet unknown amount of independent variables, the job & company specific characteristics. They are determined in section 6.3.2. The tool that is best suited to collect information about so many variables is a survey. Case studies and direct observations with registration require more time per variable to collect all the data. Second, the tool needs to be able to cope with a large sample size. A large amount of respondents is needed to determine if the risks are perceived differently for a certain job & company specific characteristic. Direct observations with registration and case studies are time consuming. A survey is designed to efficiently cope with a large amount of respondents.

Overall the best tool to determine which risks are most important is a survey because of the large amount of respondents needed and the large amount of variables involved.

6.3 Data collection

As stated above, the best way to gather the data to answer the research question is a questionnaire. In this section a description of the questionnaire as well as a distribution plan is provided to collect the data and have a sufficient amount of respondents to draw meaningful conclusions.

6.3.1 Structure

The questionnaire will be divided into two parts. In part A questions about the job & company specific characteristics are asked and in part B the respondents are asked to fill in how they perceive the corporate real estate risks.

Part A is the first part of the questionnaire. The respondents are asked to introduce themselves and their company. In order to get as much respondents as possible it is possible to fill in the questionnaire anonymously. In the next section the job & company specific characteristics are discussed in more detail.

Part B of the questionnaire contains the corporate real estate risk list. The respondents are asked to give their opinion about the way they perceive corporate real estate risks. This will be done by asking about the likelihood and impact of each risk. According to COSO (2012), a risk is a function of the likelihood that this risk occurs and the impact of the risk when it occurs. Impact in context of this thesis is the impact on the shareholder value by reduced added value of corporate real estate to the organization. Each risk category is separately discussed.

The respondent is asked for each risk to rate the likelihood and impact on a five point scale. Such a scale is called a Likert scale. A Likert scale has a special position in

statistics, because it is used in parametric as well as non-parametric statistics. This is possible, because a five-point Likert scale can be used on ordinal or interval level. The Likert scale is preferably used on ordinal level, but when the assumption is made that the distances between the five points is equal than it can be used as interval scale as well (Carifio & Rocco, 2007).

6.3.2 Independent variables

The independent variables in part A exist of four questions about the respondent's job and their position, followed by four questions about the company specific characteristics. The last five questions in part A are about the CREM, corporate risk management and CRERM maturity level of the organization and the processes and responses implemented to manage them. The questions in part A will short be discussed.

Job characteristics

The first four questions in Part A are questions about the respondent's job. The first question is about the profession of the respondent. Is the respondent a real estate manager/facility manager, real estate consultant or something else? The reason to ask this is to distinguish the end users from the consultants. The target group for the questionnaire is the corporate real estate manager or facility manager, but it might be interesting to compare if the end users perceive CRE risks different than the consultants.

The second question is about the management level on which the respondent operates. It is likely that people within the same organization fill in the questionnaire differently. A CRE director responsible for all the CRE in the EMEA will look differently at the risks as a colleague that is a facility manager and responsible for a single production plant.

Question number three asks the respondents about the continent on which the respondent lives. This is asked to geographically categorize the respondents.

In the last question about job information the respondent is asked where the real estate is located for which he/she is responsible. The answer range includes all continents. It is possible to select multiple continents. This question together with the third question enables a geographical comparison of the risks.

Company characteristics

The next four questions are the company specific characteristics. The first question is about the company's name. If the respondent does not want to share this information and keep the organization anonymous than this is possible too.

The second company characteristics question is about the industry sector the company operates in. There are 21 different sectors identified based on the international standard industrial classification (ISIC) codes (United Nations, 2008). The advantage of the ISIC is that they are recognized worldwide and that sectors can, if needed, be merged afterwards into the four sectors of industry, the primary, secondary, tertiary or quaternary sector. This question enables to rank risks for different industry sectors. The idea that corporate real estate risks differentiate for industry sectors was suggested by the interviewees and in the literature by several sources including CBRE (2012), Huffman (2004) and Simons (1999). During the interviews the interviewees were asked to not only mention the CRE risks, but also to explain why they experience the risk. The most heard argument was that the risk was specific for the industry they operate in.

The next question is to give an indication of the company size. There are five different sizes based on the categories identified by the Dutch Central Bureau of Statistics (CBS). However, according to this classification companies with over 250 FTE are defined as 'large' (CBS, 2011). This category has been further divided into three categories; 250 to 2.500 FTE, 2500 to 25.000 FTE and organizations with more than 25.000 FTE. One Full-Time Equivalent (FTE) is 38 hours a week. According to Simons (1999) the size of the company can be of influence on the risks. The size can also be measured according

to balance sheet size, cash flow size etc. However the size of the company expressed in the number of employees is expected to be best known within organizations.

The last question about company specific characteristics is the real estate ownership type. It is likely that risks differentiate for different types of ownership as the example in section 5.3 described. The question is to identify what percentage of the entire CRE is owned. The answer possibilities are;

- 0%
- 1-20%
- 20-40%
- 40-60%
- 60-80%
- 80-99%
- 100%

The assumption is made that the CRE which is not owned is rented. Huffman (2002) mentions that the lease versus purchase decision is the first CRE risk CRE managers face when confronted with the search for suitable real estate to match the company's corporate real estate demand.

CRERM processes

The last five questions of part A are questions about the CRERM processes that the company implemented.

Question number nine is about the corporate real estate management maturity level of the organization. In chapter two CREM has been discussed. It is interesting to know how CRE managers perceive the professionalism of their company's own CREM. Respondents are asked to rate the company's CREM maturity level on a five point scale.

The next question is almost the same question as the previous one, only now respondents are asked to rate the company's corporate risk management maturity level. This question together with the previous question give an indication of the professionalism of the organization concerning CREM and corporate risk management.

In chapter four the added value of corporate real estate risk management has been discussed. Five aspects of added value were introduced:

- Identification of CRE risks.
- Making CRE risks visible
- Making CRE risks understandable.
- Implementing plans, procedures and protocols to manage CRE risks.
- Helping managers focus their time on the most important CRE risks.

In question eleven the respondents are asked to identify which of the above mentioned possible advantages of CRERM they recognize. It is possible to select multiple answers.

In figure 4.1 the corporate real estate risk management process has been described. The three phases of risk management are based on Merna and Al-Thani (2010). In question twelve the respondent will be asked which phases of the CRERM process they apply at their organization. The possible answers are: risk identification, risk analysis and risk response. It is possible to select multiple phases.

In the last question of part A the respondent is asked to select the risk response options for CRERM they use within their organization. COSO (2012) identified four risk response options; avoid, control, retain and reduce. The possible answers are these risk response options together with the 'not applicable' possibility.

The job & company related questions discussed above give an indication of the respondents, the company they work for and the CRERM processes implemented. Part A of the questionnaire makes it possible to rank the risks for certain groups based on specific characteristic. Part A together with the risk list, part B in the questionnaire, will provide the necessary input to answer the last research question. The entire questionnaire can be consulted in appendix 6.

Corporate Real Estate Risk Management

6.3.3 Questionnaire distribution

The questionnaire needs to be distributed amongst as many potential respondents as possible to warrant representativeness of the research.

The target group for the questionnaire is corporate real estate managers from around the world. It is hard to get enough corporate real estate managers to fill in the questionnaire but there are four ways in which this questionnaire is distributed.

First, the questionnaire is sent out by CoreNet Global. CoreNet global is the worldwide organization of corporate real estate professionals such as managers, consultants and academics. A total of 7.995 members will receive the questionnaire.

The second organization that distributes the questionnaire amongst their members is Corporate Real Estate Management Executives. CREME is the Dutch organization of corporate real estate end users. Between ten and twenty people will receive the questionnaire.

The third distribution method is the personal contact list of colleagues from AT Osborne. In total 134 contacts of AT Osborne are asked to fill in the questionnaire.

The last distribution method is distribution via social media. A link to the online survey was published in the LinkedIn group: Corporate Real Estate. The post was made 'managers choice' making it visible on top of the page for over 130.000 real estate professionals for a couple of days.

Approximately 8.150 potential respondents received a request to fill in the questionnaire. Another unknown number of potential respondents is reached with the LinkedIn group. The exact number is hard to determine, because some people are connected to more than one organizations and receive the questionnaire multiple times. All organizations send out an invitation to fill in the online questionnaire mid-November. A reminder is sent out exactly one week later.

6.4 Analysis techniques

After data preparation there are five techniques used for analysis. Two of those are used for the descriptive analysis and three are used for differences analysis.

6.4.1 Descriptive analysis

First, the data homogeneity needs to be controlled. This is done in two steps. The first step is to filter all respondents out that might contaminate the data set. This is done by testing if the frequency distribution of the risks are normal distributed. If this is not the case the respondent needs further analysis to determine if the respondent should be taken out of the data set. This is the case if the answers provided by the respondent show a clear answer pattern. The second step is analyzing the data distribution by looking at the standard deviation. The standard deviation measures the amount of variation within the data by calculating the dispersion from the average. A high standard deviation is an indication that the respondents ranked the risk differently from each other.

Second, the risks need to be categorized according to importance related to job & company specific characteristics. This is done by looking at the likelihood and the impact of the risk separately and by calculating the total risk score. The higher the total score the more important the risk is.

6.4.2 Difference analysis

The tests used for the difference analysis aims on determining if there is a significant difference in risk perception between groups related to job & company specific characteristics. The best analysis technique depends on the data input. In total three analysis techniques are used.

The first analysis technique used is the independent samples t-test. This test is used to compare two independent groups with each other. The independent samples t-test is a parametric test, which may only be used if there are plenty of respondents for each compared group and the data is on interval level and normally distributed. In previous section it is explained that five-point interval scales can be on interval level. The job characteristics, job position and management level are analyzed using a t-test.

The second test used is the Kruskal-Wallis test. This test is used to analyze the difference between groups if there are three or more groups for which the difference needs to be analyzed. This technique is used to analyze the geographical location, ownership type, size and industry. The Kruskal-Wallis test is a non-parametric test. The groups for which the difference is analyzed are too small and are therefore not normally distributed. The Kruskal-Wallis test shows if there is a significant difference between at least two of the groups, but does not indicate which groups.

For this purpose the Mann-Whitney U-test can be used. If the Kruskal-Wallis test shows there is a significant difference and there is an assumption which groups might differ in risk perception than the Mann-Whitney U-test is used. The Mann-Whitney U-test is the non-parametric equivalent of the T-test and is used to analyze the difference between two groups when the sample sizes are small or the data is not normal distributed.

6.5 Validation

The validation of the research consists of internal and external validity.

Internal validity

Internal validity refers to how well the research is done. It is the extent to which you measure what you intend to measure. The research tries to measure how CRE managers perceive different risks. Several measures are implemented in the survey to increase the internal validity. The first question in which the respondents are asked about their profession is included to separate the CRE managers and facility managers from the CRE consultants. This question will increase the internal validity, because the thesis focusses mainly on CRE managers and facility managers. The data provided by the corporate real estate consultants is used to compare the consultants with the CRE managers.

In general a survey has a low internal validity because it is not an unbiased experimental research design. This means that it is impossible to exactly repeat the research and therefore it is not possible to check the results. Other respondents will fill in the survey and there might be other confounding factors that makes comparison of two surveys very hard (Baarda and De Goede; 2006).

The low internal validity is not a problem, since its normal for exploratory quantitative research to have a low internal validity. This type of research is not designed to determine causal conclusions and this is also not within the scope of this research.

External validity

External validity is the extent to which the results can be generalized. In other words, external validity is an indication if the questionnaire results are also valid for larger groups than only the survey sample (Baarda & De Goede, 2006). Normally, the external validity of a questionnaire is high if the survey sample is a representation of the entire target population. The representativeness, and therefore external validity, depends on:

- Standard deviation:
A low standard deviation increases the representativeness of the data. It indicates the data consistency. A low standard deviation means that all the respondents in the survey sample rank the risks the same.
- Sample selection type:
To increase the representativeness the sample selection will be taken at random. The questionnaire is send to more than 8.000 real estate professionals without making a selection in advance.
- Sample size:
More respondents means a higher representativeness. This is only valid if the standard deviation is low.
- Response rate:
A higher response rate means a higher representativeness because a larger percentage of the total population is represented in the survey sample.

The CoreNet database is with approximately 8.000 members one of the largest

databases with CRE professionals in the world. The survey sample is expected to be a good representation of the total population depending on the response rate and data variation. In the next chapter, the actual validity of the data is discussed.

6.6 Conclusion

Descriptive qualitative research by means of a literature study with additional interviews has been conducted to identify CRE risks. In order to rank these risks, exploratory quantitative research is needed. The tool best suited for this kind of research is a survey since this tool is able to cope with a large amount of variables and a large amount of respondents needed for the research.

The survey is divided into two parts. In the first part, information about the respondent's job, company specific characteristics and questions concerning CRERM are asked. The second part contains the corporate real estate risk list as discussed in previous chapter. For each risk the respondent is asked to rate the likelihood and impact on a five point Likert scale.

Data that contaminates the data set is filtered out by analyzing the frequency distribution of the respondents. If the data significantly differentiates from a normal distribution, a closer look at the data is required and a respondent might be taken out. The remaining respondents will be tested on internal homogeneity by looking at the standard deviation. The risks are ranked according to importance by calculating the final risk score. The analysis techniques used to analyze the difference in risk perception between the groups are the independent samples T-test, The Kruskal-Wallis test and the Mann-Whitney U-test.

The internal validity can not be justified since the survey can not exactly be repeated. The external validity is expected to be higher but depends on the response rate and the standard deviation of the data.

Chapter



Data description

The previous chapter described the research approach. This chapter describes the data preparation and the final data set composition. First, the process from data collection to the final data set will shortly be addressed. Second, the data composition will be described. In the next chapter, the research results are discussed and an answer to the last research question, which CRE risks are most important will be given.

7.1 Data preparation

The questionnaire was sent out on the 18th of November 2014. The first reminder was sent out two weeks later and the third and last reminder on the 8th of December. On the 15th of December the questionnaire was closed.

7.1.1 Response rate

In total 7.995 CoreNet-members received the questionnaire. Approximately 150 additional CRE managers received the questionnaire from CREME or directly from AT Osborne. An additional 130.000 CRE specialist might have seen the request to participate in the corporate real estate LinkedIn group. The total response to the questionnaire is 143 of the approximately 8.150 CRE specialist who received the questionnaire. Only 93 of these 143 respondents took the time to entirely complete the survey, the other 50 respondents did not complete it.

The total response rate is 1,2 percent. The response rate can be explained when it is broken down. In total 57 CoreNet members filled in the questionnaire compared to 36 CREME and AT Osborne connections. This results in a response rate of respectively 0,75 percent and 24 percent. It seems that the difference between the heights of the response rates is related to the organization which sends out the questionnaire. The assumption is that two factors influenced the response rate. First, CoreNet has more members, but sends out questionnaires more frequently than CREME or AT Osborne. The frequency with which CoreNet sends out questionnaires discourages members to invest time in yet another survey. Second, all the people on the personal contact list from AT Osborne are close relations and are associates to the distributing organization. This might explain why the response rates differentiate this much.

7.1.2 Data preparation

The raw data needs additional preparations before it is suited for further analysis. The data preparation is done in three phases. First all respondents who might have contaminated the data set need to be filtered out. Second all the remaining data needs to be checked for missing values or mistakes. Third, all the data not suited for analysis with SPSS need to be recoded.

Not all the data provided by the 93 respondents is usable for analysis. The data set contains respondents who contaminate the data set. To identify and eliminate these respondents the data is checked on distribution for each respondent separately by means of frequency tables. By asking the respondents to give their opinion on a five-point Likert scale it is expected that the data is normally distributed. If the frequency graph for a single respondent significantly differentiates from a normal distribution, then a closer look at the data is needed. In total, five respondents were taken out of the data set. The answers from these respondents show a clear pattern or they selected the same answer for each risk.

The 88 respondents left for data analysis need to be checked for mistakes or missing values. Missing values occur if the respondent forgot to fill in a question. In total, 7 missing values were found that are replaced with the mean to make sure that not all data from the respondent is lost. Mistakes happen if the respondent selected the wrong answer. One of the questions about the company specific characteristics was about the industry in which the company operates. Multiple respondents answered with 'real estate activities', although the company operates in a different industry. This mistake

most likely happened, because the respondent is responsible for the CRE or working at the real estate department of an organization who's core business is something else than real estate. Luckily it is an easy task to check this since almost all respondents filled in the name of the organization for which they work. All mistakes are corrected and all missing values were replaced.

The last step of the data preparation is to recode relevant questions to make it suitable for analysis in SPSS. After the last step, the data is prepared for data analysis. The exact composition of the data set will be discussed in the next section.

