Cognitive risk in external real estate valuation

Master's Thesis in the Master's Programme Design and Construction Project Management

JENS WALLÈN

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CHALMERS UNIVERSITY OF TECHNOLOGY

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ABSTRACT

Due to the long durability of buildings, the real estate industry is a longterm business relying on fair longterm real estate valuations. In order for real estate companies to check their internal valuation, external valuation is used to assure that their internal valuation is fair and reliable. Since external valuation is frequently used to compare with internal valuation, it is crucial that external valuators are aware of the cognitive risk associated with the assumptions and interpretations they use in the valuation process. Current research has discussed important cognitive risk management disciplines, however without analysing their implications in practical valuation and neither suggested how this risk can be mitigated in the valuation process.

The purpose of this thesis is to analyse the implications of cognitive risk in external real estate valuation in order to propose a framework for addressing this risk and its mitigation. From the purpose, two research questions are developed: What implications does cognitive risk have in external real estate valuation? How do external valuators address this risk in order to mitigate its implications?

The method consisted of four phases. Firstly, a literature survey concerning real estate valuation and cognitive risk management was made. Secondly, interview questions were formulated based on the findings from the literature survey. Thirdly, empirical data were collected from eight semi-structured qualitative interviews, which were conducted with eight valuators who represented eight valuation firms. Finally, an analysis and discussion ended the thesis by answering the purpose of the thesis.

The findings of this research are brought together in a framework including five cognitive risk management fields and connected mitigation aspects. This framework emphasises the importance of client communication, access to internal and external support, access to alternative technology and alternative sources, utilisation of internal risk matrixes, local knowledge and local plan analysis. The intention is that this framework can be used as an analytical tool in order to mitigate cognitive risk in external real estate valuation.

Key words: Real estate, external valuation, cognition, risk management, mitigation

Kognitiv risk i extern fastighetsvärdering

Examensarbete inom masterprogrammet Design and Construction Project Management

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Institutionen för Teknikens ekonomi och organisation
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SAMMANFATTNING

Till följd av att byggnader har en lång livstid så anses fastighetsbranschen vara en långsiktig industri som förlitar sig på pålitliga och långsiktiga fastighetsvärden. För att fastighetsbolag ska ha möjlighet att kontrollera sina interna värderingar används extern värdering som jämförelse, i syfte att kunna presentera legitima och pålitliga interna värderingar. Eftersom extern värdering används som jämförelse med intern värdering är det viktigt att externa värderar känner till de kognitiva risker som är förknippade med antaganden och tolkningar som används I värderingsprocessen. Dagens forskning har diskuterat viktiga områden inom kognitiv riskhantering men utan att analysera dess konsekvens i praktiken och heller inte hur denna typ av risk kan minskas i värderingsprocessen.

Syftet med denna undersökning är att analysera vilken påverkan kognitiv risk har i extern fastighetsvärdering för att på så vis föreslå ett ramverk som belyser denna typ av risk och hur den kan minskas. Från syftet utvecklades två stycken forskningsfrågor: Vilken typ av påverkan har kognitiv risk I extern fastighetsvärdering? Hur belyser externa värderare denna typ av risk för att kunna minska dess påverkan?

Metodiken bestod av fyra faser. Först av allt genomfördes en litteraturstudie inom fastighetsvärdering samt inom kognitiv riskhantering. Efter det skapades intervjufrågor baserade på resultaten från litteraturstudien. Sedan samlades empirisk data in från åtta stycken intervjuer med fastighetsvärderare som representerade åtta olika värderingsföretag. Slutligen gjordes en analys och diskussion som avslutades genom att svara på syftet och tillhörande forskningsfrågor.

Resultaten av denna undersökning är sammanställda i ett ramverk som innehåller fem områden för kognitiv riskhantering och hur risker minskas inom dessa områden. Detta ramverk påvisar vikten av kommunikation med beställaren, tillgång till intern och extern support, tillgång till alternativ teknologi och alternativa informationskällor, nyttjandet av interna riskmatriser, god lokalkännedom samt detaljplansanalys. Förhoppningen är att detta ramverk kan användas som ett analytiskt hjälpmedel för att minska kognitiv risk i extern fastighetsvärdering.

Nyckelord: Fastighet, extern värdering, kognition, risk management, minska

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Contents

Preface

This thesis was written during the spring of 2015 as a finalising part of the Master's Programme Design and Construction Project Management and corresponds to 30 higher education credits. The thesis was written at the Division of Service Management within the Department of Technology Management and Economics at Chalmers University of Technology. The research was carried out in cooperation with Harry Sjögren AB, which is a real estate company operating in the metropolitan area of Gothenburg, Alingsås, Borås and Halmstad. Harry Sjögren AB is a subsidiary to Castellum AB, which is listed on the stock exchange.

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Jens Wallén

1   Introduction

This introducing chapter aims to outline the framework of this research including the background context, the purpose and its limitations, definition of key concepts used consistently in the report and finally the disposition of the thesis.

1.1   Background

Looking at the construction sector and its actors, the diversification of businesses alongside with the common approach to a more service oriented and thus flexible industry is apparent (Harris and Cooke, 2014). The construction sector has previously been criticised for being retrogressive and resistant to change, however in the last couple of years this has begun to be reformed since aspects such as partnering, BIM and sustainable development have been introduced as revolutionary tools, models and concepts (Egan, 1998).

Looking at one specific part of the construction sector from an organisational point of view, the real estate industry is an interesting business due to the diversity of its operations. Real estate companies need to control fields such as Portfolio (Asset) Management, Project Management, Marketing, Financing, Accounting, Law and Leasing, which call for a diversified organisation in terms of knowledge (Huffman, 2002). Furthermore this implies a transparent and flexible organisation in order to manage such different fields and get the employees to work towards mutual goals and objectives. (Huffman, 2002; Harris and Cooke, 2014)

The real estate industry is further a particularly longterm business due to the long durability of buildings (Huffman, 2002). Therefore, real estate companies are interested in longterm real estate values in order to remain liquidly strong in a rapidly changing business environment (Lay Frics, 1988). Since real estate, including related interests, is regarded as assets in an organisation's balance sheet, it is crucial to make reliable and market oriented internal valuations (Pagourtzi et al., 2003). In order for a real estate company to check its internal valuation, which is the foundation for presenting financial information to the company's stakeholders, external valuations are frequently used for comparison purposes (Lay Frics, 1988). By comparing external valuation with internal valuation, the financial risk associated with revaluing the company's assets is reduced. However this implies cognitive risk since external valuators are not familiar with all information necessary to make full-scale reliable and valid valuations (Wofford et al., 2011). Hence, information and data are assumed and individually interpreted by the valuators, which stresses a critical gap in the information used for external valuation (Wofford et al., 2010).

Addressing and mitigating cognitive risk in external real estate valuation is thereby crucial for real estate companies and valuation firms. By analysing cognitive risk in external real estate valuation, the possibilities for reliable external valuation increase. Moreover, since internal valuation is connected to the risk with revaluing the company's property and revaluing future investments, reliable external valuation minimises this issue and thereby increases the possibilities for real estate companies to present fair and supported financial information. Current research has discussed important cognitive risk management disciplines, however without proposing how

cognitive risk can be mitigated. Thus, there is an identified lacuna in current research, i.e. a cognitive risk management framework including mitigation aspects.

1.2 Purpose

The purpose of this research is to analyse the implications of cognitive risk in external real estate valuation in order to propose a framework for addressing this risk and the mitigation of it. Thus, the purpose can be divided into two research questions:

➢ What implications does cognitive risk have in external real estate valuation?

➢ How do external valuators address this risk in order to mitigate its implications?

1.3 Delimitations

In order to make the purpose of the thesis manageable, the research is limited to analyse external real estate valuation for commercial and industrial real estate. Furthermore, the thesis is limited to analysing real estate valuation for the Swedish market and its actors. However, the intention is to address results relevant to other real estate markets as well. The reason for this choice of delimitations has been to enable a deep-going qualitative approach to the analysis of the results.

1.4 Definition of key concepts

Firstly, even if the term real estate, in a legal context, is equal to a limited area of land including any building, it will here be considered as a piece of land including a building erected in purpose to serve non-residential tenants, thus commercial or industrial real estate.

Secondly, external real estate valuation is in this thesis defined as "the process established and executed by an outside firm whose core business is real estate valuation, analysis and consulting". Thus, real estate valuation in this context is not exclusively to be referred to as a process established in order to achieve book value or fair value according to IFRS or other similar standard documents. On the contrary, the purpose with external real estate valuation is here perceived as a possibility to achieve an outside statement of the most probable market value that can be used for juxtaposing the internal valuation.

Thirdly, the term commercial real estate is here considered as any rental space in which a business-to-business relationship exists between the tenant and the property owner. Hence, no residential buildings will be covered since these imply relationships between the property owner and private dwellers.

Lastly, cognition is considered as a common psychological term for aspects such as knowledge, memory, attention, perception and the processing of data and information (Barsalou, 2008). Cognitive risk is associated with individual assumptions, guesses, interpretations and translations (Wofford et al., 2011). Cognitive risk management is therefore understood here as how external valuators address and mitigate cognitive risk in the individual valuation process.

1.5   Disposition

This thesis consists of six chapters. The first chapter is an introduction to the research including background, purpose, delimitations and definition of key concepts. The second chapter outlines the methodology used in this research. The third chapter presents the theoretical framework which is divided into three subchapters. The results are presented in Chapter 4 followed by an analysis and discussion in Chapter 5 Finally concluding remarks are stated in Chapter 6 including reflections on the research and proposals for future research within the field.

2 Methodology

This chapter aims to describe how the research was conducted. Firstly, it describes how information was found and processed during the research. Secondly, it presents how the creation process of the questions to real estate valuators was conducted. Thirdly, the chosen interview method is described as well as the physical interviews. Finally the analysis of the results is outlined. Figure 1 illustrates the research approach used for this study.
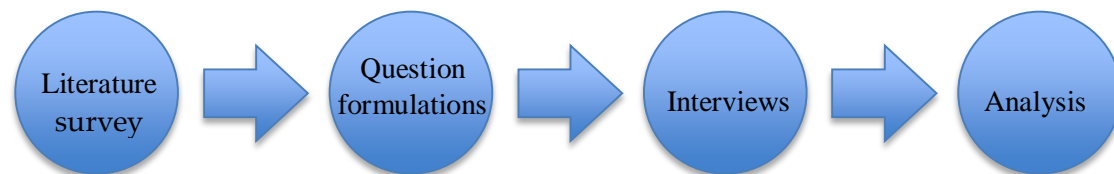
Figure 1. The chosen research approach

2.1 Literature research

The initiation phase of this research was a literature survey that was conducted in order to present a theoretical view of real estate valuation, risk management and cognition. The background material derives from academic articles, books covering primarily real estate valuation and cognitive risk management. Therefore a critical analyse of relevant information has been the approach through the writing process as well as comparing and analysing different researchers' interpretations and conclusions of the field.

The survey of academic articles was initiated through an online literature search within the subject field of the thesis. By defining keywords such as real estate, valuation, risk management and cognition, articles covering the subject were collected, analysed and summarised in order to get an essential insight in the research done so far. The sources were selected with regard to facts such as number of citations, extent of bibliography and source of publication, indicating their relevance in the topic of this thesis. The articles were downloaded from scholarly publishers such as Emerald Insight, SAGE and through Google Scholar, all accessed through Chalmers University of Technology Library Service.

2.2 Formulation of questions

The second phase included the process of making the questionnaire, which was based on the most important findings from the literature research presented in the theoretical framework. The initial questions considered market value, the relationship between market value and supply-demand theory and also which valuation methods are used in practice. The aim was to achieve an understanding of practical valuation comparable to the presented theory in order to be able to analyse its accordance.

Thereafter the questions addressed cognitive risk management and risk mitigation. The presented cognitive risk management disciplines, see Section 3.2.2, were used as basic information in order to formulate questions in accordance with that framework. Moreover, questions regarding valuation purposes and the relationship between human error and quality were addressed. The purpose with these questions was to understand

how real estate valuators consider cognitive risk management and how they mitigate these risks in the valuation process.

2.3   Qualitative interviews

The third phase included eight interviews with external valuators. The main object with the interviews was to collect empirical data and thus provide an understanding of how real estate valuators address and mitigate cognitive risk in the valuation process. The purpose with the interviews was to achieve specific information from each respondent (Merriam, 1988), and therefore a qualitative interview approach was chosen since it has been shown to be beneficial for smaller groups of interviewees (Solvang and Holme, 2003). Qualitative interviews are also used to achieve the respondents' personal perspective, however they may also reveal valid facts (Kvale and Brinkman, 2009) and each interview is thereby of greater value rather than a huge amount of interviews such as in a quantitative interview approach.

The respondents were of different age and gender and they represented eight different companies operating in fields such as real estate valuation and analysis, property advisement, property services and external environment monitoring. The represented companies, all operating in the Swedish market, were a mix of large international organisations such as JLL, Savills and DTZ, medium-sized organisations working primarily in the Swedish or Nordic market, such as Newsec and Forum, as well as small consultancy companies such as Navet and Värderingsgruppen which are working exclusively in Sweden.

The interviews were made by phone in order to avoid misunderstandings or ambiguities, which written questionnaires may imply. Moreover, the possibility of committing physical interviews at each company's office was considered however not utilised due to time limits and practical issues due to the companies' different geographical locations. The interviews were constructed as open and relaxed but formal conversations and were semi-structured in order to let the respondents ask counter-questions within the theme of the original questions (Merriam, 1988; Sörensen and Olsson, 2007). Furthermore, the questions were asked openly in order to avoid answers such as simply 'yes' or 'no', and thereby creating possibilities for developing answers which could open for further discussions. The length of each interview varied between 20 and 50 minutes depending on how active the interviewee was and also how the questions were developed. However, six of the interviews were longer than 30 minutes allowing more deep-going conversations.

This approach implied interesting discussions concerning cognitive risk management and further questions and issues were raised during these discussions. The respondents were chosen due to their authorisation in real estate valuation in conjunction with their experience. However, even in this case there was an intended mix of individuals who have been authorised for a long time and individuals who rather have been authorised for a quite short time. The purpose was, similar to the mix of the organisations' size, to analyse if this could influence on the individuals' cognitive capacity.

2.4   Results and analysis

The final part of the research included a presentation of the results from the interviews followed by an analysis and a discussion based on these results. The approach of the analysis was to critically evaluate the answers from the respondents by looking at the theoretical framework and the findings made through it. By comparing the different answers with each other as well as comparing them to what previous research has stated, it was possible to further analyse the validity and relevance of how external valuators analyse and mitigate cognitive risk in valuation processes. Chapter 6 presents the concluding remarks, guidelines for further research and some reflections on the study.

3 Theoretical framework

The purpose with this chapter is to present a disposition of the theoretical framework used as basic information for the latter parts of this report. This chapter thereby submits the theoretical view of real estate valuation in conjunction with cognitive risk management in order to stress its limitations and relevance for research. The chapter is ended by a summary of the most relevant findings that will be used in the following parts of the thesis.

3.1 Definition of real estate

The Swedish real property law defines real property as limited land area, traditionally in two dimensions (Jordabalk, 1970:994). The land is divided into different real properties separated by their physical boundaries (Tagaeus and Johansson, 2008). Buildings are regarded as integrated fixed assets of real property and thus standing improvements and anything necessary for the continued use of them are included (Tagaeus and Johansson, 2008). Thus, real property can be defined as limited land area and what belongs thereto (Tagaeus and Johansson, 2008).

Pagourtzi et al. (2003:383), argue that: "*Real property is defined as all the interests, benefits, rights and encumbrances inherent in the ownership of physical real estate, where real estate is the land together with all improvements that are permanently affixed to it and all appurtenances associated thereto*". Graaskamp (1981) argues that one aim of real estate is to embrace physical activities for a specific period of time, e.g. for leasing purposes, and Mard and Todd (2010) describe assets as an aggregated sum of liabilities and equity.

3.2 Real estate valuation

According to Persson (1998), a real estate valuator needs to have sufficient knowledge of the market and the district in which he or she operates. Anderson and Funderburk (1989) and Roulac et al. (2006) emphasise the traditional view of real estate value as accumulated by different elements or prerequisites. Hence, there will exist more than one or two single factors in terms of real estate value.

In their elaborated review of real estate valuation, Pagourtzi et al. (2003:385) argue: "*A definition of a value is an attempt to clarify the assumptions made in estimating the exchange price of a property if it were to be sold in an open market*". These assumptions could be, for instance, the physical condition of the building, the current market conditions such as the relationship between supply and demand, speculations regarding possible purchasers and the nature of the legal interest (Pagourtzi et al., 2003).

Speaking of real estate value, there are several different kind of values, e.g. market value, fair value, book value, assessed or rateable value and asset value (Lorentzon, 2011). However, market value and fair value seem to be the two most common topics in previous real estate valuation research (Dorchester, 2011; Lorentzon, 2011; Mard and Todd, 2010; Pellegrino, 2011). In order to examine which kind of value is the more relevant to consider in the future implication of real estate valuation, market value and fair value will be analysed thoroughly below. By comparing and examining these

different kinds of value, it is possible to further determinate which kind of value that is relevant and, first and foremost, achievable in external valuation.

3.2.1   Market value

According to the International Valuation Standards Committee (IVSC, 2015) which aims to state definitions in valuation assignments by avoiding accounting or legal definitions: "*Market value is the estimated amount for which an asset should exchange on the date of valuation between a willing buyer and a willing seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion*". This definition thus emphasises the importance of each party's honesty and free will as well as it indicates the estimated price at a specific time.

Similar to this definition is an EU directive (91/674) which defines market value as: "*Market value shall mean the price at which land and buildings could be sold under private contract between a willing seller and an arm's length buyer on the date of valuation, it being assumed that the property is publicly exposed to the market, that market conditions permit orderly disposal and that a normal period, having regarded to the nature of property, is available for the negotiation of the sale*". This definition also stresses the estimated price at a given time, the importance of honesty and free will and adds conditions concerning the transaction itself.

In light of these definitions, Dorchester (2011) accentuates the terms willing buyer and willing seller in a transaction context, and further argues these conditions could be regarded as the fundaments of the definitions. Dorchester (2011) emphasises the similarities between market value and fair value and states that neither one is equal to the actual price that is agreed upon within the transaction. Dorchester (2011) argues that market value is not equal to asset value since market value is related to the question "what do I have to pay" while asset value is related to the question "what should I pay". Furthermore, Dorchester (2011) stresses the non-existence of long-term or solid value according to the definition of market value that claims the value is only appropriate on the date of valuation due to rapidly changing market conditions.

IVF (1995) has a similar, however narrower, definition of market value since it only describes the most probable price on a free and open market. Pagourtzi et al. (2003) further explain market value as a representation of a value in exchange, arguing that the real estate must be sold on the date of valuation in a context derived from the definition above. Therefore a real estate valuator needs to estimate the best use of the real estate, for instance the business opportunities in the building, where the determinations are made from market evidence (Pagourtzi et al., 2003). Lay Frics (1988), Fengge and Meng (2009), Wofford et al. (2010) and Lorentzon (2011) describe the complexity related to this as unreliable information, which is perceived as an obstacle to the valuator's cognitive capacity in interpreting and translating this information. This is further analysed below.

In light of this, Lorentzon (2011) argues that market value is one of the most common value concepts in practice, illustrating its relevance in external valuation. Dorchester (2011) shares this opinion and states that market value is one of the least understood terms in the Real Estate Business. Dorchester (2011) further stresses the common confuse of market value with market price since many valuators regard sales price as a

market value indicator based on the agreement of the price between two parties in a transaction. Even if some transactions may be a proof of market value it is not applicable universally or generically since the definition of market value is not to be considered as true for all situations (Dorchester, 2011). This may depend on an unreliable and unstable market with continuous fluctuations affecting the general price level.