7.2 Data description

The data composition is described using the independent variables. First, the data set is described according to job characteristics. Second, the company specific characteristics are discussed. In the end of this chapter, more information about the CRERM process implemented at the organizations where the respondents work is addressed.

7.2.1 Job characteristics

The first thing to look at is how many respondents are corporate end users, how many are corporate real estate consultants and how many have another positions. Figure 7.1 shows how the job positions are represented in the data set.

As displayed 61 out of the 88 respondents are CRE managers or facility managers. 16 are CRE consultant and 11 have another position, including: project controller, real estate development project director, risk analyst, professor (2x), facilities planner, director of business development and other senior management functions (4x). A CRE consultant is not bound to a single organization and will therefore fill in the questionnaire from a broad perspective, which is not specific for one organization. A corporate end user on the other hand fills in the questionnaire from the point of view of the organization they are employed at. Taking a closer look at the 11 respondents who selected the option 'other', 9 are end users and 2 actual have other jobs, they are academics.

It is interesting to see if CRE end users and CRE consultants perceive the risks differently. Figure 7.2 shows the job position distribution when all respondents are rearranged to according CRE end users and CRE consultants.

The difference between figure 7.2 and 7.1 is that 9 out of the 11 respondents have been shifted from the category 'other' to the CRE end user category.

In all of the following the CRE consultants are not included unless stated otherwise. This is because the corporate real estate consultants do not fill in the questionnaire from a specific point of view, which makes it very difficult to rank the risks according to job & company specific characteristics.

The second aspect to look at is the management level the respondents are

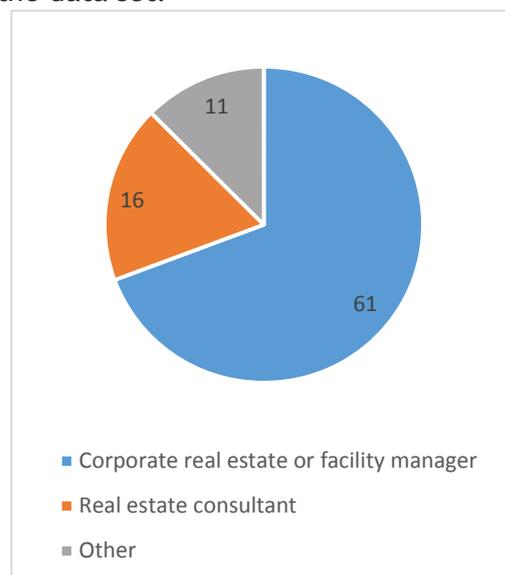


Figure 7.1: Job position

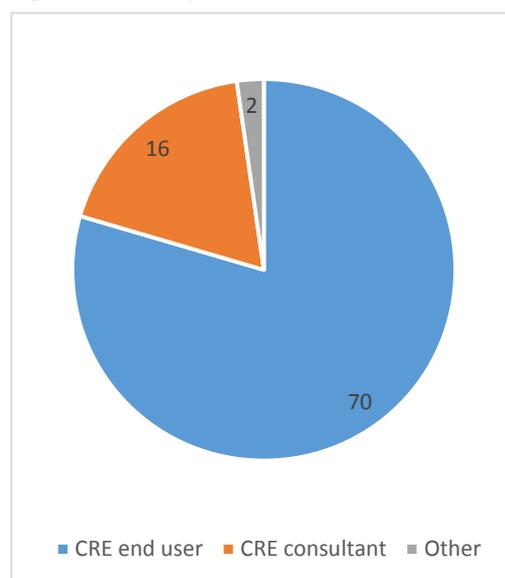


Figure 7.2: End users and consultants

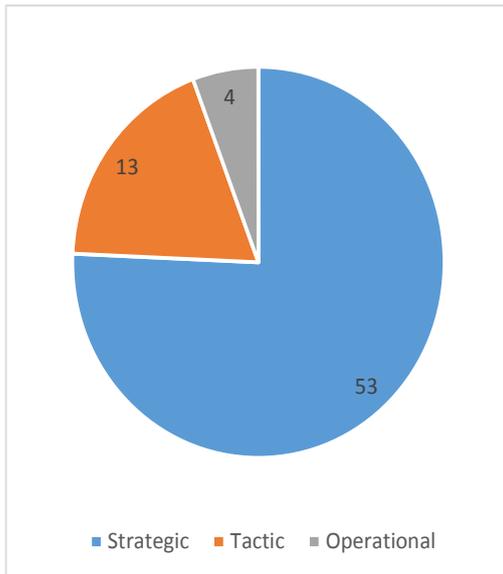


Figure 7.3: Management level

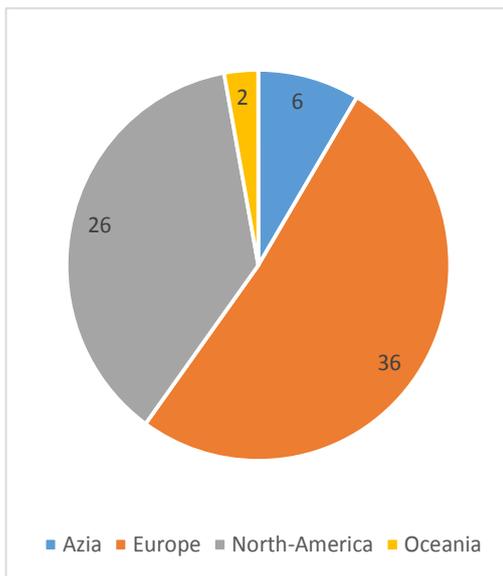


Figure 7.4: Geographical distribution

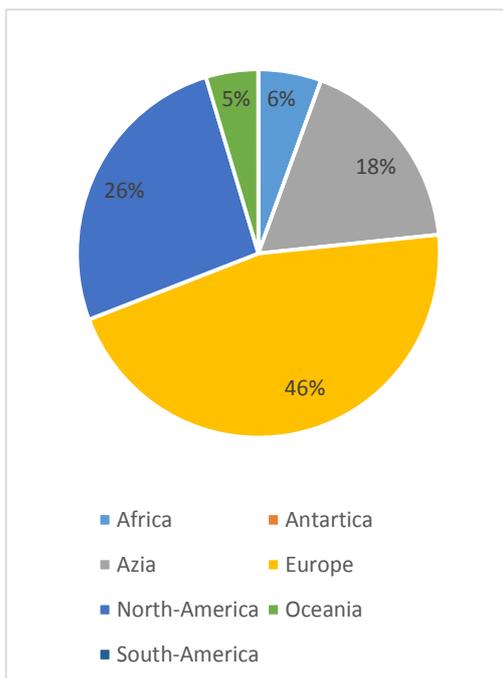


Figure 7.5: CRE location

active on. Figure 7.3 shows how many of the end users are active on operational, tactical and strategic level.

In total 53 of the 70 end users operate on strategic level. It has to be noted that two of those 53 respondents filled in that they are active on all management fields. Those two respondents have been added to the highest management field they operate on which in both cases is the strategic management field. 13 people operate on tactical level, while only 4 operate on an operational management level.

As explained in chapter six, it is likely that respondents fill in the questionnaire differently according to the management level on which they operate. It is not unlikely that respondents within one organisation, filled in the questionnaire differently. These differences can probably be explained according to the management level on which they operate.

The last job specific characteristic to look at is how the respondents are geographically distributed. This can be done by looking at the continent where the respondents live (figure 7.4) or by looking at the location of the corporate real estate they are responsible for (figure 7.5).

North America and Europe are best represented in the questionnaire. From the 36 respondents that are from Europe 29 are likely to come from the Netherlands or Belgium because they filled in the questionnaire in Dutch. 26 of the respondents live in North-America. Oceania and Asia are represented in the data set as well. But they are represented by respectively only two and six respondents.

Figure 7.5 shows where the CRE is located for which the respondents are responsible. The pie chart displays percentages, because a respondent could select multiple answers. This explains why 6 percent of all respondents are responsible for CRE in Africa although none of the respondents lives on that continent. CRE managers are often responsible for real estate in EMEA (Europe, Middle East and Africa). Europe, North-America and Asia are best represented by the respondents.

It might be interesting to look at the geographical distribution of the respondents and examine if they perceive CRE risks differently. In this chapter this is done by looking at the geographical location where

the CRE end users live. It is not evident to do this for the location where the corporate real estate is located, because this means that respondents who are responsible for CRE on multiple continents are included multiple times in the data set.

7.2.2 Company characteristics

Risks can not only differentiate for job specific characteristics, but also for company specific characteristics, like industry, size or ownership type of the real estate.

Out of the 21 industries identified by the UN ISIC codes, 11 are represented in the data set. The represented industries are displayed in figure 7.6. All respondents are included in this figure including the CRE consultants. The highest amount of respondents are working in the real estate activities industry with a total of 18 respondents. This was to be expected, since 16 of these respondents answered at question one that they are CRE consultants and thus employed in this industry. The other industries that are well represented are in order from large to small: education, information & communication, public administration & defence, human health & social work activities, professional, scientific & technical activities, financial and insurance activities, and manufacturing.

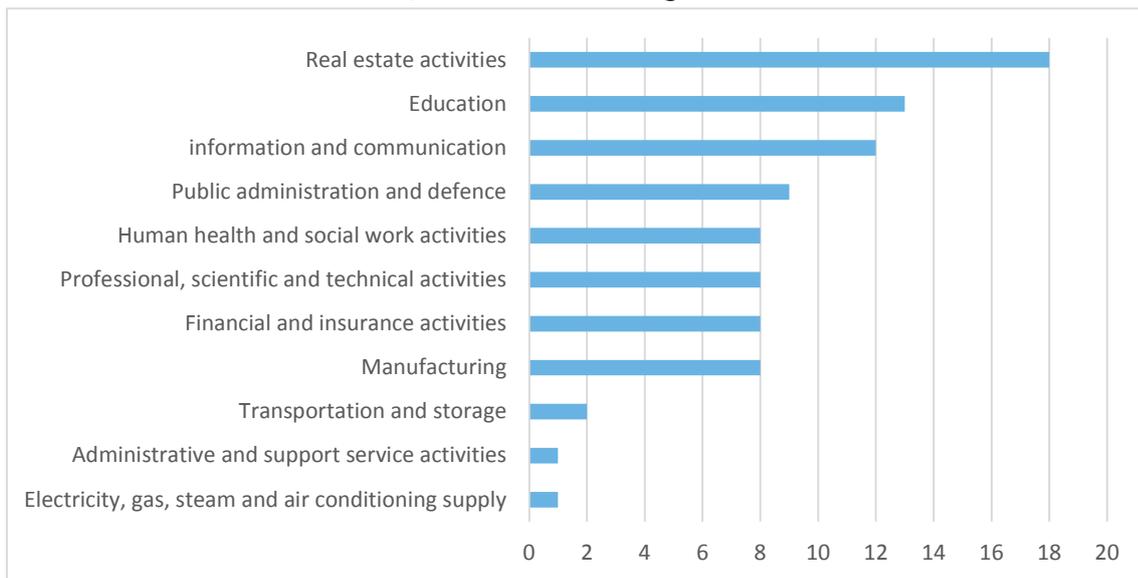


Figure 7.6: Company industry

Two remarks can be made about the company industry classification. First, out of the eight respondents that are employed in the manufacturing industry three work for the same organization, Philips N.V. Second, four of the respondents that are employed in the professional, scientific and technical activities industry are employed in an education related industry. They work for companies that provide courses, trainings and adult education.

The second company specific characteristic to look at is the company size. Figure 7.7 displays the representation of company sizes in the data set.

Best represented in the study are the large companies that employ between 2.500 and 25.000 FTE. Above 25.000 FTE and between 250 and 2.500 FTE have a significant representation as well.

The last company specific characteristic to look at is the respondent's real estate

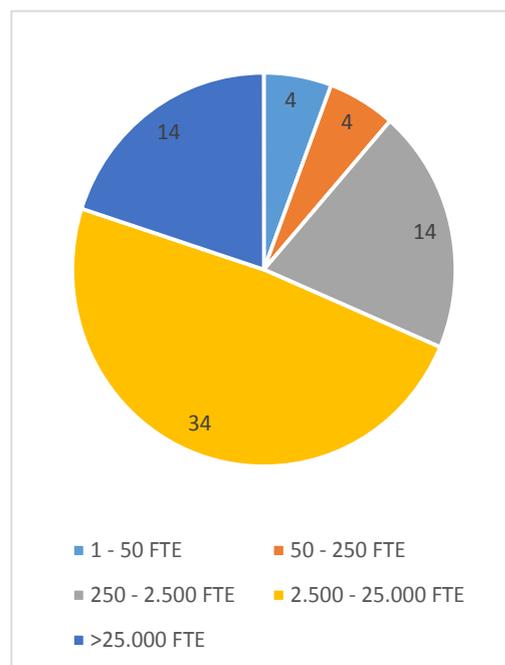


Figure 7.7: Company size

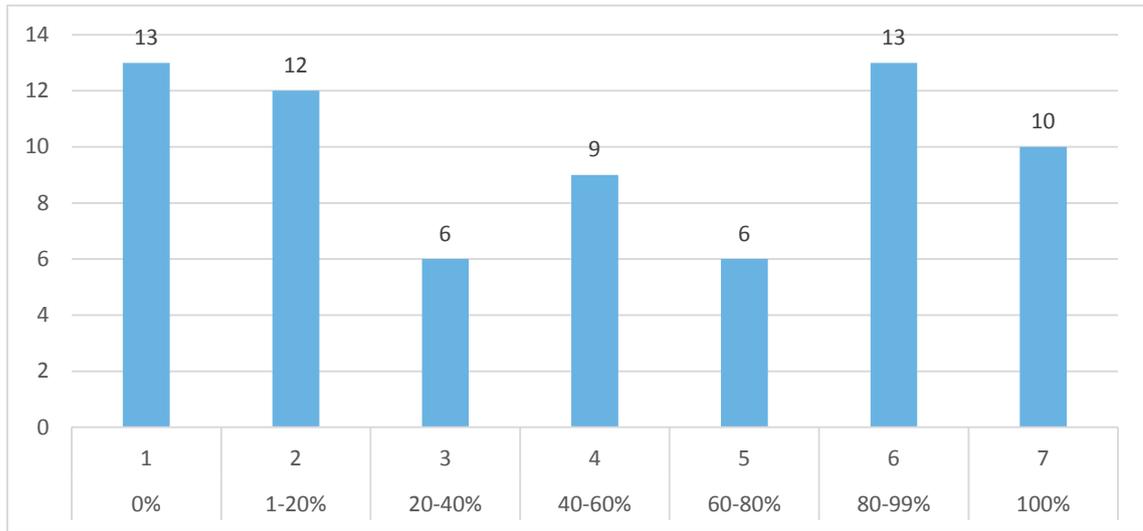


Figure 7.8: Real estate ownership type

ownership type. As explained before it is not unlikely that the perceived risks differentiate for percentage of real estate that is owned by the respondent’s organization. Figure 7.8 shows the number of companies that own a certain percentage of the entire CRE portfolio.

The percentage of real estate owned by the respondent’s organization is evenly distributed. However there is a small peak in the beginning and at the end of the graph. This suggests that most organizations rent almost all their real estate, 100-80 percent rented (25 respondents), or they own all the real estate, 100-80 percent (23 respondents). The smallest group with only 21 respondents have a more equal distribution of ownership type, 20-80 percent of the CRE is owned by the organization.

7.2.3 CRERM process

To get an indication of the CRERM maturity level of the respondents’ organizations the maturity levels of CREM and corporate risk management are asked separately. They are asked separately because many of the corporations do not have a formal corporate real estate risk management program in place. Although the respondents are not asked directly about the CRERM maturity level, an indication can be given by comparing both the CRERM and the corporate risk management maturity level with each other. This can be done by calculating the average by adding the scores of CREM and corporate risk management and divide them by two. Figure 7.9 shows the corporate risk management, CREM maturity levels of the respondents as well as the derived CRERM level.

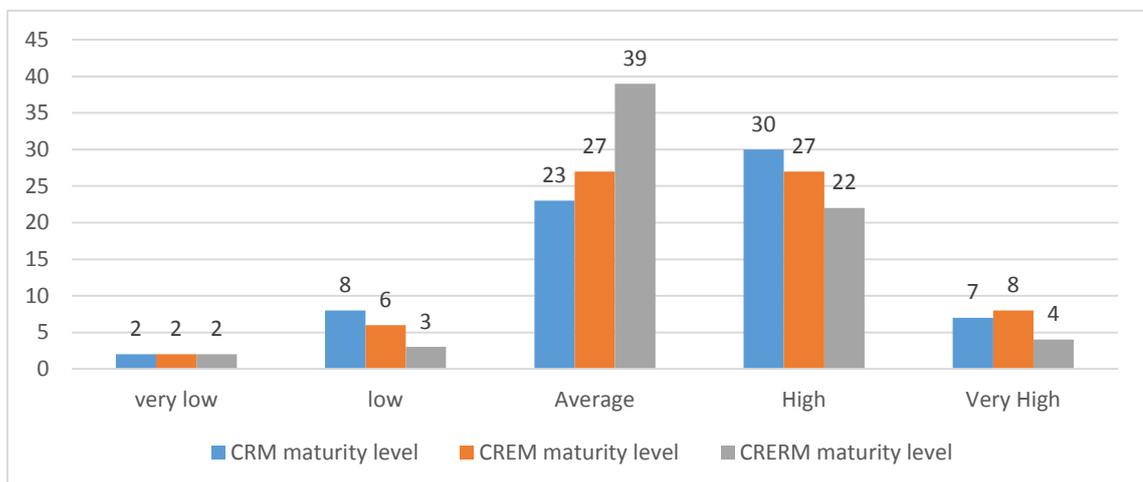


Figure 7.9: Maturity levels

The CREM and CRM maturity levels show a normal distribution that have the peak slightly to the right of the center. This indicates that most of the respondents value their maturity level of both CREM and corporate risk management as ‘high’. The remarkable thing about figure 7 is that the mean of the CRERM maturity level shifted from high to average. The only explanation for this is that a respondent who rated the maturity level of CREM or corporate risk management as ‘high’ rated the other as average or lower.

Figure 7.10 shows what percentage of the organizations have what phase of the CRERM process implemented. Most of the organizations (33 percent) have implemented all three phases of the CRERM processes, including risk identification, risk analysis and risk response. Yet 9 percent, which corresponds with six respondents, have not implemented any of the CRERM phases within the organization.

Risk identification or risk reduction are the most single mentioned phases (both 14 percent). Risk response is slightly less implemented with 8 respondents. A combination of only risk identification with risk analysis is implemented nine times. All other combinations combined are implemented at only 7 percent of the respondents’ organizations.

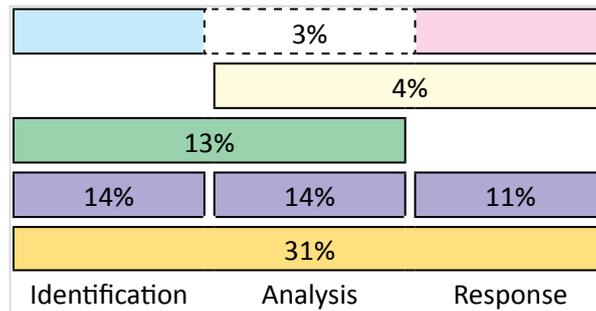


Figure 7.10: CRERM phases in place

Figure 7.11 shows the risk responses that are most used within organizations. The respondents were able to select multiple answers so the risk response is expressed in a percentage. The most common risk response, if an organization has implemented one, is risk reduction with 31 percent. Risk avoidance is the second most implemented risk response with 26 percent. Risk retention and risk transferring are risk responses mentioned by 20 percent of the respondents. Five respondents do not have any risk response at all.

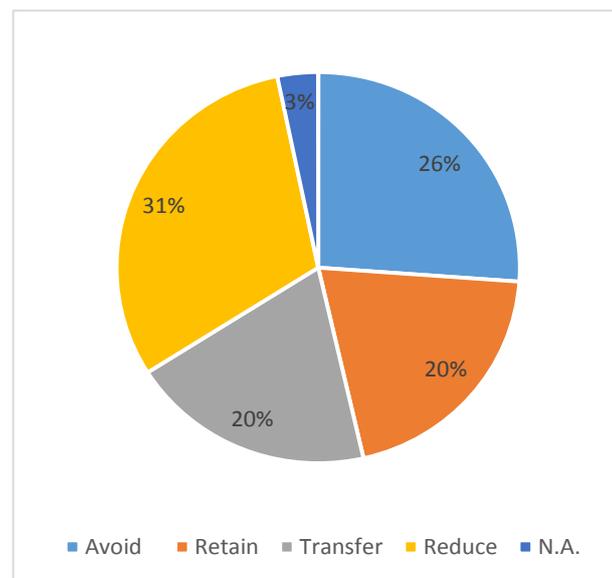


Figure 7.11: Risk responses

7.3 Conclusion

From the 8.150 CRE specialists who received the questionnaire 143 responded. 50 of them did not finish it and were excluded from the data set. After analysis, it turned out that from the remaining 93 questionnaires that were entirely filled in, five filled it in showing a clear pattern disqualifying them from the final data set suited for analysis. The final data set contains in total 88 respondents. The total response rate is 1,2 percent, which is low. Separately for CoreNet this means that they have realized a response rate of approximately 0,7 percent, while CREME and AT Osborne have a response rate close to 25 percent.

70 of the respondents are CRE end users and 16 are CRE consultants. The remaining two respondents are academics. Half of the respondents live in Europe of which almost all live in the Benelux.

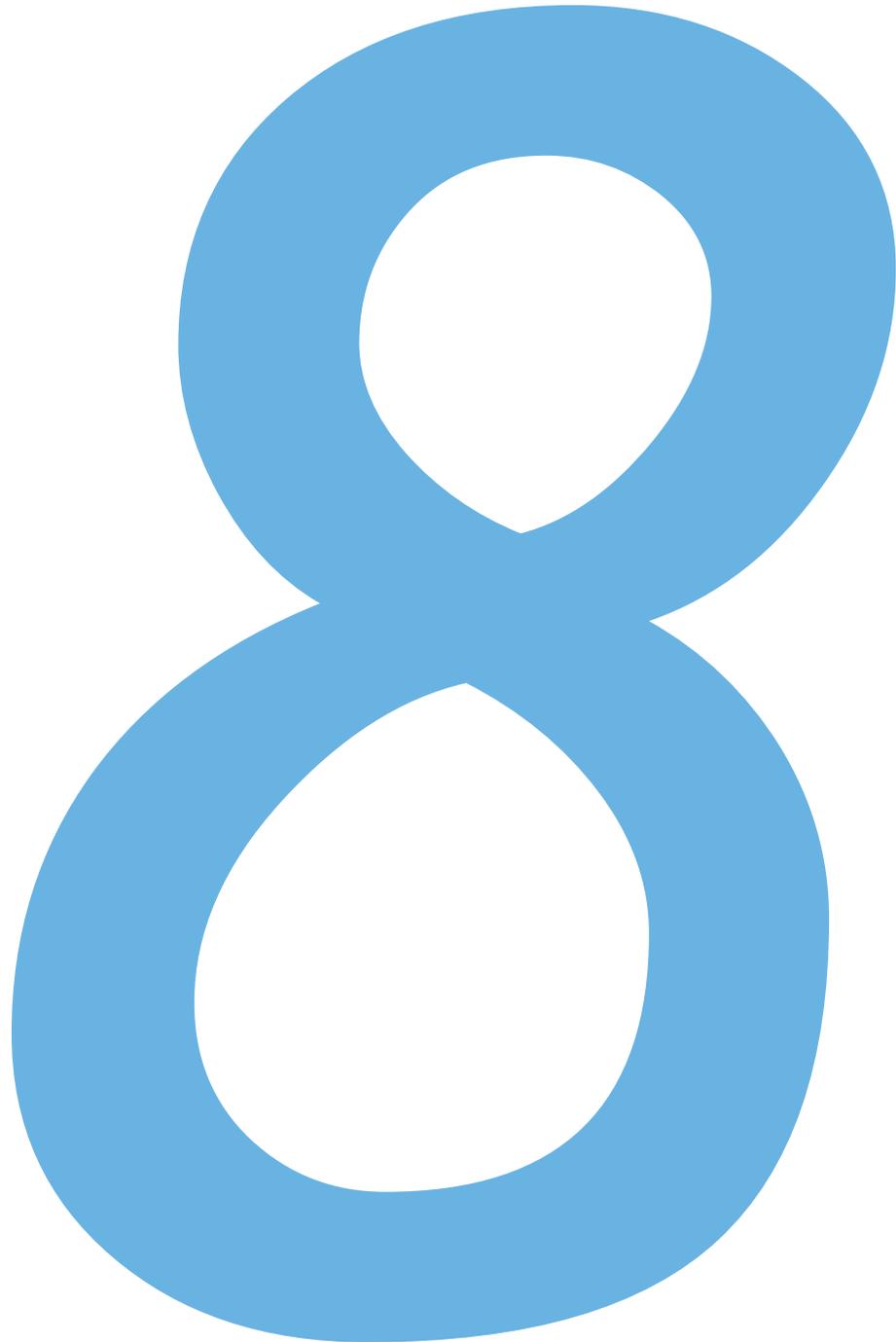
The industry that is best represented is real estate activities, which includes all CRE consultants. The most common company size is between 2.500 and 25.000 employees. Organizations rate their CREM and corporate risk management maturity level on average as ‘high’ but the derivative CRERM maturity level is ‘average’. The most common

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corporate risk response is reduction closely followed by avoidance. Before a risk response can take place, the CRERM process needs to be implemented. Most organizations have a risk identification process in place but still six organizations do not have any phase of the CRERM process implemented.

The data provides an insight in how the respondents are distributed over the independent variables, such as job information or company specific characteristics. This distribution provides the categories that are needed to answer the last research question: *“Which corporate real estate risks that may affect the added value of the CRE to the shareholder value of an organization are perceived as most important and how are these risks ranked according to job & company specific characteristics?”*

Chapter



Research results

The two previous chapters described the research approach and the data distribution. This chapter provides an answer to the question which CRE risks are most important related to company specific characteristics. First the ranking method is discussed followed by a risk list that includes all respondents not taking the job & company specific characteristics into account. In the following two sections the risks are ranked taking these characteristics into account. This chapter will end with a validation of the data and a conclusion. The following, and last, chapter is conclusions & recommendations.

8.1 Most important CRE risks

There are two aspects to take into consideration when ranking the risks. First the risks can be ranked according to likelihood or importance which are both expressed on a five point Likert scale. A combination of them both, the total risk score, is possible too. The second important thing besides the score is the data consistency expressed in the standard deviation. The standard deviation is an indication of the variation within the data set. A low standard deviation increases the representativeness which in turn stimulates the external validity.

Besides these descriptive analyses the differences in risk perception are analyzed. The analysis carried out identify significant differences in risk perception for certain job & company specific groups.

8.1.1 Descriptive analysis

The descriptive analysis of the research results focusses at the risk rank, based on the mean of the likelihood, impact and total risk score, and the standard deviation.

Risk rank

All respondents filled in the questionnaire and rated the risk by grading the impact and likelihood on a five point scale. Ranking the risk solely for the likelihood or the impact is done by taking the risk average over all respondents.

The risks can also be ranked based on their total score. As explained in section 6.4, risk is a function of the likelihood that the risk occurs and the impact of the risk when it occurs (COSO, 2012). In formula this would be:

$$\text{Risk} = \text{likelihood} * \text{impact}$$

Figure 8.1 shows the score range for the total risk score:

The total risk score can range between 1 (1x1) and 25 (5*5). The arithmetic mean will in this case have a score of 9 (3*3). This means that the scale is not linear but that the score increases exponentially. There are two aspects of which one has to be aware when working with an exponential scale.

First of all, the intervals between the risk scores are not equal. This indicates that the data collected by the five point Likert scale is at an ordinal level. As a result, the higher scores outweigh the lower scores. This is beneficial for the total score since a risk for which the likelihood and the impact is rated very high is exponentially more important than a risk which is ranked as 'high'.

The second aspect is that scores higher than nine, the arithmetic mean, occur less often than scores lower than the arithmetic mean, respectively 10 and 14 times. As a result the frequency of occurrence is lower than the arithmetic mean.

Concluding, the exponential scale makes risks that are ranked higher in the list exponentially more important and the data distribution is not likely to be normally distributed making non-parametric analysis preferable.

		Likelihood				
		1	2	3	4	5
Impact	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

Figure 8.1: Possible total risk scores

Standard deviation

As explained in section 6.5, the standard deviation measures the amount of variation within the data by calculating the dispersion from the average. Because of the exponential scales it is impossible to compare the standard deviation from the total risk score so instead the standard deviation of the risk likelihood and risk impact are analyzed separately.

If the standard deviation is 'high' than this means that there is no consensus between the respondents. This is not preferable because it is not beneficial for the representativeness of the data.

In general standard deviations are not 'good' or 'bad'. A standard deviation is an indicator how spread out the data is. There are no general borders indicating what a 'low' or 'high' standard deviation is. This is because it is a function of the mean and the number of respondents which for each data set are different. Besides, outliers (extremely low or extremely high numbers in the data set) disproportionately influence the standard deviation.

However, because of the large amount of data that needs to be analyzed, an indication of a 'low' and 'high' standard deviation has to be given. For this purpose Seth-Voss (2008) conducted research about standard deviations. He compared different standard deviations of researches that make use of a five-point Likert scale. He concluded:

"In practice, the standard deviation is typically well below the maximum. The sample standard deviation versus the sample mean for all items measured on 1-5 scales in a recent survey. The actual standard deviation averaged between 40% and 60% of the maximum variation" (Seth-Voss 2008).

Standard deviation		
Minimum	Maximum	indication
0	0,8	Low
0,8	1,2	Average
1,2	2	High

This enables a quick evaluation to determine if the variation is acceptable. Table 8.1 gives an indication of the range of the standard deviation. If the standard deviation is above 1,2 it does not directly mean that there is too much variation within the data set but a closer look is required.

Table 8.1: Standard deviation indication

8.1.2 Difference analysis

After ranking the risks it is interesting to see if the risk perception between groups is perceived significantly different. For this purpose several analyses are carried out. In section 6.4.2 it is explained that three analysis techniques have been used:

- Independent samples T-test
- Kruskal-Wallis test
- Mann-Whitney U-test

In the previous section it is explained that the data input (total risk score) is not normal distributed and on an ordinal level and therefore the suited tests are non-parametric statistic test. The independent samples t-test is a parametric test and is used to analyze the differences in risk perception according to job position and management level.

There are a couple of reasons why these two job characteristics are preferably analyzed with the independent samples t-test over the Mann-Whitney U-test:

- Both job characteristics consist of two independent groups.
- The data is for most risks normally distributed because there are more respondents per group.
- A Likert scale may be used as interval scale and parametric tests.

But the most important reason is that the non-parametric equivalent of the t-test, the Mann-Whitney U-test, is not suited for the data. This is because the sample sizes differentiate too much in size for comparison with the Mann-Whitney U-test. The difference in sample size makes the critical value so low that there is a significant difference for each risk. However this difference is not based on the difference in risk

perception but in deference of the amount of respondents per group.

8.2 Overall risk rank

In table 8.3 the risks are ranked not taking the job & company specific characteristics into account. It is a total overview including all respondents. Appendix 7 can be consulted for more information about the standard deviation. In table 8.2 the legend is provided which is used for all the remaining tables in this chapter (table 8.3 until 8.20).

legend
Development risks
Financial policy risks
Operational & business policy risks
Location risks
Appearance risks
External & regulation risks

Table 8.2: Legend tables 8.3 - 8.20

n=88			
Risk description	Likelihood mean	Impact mean	total score mean
Planning risk	2,93	3,24	10,17
Budget cut risk	2,98	3,18	9,89
Development budget risk	2,89	3,17	9,77
Tender risk	2,82	3,13	9,49
Occupancy rate risk	2,89	3,01	9,40
Real estate flexibility risk	2,83	3,07	9,27
Economy risk	2,65	3,20	8,94
Malfunctioning installation risk	2,57	3,31	8,85
Maintenance risk	2,73	3,02	8,76
Financing risk	2,48	3,09	8,72
Regulation risk	2,66	2,94	8,50
CRE budget risk	2,65	2,94	8,43
Technology advancement risk	2,72	2,88	8,43
Health and safety risk	2,33	3,41	8,38
Zoning plan risk	2,35	3,29	8,21
Facility management risk	2,53	2,90	7,95
preferred location risk	2,53	2,88	7,91
Maintenance risk (reputation)	2,48	2,84	7,80
Workspace risk	2,59	2,75	7,73
Uptime of production facility risk	2,34	2,97	7,67
Cost of capital risk	2,41	2,80	7,60
Nuisance risk	2,46	2,70	7,50
Contracts risk	2,45	2,76	7,34
Book value risk	2,53	2,53	7,32
Ground acquisition	2,28	2,83	7,19
Office layout risk	2,48	2,59	7,18
Relocation risk	2,36	2,81	7,16
Real estate data availability risk	2,38	2,57	6,86
Liquidity risk	2,17	2,73	6,85
Expansion profile risk	2,28	2,64	6,83
Property market risk	2,43	2,53	6,74
Stakeholder risk	2,31	2,66	6,73
Terrorism risk	1,91	3,45	6,69
Natural disaster risk	1,94	3,31	6,59
Real estate investment risk	2,31	2,53	6,48
Political and social unrest risk	2,03	3,00	6,44
Design risk	2,25	2,51	6,39
Solvability risk	2,08	2,61	6,18
Accessibility risk	2,11	2,67	6,16
supplier risk	2,11	2,52	6,02
Social unethical development risk	1,99	2,68	5,99
Temporary housing risk	2,24	2,40	5,99

Table 8.3: Risk scores overall

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There are two general remarks to be made about the overall risk score. First of all, all risks are ranked with a total score mean differentiating between 10,17 and 5,49. The risk which is ranked first has almost the double score of the risk which is ranked last, however the difference in risk perception is distributed in equal steps over the 43 risks. As a result there are no risks that stand out because of a risk score which is remarkable higher or lower compared to the risks prior or after this risk. This indicates that all outliers are evened out by the large number of respondents and the large diversity looking at job & company specific characteristics. This idea is confirmed when the standard deviation is evaluated. Almost all standard deviations are between 0,8 and 1,2 meaning that this is an average standard deviation for a five-point scale. The standard deviation is relatively low because outliers are evened out by the large number of respondents.