Looking at market value fluctuations in basic terms, i.e. from a classic supply-demand point of view, derived from microeconomic theory, Figure 2 and Figure 3 below illustrate changing market conditions, i.e. fluctuations, and how these changes affect the equilibrium between the two curves (Frank, 2008). The equilibrium is made up of the intersection between the supply curve and the demand curve and represents the confirmed price that the parties have agreed upon in a hypothetical transaction (Anderson and Funderburk, 1989; Frank, 2008). The equilibrium could thus be defined as a state of balance, i.e. a price the market will move toward (Anderson and Funderburk, 1989). These curves are in each figure plotted into a two-dimensional diagram where the X-axis represents price and the Y-axis represents quantity (Frank, 2008).
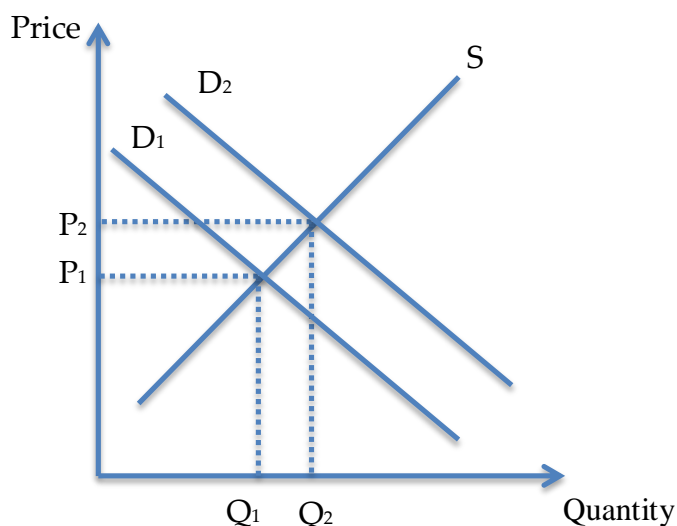
Figure 2. Supply-demand curve with an increased demand (Interpretation of Frank, 2008)

Figure 2 illustrates the situation where an increased demand (D_1 to D_2) leads to an increased price level (P_1 to P_2) as well as an increased level of transactions (Q_1 to Q_2) made on the market. On the contrary, a decreased demand implies a lower level of transactions in conjunction with reduced prices. (Frank, 2008)

Traditionally this theory is based on linear supply and demand curves as Figure 2 and Figure 3 illustrate, however in reality the curves are probably shaped as non-linear due to the conditions of the real estate market and the discussion regarding rapidly changing market conditions.

Price (y-axis), Quantity (x-axis). Curves labeled D, S_1, S_2. Price levels P_1, P_2 and quantities Q_1, Q marked.
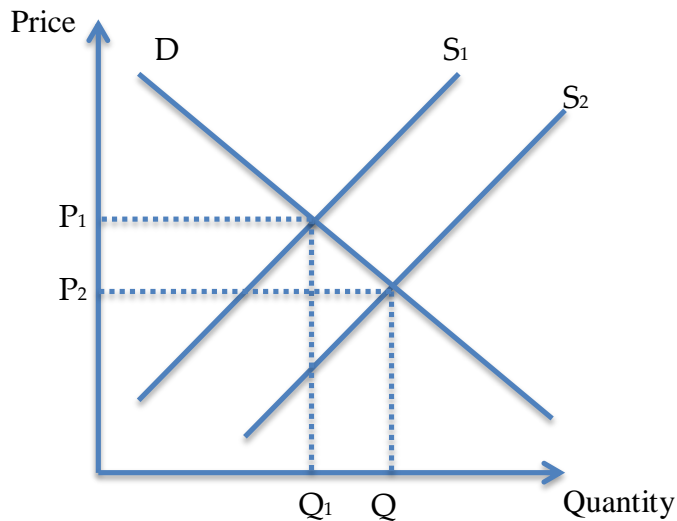
Figure 3. Supply-demand curve with an increased supply (Interpretation of Frank, 2008)

Figure 3 illustrates a similar situation as Figure 2 however with an increased supply (S_1 to S_2) as the affecting market condition. This change leads to a decreased price level (P_1 to P_2) implying declining real estate values as well as an increased quantity of transactions on the market (Frank, 2008). Thus it is important for real estate valuators to be familiar with these theoretical relations between supply and demand since they illustrate the effect of changing market conditions concerning real estate value (Pagourtzi et al., 2003). However, Dorchester (2011) argues that equilibrium is neither an element of market value nor a requirement for either market value or fair value due to the fact that market participants, at all market stages, interact in terms of price negotiation. On the contrary, Anderson and Funderburk (1989) stress the importance of supply and demand as relevant market factors to take into consideration for investors as well as valuators. Dorchester (2011) adds that investors are currently familiar with these concepts but valuators, on the contrary, have not fully agreed upon them.

Market value could thus be regarded as the kind of value to be used further since it seems to illustrate an immediate divestment value for the real estate company, however not in a long-term or solid perspective. In addition, market value reflects the external opinion of real estate value offering a supporting comparison to internal valuation. On the contrary, relying too much on market value may be devastating in times of fluctuating market prices in conjunction with unstable market conditions. Consequently, it is necessary to examine fair value as well, in order to find out if market value should be regarded continuously.

3.2.2   Fair value

According to IVSC (2015), fair value is defined as: *"the estimated price for the transfer of an asset or liability between identified knowledgeable and willing parties that reflects the respective interests of those parties"*. Similar to the definitions of market value, this definition accentuates the significance of willing parties as Dorchester (2011) observes as he claims a surprisingly similarity of fair value and market value.

However, for use in financial reporting under International Financial Reporting Standards, referred to as IFRS, fair value is defined by: "*Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date*". Despite the strong connection to internal valuation, i.e. for accounting purposes, this definition is more related to the traditional concept of market value than previous research has considered (Dorchester, 2011). Dorchester (2011) further argues that both definitions do not conflict with market value definitions, however there are differences that should be considered. Fair value, for instance, must be perceived from a seller's perspective due to the legal ownership of the asset. This fact does not neglect the buyer since, as Dorchester (2011:439) puts it, "a hypothetical transaction requires both parties", but in order to reach valuation decisions the same three level of information that valuators use for market value assignments need to be examined.

According to the Financial Accounting Standards Board, referred to as FASB, these three levels are addressed as the fair value hierarchy wherein each level applies the same fundamental rules as for market value determination. Regarding to Figure 4 below, Level 1 implies transactions that meet fair value concepts as well as divestments of identical properties, which is impossible by practice and hence not relevant in this context. Level 2 illustrates conditions in which similar properties are sold at the same time as they meet the requirements of fair value, which can be useful information in valuation, however in order to adapt to the current situation some adjustments may be required. Level 3 is applicable when Level 1 and Level 2 are not available, for instance when the economic conditions affect the transaction by not meeting the fair value definition, for example for liquidation purposes where there is a lack of willing parties. (Dorchester, 2011)

Level 1 → Quoted prices

Level 2 → Observable

Level 3 →No observable
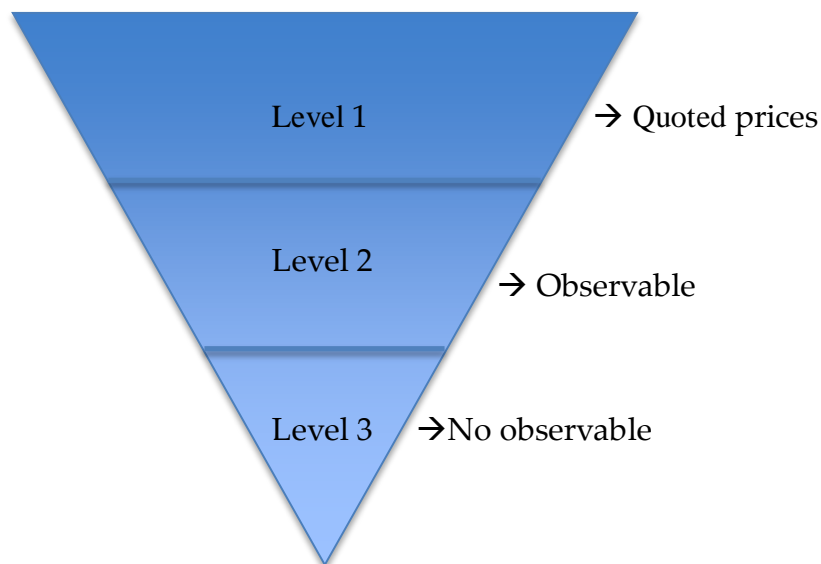
Figure 4. The Fair Value Hierarchy (Interpretation of Dorchester, 2011)

In his doctoral dissertation on determining fair value in the forestry and real estate businesses, Lorentzon (2011) describes fair value as strongly related to accounting according the second part of the definition above, similar to Dorchester's (2011) view of the connection to market value. According to the International Accounting Standards Board's, referred to as IASB, accounting standard IAS 40, fair value is described as the amount to which an asset could be disposed between knowledgeable and independent

parties which have an interest in the transaction (IAS 40.5). Lorentzon (2011) emphasises the similarities of this definition with the above definitions of market value and adds that fair value in general has been regarded as ambiguous. Bengtsson (2006) agrees as he claims that there exist several different concepts of value which may be confused with fair value. Parlagi (2009) shares Dorchester's (2011) opinion of fair value's similarity to market value as he stresses factors such as market conditions, location, physical and economic characteristics and business opportunities as relevant factors for the concept of fair value.

In spite of the discussion of the relevance of fair value in accounting, it seems that market value is to be preferred in an external valuation process since fair value is relevant for the internal valuation process. Moreover, the lack of an unequivocal definition of fair value in conjunction with its strong similarity to market value also supports market value to be analysed continuously. This similarity has led some authors (Graaskamp, 1992; Lorentzon, 2011; Mard and Todd, 2010; Pellegrino, 2011) to use the term "fair market value" or "fair market price" to describe the most appropriate real estate value at a given time, which thus could be regarded as a combination of fair value and market value. Furthermore, since the definitions of fair market value are equal to the presented definitions of market value, fair value will not be regarded in the further part of the thesis.

3.2.3 Valuation methods

According to Shiller and Weiss (1999), a real estate valuation method must enable a competitive advantage for the investor, illustrating its need of accurate valuators. Although this concept may be complex to translate into practice in terms of judging appropriate valuations methods due to faulty decisions by the valuators (Shiller and Weiss, 1999). Pagourtzi et al. (2003) stress that since there exist such differences between valuators in terms of, for instance, culture and experience, these differences will determine the appropriate valuation method. Graaskamp (1992) agrees as he describes real estate valuation as intrinsically linked to culture due to the valuator's chosen pricing technique.