The second remark is that for all 43 risks the mean of the likelihood is lower than the mean of the impact. Apparently the respondents value the impact of a risk higher than the likelihood that the risk occurs.

Looking at the risks separately there are a couple of risks that stand out. Terrorism and natural disaster risk for example stand out because the likelihood and impact are ranked very different. The likelihood for these two risks is the lowest of all risks (1,91 and 1,94) while at the same time the impact is ranked the highest (3,45 and 3,31). Second three out of the top five risks are development risks. Planning, development budget and tender risks are ranked respectively at place one, three and four. This confirms the theory from Huffman (2004) that only corporations with the highest risk acceptance profiles engage in developing their own real estate because the risk exposure is very high.

Overall the conclusion can be made that all risks are graded average. Each outlier for likelihood, impact or standard deviation is evened out and spread over the large number of respondents. To distinguish significant differences in risk perception it is meaningful to separate the risks according to job & company specific characteristics. To determine if risk perception is related to one person or to a coherent group of individuals.

8.3 Job characteristics

For each job characteristic an overview of the risks is given. First the results will be described followed by an explanation of the risks that significantly differentiate. The risks will be ranked for job position, management level and geographical location. Appendix 7 can be consulted for more detailed information about the risks ranked for job characteristics.

8.3.1 Job position

The first job characteristic to look at is the job position. In section 7.3.1 the distinction between corporate real estate end users and corporate real estate consultants was made. Corporate real estate consultants frequently advice corporate end users about their real estate. It is interesting to compare these two job positions to see if the consultants have the same risk perception as the end users. In table 8.4 the risks are listed for CRE end users and CRE consultants together.

Risk description	CRE End Users n=70			CRE Service Providers n=16			Difference significant
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	P-value <0,05
Planning risk	2,90	3,21	9,94	2,94	3,31	10,44	
Budget cut risk	2,97	3,19	9,84	2,88	3,19	9,81	
Development budget risk	2,89	3,16	9,75	2,81	3,13	9,25	
Occupancy rate risk	2,90	3,01	9,57	2,75	3,06	8,75	
Real estate flexibility risk	2,87	3,03	9,37	2,63	3,13	8,50	
Regulation risk	2,77	3,07	9,17	2,19	2,31	5,56	*
Tender risk	2,73	3,13	9,13	3,13	3,13	10,63	
Malfunctioning installation risk	2,61	3,33	9,10	2,31	3,13	7,38	
Maintenance risk	2,77	3,06	9,01	2,44	2,69	6,75	*
Economy risk	2,61	3,17	8,77	2,81	3,25	9,56	
Technology advancement risk	2,77	2,94	8,73	2,44	2,50	6,69	
Health and safety risk	2,34	3,46	8,60	2,25	3,13	7,25	
Financing risk	2,34	3,03	8,30	2,88	3,25	9,69	
Workspace risk	2,70	2,81	8,19	2,06	2,50	5,63	*
CRE budget risk	2,63	2,84	8,14	2,63	3,19	8,75	
Facility management risk	2,54	2,87	8,03	2,38	2,88	6,88	
Maintenance risk (reputation)	2,49	2,87	7,86	2,38	2,69	7,25	
Zoning plan risk	2,32	3,13	7,79	2,31	3,75	8,81	
preferred location risk	2,50	2,83	7,71	2,56	2,94	8,00	
Office layout risk	2,56	2,66	7,63	2,13	2,31	5,31	*
Nuisance risk	2,46	2,71	7,62	2,40	2,47	6,27	
Uptime of production facility risk	2,33	2,89	7,53	2,44	3,13	8,19	
Book value risk	2,56	2,57	7,51	2,25	2,31	5,88	
Contracts risk	2,46	2,80	7,34	2,44	2,56	7,13	
Relocation risk	2,37	2,81	7,30	2,38	2,69	6,63	
Cost of capital risk	2,31	2,70	7,14	2,69	3,19	9,19	
Real estate data availability risk	2,44	2,59	7,03	2,06	2,31	5,75	
Ground acquisition	2,19	2,75	6,75	2,57	2,93	8,00	
Terrorism risk	1,93	3,47	6,67	1,75	3,19	6,06	
Political and social unrest risk	2,06	3,10	6,66	1,88	2,50	5,19	
Natural disaster risk	1,94	3,30	6,63	2,00	3,25	6,50	
Stakeholder risk	2,29	2,61	6,60	2,31	2,75	6,75	
Design risk	2,26	2,53	6,50	2,25	2,50	6,19	
Expansion profile risk	2,21	2,53	6,49	2,44	3,06	7,81	
Property market risk	2,37	2,49	6,46	2,56	2,75	7,75	
Accessibility risk	2,14	2,71	6,40	2,00	2,31	5,00	
Liquidity risk	2,07	2,61	6,34	2,50	3,06	8,31	
Real estate investment risk	2,23	2,47	6,13	2,50	2,88	7,94	
Supplier risk	2,11	2,53	6,13	2,06	2,44	5,31	
Temporary housing risk	2,23	2,45	6,04	2,00	1,92	4,08	*
Solvability risk	2,01	2,57	5,93	2,25	2,75	6,81	
Social unethical development risk	1,94	2,68	5,78	2,00	2,50	5,79	
Exchange rate risk	2,07	2,20	5,36	2,31	2,25	5,63	

Table 8.4: Risk scores job position

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Only for the end users the risks are ranked according to importance. The total risk score for the ten most important risks are bold in the table. The star behind the risk indicates that the risk perception between the groups is significantly (P-value <0,05) different. The colors correspond with the risk category to which the risk belongs.

A overview of the top ten most important risks for end users and consultants is given in table 8.5.

Rank	CRE End Users n=70	CRE Service Providers n=16
1	Planning risk	Tender risk
2	Budget cut risk	Planning risk
3	Development budget risk	Budget cut risk
4	Occupancy rate risk	Financing risk
5	Real estate flexibility risk	Economy risk
6	Regulation risk	Development budget risk
7	Tender risk	Cost of capital risk
8	Malfunctioning installation risk	Zoning plan risk
9	Maintenance risk	CRE budget risk
10	Economy risk	Occupancy rate risk

Table 8.5: Top ten job position

It is interesting to see that there are differences in risk perception in the top ten. End users value operational risks in general higher than consultants who in their turn value financial risks higher. However this difference is only significant for maintenance risk and office layout risk. This means that the risk perception for these two groups differentiates with a certainty of 95 percent. There is only one risk that stands out when analyzing the standard deviation. Financing risk has a high standard deviation for the end users. Likelihood and impact have standard deviations of respectively 1,22 and 1,34. This indicates that the respondents belonging to the end users are not consistent in the way they value financing risk.

There are in total five risks for which the risk perception significantly differentiates between the end users and the consultants. These five risks are:

- Regulation risk
- Temporary housing risk
- Maintenance risk
- Office layout risk
- Workspace risk

It is interesting to mention that all of these risks are significantly valued higher by the end user than by the consultants. There are risks that are valued higher by the consultants than by the end users (especially financial policy risks) but this difference in risk perception is not significant. Regulation risk is with a score difference of 3,61 the risk with the highest significance level. The end users place regulation risk at a 6th place while the consultants value it at a 38th place.

The last remark related to the job position of the respondent is pictured in table 8.6. This table shows that all risks are valued higher by the end users than by the consultants. The most important risk category according to the end users is operational & business policy risks while the most important risk category according to the consultant is financial policy risks. This makes sense as the CRE managers will probably look at their real estate from another view than the consultant. The corporate real estate is in the eyes of the CRE manager an asset that supports the operational activities of the organization. The CRE consultant will probably look at the same real estate from a merely financial perspective.

	End user	Consultants	Difference
Operational & business policy risks	8,34	7,25	1,09
Financial policy risks	7,29	8,1	-0,81
External & regulation risks	7,28	6,58	0,7
Appearance risks	7,18	6,72	0,46
Location risks	6,87	6,65	0,22
Development risks	7,93	7,86	0,07

Table 8.6: Risk scores per category

8.3.2 CRE Management level

The second job specific characteristic is the management level on which the respondent operates. The total overview of all risks scores is provided in table 8.7. The risks in table 8.7 are at strategic level ranked according to importance. The corresponding risks are for tactical and operational level ranked disorderly but correspond with the risks at strategic level. Just as in all other tables in this chapter the top ten risk scores are made bold and the colors are correspond with the risk category to which the risk belongs.

When analyzing table 8.7 it shows that the likelihood of the terrorism risk is valued way lower than the impact of the same risks. The mean scores are respectively 1,53 and 4,00 accounting for the lowest and highest means in this risk list.

When looking at the standard deviation of the risks there are two risks that stand out. First, financing risk has a high variation in risk perception according to the respondents who operate on tactical or operational level. The standard deviation is for both likelihood and impact above 1,2. Second, the standard deviation of solvability risk is for the likelihood very low with 0,62 while at the same time the standard deviation of the impact is very high with 1,46. This means that the respondents who operate on strategic or tactical level have the same risk perception that this risk materializes and yet do not show any consensus in the way they value the impact of solvability risk.

Table 8.8 shows the top ten of most important risks for the strategic and tactical & operational management level separately. The lists are pretty similar since seven of the top ten risks are mentioned on strategic as well as on tactical and operational management level. The only risk that stands out is maintenance risk which is ranked number one on tactical and operational level while it is not ranked in the top ten on strategic level (12th place). The difference in risk perception of maintenance is not significant with a P-value of 0,306.

Rank	Strategic n=53	Tactical & operational n=17
1	Planning risk	Maintenance risk
2	Budget cut risk	Real estate flexibility risk
3	Development budget risk	Malfunctioning installation risk
4	Tender risk	Occupancy rate risk
5	Occupancy rate risk	Planning risk
6	Economy risk	Budget cut risk
7	Regulation risk	Regulation risk
8	Real estate flexibility risk	Health and safety risk
9	Technology advancement risk	Facility management risk
10	Malfunctioning installation risk	Development budget risk

Table 8.8: Top ten management level

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Risk description	Strategic n=53			Tactical & operational n=17			Difference significant
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	P-value <0,05
Planning risk	2,94	3,22	10,24	2,76	3,18	9,06	
Budget cut risk	3,02	3,21	10,15	2,82	3,12	8,88	
Development budget risk	3,00	3,14	10,10	2,46	3,23	8,38	
Tender risk	2,82	3,24	9,63	2,47	2,73	7,47	
Occupancy rate risk	2,91	3,00	9,60	2,88	3,06	9,47	
Economy risk	2,68	3,21	9,30	2,41	3,06	7,12	
Regulation risk	2,81	3,06	9,26	2,65	3,12	8,88	
Real estate flexibility risk	2,87	2,94	9,21	2,88	3,29	9,88	
Technology advancement risk	2,83	2,94	8,98	2,59	2,94	7,94	
Malfunctioning installation risk	2,60	3,25	8,94	2,65	3,59	9,59	
Financing risk	2,45	3,16	8,88	2,00	2,60	6,40	
Maintenance risk	2,75	2,94	8,68	2,82	3,41	10,06	
Workspace risk	2,78	2,88	8,67	2,44	2,56	6,69	
Health and safety risk	2,38	3,42	8,55	2,24	3,59	8,76	
CRE budget risk	2,68	2,87	8,43	2,47	2,76	7,24	
Maintenance risk (reputation)	2,58	2,91	8,17	2,18	2,76	6,88	
Book value risk	2,64	2,64	8,04	2,29	2,35	5,88	
Office layout risk	2,64	2,68	8,00	2,29	2,59	6,47	
Facility management risk	2,53	2,83	7,87	2,59	3,00	8,53	
Zoning plan risk	2,32	3,06	7,79	2,33	3,33	7,80	
Preferred location risk	2,53	2,81	7,75	2,41	2,88	7,59	
Nuisance risk	2,46	2,71	7,65	2,47	2,73	7,53	
Uptime of production facility risk	2,34	2,89	7,60	2,29	2,88	7,29	
Contracts risk	2,55	2,79	7,60	2,18	2,82	6,53	
Real estate data availability risk	2,55	2,66	7,55	2,12	2,35	5,41	
Relocation risk	2,38	2,77	7,28	2,35	2,94	7,35	
Cost of capital risk	2,34	2,66	7,23	2,24	2,82	6,88	
Design risk	2,38	2,66	7,13	1,88	2,12	4,53	*
Property market risk	2,49	2,57	7,06	2,00	2,24	4,59	*
Natural disaster risk	2,08	3,17	7,00	1,53	3,71	5,47	
Liquidity risk	2,19	2,66	6,96	1,71	2,47	4,41	*
Political and social unrest risk	2,15	3,08	6,96	1,76	3,18	5,71	
Terrorism risk	2,06	3,30	6,91	1,53	4,00	5,94	
Expansion profile risk	2,30	2,58	6,89	1,94	2,35	5,24	
Stakeholder risk	2,36	2,58	6,81	2,06	2,71	5,94	
Ground acquisition	2,22	2,73	6,80	2,07	2,79	6,57	
Accessibility risk	2,21	2,75	6,74	1,94	2,59	5,35	
Real estate investment risk	2,34	2,57	6,66	1,88	2,18	4,47	*
Solvability risk	2,19	2,60	6,60	1,47	2,47	3,82	*
Supplier risk	2,15	2,57	6,40	2,00	2,41	5,29	
Temporary housing risk	2,20	2,42	5,87	2,36	2,55	6,73	
Social unethical development risk	1,94	2,66	5,84	1,92	2,77	5,54	
Exchange rate risk	2,15	2,25	5,75	1,82	2,06	4,12	

Table 8.7: Risk scores management level

When analyzing the differences in risk perception there are five risks that are perceived significantly different on strategic level than on tactical and operational management level. These risks are:

- Solvability risk
- Property market risk
- Design risk
- Real estate investment risk
- Liquidity risk

All five risks are perceived significantly higher on strategic management level than on tactical and operational management level. It is noticeable that three out of these five risks are financial policy risks. This may indicate that financial policy risks are in general perceived higher on strategic management level than on tactical and operational management level. This theory is confirmed when all risks in the financial policy risk category are compared. All risks within this category are perceived higher on strategic management level than on tactical and operational management level. An explanation for this phenomenon can be that managers who operate on strategic management level are more steering on financial KPI's such as solvability and liquidity of the organization while respondents operating on tactical and operational level focus more on risks that are likely to occur on a daily basis.

The risks where respondents on tactical and operational management level focus on are operational & business policy risks. Six out of the eight risks that are perceived higher on tactical and operational management level than on strategic management level belong to the operational & business policy risks category. Table 8.9 shows the risks that are perceived higher on tactical and operational management level than on strategic management level.

Rank	Risk name	Difference
1	Zoning plan risk	-0,01
2	Relocation risk	-0,07
3	Health and safety risk	-0,22
4	Malfunctioning installation risk	-0,64
5	Facility management risk	-0,66
6	Real estate flexibility risk	-0,67
7	Temporary housing risk	-0,86
8	Maintenance risk	-1,38

Table 8.9: Top eight negative differences management level

8.3.3 Geographical location

The last job specific characteristic to analyze is how the risks are perceived according to the geographic location of the respondents. The geographical location is a job characteristic and not a company characteristic because a company can have CRE at multiple locations while a CRE specialist can only be present at one location, the continent where the specialist lives. Table 8.10 shows the total overview of all CRE risks ranked according to geographical location.