As there is a variety of real estate value definitions as well as different kinds of values, there is also a variety of valuation methods (Pagourtzi et al., 2003; Wyman et al., 2011). According to Dorchester (2011), in the valuation process the valuator aims to reflect the thinking and acting on the market in purpose to assess the most probable price. Furthermore, in order for a valuation to possess validity, it needs to produce an accurate estimate of real estate value in terms of market price, i.e. it needs to correspond to the market value (Pagourtzi et al., 2003). The valuation model must therefore take the market conditions into consideration at the date of valuation in accordance with the market value theory presented above.

Pagourtzi et al. (2003) present two groups of valuation methods: traditional valuation methods and advanced valuation methods. The former include, for instance, comparable method, investment/income method, profit methods and development method. The latter include, for instance, artificial neural method, hedonic pricing method, spatial analysis methods and fuzzy logic. Graaskamp (1992) presents traditional valuation methods such as the gross rent multiplier, the net income multiplier and sale price multipliers and emphasise the practical use of them in terms of accuracy and reliability of the multiplying factors. These methods, however, work as rule of

thumb and are therefore probably more accurate for specific local real estate markets all with different multiplying factors (Graaskamp, 1992).

The National Land Survey of Sweden (2005) describes traditional valuation methods as the district pricing method, the current value method and the total cost of production method. The district pricing method derives from the price level of previous transactions including similar properties, connected to level 2 in Figure 4 in Section 3.2.2 (Lantmäteriverket, 2005). The current value method, illustrated in Formula 1 below, discounts future benefits and liabilities to the date of valuation, which can be regarded as a future cash flow method including a pre-decided discount rate (IVF, 1995; Lantmäteriverket, 2005). The total cost of production method highlights the production costs of a new building and can therefore be used as a complementary source rather than a solely valuation method, at least when it comes to new housing estates (Lantmäteriverket, 2005).

$$CV = CF_1/(1+r)^1 + CF_2/(1+r)^2 + \ldots + CF_n/(1+r)^n, \text{ where:}$$

CV = Current value, CF = Cash flow, r = discount rate, n = number of years

Formula 1. The current value method based on a discounted cash flow

Obviously, there are many valuation methods. Some of them are similar although named differently by different authors. Therefore, as Wyman et al. (2011) advocate, due to the discontinuity in the real estate market with fluctuating market prices, it is hard or rather impossible to determine which valuation method that is to be preferred in all situations since all real estate behaviour originates from cognition. Moreover, it may be hard to solely utilise a theoretical model due to diversity in internal valuation standards. Thus, this question is to be further analysed in Chapter 5 since it reveals the valuation methods used in practice. Before that, however, it is time to examine cognition in a real estate context.

3.3 Cognition

According to Wofford et al. (2011:372), "Cognition permeates real estate valuation", and it is their opinion that cognition is one of the most critical factors of the valuation process. Cognition is a psychological term which describes a tool humans use for processing data and information and it consists of knowledge, perception, memory and attention, as illustrated in Figure 5 (Barsalou, 2008).
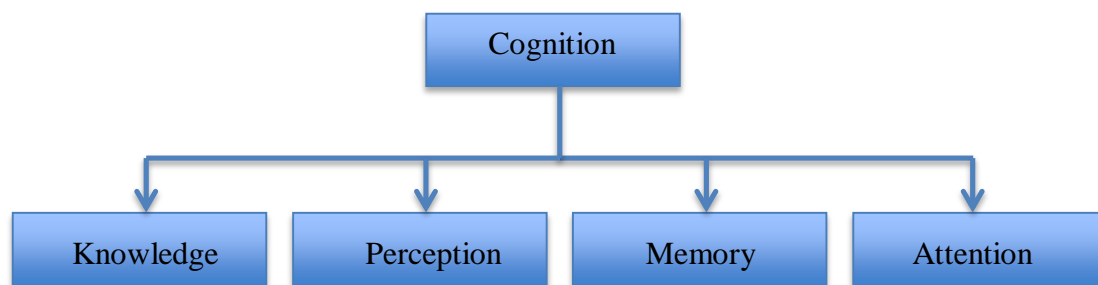

Figure 5. Example of cognitive components (Interpretation of Barsalou, 2008)

Due to the fact that real estate valuation takes place in a complex environment where different actors must process data that often are inaccurate, incomplete and changing over time, cognition is the tool which these actors use for processing data (Wofford et al., 2011). Wyman et al. (2011) agree as they describe the efficient market, including underlying assumptions such as perfect information and a rational valuator, as a commonly used paradigm for real estate valuation. Thus, Wyman et al. (2011) stresses the importance of cognition in a valuation context. Anderson and Funderburk (1989) accentuate the complexity of cognition in real estate valuation since each piece of real estate can be considered as a unique good, consequently real estate value cannot be assessed equally as appraisal of other goods or assets. Moreover, Wofford et al. (2011) highlight that cognition has not yet been considered as a risk factor in real estate valuation, which is why it neither has been considered as an important element in risk management. Thus, Wofford et al. (2011:70) raise the question: "to what extent can cognitive risk be managed?" and include the answer that like most explicit risks it can be managed to a certain degree however not eliminated. To better understand this question as well as its answer, it is relevant to examine how the human mind processes information and what previous research has stated.

3.3.1 Cognition in a historical context

Prior to the 1950s, some researchers began to analyse the human mind as an active entity and therefore the focus was set to how the human mind processed data and information (Wofford et al., 2011). From this research, early results emphasised the limitations of individuals' cognitive capacity where Simon (1955) discussed rational behaviour in terms of bounded rationality and Miller (1956) argued that the human mind can only process seven segments of information at the same time. Previous research also revealed that individuals use mental shortcuts in terms of biases and assumptions due to the limitations in their cognitive capacity (Wofford et al., 2011). This means humans deviate from rationality and therefore design their own interpretations from available information and data. However, previous research also discussed whether deviations from rationality are random or systematic and ended up stating that these deviations are to be considered as systematic (Wofford et al., 2010). Consequently, it is possible to create strategies to deal with the problems derived from biases and assumptions and thus produce significant results from it, as Wofford et al. (2010:269) argue: "Research indicates that deviations from rationality frequently exhibit a systematic component", allowing a possibility for analysis.

During the 1970s and the 1980s, the discussion of individuals' limited cognitive capacity developed from behavioural science to economics and finance implying its relevance in the real estate business (Wofford et al., 2010). Ratcliff (1972) stressed the importance of understanding behaviour of participants in the real estate market and Wofford (1985) discussed the cognitive impact in real estate investment decisions, highlighting its connection to real estate valuation. Moreover, Diaz (1990) introduced a research effort which analysed empirical behavioural in the real estate industry.

Thus, behavioural real estate, in terms of cognition, has imitated the research done on economics and finance (Wofford et al., 2010) where real estate valuation, compared to other real estate areas, has been prioritised in behavioural research (Diaz, 2002). Diaz (2002) argues this is why behavioural real estate research previously has been concentrated in terms of research scope, methodologies and research questions. In light of this, given the limited number of researchers in the field, Diaz and Hansz (2006)

developed a behavioural real estate paradigm with focus on implicit processes which has been considered as a de facto theoretical framework for previous research. On the contrary, Wofford et al. (2010) stress the development of explicit research paradigms in order to expand the behavioural real estate research scope and thereby achieve a better understanding of the field. By utilising expanded methodologies, knowledge and approaches, it is possible to develop current research paradigms and thereby improve the available framework (Wofford et al., 2010). Thus, an explicit approach to behavioural real estate research enables a more effective analysis of cognitive risk in real estate valuation.

3.3.2 Cognitive risk

Cognitive risk in real estate valuation includes a number of risks such as, communication problems, unreliable or insufficient information, stress and fatigue, distraction, time limits, inattention and bad work environment (Wofford et al., 2011). All of these risks can be regarded as distractions to the human cognitive capacity and are therefore to be considered as cognitive risks in real estate valuation. According to Wofford et al. (2011), many of these risks have been disregarded in previous behavioural real estate research as well as in practical real estate valuation. Many valuators are aware of information biases and are eager to confirm them, however it seems that valuators at the same time are ignoring data that are conflicting with those biases (Wofford et al., 2011). In light of this, Fengge and Meng (2009) argue that the behaviour of investors is affected by the market conditions in terms of price reactions, which can be explained from the limitations in valuators' cognitive capacity.

Recalling what stated in the previous section regarding improvement of the available research framework, Wofford et al. (2011) accentuate the question of what it should be useful for. Since cognitive risk create deviations from rationality, one approach could be minimising or eliminating those deviations through risk mitigation (Fengge and Meng, 2009). Therefore, risk management in terms of cognition is to be further analysed.

3.3.3 Cognitive risk management

Huffman (2002) stresses that even if investment and risk are strongly related in the financial literature, real estate investment should be regarded as a solely internal decision of the real estate company. This highlights the importance of trust between the real estate company and the external valuator and thus cognitive risk should be prioritised in terms of risk management and mitigation.

Wofford et al. (2011) emphasise the significance of cognitive understanding in behavioural real estate in purpose to address cognitive risks by utilise findings and applications from cognitive science. However, Wofford et al. (2011) raise the question whether or not the current results from cognitive science are yet enough to provide a strong and reliable knowledge base for addressing cognitive risk management. Since the findings from current cognitive research continuously provide new questions and applicable methodologies, it is hard to evaluate the current breadth of the available theoretical framework (Wofford et al., 2011). On the contrary, when focusing on practical cognitive risk management, there are other disciplines that are applicable in a more or less limited cognitive risk management framework (Wofford et al., 2011).