Risk description	Europe n=36			North America n=26			Asia & Oceania n=8			Difference significant P-value <0,05
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	
Occupancy rate risk	3,19	3,19	11,33	2,65	2,88	8,04	2,38	2,63	6,63	
Maintenance risk	3,06	3,28	10,42	2,38	2,65	6,81	2,75	3,38	9,88	*
Malfunctioning installation risk	2,81	3,47	10,11	2,12	2,96	6,35	3,38	3,88	13,50	*
Planning risk	2,97	3,18	10,03	2,62	3,12	8,85	3,50	3,63	13,13	*
Budget cut risk	3,00	3,19	9,92	2,81	3,12	9,23	3,38	3,38	11,50	
Tender risk	2,74	3,32	9,68	2,61	2,70	7,57	3,14	3,57	11,57	*
Real estate flexibility risk	2,83	3,03	9,64	2,85	3,00	8,92	3,13	3,13	9,63	
Development budget risk	2,87	3,10	9,43	2,88	3,08	9,65	3,00	3,63	11,25	
Regulation risk	2,81	2,97	9,17	2,73	3,15	9,19	2,75	3,25	9,13	
Zoning plan risk	2,45	3,45	8,97	2,04	2,70	5,91	2,67	3,00	8,50	
Nuisance risk	2,69	2,97	8,91	2,08	2,38	5,58	2,71	2,71	8,71	
Health and safety risk	2,39	3,50	8,75	2,15	3,42	7,88	2,75	3,38	10,25	
Financing risk	2,36	3,12	8,73	2,13	2,83	7,00	3,00	3,29	10,71	
Economy risk	2,50	3,06	8,31	2,73	3,35	9,42	2,75	3,13	8,75	
Book value risk	2,67	2,67	8,25	2,54	2,58	7,31	2,13	2,13	4,88	
Office layout risk	2,58	2,67	7,94	2,50	2,69	7,35	2,63	2,50	7,13	
Technology advancement risk	2,69	2,67	7,94	2,92	3,27	9,96	2,63	3,13	8,25	
Facility management risk	2,56	2,72	7,58	2,42	2,88	7,69	2,88	3,50	11,13	
Maintenance risk (reputation)	2,50	2,75	7,58	2,38	2,92	7,73	2,75	3,25	9,50	
Workspace risk	2,70	2,58	7,48	2,69	2,96	8,58	2,75	3,25	9,88	
CRE budget risk	2,53	2,67	7,28	2,69	3,04	8,92	2,88	3,00	9,50	
Uptime of production facility risk	2,22	2,72	7,03	2,23	2,92	7,12	3,13	3,50	11,13	
Real estate data availability risk	2,39	2,61	7,00	2,58	2,62	7,38	2,25	2,38	6,00	
Cost of capital risk	2,22	2,75	6,97	2,35	2,58	6,77	2,63	2,88	9,13	
Preferred location risk	2,42	2,53	6,97	2,54	3,08	8,19	2,75	3,38	9,50	
Ground acquisition	2,13	2,74	6,94	2,14	2,59	5,82	2,67	3,33	9,17	
Real estate investment risk	2,33	2,67	6,81	2,15	2,35	5,73	2,00	2,00	4,38	
Accessibility risk	2,17	2,83	6,75	2,04	2,58	5,65	2,38	2,63	7,25	
Temporary housing risk	2,36	2,64	6,67	2,00	2,16	5,00	2,25	2,25	5,75	
Political and social unrest risk	2,00	3,08	6,58	2,04	3,12	6,46	2,38	3,13	7,63	
Contracts risk	2,28	2,69	6,58	2,62	2,88	8,15	2,75	3,00	8,13	
Liquidity risk	2,03	2,75	6,56	2,00	2,46	5,81	2,50	2,50	7,13	
Relocation risk	2,17	2,56	6,33	2,46	3,04	7,92	3,00	3,25	9,63	*
Solvability risk	1,94	2,69	6,19	2,15	2,54	5,88	1,88	2,13	4,88	
Design risk	2,19	2,42	6,08	2,35	2,73	7,31	2,25	2,38	5,75	
Social unethical development risk	2,03	2,77	6,00	1,64	2,56	4,80	2,50	2,75	8,00	
Expansion profile risk	1,97	2,36	5,78	2,50	2,81	7,50	2,38	2,38	6,38	
Property market risk	2,14	2,33	5,75	2,62	2,62	7,12	2,63	2,75	7,50	
Stakeholder risk	2,08	2,44	5,67	2,38	2,69	7,00	2,88	3,13	9,50	*
Terrorism risk	1,64	3,42	5,61	2,12	3,54	7,38	2,63	3,50	9,13	*
Natural disaster risk	1,53	3,14	4,86	2,46	3,62	9,00	2,13	3,00	6,88	*
supplier risk	1,83	2,22	4,58	2,27	2,81	7,08	2,88	3,00	10,00	*
Exchange rate risk	1,67	1,75	3,58	2,54	2,65	7,38	2,38	2,75	6,75	*

Table 8.10: Risk scores geographical location

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There is one thing in particular which is interesting to discuss when analyzing the risks ranked according to geographical location. In general the differences in risk perceptions based on geographical location are large. Terrorism risk is one of those risks. In Europe this risk is ranked at the 40th place while in North America the same risk is ranked 20 places higher at the 20th place. The second risk is natural disaster risk. This risk is ranked at a 41st place by the European respondents and at 6th place according to the North American CRE managers. However this is not even the biggest difference. Malfunctioning installation risk is ranked at place 1 with a score of 13,50 in Asia and Oceania while this risk is graded over seven points lower on place 34 by the North American respondents. All three above mentioned risks are significantly perceived differently.

Table 8.11 shows the top ten of the most important risks for respectively Europe, North America and Asia.

Rank	Europe n=36	North America n=26	Asia & Oceania n=8
1	Occupancy rate risk	Technology advancement risk	Malfunctioning installation risk
2	Maintenance risk	Development budget risk	Planning risk
3	Malfunctioning installation risk	Economy risk	Tender risk
4	Planning risk	Budget cut risk	Budget cut risk
5	Budget cut risk	Regulation risk	Development budget risk
6	Tender risk	Natural disaster risk	Facility management risk
7	Real estate flexibility risk	CRE budget risk	Uptime of production facility risk
8	Development budget risk	Real estate flexibility risk	Financing risk
9	Regulation risk	Planning risk	Health and safety risk
10	Zoning plan risk	Workspace risk	Supplier risk

Table 8.11: Top ten geographical location

The top ten based on the geographical location of the respondents differentiates a lot. Only budget cut risk and planning risk are risks that appear in the top ten of Europe, North America and Asia and Oceania together. North America is in comparison the geographical location that stands out by having 4 external & regulation risks in the top ten while Europe has one, namely regulation risk and Asia & Oceania has none.

Analyzing if the risks are perceived significantly different by respondents living on different continents is done by means of the Kruskal-Wallis test. The independent samples t-test which was used for analyzing previous two job characteristics is not applicable for geographical location because there are more than three groups that are compared. The Kruskal-Wallis analysis identifies ten risks that are perceived significantly different. These risks are in order from most significant to least significantly:

- Malfunctioning installation risk
- Natural disaster risk
- Exchange rate risk
- Planning risk
- Maintenance risk
- Stakeholder risk
- Terrorism risk
- Tender risk
- Relocation risk
- Supplier risk

The downside of the Kruskal-Wallis test is that it only indicates that at least two risk groups significantly differentiate but it does not identify which groups that are.

For this purpose Mann-Whitney U-tests are conducted to determine which risk cause the significance identified by the Kruskal-Wallis test. The results of the Mann-Whitney U-test are provided in table 8.12.

Risk	Continent	Europe	North-America	Asia
Tender risk	Asia		*	
Maintenance risk	North-America	*		*
Malfunctioning installation risk	North-America	*		*
Stakeholder risk	Asia	*		
Natural disaster risk	North-America	*		
Exchange rate risk	Europe		*	*

Table 8.12: Significant risks geographical location

If a risk is perceived significantly different on two continents than this is identified with a star. Malfunctioning installation risk for example is perceived different in North America compared to Europe and North America compared to Asia & Oceania. There is no significant difference between Europe and Asia & Oceania for malfunctioning installation risk. It turns out that planning risk, relocation risk, supplier and terrorism risk are not identified as risks which are perceived significantly different using the Mann-Whitney U-test. However they are identified as significantly different by the Kruskal-Wallis test. This is a result of changes in the mathematical calculation used to determine whether the risk is significant or not. The Mann-Whitney U-test and the Kruskal-Wallis test use an average ranking to determine if risks significantly differentiate. This average ranking changes when the number of compared continents changes.

8.4 Company characteristics

The risk perception may not only differentiate according to the job characteristics but also for company specific characteristics. In this section the risks are ranked according to the company industry, the company size and the real estate ownership type.

8.4.1 Company industry

The first company specific characteristic to look at is the industry in which the organization operates. Respondents were asked to select the industry according to ISIC code. There are eight industries that have at least eight respondents:

- Manufacturing
- Information & communication
- Financial and insurance activities
- Real estate activities
- Professional, scientific and technical activities
- Public administration and defense
- Education
- Human health and social work activities

Table 8.13 shows for each industry the likelihood, impact, and total risk score. The industry real estate activities include all real estate consultants.

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Risk description	Manufacturing n=8			Information & communication n=12			Financial and insurance activities n=8			Real estate activities n=18			Professional, scientific and technical activities n=8			Public administration and defense n=9			Education n=13			Human health and social work activities n=8			Difference significant P-value <0,05
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	
Real estate flexibility risk	3,25	3,13	11,00	2,63	3,25	8,08	2,63	3,13	8,50	2,54	3,11	8,72	2,38	2,38	6,25	3,33	3,11	10,89	3,08	3,31	11,00	3,00	3,25	10,63	
Occupancy rate risk	2,88	3,38	11,00	2,75	2,58	6,33	2,75	3,25	8,88	2,69	3,06	9,22	2,50	2,63	7,75	3,33	2,89	10,33	3,31	3,31	11,62	3,13	3,38	11,00	
Relocation risk	2,75	3,88	10,88	2,50	2,75	6,83	2,50	3,00	8,00	2,42	2,67	6,61	2,63	2,63	7,38	2,33	2,67	6,33	2,38	3,15	8,15	1,75	1,75	3,50	
Budget cut risk	3,00	3,38	10,50	2,75	2,75	6,75	2,75	2,88	8,13	2,81	3,22	9,50	2,88	3,13	10,00	4,00	3,78	15,22	3,08	3,38	10,85	3,00	3,25	9,75	*
Economy risk	2,50	3,88	10,00	3,13	2,92	6,08	3,13	3,25	10,38	3,08	3,17	9,56	3,50	4,00	13,75	2,33	2,56	7,11	2,23	3,23	7,92	2,88	3,00	9,13	*
Natural disaster risk	2,50	3,75	9,63	2,25	3,08	6,25	2,25	3,88	8,88	2,23	3,28	6,28	2,88	3,63	10,38	1,67	3,11	5,00	1,46	3,15	4,62	1,38	2,25	3,50	*
Book value risk	2,88	2,88	9,25	2,50	2,17	4,75	2,50	2,50	7,00	2,31	2,33	5,94	2,50	2,63	7,38	3,00	2,67	8,89	2,85	2,69	8,85	3,00	3,25	10,63	
Exchange rate risk	2,63	3,13	9,13	2,25	2,67	6,58	2,25	2,63	6,25	2,38	2,11	5,11	2,88	3,00	8,75	1,89	1,78	4,11	1,92	1,92	4,69	1,13	1,25	1,50	*
Regulation risk	2,75	3,00	9,00	2,75	2,92	7,83	2,75	3,25	9,00	2,35	2,28	5,17	3,00	3,38	10,88	2,78	2,89	8,33	2,62	3,08	8,15	3,75	3,75	15,25	
Office layout risk	2,50	3,38	8,88	2,63	2,33	5,42	2,63	2,63	7,38	2,35	2,28	5,11	3,00	2,88	9,13	2,67	2,67	8,00	2,85	2,92	9,23	2,38	2,00	5,88	
Planning risk	2,50	3,13	8,38	3,25	3,25	9,33	3,25	3,50	11,63	2,77	3,22	10,22	2,50	3,25	9,50	3,33	3,22	10,89	3,23	3,15	11,00	3,13	3,25	10,63	
CRE budget risk	2,63	2,88	8,38	2,25	2,67	6,42	2,25	2,63	6,25	2,73	3,17	8,67	3,13	3,25	11,38	3,00	3,00	9,89	3,00	3,23	10,31	2,50	2,88	7,25	
Ground acquisition	2,29	3,14	8,29	2,43	2,89	6,44	2,43	2,43	6,57	2,39	2,88	8,06	2,00	2,71	6,00	2,00	3,00	6,13	2,18	2,64	7,09	2,50	2,88	8,38	
Technology advancement risk	2,50	3,13	8,25	2,63	2,83	8,42	2,63	3,00	8,13	2,62	2,44	6,33	3,25	3,50	11,63	3,00	2,89	8,78	2,85	2,77	9,08	2,63	2,75	8,13	
Stakeholder risk	2,25	3,13	7,88	2,38	2,42	5,92	2,38	3,25	7,75	2,50	2,67	6,39	3,13	2,63	8,75	2,56	2,67	8,00	2,38	2,54	6,85	1,88	2,38	4,13	
Zoning plan risk	2,29	3,14	7,86	2,13	2,70	4,70	2,13	2,75	6,13	2,32	3,67	9,28	2,14	2,43	5,86	2,25	3,50	8,00	2,83	3,50	10,50	2,88	4,13	11,63	
Tender risk	2,50	2,88	7,63	2,75	2,80	7,60	2,75	2,63	7,63	3,00	3,06	10,39	2,86	3,43	10,00	2,44	3,67	9,67	3,46	3,54	12,77	2,43	3,00	7,86	
Development budget risk	2,63	2,63	7,63	2,75	3,30	9,10	2,75	3,00	9,00	2,85	3,06	8,94	3,13	3,63	11,75	3,11	3,33	10,44	3,18	3,55	11,73	3,25	3,13	11,13	
Contracts risk	2,63	2,75	7,63	2,63	2,67	6,08	2,63	2,88	7,75	2,54	2,56	6,83	3,00	3,38	10,88	3,00	3,56	11,00	2,08	2,54	5,92	2,38	2,63	6,38	
Malfunctioning installation risk	2,38	3,13	7,38	2,63	2,83	6,42	2,63	3,88	10,13	2,35	3,11	7,72	2,38	2,63	7,13	3,00	3,67	11,11	2,92	3,69	11,00	2,50	3,63	9,25	
Workspace risk	2,38	2,88	7,25	3,50	2,67	7,00	3,50	3,13	11,25	2,27	2,44	5,39	2,88	3,50	10,25	3,11	3,11	9,67	3,00	2,83	9,25	2,25	2,00	4,75	*
Maintenance risk	2,50	2,88	7,25	2,75	2,83	6,83	2,75	3,00	8,25	2,38	2,72	6,89	2,38	2,38	6,13	3,33	3,44	11,67	3,08	3,62	11,54	3,25	3,38	12,00	*
Health and safety risk	2,13	3,25	7,25	2,38	2,83	5,67	2,38	3,63	8,63	2,46	3,11	7,61	2,88	3,75	11,25	2,78	4,56	12,67	2,46	3,15	7,85	2,38	3,50	9,25	*
Uptime of production facility risk	2,38	3,00	7,25	2,38	2,83	6,67	2,38	3,00	7,63	2,54	3,17	8,89	2,50	2,75	8,50	2,22	2,56	6,44	2,31	3,15	7,77	2,38	3,13	8,50	
Supplier risk	2,25	2,88	7,25	2,25	2,25	5,25	2,25	3,00	7,25	2,31	2,44	5,44	2,88	2,88	9,88	1,89	2,33	4,78	2,23	2,62	6,15	1,88	2,00	4,25	
Preferred location risk	2,25	2,75	6,63	2,63	2,92	6,58	2,63	2,88	8,00	2,73	3,00	8,44	3,00	3,38	10,75	2,78	2,78	7,78	2,46	2,92	8,62	2,75	2,88	8,63	
Facility management risk	2,13	2,88	6,25	3,25	2,50	6,42	3,25	3,63	12,00	2,31	2,89	7,00	2,25	2,38	6,38	3,22	3,33	11,00	2,54	3,08	8,85	2,63	2,88	8,13	
Expansion profile risk	1,88	2,88	6,13	2,38	2,42	5,08	2,38	2,50	6,50	2,62	3,00	7,67	3,13	3,13	10,25	1,78	1,89	3,89	2,85	2,92	9,85	1,88	2,00	4,75	
Maintenance risk (reputation)	1,88	2,75	6,13	2,63	2,33	5,67	2,63	3,00	8,38	2,38	2,67	6,94	2,63	3,00	8,38	2,89	3,00	9,33	2,92	3,00	9,23	2,75	3,50	10,38	
Property market risk	2,25	2,63	6,13	3,00	2,42	5,50	3,00	2,63	8,13	2,58	2,72	7,61	2,75	2,75	7,88	2,56	2,44	7,00	2,38	2,54	7,23	2,00	2,25	4,88	
Real estate data availability risk	2,13	2,50	6,00	2,75	2,08	4,08	2,75	2,63	7,75	2,27	2,28	5,50	2,88	2,63	7,75	3,22	3,22	10,78	2,54	3,00	8,23	2,50	2,50	7,63	*
Accessibility risk	1,88	3,00	5,63	1,88	2,58	6,33	1,88	2,50	5,13	2,15	2,33	5,00	2,50	2,75	7,88	2,11	2,44	5,56	2,38	3,15	7,62	2,25	2,88	7,75	
Terrorism risk	1,63	3,50	5,63	2,25	3,42	6,67	2,25	4,00	8,63	1,85	3,22	5,89	2,13	3,25	7,00	2,67	3,89	10,33	2,00	3,85	7,62	1,13	2,00	2,25	*
Design risk	1,75	2,50	5,50	2,50	2,00	4,17	2,50	2,38	6,75	2,27	2,44	5,89	2,50	3,00	8,50	2,67	2,89	8,44	2,38	2,77	7,00	2,38	2,50	6,50	
Liquidity risk	1,88	2,25	5,00	2,00	2,42	5,25	2,00	2,63	5,88	2,38	3,00	7,67	2,50	2,75	8,38	1,67	2,33	4,78	2,38	3,23	8,69	2,88	3,38	10,75	
Cost of capital risk	2,13	2,13	5,00	2,00	2,42	5,92	2,00	2,63	5,88	2,77	3,17	9,06	3,13	3,50	12,00	2,00	2,11	5,11	2,69	3,08	9,08	2,63	3,63	9,88	
Political and social unrest risk	1,75	2,88	5,00	2,25	2,92	6,08	2,25	3,88	8,50	2,04	2,50	5,50	2,13	3,13	6,50	2,78	3,22	10,11	1,92	3,31	6,62	1,75	2,50	5,13	
Social unethical development risk	1,71	2,57	4,86	2,25	2,55	6,00	2,25	2,63	6,75	1,88	2,50	5,63	1,75	2,00	4,38	1,89	3,22	6,67	2,60	3,30	8,50	1,63	2,50	4,38	
Real estate investment risk	2,00	2,13	4,75	2,00	2,08	4,42	2,00	2,38	5,00	2,31	2,78	7,28	2,25	2,63	6,75	2,56	2,78	7,67	2,85	2,62	8,08	2,63	3,25	8,75	*
Solvability risk	1,88	2,13	4,63	1,88	2,17	4,08	1,88	2,63	5,63	2,27	2,83	6,67	2,38	2,63	7,25	1,44	2,33	3,67	2,38	2,92	8,00	2,75	3,25	10,00	
Financing risk	1,43	2,29	3,71	2,25	2,91	7,45	2,25	2,75	7,25	2,81	3,22	10,06	2,63	3,50	10,00	2,00	3,00	7,29	2,38	2,77	8,38	3,38	4,38	14,75	*
Temporary housing risk	1,60	2,00	3,60	2,43	2,44	5,00	2,43	2,14	6,14	2,05	2,00	4,71	2,00	2,29	5,43	2,29	2,29	5,71	2,85	3,00	9,08	2,43	2,86	7,00	
Nuisance risk	1,29	1,86	2,57	2,50	2,75	7,50	2,50	2,75	7,50	2,36	2,38	5,94	2,50	2,67	7,17	3,00	3,33	10,33	3,08	3,38	11,69	2,43	2,29	6,14	*