Wofford et al. (2011:376) describe available disciplines for managing cognitive risk as: "behavioural economics, behavioural finance, communications theory, organisational theory, organisational design, futuring and strategic foresight, strategic planning, enterprise risk management, networks, systems, human error, failure, ergonomics, high reliability organisations and time". Wofford et al. (2011) acknowledge that this is, as a matter of fact, a mix of theoretical and practical disciplines for cognitive risk management and this set of disciplines is intended to be suggestive rather than exhaustive. This set of disciplines shows the diversity of managing cognitive risk and thus some of the disciplines, which Wofford et al. (2011) highlight as relevant for external real estate valuation, will be analysed further here in order to create a framework for cognitive risk management.

Futuring, also related to as planning, and strategic foresight is not about prediction but rather tools for analysing probable, possible and preferred futures. By using different methodologies it is possible to examine different situations which may appear and also the stream of actions which are producing them. Planning identifies goals and objectives in order to reach preferred futures while strategic foresight provides possibilities. Another essential aspect of futuring is to analyse the timespan for which a valuation can be considered as valid and reliable. There is a risk connected to valuations which have been made some time ago, at least on volatile markets with unstable conditions. (Wofford et al., 2011)

Cognitive risk management is also connected to systems where people, processes, technologies, law, valuation standards and policies are embedded. In external real estate valuation these aspects may have a large impact on the valuator's cognitive ability since he or she may be limited by organisational and systemic influences as well as by directions from people in the valuator's environment. For example if a valuator works at a small sole proprietorship he or she is not affected to the same extent as a valuator working at a large multinational firm. (Wofford et al., 2010; Wofford et al., 2011)

According to Reason (1990), human error and failure are not random and may therefore be reduced to recognisable problems based on rules, skills and knowledge. Furthermore, approaches to reduce human error and failure may include defences, training and the cognitive environment (Wofford et al., 2011). Human error derives from individuals' cognitive capacity and is affected by factors such as stress, communication and information (Wofford et al., 2011).

Highly reliable organisations are characterised by an attention to failure, a reluctance to simplify and disregard, compassion to operations and commitment to flexibility (Wofford et al., 2011). These characteristics support an organisation to mitigate cognitive risk connected to, for example, future human error and failure and they also allow flexibility when error or failure occur (Wofford et al., 2011). These organisations are further associated with quality which implies the importance of quality assurance in terms of valuation statements (Hollnagel et al., 2006). Hollnagel et al. (2006) accentuate that organisations which have these characteristics stay strong and resilient in an unstable environment affected by cognitive factors.

Concerning the time aspect, Graaskamp (1972) argues that real estate deals with the difficulties of space over time in conjunction with change and its impacts. This implies issues on rapidly growing markets where the demand exceeds the supply and thus forces the prices to deviate upwards from equilibrium. The difficulties are associated with

growing cities where change means different future demand in certain geographical areas (Mueller, 2013). This fact might have an impact on the valuation since it requires analyse of future exploitation and usage of facilities (Mueller, 2013). Hence, the relationship between time, cognition and real estate behaviour is considered as multifaceted (Wofford et al., 2011).

To sum up, a cognitive risk management (CRM) based on these practical disciplines involves futuring, systems, human error or failure, high reliability organisations (HRO) and time. Figure 6 illustrates these disciplines in a cognitive risk management framework which can be used for addressing cognitive risk in external real estate valuation.
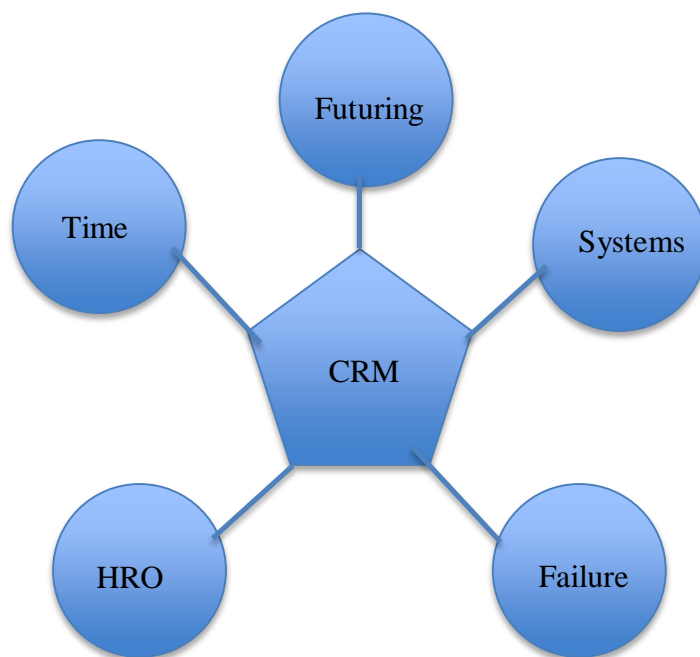

Figure 6. Cognitive risk management framework excluding mitigation aspects

3.4   Summary of Chapter 3

This section aims to present the most relevant conclusions which can be drawn form the theories in this chapter. These conclusions will thus be the base for the questions to the external real estate valuators.

Real estate is considered as a limited area of land including any integrated building, standing improvements and anything essential for the continued use of the building. There exist several different kinds of real estate value and various definitions, however, it seems that market value and fair value are the two most common in current practice. In brief, market value represents the most probable price on an open market where a willing seller and a willing buyer make an agreement of a transaction. Fair value is often defined similar to market value however it seems to be more related to financial reporting, i.e. to be used in internal valuation.

As there are several different definitions of real estate value there are also several valuation methods although some of them seem to be the same despite their name.

However, it is hard to state which valuation method that is to be preferred in all situations due to the discontinuity in the real estate market and the diversity in internal valuation standards.

Cognition is a tool used for processing data and information and since it is perceived as an individual skill, it implies cognitive risks due to variable conditions. Cognitive risk is related to behavioural sciences and the ability of managing cognitive risk is affected by planning, systems, human error, high reliability organisations and time. These disciplines can together be used to create a cognitive risk management framework.

4 Results

In this chapter the results from the empirical research are presented. The questions used are found in the Appendix. All interviews with the eight valuators, also referred to as respondents, are presented together, i.e. each interview will not be presented individually, although some deviating answers will be presented more in detail. Moreover, the answers are, from Section 4.4, separated according to the disciplines already presented in the cognitive risk management framework. The purpose of this is to be able to consider and compare all information gathered from the interviews at once. Important findings are summarised in the end of the chapter.

4.1 Market value

Initially, when asked about market value, each respondent highlighted aspects similar to IVSC's (2015) definition of market value, i.e. the most probable price on a free and open market where a willing seller and a willing buyer meets within an arm's length transaction at the date of valuation. As a matter of fact, some valuators mentioned the similarities to IVSC's (2015) definition and added that they worked according to the definition of market value within the Royal Institute of Charted Surveyors (RICS) Red Book. The Red Book provides standards and guidelines for professional valuation and when asked about its definition of market value in detail, each valuator who mentioned this book also verified the similarity to the IVSC (2015) definition of market value.

However, during the discussion of the market value definition, some respondents mentioned that their organisation has simplified the IVSC (2015) definition by disregarding some of its elements. For instance, the condition of making an agreement within an arm's length transaction and the condition of independence parties are not prerequisites for market value according to some of the respondents. Furthermore, some valuators accentuated that market value is defined with respect to what the buyer is willing to pay rather than with respect to the price the seller claims. On the contrary, the majority of the respondents stress the importance of a willing buyer as well as a willing seller in order to define market value.

Connecting market value to supply-demand theory encouraged the valuators to distinguish price from market value and thus develop their answers from the previous question. The majority stressed its connection by expressing that market value is a function of supply-demand, i.e. the equilibrium of the two curves in Figure 2 as well as in Figure 3 in Section 3.2.1.

This view of market value was, as mentioned, developed from the previous question and was discussed with the respondents which raised the current increase in real estate prices as a further interesting question. This price increase is the result of high demand together with insufficient supply and the respondents derive this from the current economic situation. These conditions imply transaction agreements with prices that exceed the equilibrium between supply and demand, i.e. prices higher than market value, due to the lack of available objects on the market. This has led to transaction price records with all time high prices. Some of the respondents added, on the contrary, in situations where there are many available objects on the market in conjunction with a low demand imply prices less than market value. However, these statements are in

conflict with the market value definition which might be due to the respondents' mix-up of market value and fair value.

4.2 Valuation methods and models

All respondents reported that they use a cash flow model in combination with the district pricing method. This means looking at a discounted cash flow for a certain number of years and at the same time analyse previous transactions in the same market with similar objects. In light of this, one of the valuators raised an issue with the district pricing method regarding the situations where there are no similar historical transactions made on the market, implying there are no comparable yields, prices or even indicative market values that can be utilised in the valuation process. In these situations, more assumptions and guesses need to be made and these are affected by the valuators cognitive capacity. Furthermore, the majority of the respondents also used a rate of return method in combination with the cash flow method and the district pricing method. Here, the valuators analyse previous transactions in order to derive a probable rate of return, also referred to as yield, which is measured as a percentage of the market value. Some respondents also highlighted that sometimes it is relevant to complement these three methods with an annual construction estimate in order to take short-term construction investments such as reparation into account.

Figure 7 presents the relationship between these four methods as discussed by the respondents, the crosshatched lines represent the interfaces that separate the two methods used by all respondents, the method used by the majority (I_1) and the method used by only a few (I_2).