Table 8.13: Risk scores company industry

Rank	Manufacturing n=8	Information & communication n=12	Financial and insurance activities n=8	Real estate activities n=18	Professional, scientific and technical activities n=8	Public administration and defense n=9	Education n=13	Human health and social work activities n=8
1	Real estate flexibility risk	Planning risk	Facility management risk	Tender risk	Economy risk	Budget cut risk	Tender risk	Regulation risk
2	Occupancy rate risk	Development budget risk	Planning risk	Planning risk	Cost of capital risk	Health and safety risk	Development budget risk	Financing risk
3	Relocation risk	Technology advancement risk	Workspace risk	Financing risk	Development budget risk	Maintenance risk	Nuisance risk	Maintenance risk
4	Budget cut risk	Real estate flexibility risk	Economy risk	Economy risk	Technology advancement risk	Malfunctioning installation risk	Occupancy rate risk	Zoning plan risk
5	Economy risk	Regulation risk	Malfunctioning installation risk	Budget cut risk	CRE budget risk	Contracts risk	Maintenance risk	Development budget risk
6	Natural disaster risk	Tender risk	Development budget risk	Zoning plan risk	Health and safety risk	Facility management risk	Malfunctioning installation risk	Occupancy rate risk
7	Book value risk	Nuisance risk	Regulation risk	Occupancy rate risk	Contracts risk	Planning risk	Planning risk	Liquidity risk
8	Exchange rate risk	Financing risk	Occupancy rate risk	Cost of capital risk	Regulation risk	Real estate flexibility risk	Real estate flexibility risk	Planning risk
9	Regulation risk	Workspace risk	Natural disaster risk	Development budget risk	Preferred location risk	Real estate data availability risk	Budget cut risk	Real estate flexibility risk
10	Office layout risk	Maintenance risk	Terrorism risk	Uptime of production facility risk	Natural disaster risk	Development budget risk	Zoning plan risk	Book value risk

Table 8.14: Top ten company industry

Risk	Industry	Manufacturing	Information & communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical activities	Public administration and defense	Education	Human health and social work activities
Financing risk	Manufacturing			*	*				*
Nuisance risk	manufacturing		*				*	*	
	Real estate activities							*	
Workspace risk	Human health and social work activities		*		*	*			
	Real estate activities		*		*	*			
Budget cut risk	Information & communication						*		
Real estate investment risk	Information & communication							*	
Maintenance risk	Education	*		*	*				
	Public administration and defense	*		*	*				
Health and safety risk	Information & communication					*	*		
	Manufacturing						*		
Natural disaster risk	Human health and social work activities	*	*		*				
	Education	*	*		*				
	Public administration and defense	*			*				
Terrorism risk	Human health and social work activities	*	*		*	*	*	*	
	Public administration and defense	*		*					
Economy risk	Professional, scientific and technical activities	*		*		*	*	*	*
Exchange rate risk	Human health and social work activities	*	*	*	*	*			
Real estate data availability risk	Public administration and defense	*							

Table 8.15: Significant risks company industry

A couple of things stand out while analyzing the risk scores. Within the manufacturing industry it is remarkable that nuisance risk scores extremely low. The mean of the likelihood is 1,29 and the mean of the impact is 1,86 giving it a total score of only 2,57. Besides the score the variation of the likelihood is extremely low. Six respondents rated the likelihood as “very low” and two as “low”. Within the human and social work activities industry there are a couple of risks that stand out. The zoning plan risk and the financing risk are with an mean of respectively 4,13 and 4,38 valued very high. All respondents valued these risks as ‘high’ or ‘very high’. The exchange rate risk on the other hand has a total risk score of only 1,5 which is the lowest total risk score in the entire data set. The likelihood and the impact of this risk are valued as ‘low’ or ‘very low’.

The respondents employed in the professional, scientific and technical activities industry do not show much consistency in the valuation concerning the impact. 25 out of the 43 risks have a standard deviation for the impact around 1,20 or higher. On the other hand the likelihood of these risks shows less variance.

Within the public administration and defense industry there is only one risk popping out, the social unethical development risk. The dispersion from the mean is very low for the likelihood with 0,78 but for the impact it is very high with 1,57.

In table 8.14 all the top ten risk scores for each industry are displayed. There are two number one risks that are worth mentioning.

The risk which is graded the highest within the public administration and defense industry is the budget cut risk. Henk Koster working for the ministry of defense mentioned during the interviews that this was one of their most important risks. This might be a result of the financial crisis. The governmental budget deficit might not be higher than 3 percent resulting in cost reductions. These cost reductions directly influenced the budgets of the ministries and therefore influence the CRE budget.

The second risk is the regulation risk which is ranked number one in the human health and social work activities industry. Taking a closer look at the respondents in this industry it turns out that seven out of the eight respondents live in The Netherlands. Dutch healthcare regulations are changing a lot recently. Healthcare and health insurances are being privatized changing the real estate demand of health and care institutions.

When conducting the difference analysis it turns out that budget cut is perceived significantly different by the respondents of at least two industries. Regulation risk has a P-value of 0.066 and is therefore not perceived significantly different. The risks that are perceived significantly different are:

- Financing risk
- Nuisance risk
- Workspace risk
- Budget cut risk
- Real estate investment risk
- Maintenance risk
- Health and safety risk
- Natural disaster risk
- Terrorism risk
- Economy risk
- Exchange rate risk
- Real estate data availability risk

A closer analysis of these risks is given in table 8.15. This table contains the results of all Mann-Whitney U-tests that have been done to determine which industries exactly perceive the risks significantly different.

It turns out that some risks are perceived significantly different by two industries, for example budget cut risk, while for other risks the risk perception differentiates between up to eight industries (natural disaster risk).

Especially the risks belonging to the external & regulation risks category catch the eye. Half of the risks in this category are perceived significantly different. Some of these risks such as terrorism risk show that there is one risk that causes most of the significance. Respondents working in the human health and social work industry value terrorism risk significantly different than respondents working in the information & communication, financial & insurance activities, real estate activities, professional scientific & technical activities, public administration & defense and education.

The second thing that stands out is that respondents working in the professional scientific & technical activities industry value 8 risks significantly different than respondents belonging to another industry.

8.4.2 Company ownership type

The second company specific characteristic to look at is the company ownership type. In the previous chapter three company ownership type categories were identified:

- 0-20% owned
- 21-80% owned
- 81-100% owned

The assumption is that the real estate which is not owned is rented. The research results according to company ownership type are displayed in table 8.16.

Corporate Real Estate Risk Management

Risk description	0-20% n=25			21-80% n=21			81-100% n=24			Difference significant P-value <0,05
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	
Planning risk	2,88	3,42	10,71	2,67	2,95	8,52	3,13	3,22	10,43	
Workspace risk	2,88	3,08	9,54	2,38	2,48	6,29	2,82	2,82	8,55	
Development budget risk	2,74	3,22	9,52	3,00	3,00	9,50	2,95	3,24	10,24	
Economy risk	2,64	3,44	9,24	2,86	3,05	8,95	2,38	3,00	8,13	
Budget cut risk	2,84	3,12	9,12	3,10	3,10	9,95	3,00	3,33	10,50	
Financing risk	2,45	3,14	9,00	2,26	3,16	7,84	2,30	2,826	8,00	
Real estate flexibility risk	2,68	3,12	8,76	2,95	2,90	9,33	3,00	3,04	10,04	
Malfunctioning installation risk	2,44	3,32	8,68	2,52	3,14	8,14	2,88	3,50	10,38	
Technology advancement risk	2,68	3,04	8,60	2,76	2,86	8,43	2,88	2,92	9,13	
Occupancy rate risk	2,76	2,84	8,48	2,81	2,95	8,86	3,13	3,25	11,33	
Regulation risk	2,60	3,08	8,48	3,10	3,14	10,81	2,67	3,00	8,46	
Preferred location risk	2,64	3,08	8,40	2,62	2,71	7,62	2,25	2,67	7,08	
Tender risk	2,64	2,82	8,23	2,58	3,26	8,74	2,96	3,30	10,30	
Relocation risk	2,52	3,00	8,12	2,48	2,71	7,29	2,13	2,71	6,46	
Natural disaster risk	2,16	3,64	8,08	2,24	3,00	7,05	1,46	3,21	4,75	*
CRE budget risk	2,52	2,88	7,88	2,81	2,90	8,90	2,58	2,75	7,75	
Facility management risk	2,44	2,84	7,72	2,76	3,05	9,10	2,46	2,75	7,42	
Uptime of production facility risk	2,32	3,00	7,68	2,38	2,86	7,62	2,29	2,79	7,29	
Stakeholder risk	2,44	2,88	7,64	2,43	2,48	6,81	2,00	2,46	5,33	
Maintenance risk	2,36	2,92	7,48	3,00	2,95	9,33	3,00	3,29	10,33	
Contracts risk	2,48	2,88	7,48	2,81	3,05	8,90	2,13	2,50	5,83	
Cost of capital risk	2,32	2,80	7,40	2,29	2,43	6,10	2,33	2,83	7,79	
Health and safety risk	2,08	3,24	7,36	2,71	3,67	10,52	2,29	3,50	8,21	
Office layout risk	2,52	2,64	7,28	2,29	2,52	6,24	2,83	2,79	9,21	
Zoning plan risk	2,32	2,82	7,23	2,11	3,00	6,84	2,52	3,57	9,24	
Ground acquisition	2,32	2,68	6,95	2,30	2,95	7,65	1,95	2,60	5,65	
Expansion profile risk	2,36	2,64	6,84	2,14	2,57	6,29	2,13	2,38	6,29	
Nuisance risk	2,27	2,64	6,68	2,11	2,11	5,22	2,91	3,26	10,39	*
Supplier risk	2,24	2,60	6,68	2,14	2,52	6,57	1,96	2,46	5,17	
Property market risk	2,44	2,64	6,68	2,52	2,48	6,52	2,17	2,33	6,17	
Exchange rate risk	2,32	2,64	6,60	2,33	2,29	6,38	1,58	1,67	3,17	*
Maintenance risk (reputation)	2,24	2,64	6,56	2,62	3,10	8,90	2,63	2,92	8,29	
Terrorism risk	1,88	3,64	6,52	2,10	3,14	6,95	1,83	3,58	6,58	
Temporary housing risk	2,20	2,50	6,30	2,14	2,29	5,07	2,32	2,50	6,41	
Book value risk	2,40	2,36	6,28	2,71	2,86	8,48	2,58	2,54	7,96	
Political ans social unrest risk	1,96	3,28	6,28	2,29	2,62	6,81	1,96	3,33	6,92	
Real estate data availability risk	2,28	2,52	6,08	2,52	2,62	7,38	2,54	2,63	7,71	
Accessibility risk	2,08	2,52	5,80	2,00	2,67	5,71	2,33	2,96	7,63	
Design risk	2,08	2,32	5,52	2,33	2,62	7,24	2,38	2,67	6,88	
Liquidity risk	1,88	2,56	5,40	2,33	2,71	7,29	2,04	2,58	6,50	
Solvability risk	1,84	2,68	5,36	2,00	2,24	5,05	2,21	2,75	7,29	
Social enethical development risk	1,79	2,50	5,29	1,89	2,53	5,32	2,15	3,05	6,80	
Real estate investment risk	1,80	2,08	4,20	2,29	2,57	6,29	2,63	2,79	8,00	*

Table 8.16: Risk scores ownership type

Analyzing the risk score and the standard deviation there are multiple risks standing out because they show clear trends. The two most evident trends are economy risk and maintenance risk.

If the organization owns more real estate than the economy risk becomes less important. If an organization owns only 20 percent or less of the real estate than the risk is ranked at place 4. If between 21 and 80 percent of the real estate is owned by the organization than the same risk is ranked at place eight. The risk is ranked at place 17 if the percentage of owned real estate increases even further. This is expected because organizations that own more real estate are less exposed to economic conditions that can influence for example rent levels than organizations that rent most of their real estate.

Maintenance risk follows exactly the opposite path of economy risk. If the real estate ownership percentage increases for an organization than the maintenance risk becomes more important. This makes sense since organizations that rent most of their real estate are not responsible for the maintenance of it. Maintenance is mostly a responsibility for the owner. Figure 8.2 graphically represents the economy and maintenance trend. There are more risks that show patterns. Development budget risk for example is ranked respectively at place 3, 4 and 8 when the percentage of CRE owned increases.

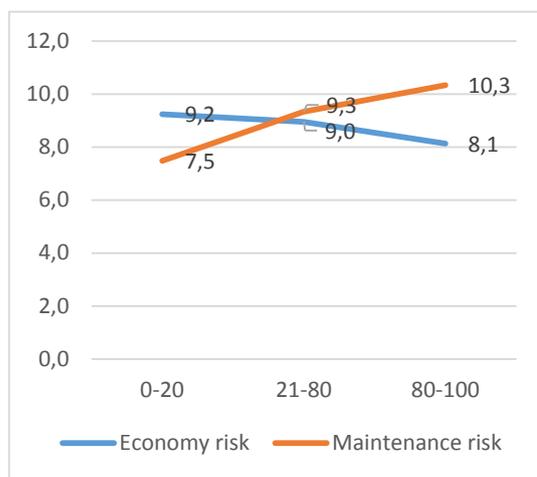


Figure 8.2: Economy and maintenance risk

However trends like this are not as clear as for economy and maintenance risk.

Table 8.17 shows the top ten risks for the different ownership percentages. It seems that there is not much relation between the risk perceptions according to the ownership percentage. The only risk that is ranked in all three top five's is the budget cut risk.

There are four risks distinguished after running the Kruskal-Wallis analysis that are perceived significantly different by respondents whose CRE ownership type is different. These risks are displayed in table 8.18.

Rank	0-20% n=25	21-80% n=21	81-100% n=24
1	Planning risk	Regulation risk	Occupancy rate risk
2	Workspace risk	Health and safety risk	Budget cut risk
3	Development budget risk	Budget cut risk	Planning risk
4	Economy risk	Development budget risk	Nuisance risk
5	Budget cut risk	Maintenance risk	Malfunctioning installation risk
6	Financing risk	Real estate flexibility risk	Maintenance risk
7	Real estate flexibility risk	Facility management risk	Tender risk
8	Malfunctioning installation risk	Economy risk	Development budget risk
9	Technology advancement risk	CRE budget risk	Real estate flexibility risk
10	Occupancy rate risk	Maintenance risk (reputation)	Zoning plan risk

Figure 8.17: Top ten ownership type

Risk	Ownership percentage	Ownership percentage		
		100-81%	80-21%	0-20%
Nuisance risk	100-81%		*	*
Real estate investment risk	0-20%	*	*	
Natural disaster risk	0-20%	*		
Exchange rate risk	100-81%		*	*

Table 8.18: Significant risks ownership type

It seems that the biggest difference in risk perception is between the 0-20 percent and the 81-100 % category since all four risks are perceived significantly different for these two categories. This makes sense since these ownership percentages are the limits of the answer range.

8.4.3 Company size

The last independent variable for which the risks are ranked is company size. The company size is expressed in the number of FTE that are employed at an organization. The data has been categorized according to one of the four identified company sizes:

- 0-250 FTE
- 251-2.500 FTE
- 2.500-25.000 FTE
- >25.000 FTE

Table 8.19 provides an overview of risks with their likelihood, impact and standard deviation.

The high standard deviation within the 0 to 250 fte category immediately catches the eye. The impact and likelihood of the risk have 42 times a standard deviation of 1,20 or higher with an absolute maximum of 1,77. If the standard deviation of the likelihood and impact is this high it is safe to say that there is no consensus at all between the respondents within the 0 to 250 FTE category. The three other categories have normal standard deviations with some outliers now and then.

Within the 251 to 2.500 FTE category there are two risk that stands out. CRE budget risk and development budget risk have very low standard deviations for the likelihood as well as the impact. It seems that the respondents within this category are consistent in the way they value budget related CRE risks.

Comparing all risk categories with each other there is one risk that shows a clear trend. In figure 8.3 the score of maintenance risk is compared with the company size.

The figure shows that maintenance risk becomes more important if the organization is larger. In small organizations with 250 FTE or less maintenance risk is ranked at place 31 while at large organizations with 25.000 FTE or more the same risk is ranked at place 4. There is no immediate cause that comes to mind that might explain this trend.

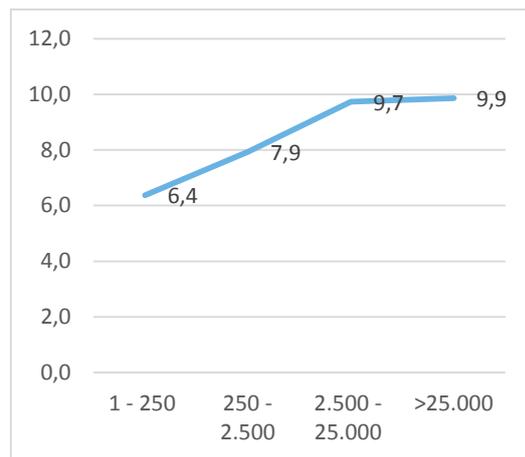


Figure 8.3: Maintenance risk ownership type

Corporate Real Estate Risk Management

Risk description	0 - 250 fte n=8			250 -2.500 FTE n=14			2.500 - 25.000 FTE n=34			>25.0000 FTE n=14			Difference significant P-value <0,05
	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	Likelihood mean	Impact mean	total score mean	
Regulation risk	3,13	3,38	12,00	2,64	3,29	9,21	2,62	2,85	7,88	3,07	3,21	10,64	
Economy risk	3,25	3,25	11,38	2,64	3,57	9,71	2,47	3,06	7,91	2,57	3,00	8,43	
Contracts risk	3,00	3,13	10,38	2,36	3,21	7,64	2,29	2,53	6,29	2,64	2,86	7,86	
Health and safety risk	2,63	3,38	10,13	2,36	3,36	8,64	2,24	3,38	7,97	2,43	3,79	9,21	
Development budget risk	2,75	3,25	9,88	3,14	3,64	11,43	2,89	3,04	9,61	2,71	2,86	8,29	
Occupancy rate risk	2,75	2,75	9,75	2,79	3,07	9,00	3,06	3,09	9,97	2,71	2,93	9,07	
Cost of capital risk	2,63	3,13	9,50	2,29	3,29	7,86	2,35	2,62	7,24	2,07	2,07	4,86	
Real estate data availability risk	2,88	2,88	9,38	2,50	2,71	7,43	2,29	2,50	6,35	2,50	2,50	6,93	
Technology advancement risk	2,88	2,88	9,25	3,00	3,14	9,21	2,68	2,85	8,53	2,71	3,00	8,43	
Planning risk	2,63	2,75	8,88	3,29	3,36	11,36	2,88	3,34	10,28	2,71	3,00	8,36	
Uptime of production facility risk	2,75	2,63	8,50	2,29	3,21	7,93	2,29	2,79	7,41	2,21	2,93	6,86	
Ground acquisition	2,43	2,86	8,14	2,31	2,77	6,85	2,04	2,48	5,78	2,25	3,25	8,00	
Book value risk	2,38	2,63	8,13	2,71	2,93	8,79	2,56	2,44	7,09	2,50	2,50	6,93	
Financing risk	2,50	2,75	8,00	2,21	3,29	8,21	2,50	3,00	9,04	2,07	3,00	7,07	
Solvability risk	2,50	2,63	7,88	1,86	2,86	5,57	2,03	2,65	6,26	1,86	2,07	4,36	
CRE budget risk	2,25	2,88	7,50	2,71	2,93	8,00	2,71	2,82	8,32	2,57	2,79	8,21	
Maintenance risk (reputation)	2,25	2,88	7,50	2,57	2,86	7,50	2,62	2,79	8,24	2,21	3,07	7,50	
Supplier risk	2,38	2,63	7,38	2,00	2,36	5,14	2,06	2,47	5,94	2,21	2,79	6,86	
Real estate flexibility risk	2,63	2,25	7,25	2,86	3,36	10,00	2,82	3,09	9,32	3,14	3,00	10,07	
Malfunctioning installation risk	2,50	2,50	7,13	2,43	3,36	8,29	2,76	3,56	10,35	2,50	3,21	8,00	
Office layout risk	2,63	2,38	7,13	2,29	2,43	6,21	2,71	2,74	8,38	2,43	2,86	7,50	
Tender risk	2,25	2,63	6,88	3,00	3,50	10,75	2,74	3,03	8,84	2,77	3,31	9,69	
Nuisance risk	2,43	2,43	6,86	2,79	3,07	8,93	2,40	2,70	7,37	2,25	2,50	7,17	
Liquidity risk	2,13	2,63	6,75	2,21	2,86	7,14	2,06	2,71	6,47	1,93	2,14	5,00	
Budget cut risk	2,50	2,50	6,75	3,21	3,29	10,14	2,91	3,24	9,88	3,14	3,36	11,21	
Facility management risk	2,38	2,25	6,75	2,43	2,79	7,21	2,59	2,91	8,35	2,64	3,21	8,79	
Preferred location risk	2,50	2,50	6,75	2,79	3,07	8,43	2,41	2,79	7,74	2,43	2,86	7,50	
Accessibility risk	2,13	2,88	6,75	2,14	2,36	5,64	2,18	2,71	6,68	2,07	3,00	6,29	
Workspace risk	2,63	2,38	6,63	2,86	2,86	8,86	2,74	2,87	8,52	2,50	2,86	7,71	
Political and social unrest risk	2,38	2,50	6,50	2,07	3,57	7,64	1,88	3,09	6,03	2,29	3,00	7,29	
Maintenance risk	2,50	2,25	6,38	2,57	2,86	7,93	2,85	3,24	9,74	2,93	3,29	9,86	
Exchange rate risk	2,38	2,38	6,38	1,71	2,36	4,50	1,97	1,88	4,44	2,50	2,71	7,86	
Zoning plan risk	2,00	2,71	6,00	2,38	3,00	8,15	2,38	3,31	8,07	2,31	3,08	7,77	
Stakeholder risk	2,13	2,63	5,88	2,79	2,93	8,57	2,18	2,47	6,09	2,14	2,64	6,29	
Expansion profile risk	2,25	2,13	5,75	2,14	2,43	6,21	2,44	2,79	7,65	1,71	2,21	4,36	
Real estate investment risk	2,00	2,50	5,50	2,36	2,71	6,86	2,21	2,38	6,03	2,29	2,43	6,00	
Design risk	2,00	2,13	5,50	2,36	2,86	7,00	2,32	2,44	6,53	2,14	2,64	6,50	
Relocation risk	2,25	2,13	5,38	2,29	3,00	7,29	2,38	2,76	7,41	2,50	3,14	8,14	
Property market risk	2,13	2,00	4,88	2,64	3,07	8,43	2,32	2,32	6,00	2,36	2,57	6,50	
Natural disaster risk	2,00	2,50	4,75	1,86	3,57	6,93	1,85	3,38	6,56	2,21	3,29	7,57	
Temporary housing risk	2,14	1,86	4,71	2,50	2,75	7,33	2,30	2,70	6,70	1,80	1,80	3,60	
Terrorism risk	1,88	2,38	4,63	1,71	3,64	6,14	1,82	3,56	6,38	2,43	3,71	9,07	
Social unethical development risk	2,00	1,88	4,38	2,00	2,79	6,29	1,86	2,82	5,89	2,00	2,77	5,85	

Figure 8.19: Risk scores company size

	0 - 250 fte	250 -2.500 FTE	2.500 - 25.000 FTE	>25.0000 FTE
Rank	n=8	n=14	n=34	n=14
1	Regulation risk	Development budget risk	Malfunctioning installation risk	Budget cut risk
2	Economy risk	Planning risk	Planning risk	Regulation risk
3	Contracts risk	Tender risk	Occupancy rate risk	Real estate flexibility risk
4	Health and safety risk	Budget cut risk	Budget cut risk	Maintenance risk
5	Development budget risk	Real estate flexibility risk	Maintenance risk	Tender risk
6	Occupancy rate risk	Economy risk	Development budget risk	Health and safety risk
7	Cost of capital risk	Regulation risk	Real estate flexibility risk	Occupancy rate risk
8	Real estate data availability risk	Technology advancement risk	Financing risk	Terrorism risk
9	Technology advancement risk	Occupancy rate risk	Tender risk	Facility management risk
10	Planning risk	Nuisance risk	Technology advancement risk	Technology advancement risk

Figure 8.20: Top ten company size

Table 8.20 shows the top ten risks for the different company sizes. There is not a single risk that appears in the top ten of all four of the company size categories. It is noticeable that the small organizations don't have many development risks in their top ten. The respondents within the 2.500-25.000 FTE and 25.000 FTE or more categories have on average more development risks in their top ten. This might indicate that small organizations develop less real estate than larger organizations.

The most remarkable result is that there is not a single risk for which the risk perception is significantly different based on the company size. This raises the question to what extent the size of the organization matters related to CRERM. It seems that risk perception does not depend on the size of the organization. This idea is strengthened by the proposition that small organizations tend to disagree about risk perception as reflected by the high standard deviation.

8.5 Validation

The New Year's reception of CoreNet Benelux focused on CRERM. Approximately 45 CRE specialists attended the presentation in which they were presented the results as described in this chapter. The reception was not only used to present the results but also to give an indication of the validation of them.

The CRE specialists that were present were divided in CRE end users and CRE service providers (consultants). The respondents were asked to select the most important risk out of the two risks that were introduced. The risks that were introduced were selected upfront. According to the data set the risk perception of the two selected risks differentiated for end users and the service providers. The risk couples to choose from were:

- Liquidity risk vs workspace design risk
- Regulation risk vs real estate investment risk
- Maintenance risk vs cost of capital risk
- Zoning plan risk vs malfunctioning real estate risk

Liquidity risk is ranked at place 37 for the end users but at place 12 for the service providers. Workspace design risk is ranked 14th for the end user and 36th for the consultant. It is expected that most of the end users will choose workspace design risk above liquidity risk and the service providers will choose just the other way around. During the presentation the end users were indecisive. The service providers on the other hand would rank liquidity risk higher which is in line with the expectation.

Regulation risk is according to the data set ranked higher by the end users than by the service providers. Real estate investment risk is the other way around. This was confirmed during the reception.

The next risk couple was maintenance risk vs cost of capital risk. Maintenance risk was by almost all end users valued higher the services providers valued it the same as cost of capital risk. This is in line with the results out of the data set except that in the data set the service providers ranked cost of capital risk at place seven and the maintenance risk at the 25th place.

The last two risks validated with the audience were malfunctioning installation risk and zoning plan risk. Both the end user and the service provider valued zoning plan risk as more important but the difference with malfunctioning real estate risk is within the end user group small. According to the survey malfunctioning real estate risk was expected to be more important for the end users.

The four risk couples confirmed the validation of the research results since seven out of the eight results were valued the same as indicated by this research. Only malfunctioning real estate risk was not valued higher than maintenance risk by the end users which is not in line with the survey results.

After the validation the audience was asked if they would agree or not with three hypotheses. The first hypothesis was: *CRERM is still at an early stage*. 14 people agreed and 4 disagreed the remaining respondents did not have an opinion. The conclusion is that for a regular organization mainly making use of offices this might be true but it depends on the industry in which the organization operates. One of the end users

was employed in the pharmaceutical industry and said that risk management is in the company's DNA. Risk management at this organization is included in all aspects of the organization.

The second hypothesis was: *The risk profile of CRE is easily combined with the core business risk profile.* In total two end users agreed and two disagreed. Eight of the service providers agreed and three disagreed. The others did not have an opinion. An argument to not agree with the hypothesis is that CRE risks are steadier than commercial risk profiles and therefore not very combinable. The refutation was that the real estate strategy should always fit the core business of the organization and should therefore be easy to combine.

The last hypothesis was: *Risk management is an essential part of a professional CREM organization.* Everybody agreed with this hypothesis except two persons present. One of them worked at a Dutch governmental organization and he explained that within the governmental industry there is too much focus on the budget and not on the other corporate resources. These governmental organizations can make big improvements in this area by shifting their focus from the budget to other corporate resources such as IT, human resources or CRE. This shows that CRE is not yet an essential part of the organization but he adds that it has the potential value to the core business process.

8.6 Conclusion

The goal of this chapter was to provide an answer to the last research question: *Which corporate real estate risks that may affect the added value of CRE to the shareholder value of an organization are perceived as most important and are these risks differently evaluated with respect to job & company specific characteristics?*

This question was answered by comparing the total risk score for each risk separately. The total risk score is the likelihood multiplied with impact. Besides the total risk score the standard deviation, which is a measure for the amount of variation, within a risk category has been calculated and compared.

When a general rank list, including all respondents without taking the job & company specific characteristics into account, is constructed then the differentiation in risk perception is small. This general score is a result of the large number of respondents included. Each outlier for likelihood, impact or standard deviation is evened out and spread over the large number of respondents. To distinguish more clear patterns it is meaningful to separate the data and rank the risks according to job & company specific characteristics.