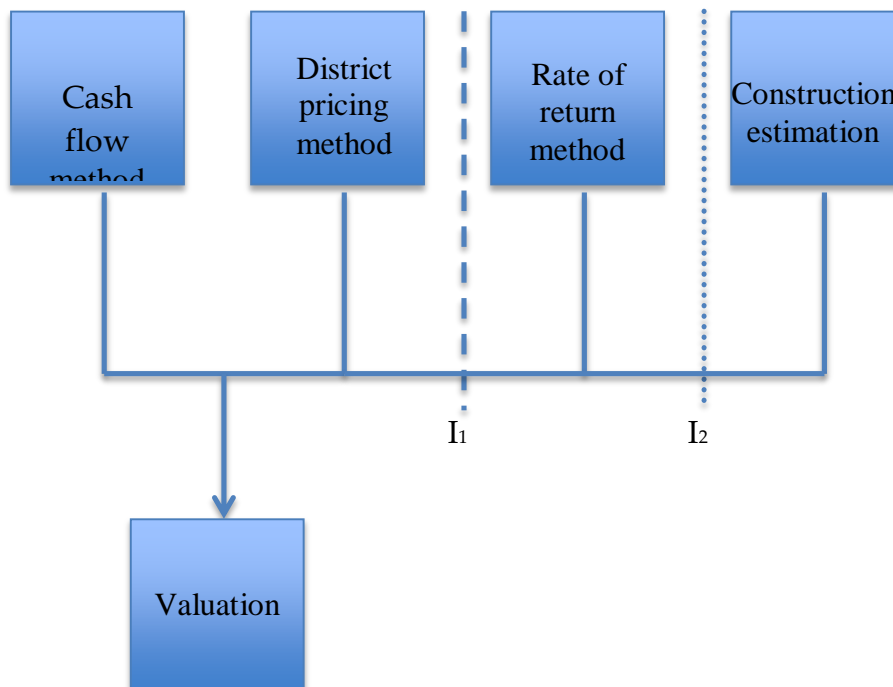**Figure 7. The four observed valuation methods separated by two interfaces**

Furthermore, the valuators accentuated they use an internal cash flow model based on the traditional cash flow method as expressed in Formula 2 above. Even if all

respondents stressed the importance of using the internal model, some of them who have worked in different valuation organisations described the different models they have operated as more or less the same. The aspects that differed the cash flow models are rather the adaption to the organisation and sometimes the programme that is used for the specific model. The basics of the different cash flow models seemed to be equal according to these respondents.

Depending on the contract between the real estate company and its tenants, the number of years that is taken into account varies, however for normal objects not more than 10 years are usually taken into account. According to some of the respondents, using the cash flow model on more complex objects, e.g. special facilities adapted for local government, requires more than 10 years to be discounted due to contracts which may span over 20 or 30 years. However, the more years that are taken into account, the more assumptions need to be made in terms of future vacancies, adjusted rents due to changes in retail price index, the building's future residual value, future operations and maintenance. Thus, one respondent claimed that it is sometimes possible to use a cash flow model that only takes one year into account in order to mitigate the risks derived from assumptions and guesses. On the contrary, this is only appropriate for real estate located in small markets where there is little activity either in the real estate or in the market itself.

4.3 Valuation purposes

According to all respondents, the main purposes with external valuation are for financing, also referred to as mortgaging, and for final accounts either quarterly or annually. Moreover, some respondents highlighted that they do valuations for purposes such as refinancing and revaluing in order for the client to check the value of his or her portfolio to be able to satisfy the requirements for common equity. This is appropriate in situations where, for instance, buildings are depreciated and an external valuation has not been made for a long time implying, as described by one of the respondents, a reality check for the client. Some respondents claimed that they do valuation for consulting purposes, which can be at the seller's as well as the buyer's side in an upcoming transaction. Additionally, some valuations are made as decision basis for investments, which can be acquisition of new real estate as well as for future refurbishment and real estate development. One of the respondents also added valuation purposes such as in compulsory purchase or in disagreements between two parties, who can be represented by a seller and a buyer or a real estate company and a creditor.

However the main purposes are, as described above, for financing and for final accounts and all valuators stress these as the majority of their assignments. Valuations for financing purposes are spread equally over the year while valuations for final accounts are intense at the end of the year and at the end of each quarter. Figure 8 below illustrates the observed valuation purposes and the sectors represent an approximation of the most common valuation assignments according to the respondents.
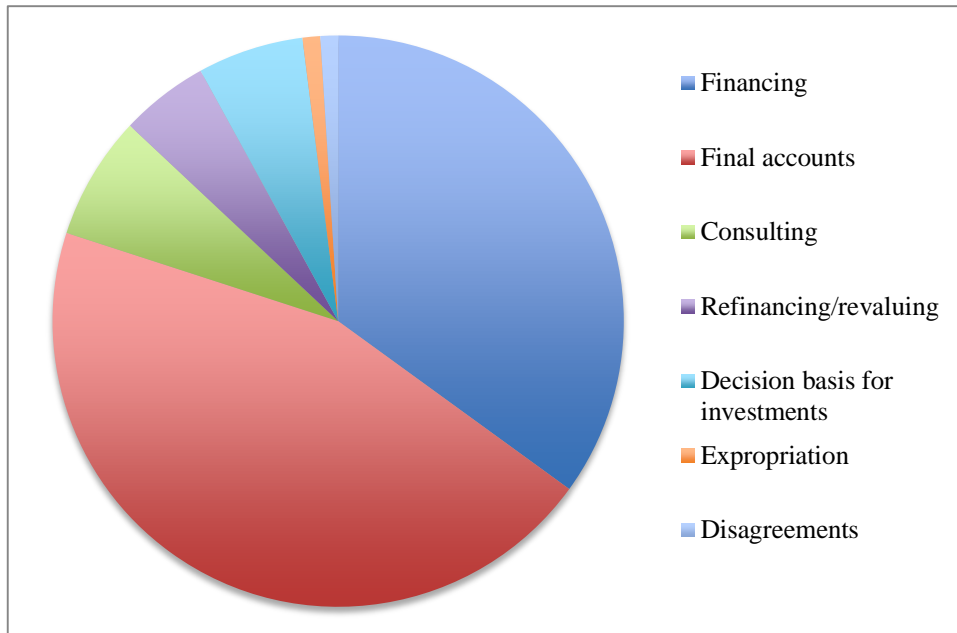
Figure 8. Common valuation purposes according to approximate activity

4.4 Futuring and strategic foresight

Looking at futuring in terms of reliability of valuations, the respondents had quite different views of the timespan for which a valuation can be considered as valid and reliable. The majority stated that their valuations are immediate snapshots only valid for the time of valuation. This implies validity for not more than one day, i.e. the date on which the valuation is made, due to the rapidly changing market conditions which currently have a high impact on real estate prices. Some of the valuators, however, stated that it is possible to make decisions based on valuations that are one to three months old. According to these respondents, depending on the market the object is located in, it may be possible to make decisions up to one year after the valuation, assumed it is located in a non-volatile market. Although, none of the valuators believed it is possible to make decent decisions based on valuations older than one year.

Figure 9 demonstrates the differentiation of perceived validity period of valuations. The stars represent each respondent and thus Figure 9 illustrates that the majority of the valuators believe a valuation is only valid at the date of valuation.
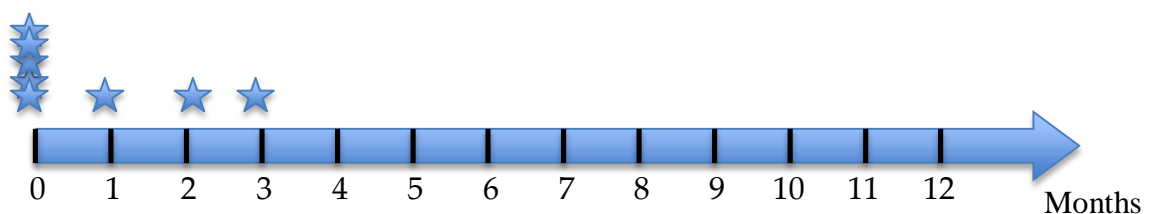

Figure 9. Differentiation of perceived reliability of valuations

In terms of strategic foresight, many valuators acknowledged their lack of technical competence due to their background as land surveyors. Also, they acknowledged that this might have an impact on the valuation since they risk missing future investment

due to required services, e.g. installation of an expanded ventilation system or repairs of the current cooling system. These neglecting in future expenses have a positive effect on the cash flow implying the risk of overestimating the market value.

In order to mitigate these risks, the respondents stressed the importance of communication with the client, and available technical competence. Concerning communication, clients whose core business is not concentrated to real estate, such as banks, funds and small private real estate owners, do not possess adequate knowledge about the real estate market. These clients thus believe valuations are valid for a longer time than they actually are, indicating the significance of good communication. However, this is not usually the case with large and established real estate companies who are up to date and active on the market themselves. In spite of the respondents' lack of technical knowledge, some of them claimed that their organisation has mitigated this risk by hiring construction engineers supporting the valuators with technical competence.

4.5   Systems

The respondents' immediate reaction to the questions regarding limitations derived from systems, were that they were not limited by systems at all. They were aware of the impact of systems and argued that they need to behave and act accordingly, but they claimed that this fact did not imply limitations in the valuation process. However, going into details including issues discussed in the theoretical framework, some of the respondents started to recognise limitations which might have an impact on the valuation.

As licensed valuators, the respondents also have to relate to ethical requirements apart from all legal aspects related to valuation. These ethical requirements concern how a valuator should act, compared to the legal requirements which control how a valuator must act. Regarding the legal aspects, the respondents mentioned, in a Swedish context, the Rental Act, the Registration of Property Act, the Planning and Building Act and the Accounting Act. However, some of the valuators argued these legal aspects do not limit them, although they have to act according to them. On the contrary, some valuators stated that of course these legal aspects limit them since they, as previously mentioned, prescribe how they must act.

For the technology aspect, some respondents mentioned limitations in systems where, for instance, they look at maps, prices from previous transactions and guideline values concerning geographical areas relevant for applying the district pricing method. Some of these systems are not always properly updated and thus incorrect, which might have an impact on the single valuator's cognitive capacity.

Some of the valuators highlighted issues in situations where clients demand valuations based on a short periodicity, for instance, dividing the first year into months. Then, the cash flow must be analysed monthly instead of annually implying assumptions to be supported more in detail. Moreover, the fact that you never work independently is also regarded as a systemic limitation by some valuators. It seemed to be common that clients require safety in the valuations having the valuators to sometimes make negative assumptions, e.g. in approximated future rental growth. The valuators' cognitive capacity is thus affected by the client's requirements which limit the process by influencing the valuators' independence. According to one of the respondents, some

clients also try to affect the outcome of the valuation by continuously trying to affect the valuator's work. This is, however, more common in situations with clients dealing with insolvency and bankruptcy.