When the risks are ranked according to job & company specific characteristics statistical analyses were conducted to determine if the risk perception was significantly different. Some interesting results show when the risks were ranked according to the job specific characteristics. When the risks are ranked according to job position it turns out that end users tend to value operational & business policy risks higher while service providers think the financial policy risks are more important. According to management level it becomes clear that facility management related risks are on average valued higher by respondents operating on the tactic and operational management level. When looking at the geographical location there significant differences in risk perception between the continents. This explains a part of the variation in risk perception.

The risks are also ranked related to company specific characteristics. Related to the industry classification there is a lot of differentiation in the risk perception leading to some interesting results. In total twelve of the 43 risks were significantly perceived different between at least two of the industries. Organizations that have a large proportion of their CRE in ownership valued typical ownership related risks, for example maintenance risk, higher than organizations which rent (almost) all their real estate. The last company specific characteristic is the size of the organization. Not one of the risks is perceived significantly different when the risks are ranked according to company size. This presumes that risk perception does not differentiate when ranked according to the company size.

The research results have been validated during a reception with approximately 45

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CRE specialist with different backgrounds. The audience valued the risks as expected validating the research results.

Chapter

9

Conclusions & Recommendations

This is the last chapter of this thesis. All research questions are answered in previous chapters, leaving this chapter for a recapitulation and some final remarks. This chapter will start with the conclusions, followed by a reflection. In the last section, policy recommendations and recommendations for further research are given.

9.1 Conclusions

The research objective as stated in chapter one of this thesis is:

The objective of this research is to develop a risk ranking list which helps CRE specialists to identify the most important corporate real estate risks that can influence the shareholder value related to job & company specific characteristics.

One of the first things to know in order to achieve the research objective is to find out what CRERM is and how it adds value to an organization and therefore influences the shareholder value.

9.1.1 Corporate real estate risk management

In essence, CRERM is the management field where corporate real estate management meets corporate risk management.

Corporate real estate management is:

“Aligning the land and buildings used for work space, infrastructure and investment to the needs of the core business process, to obtain maximum added value for the business and to contribute optimally to the overall performance of the organization in order to maximize the shareholder value.”

CREM can add value to an organization by, amongst others, reducing CRE costs, increasing flexibility and increasing productivity. This helps to increase the shareholder value in two ways. It can increase the revenue or improve the profitability of the organization.

Corporate risk management is:

“Any event or action that an organization takes to reduce the risks arising from business practice that may affect an organization’s ability to achieve its objectives and execute its strategies.”

Corporate risk management adds value to the organization in two ways. First of all, corporate risk management helps to make stakeholders aware of corporate risks, supports management decisions and improves planning and business processes. Second, organizations that are actively involved with corporate risk management are on average valued higher by investors. This implies that corporate risk management contributes to the corporate goal of maximizing shareholder value.

Corporate real estate risk management is a new research field and which is why no much research has been done in this area. A definition of CRERM can be given by combining the previous two definitions stated above:

“Corporate real estate risk management is any event or action that an organization takes to reduce the risks related to the land and buildings used for work space, infrastructure and investment that may affect an organization’s ability to achieve its objectives and execute its strategies.”

CREM and CRERM have the same goal. Both management fields want to add value to the

organization in order to maximize the shareholder value. CRERM shares this goal and adds value to an organization by means of:

- Identification of CRE risks.
- Making those risks visible and understandable for others.
- Implementing plans, procedures and protocols to manage CRE risks.
- Helping managers focus their time on the most important CRE risks.

This goal can be reached by applying the CRERM process. The CRERM process consists of three major steps: risk identification, risk analysis and risk response.

This research contributes to the first and second step of the CRERM process. This thesis identified over 40 different risks in six risk categories, which can serve as a checklist for CRE managers to identify CRE risks within their own organization. Second, this thesis contributes to the risk analysis step by serving as a benchmark. The risk importance is ranked related to job & company specific characteristics. Organizations can compare their CRE risks with similar organizations to see if they perceive risks significantly different.

9.1.2 CRE risk list

Research question number four is:

4¹ Which risks, related to corporate real estate, may affect the added value of CRE to the shareholder value?

A literature review with additional interviews with CRE specialists provided the necessary input for answering this question. In total, 43 risks divided over six categories have been identified that can influence the shareholder value of an organization. The six risk categories are:

- Development risks
- Financial policy risks
- Operational & business policy risks
- Location risks
- Appearance risks
- External & regulation risks

Table 9.1 provides the final risk list, an entire overview of all risk categories and corporate real estate risks.

Development risks and financial policy risks were not very well described in the available literature. It turned out that almost half of the risks mentioned in these categories were suggested by the interviewees. Operational & business policy risks, location risks, appearance risks and external & regulation risks were all extensively described in the literature and were confirmed by the interviewees. Occasionally new risks were mentioned during the interviews and added to these risk categories.

9.1.3 Risk perception

The final risk list identified the CRE risks that can influence the shareholder value of an organization. The next step is to determine, which risks are most important and how does the risk perception of these risks relate to job & company specific characteristics. The last research question is:

5¹ Which corporate real estate risks that may affect the added value of CRE to the shareholder value of an organization are perceived as most important and are these risks differently evaluated with respect to job & company specific characteristics?

A global survey sent to approximately 8.150 real estate specialists provided 143 responses. Out of these 143 respondents 88 are suited for analysis after data preparation. 70 of these respondents are CRE end users and 16 are CRE consultants. The remaining 2 respondents are academics.

#	Risk
1.0	Development risks
1.1	Zoning plan risk
1.2	Ground acquisition risk
1.3	Tender risk
1.4	Financing risk
1.5	Temporary housing risk
1.6	Nuisance risk
1.7	Planning risk
1.8	Workspace design risk
1.9	Development budget risk
1.10	Social unethical development risk
2.0	Financial policy risks
2.1	Liquidity risk
2.2	Solvability risk
2.3	Cost of capital risk
2.4	CRE budget risk
2.5	Budget cut risk
2.6	Book value risk
2.7	Real estate investment risk
3.0	Operational & business policy risks
3.1	Maintenance risk
3.2	Facility management risk
3.3	Malfunctioning installation risk
3.4	Health and safety risk
3.5	Real estate flexibility risk
3.6	Occupancy rate risk
3.7	Office layout risk
3.8	Relocation risk
3.9	Expansion profile risk
4.0	Location risks
4.1	Preferred location risk
4.2	Uptime of production facility risk
4.3	Stakeholder risk
4.4	Accessibility risk
4.5	Supplier risk
5.0	Appearance risks
5.1	Design risk
5.2	Maintenance risk
6.0	External & regulation risks
6.1	Natural disaster risk
6.2	Terrorism risk
6.3	Political and social unrest risk
6.4	Economy risk
6.5	Exchange rate risk
6.6	Property market risk
6.7	Contracts risk
6.8	Regulation risk
6.9	Real estate data availability risk
6.10	Technology advancement risk

Table 9.1: CRE risk list

Organizations rate their CREM and corporate risk management maturity level on average as ‘high’, but the derivative CRERM maturity level is ‘average’. The most common corporate risk response is reduction closely followed by avoidance. Before a risk response can take place the CRERM process needs to be implemented. Most organizations have a risk identification process in place but still six organizations do not have any phase of the CRERM process implemented.

The first risk list is created when the risks are ranked according to their total risk score without taking the job & company specific characteristic into account. In this risk list each outlier for likelihood, impact or standard deviation is evened out and spread over the large number of respondents. As a result the differences between the total risk scores are small which makes it hard to rank the risks according to perceived importance. Therefore the risks should be categorized related to job & company specific characteristics to be helpful in determining CRERM strategy.

Job specific characteristics

The job specific characteristics taken into account are: job position, management level and geographical location.

When the risks are ranked according to job position it seems that CRE end users focus more on operational & business policy risks while CRE consultants focus more on financial policy related risks. An independent samples t-test showed that two operational risks namely maintenance risk and office lay-out risk are perceived significantly higher by the end users than by the consultants. Regulation risk is the risk which shows the highest significant difference (P-value = 0,002). This risk is ranked at place 6 by the end users while the consultants rank it at place 38.

Ranked according to management level, it seems that CRE managers who operate on strategic level value financial policy risks higher than respondents working on tactical or operational level. All risks in this category are perceived higher by CRE managers operating on strategic level. Liquidity risk, solvability risk and real estate investment risk are even perceived significantly higher. The other two risks that are perceived significantly higher by respondents on strategic level are design risk and property market risk.

The last job specific characteristic for which the risks were ranked, is the geographical

location of the respondents. Three groups have been compared with each other: Europe, North-America and Asia & Oceania. The top ten risks for these geographical locations differentiate a lot. This is proven by a Kruskal Wallis analysis, which indicates that nine risks significantly differentiate between at least two groups. The risk with the highest significant difference is malfunctioning installation risk. This risk is perceived significantly higher by both Europe and Asia & Oceania compared to North-America.

Company specific characteristics

The company specific characteristics taken into account are: industry segment, company size and CRE ownership type.

The first company specific characteristic for which the risks are ranked is industry segment. There are eight industries with more than eight respondents that are suited for analysis. There is a lot of difference in risk perception when so many groups are compared. In total 12 risks are perceived significantly different after computing a Kruskal-Wallis test. These risks are within each risk category:

Development risks:

- Financing risk
- Nuisance risk
- Workspace risk

Financial policy risks:

- Budget cut risk
- Real estate investment risk

Operational & business policy risks

- Maintenance risk
- Health and safety risk

External & Regulation risks:

- Natural disaster risk
- Terrorism risk
- Economy risk
- Exchange rate risk
- Real estate data availability risk

Natural disaster risk is the risk that stands out the most. This risk is compared between industry segments perceived eight times significantly different. The second thing to notice is that the professional, scientific and technical activities industry differentiates the most in risk perception from all the industries. This industry segment significantly differentiates on eight risks with one or more other industry segments.

Maintenance risk stands out when the risks are ranked according to company size. This risk shows a clear trend. It becomes more important and is ranked higher if the size of the organization increases. But the most interesting thing is that the risk perception is not for a single risk perceived significantly different ranked according to the company size. This raises the question to what extent the size of the organization matters related to CRERM. It seems that risk perception does not depend on the size of the organization.

The last conclusions are drawn when the risks are ranked according to owner ship types. There are two risks which show clear trends: Maintenance risk is ranked higher if the percentage of CRE owned by an organization increases. Economy risk on the other hand decreases in importance and rank if the organization increases in size. The risks which are perceived significantly different are nuisance risk, real estate investment risk, natural disaster risk and exchange rate risk. The difference in risk perception is the largest between 0-20 percent of the CRE owned and 81-100 percent of the CRE owned, which is not strange since these are the answer range limits.

The research results have been validated during a reception with approximately 45 CRE specialist with different backgrounds. The audience valued the risks as expected validating the research results.

9.2 Reflection

In retrospect there are a couple of remarks that need to be made to make sure that the

conclusions of this research are correctly interpreted.

For this thesis various literature sources have been used. However, the majority of these sources did not focus on CRERM. Instead, they focused on corporate real estate management, corporate risk management, real estate investment risks and other topics related to CRERM. After an intensive literature review, only five papers were found that solely focused on CRERM but there is no study that includes all these topics by looking at CRERM with a broad scope. Instead all these studies analyze just one aspect of CRERM. This literature gap will be covered in this thesis. This thesis contributes to the existing literature by taking CRERM beyond its currently existing theoretical boundary by analyzing the risk perception in practice. All ideas and suggestions of risks that might be related to CRE are ranked according to actual perception by CRE specialist from over the world. This enables CRE specialist to identify CRE risks and analyze how their risk perception differentiates from comparable other CRE specialists.

In retrospect, there are a couple of things that would have been done differently if the research would be repeated with the current knowledge.

The most important thing is the number of respondents. The number of respondents determines which statistical method can be used. Because of the limited amount of useful respondents, it was only possible to use parametric statistics for independent variable with only two groups for comparison. If there were three or more groups than non-parametric statistics were used. The representativeness and therefore validity would increase if there were more respondents making the results more theoretically grounded and practically relevant. Looking back, organizations other than CoreNet should have been asked to distribute the questionnaire. This might boost the number of respondents. In line with this first point is a second thing which could have been done differently. There should have been more focus on other continents as well. Most of the conclusions are applicable for Europe (especially The Netherlands) and North America but less for the other continents, because there are not enough respondents. The small amount of respondents from Asia & Oceania showed that there is a significant difference in risk perception between these continents compared to Europe and North America but this is based on a minimum amount of respondents. The last thing which could have been done different is the focus on the independent variables. The dependent variables, the risks, consumed approximately 90 percent of the time. While the independent variables, job & company specific characteristics, consumed the remaining 10 percent. After analysis there are independent variables which contribute and clarify a large proportion of difference in risk perception, while other variables, such as company size, turn out to be less relevant. It is advised to put more emphasis on these independent variables.

The last remark is related to the point in time at which the research took place. Risks are rated according to likelihood and impact. Especially likelihood is a sentiment and is therefore dependent of the spirit of time. This is illustrated by terrorism risk. Terrorism risk is in the data set ranked very differently and depends highly on the geographical location. In America this risk is ranked at place 20 while in Europe this risk is ranked at place 40. But the spirit of time changed a lot recently. The terrorism attack on the French satirical weekly magazine Charlie Hebdo would definitely increase the awareness of terrorism attacks. Although this attack is unrelated to the corporate real estate it is expected that a lot of CRE managers re-evaluated the safety of their employees and how their CRE can contribute to that. If the research will be repeated and the same people would fill in the exact same survey than it is expected that terrorism risk would rank much higher in Europe nowadays than at the moment when the survey was conducted.

9.3 Recommendations

In the last section of this thesis the recommendations are given. The recommendations for policy and further research are separately discussed.

9.3.1 Policy recommendations

There are a couple of recommendations concerning CRERM that might take the

CREM level to the next evolutionary stage in Joroff's model. CRE managers and CREM specialists might take the recommendations in consideration when confronted with risk management.

Implement and use the CRERM process

The risk management process as described in figure 9.2 can be implemented in all CREM organizations. The three steps of the CRERM process (risk identification, analysis and response) are universal for almost all corporate risk management processes and provided a foundation for the CRERM process. This research helps in the first two steps of the CRERM process by identifying CRE risks and enables a comparison with industry peers from all over the world.

Benchmark the organization's CRERM profile

If an organization already has a formal CRERM program in place it is interesting to benchmark it with similar organizations. Comparing how other organizations based on certain job or company specific characteristics experience certain risks. This comparison can expose risks in your organization that are currently blind spots. Second, if a risk is perceived significantly different by a similar organization one could ask themselves the question how this is possible and why they perceive these risks so differently.

Provide feedback to the management

Act pro-active and do not wait until superiors ask to do a CRE risk scan within the organization. Make managers aware of the CRE risks in context of the corporate mission, corporate real estate management profile and corporate risk profile. Pointing at a risk which already has been materialized in hindsight does not make the damage undone. Make use of the knowledge provided in this research to identify and analyze CRE risks and manage them properly.

9.3.2 Recommendations for further research

During the process, questions arose that are not within the scope of this research. There are noticeable trends that need additional research to validate them. The most interesting subjects for further research are:

Measure the spirit of time

What happens when the research is repeated? It is impossible to exactly repeat the research, because the response composition and data description will always differentiate when making use of a survey, but it will be interesting to see how respondents experience risks in a couple of years from now. Are there risks of which the risk perception is stable over time? In other words, how volatile is the risk perception over time?

CRE risk response

This thesis contributes to steps one and two of the CRERM process, but does not provide any information about the best risk response. It is interesting to explore how different organizations deal with certain CRE risks. By making use of case studies it can be evaluated how and which risk response are used in practice for the risks identified in this research.

Explain what causes the difference in risk perception

In chapter eight several explanations for differences in risk perception were shortly addressed. It is interesting to conduct research about what exactly influences the risk perception of CRE end users, what are the variables that explain why respondents rate risks differently. Questions such as the following require additional research:

- Why do CRE end users value Operational & business policy risks higher than CRE service providers and why do the service providers value financial policy risks higher?
- Is the difference in risk perception on management level significant?
- Why does maintenance risk become more important if the size of an organization,

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expressed in FTE, increases? And why does economy risk become more important if the ownership percentage increases?

9.3.3 Final recommendation

The most important recommendation is to use the information provided in this thesis. This is the first thesis focusing on CRERM that takes this field of expertise beyond its currently existing theoretical boundary and puts it into practice. It helps to identify potential CRE risks in your organization and, if they are already identified, use it as an external risk audit for comparison. Second, it helps to analyze the identified CRE risk by serving as a benchmark.

“You will be able to compare your ideas about CRE risks and benchmark your organization’s CRERM with industry peers from across the world”.

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