Figure 10 demonstrates the systemic limitations observed by the respondents and thus highlights external influences on the single valuator's cognitive capacity. Technology and law have both been mentioned in Section 3.3.3 as well as 'people', which here is represented by client.
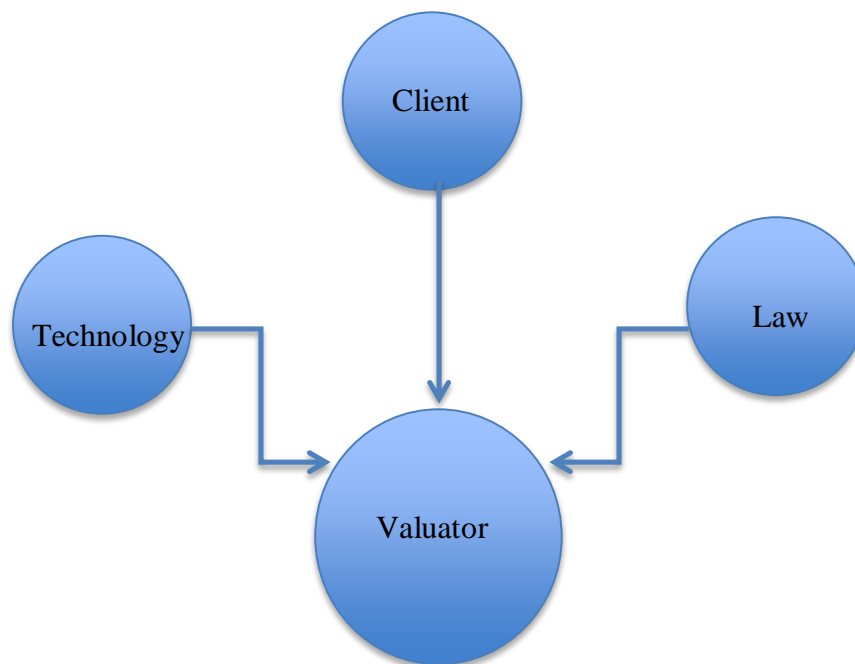
Figure 10. Observed systemic limitations

In terms of risk mitigation, the respondents claimed support in law by legal experts, where some of them had these resources internally in their organisation. Concerning the client aspect, it is important to be distinct in the interrelation with the client but also to be a good listener. Sometimes the client have important and useful information to convey, for instance, one respondent mentioned a client who knew the rental rate for a neighbouring facility. The technology risk seemed to be mitigated by the utilisation of alternate sources, as some of the valuators described that they looked into alternate systems when facing technology issues.

4.6   Failure/Human error

Failure or human error is maybe the most relevant problem when looking at cognitive risk management. As discussed in Section 3.3.2 and Section 3.3.3 previous research has identified factors such as information, communication and stress as connected to human error. In light of this, all respondents accentuated stress in conjunction with short deadlines as the primarily causing factor for failure. Some of them argued that this is quite observable at the moment due to the current economic situation with a growing market including numerous transactions. All valuators experienced a high current workload defined by short deadlines, insufficient information and stress. Some

respondents accentuated that this is connected to the time for final accounts, thus at the end of each quarter and especially at the end of each year. The main problems that derive from short deadlines and stress are that the valuators do not have the time to make critical and accurate valuations and some of them experienced that they sometimes had to deliver a non-elaborated valuation statement. Moreover, short deadlines also increase the risk of mistakes due to the lack of time.

As the second most impacting factor in terms of human error, the majority of the valuators mentioned unreliable and insufficient information. This factor is more often than not connected to short deadlines and stress, and it seems to be more common in larger markets. The problems are that insufficient information limits the valuator's cognitive capacity and unreliable information has a negative impact on it. Insufficient information might imply that the valuator does not fully understand the situation and thus unintentionally ignores aspects which affect the outcome of the valuation. One valuator highlighted issues concerning the valuation of potential construction rights, due to several uncertainties. Unreliable information can be, for instance, incorrect data for the current rental value or the status of mechanical services.

Regardless of situation, unreliable and insufficient information are strongly connected to communication with the client. According to some of the valuators, the communication is primarily affected by the client's business and there is a difference between professional and non-professional clients, as in the case with future real estate value discussed in Section 4.4. Professional clients might be real estate companies and these clients are often well prepared, do know what they want and are able to communicate this to the valuator. Non-professional customers, however, can be banks and funds and they usually have problems to communicate what they want and do not understand what is important for the real estate value.

Figure 11 outlines the observed risks in terms of failure and human error, as claimed by the respondents. The size of each arrow represents to what extent the respondents experienced its effect on cognition. As mentioned above, stress as a consequence of short deadlines was the primary affecting factor, followed by inadequate information and errors in communication with the client.

Stress   Information   Communication
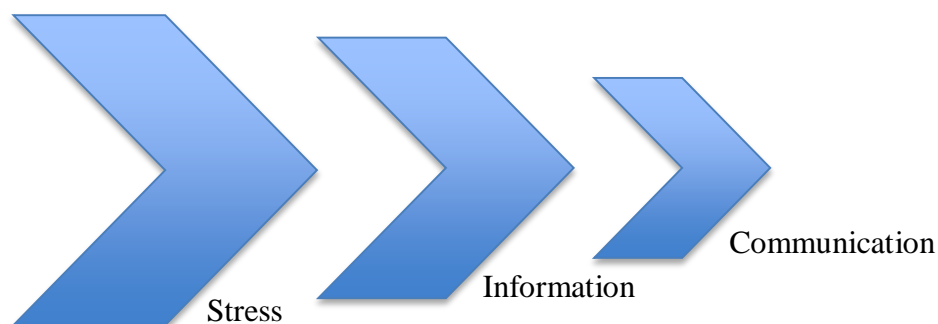
Figure 11. Experienced aspects of failure/human error

In order to mitigate the risks associated with stress, unreliable or insufficient information and communication with the client, some valuators claimed they usually include a disclaimer saying that the valuation statement illustrates an indicative market value only reliable at the exact moment of the valuation. Some respondents stressed the

importance of working systematically and critically, despite the stressful situation and information issues.

Regarding stress, one respondent argued this is only a question about dealing with the client since it is he or she who has set the deadline. This respondent emphasised that often the deadlines are subject to negotiation and thus manageable. If there is a lack of information, some valuators mentioned that they sometimes use alternate sources in order to get the relevant information, e.g. turn to the National Land Survey of Sweden or the local municipality for specific real estate data.

4.7   High reliability organisations

High reliability organisations (HROs) are, as discussed in Section 3.3.3, is a concept associated with quality in order for them to be flexible and possess an attention to failure. Since the respondents represented both large and small organisations it was possible to examine whether or not the size of the organisation had an influence on these aspects.

Regarding quality, all valuators primarily stressed knowledge of the local market regardless of the size of it, elaborated and thus supported assumptions and well-constructed valuation reports without any errors in data as well as in language. In order to provide quality in a valuation statement it is not enough to only provide one or two of these quality aspects since they are all connected and required. Some of the respondents added the time aspect in terms of delivering the valuation statement within the deadline. Furthermore, the majority of the valuators related quality to Section 4.5 and Section 4.6 as they accentuated the importance of communication with the client, using an adequate number of comparable transactions and assuring that reliable and sufficient information is retrieved. However, the important aspects of highly reliable organisations seemed to be good local knowledge, supported valuation statements and well-written reports without errors.

Figure 12 illustrates as a triangle the respondents' view of the most important aspects related to highly reliable organisations.
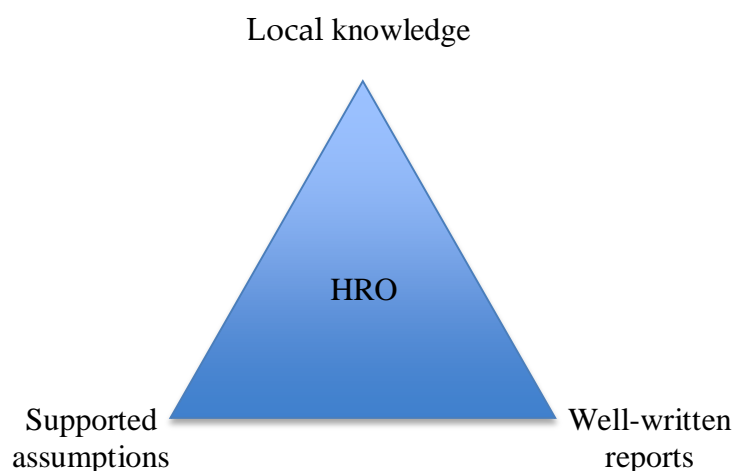

**Figure 12. Stressed aspects for highly reliable organisations**

In light of this, it was noticed that risk mitigation, in terms of the quality assurance process, differed in the respondents' organisations and partly the process seems to be related to the size of the organisation. The majority of the valuators utilise peer review and proof reading and thereby assure that it is always at least two individuals who look at and sign a valuation statement before it is handed over to the client. The peer review process seems to vary since some respondents claim that they scrutinise each other's valuations in detail, while some respondents argue they only consider the plausibility rather than examining each other's valuations in detail. On the contrary, one respondent who represents a smaller organisation stated that they do not utilise peer review for quality assurance and that they are signing their own valuation statements individually. However, instead they are supporting each other during the valuation process in order to use each other's competence and professional knowledge.

Some of the respondents which represented larger organisations mentioned that there might be more than one valuator working from scratch with the same object, e.g. in situations including large and complex buildings with many attributes that need to be analysed or in situations including many objects at once, such as in portfolio valuation. However, this was not the case in the smaller organisations due to lack of resources. As in previous sections, some respondents emphasised the importance of internal specialists in fields such as construction technology, economics and law.

4.8   Time

Addressing time in terms of future change in demand, the respondents stressed the interpretation of local plans. Also here differentiated views of the impact regarding to time and change were observed. According to the majority of the respondents, the local plan determines the value of land, mostly by defining construction rights, and hence affects the long term aspect of the valuation. These respondents addressed the risks associated with the current status of the local plan and three levels of impact were noticed. Firstly, current local plans do not imply high cognitive risk since they are often quite distinct in defining construction rights, permitted business operations and detailed regulations in general. Thus, there is little space for assumptions and guesses left for the valuators which implies a quite low impact on their cognitive capacity. On the contrary, even if there is a detailed current local plan, it is always possible for the municipality to change it in the future, forcing the valuators to analyse the future anyway. Secondly, local plans in progress implies higher cognitive risk since the valuators need to make more assumptions based on what they do believe will be the outcome of the local planning process. However, it is possible to predict the most probable outcome and thus take this into account in the valuation process. Lastly, in situations where there is no local plan at all, the valuators are required to make numerous assumptions of the future use and how a future potential local plan would be made. Moreover, if there is no current local plan there are no expressed construction rights or other detailed regulations which increase the complexity of the valuation. This situation implies the highest level of cognitive risk due to numerous required assumptions and guesses of the future.

Figure 13 below illustrates three levels of cognitive risk related to time and change where the complexity of valuation and thus how the status of local planning or the local plan (LP) has an increasing impact on the valuators' cognitive capacity.
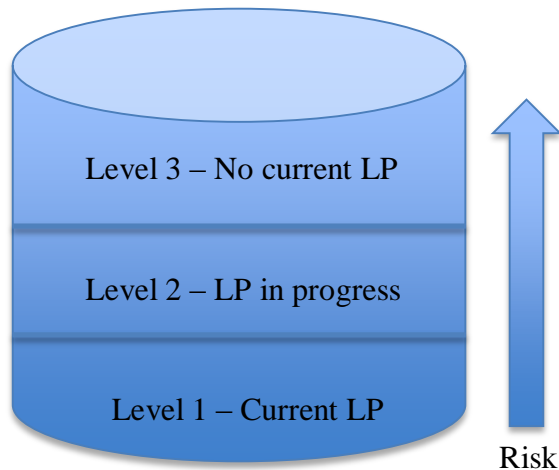
Figure 13. Local plans and levels of cognitive risk related to time and change

Despite what has just been stated, two of the respondents argued that they were not affected by the local plan, regardless of the level it represents. They claimed that the LP effect is already adjusted by the market, appearing e.g. as the required rate of return from the client.

Looking at risk mitigation, some of the valuators accentuated that their organisation had created their own risk matrix concerning probability of future property development related to time. This seems to be a tool for addressing this kind of cognitive risk and thus minimising its impact on the valuation. Furthermore, one respondent stated that in a situation where there is no current local plan, the surplus value is reduced by 50 % in the valuation, in order to minimise the risk of overestimating the market value. However, as mentioned by another valuator, this might underrate the value in a growing market.

4.9   Summary of Chapter 4

To sum up, the respondent views of market value corresponded to the IVSC (2015) definition of it, and some of the respondents also referred explicitly to this definition. The current economic situation has lead to market values deviating upwards from equilibrium regarding to the expected long term relation between supply and demand. The respondents believed that this is one reason for new transaction price records being set continuously.

The two most common valuation methods used by the valuators were the cash flow method and the district pricing method. Also, some respondents use the rate of return method and additional construction estimates. All respondents claimed they use an internal cash flow model, however, respondents who had worked on several organisations believed that these internal models are more or less the same.

The two most common valuation purposes were for final accounts and financing. Moreover, external valuation is used for consulting in general, refinancing or revaluing and as decision basis for investments such as refurbishment or development.

In terms of futuring, the majority of the valuators stressed that the validity of a valuation is only appropriate at the date on which the valuation is made. On the contrary, some respondents argued that valuations might be valid for at least one to three months. Also, the lack of technical competence was highlighted. These risks are mitigated by communication with the client and by the utilisation of internal resources such as construction specialists.

Regarding systemic limitations, the respondents argued that they were limited by the client, law and available technology. Risk mitigation included listening to and interacting with the client, support by legal experts and the utilisation of alternative technology.

Failure and human error were illustrated by risks such as stress, information and communication. Stress was argued as the most crucial cognitive risk, followed by information issues and communication errors. The cognitive risks derived from these aspects are mitigated by systematically work, disclaimers and support from external resources, e.g. by looking at real estate data from the National Land Survey of Sweden.

In order for valuators, working in highly reliable organisations, to provide quality in valuations, they need to have good local knowledge, make elaborated and thus supported assumptions and deliver well-written reports without errors. The cognitive risk related to these aspects is, in larger organisations, mitigated by the use of peer review while in smaller organisations the valuators support each other during the valuation process.

Regarding the impact of time and change, three levels of cognitive risk were found to be associated with local plans. Level 1 represents situations where there is a current local plan, Level 2 represents local plans in progress and Level 3 represents situations where there is no local plan in force. The cognitive risk increases by each level. The risks with time and change were managed by, for instance, the use of an internal risk matrix.

5 Analysis and discussion

The purpose of this thesis was to analyse the implications of cognitive risk in external real estate valuation in order to propose a framework for addressing cognitive risk and the mitigation of it. The purpose was further divided into two research questions:

➢ *What implications does cognitive risk have in external real estate valuation?*

➢ *How do external valuators address cognitive risk in order to mitigate its implications?*

Thus, this chapter aims to analyse the results presented in the previous chapter and develop the risk management framework illustrated in Figure 6, in order to present the mitigation aspects of it. The chapter is summarised by answering the two research questions.

5.1 Market value

Remarkably, it seems that the IVSC (2015) definition of market value is the common interpretation from external valuators since none of the valuators considered market value as the actual price, but rather a future price indication. However, one out of the eight respondents stated that their organisation used a simplified version of the IVSC (2015) definition since they believed that market value did not have to include an exchange within an arm's length transaction. The question is whether or not this could be accepted due to the fact that this is stated in the IVSC (2015) definition. Since it seems to be a common agreement in theory and in practice that the IVSC (2015) definition is governing, it could be argued that it is possible to add rather than delete prerequisites in order to define market value. Hence, organisations which use a simplified definition of market value do not really describe market value in their valuation statements.

Fair value is according to previous research not that relevant in external real estate valuation, which was confirmed during the interviews. Questions addressing fair value were not included into the questionnaire but when fair value was addressed out of topic, some of the respondents stated its similarity to market value.

Regarding the connection between market value and supply-demand theory, the theoretical view of it includes a difference between equilibrium and market value while the practical view of it promotes similarity. According to current research, equilibrium is what the market approaches, and since market value and price might not be equal, neither will equilibrium price and market value.

5.2 Valuation methods and models

Interestingly, the respondents seemed to work partly differently, despite the fact that all of them used some kind of cash flow method combined with the district pricing method. However, as Figure 7 in Section 4.2 has illustrated, there is a distinction between the respondents who complemented these two methods by using a rate of return method and the respondents who used additional construction estimates. The reason for this distinction might be that the valuators who did not highlight the rate of return method

and construction estimates also did not consider these as proper valuation methods. On the contrary, the purpose with the question was to examine whether or not the respondents used the theoretical methods described in Chapter 3, and thus not to analyse how they actually used these methods in detail. Moreover, none of the respondents highlighted the complex valuation methods presented in Section 3.2.3.

Another interesting aspect that was addressed was the fact that several real estate valuation companies seemed to use more or less the same kind of cash flow model. The respondents stated that they had worked at several valuation companies in Sweden and their opinion was that there were small differences between the valuation models they had used at each company. The reason seemed to be that during the 1990s, one particular organisation initiated the fundamentals of a digital cash flow model which all current cash flow models originate from. Obviously, cognitive risk implies that even if the different valuators work in the same valuation model, the final valuations would differ. Furthermore, the majority of the respondents highlighted that even if two individuals work in the same organisation and are about to value the same object in the same valuation model, the valuations will differ due to the individuals' different cognitive capacity.

5.3   Valuation purposes

Since the respondents were unable to state precisely how much activity their organisation puts in each kind of valuation, Figure 8, illustrated in Section 4.3, is only an approximation of their answers. However, the respondents seemed to be united in terms of the different valuation purposes since all emphasised that they do valuations primarily for final accounts and for financing purposes. The fact that they stressed final accounts as the most common purpose implies risk connected to failure and human error. Since clients who request valuations for final accounts present final accounts at the end of each quarter and at the end of each year, the workload for external valuators is at its peak at the end of each quarter. Consequently, factors such as stress and fatigue will have an impact on the valuators' cognitive capacity.

One respondent representing a smaller valuation company expressed that they do valuations for purposes such as compulsory purchase and disagreements. However, these valuation purposes should not imply assessing market value due to the IVSC (2015) definition. Compulsory purchase, for instance, represents forced sale, i.e. it does not always include a willing seller and thus it is not possible to orient the valuation primarily to the market value. Nevertheless, this respondent failed to make this distinction.

5.4   Futuring and strategic foresight

Although there was little variation in the respondents' perception of the reliability of valuations, all respondents did not share the view of the validity period for a valuation. The majority of the respondents regarded it as valid only at the date of valuation, and they thus agree with the IVSC market value definition. The respondents stating that a valuation could be valid and reliable for one to three months might be correct, but they are not really talking about market value according to the IVSC definition. However, it needs to be added that Figure 9 in Section 4.4 illustrates the current situation perceived by actors in the major Swedish real estate markets. In times of a different economic

situation or in small local markets, it may be different. However, as Fengge and Meng (2009) accentuated, the behaviour of investors is affected by the current market conditions in terms of price reactions, which seemed to be obvious at the moment according to the respondents.

Furthermore, none of the respondents seemed to have the technical knowledge necessary to analyse the status of technical services in facilities. Therefore it is complicated to predict what needs to be done in the facilities for the upcoming years such as investments for repairs. Although the respondents stated that they rely on advice from technical expertise, it is likely that this lack of skill has an impact on the single valuator's cognitive capacity, and thus on the valuation.

5.5   Systems

Looking at Figure 10 in Section 4.5, aspects such as technology, law and the client seemed to have an impact on the valuators cognitive capacity in terms of systemic limitations, as described by Wofford et al. (2011). However, since the valuators did not highlight these aspects before they were addressed in the interviews, there might be other systemic limitations that have an impact on cognition.

The client aspect seemed to be a crucial limitation according to the respondents' experience, something which should be interesting from a client point of view. Probably, the majority of clients are not aware of the impact they have in the valuation process and thus do not communicate with the valuators accordingly. However, this does not mean that the clients might only have a negative impact on the valuation process, as some respondents mentioned. The clients might as well have information that will enable a more valid and correct valuation.

The respondents stressed that they do use internal or external resources, in terms of legal specialists, due to their own lack of sufficient knowledge in the field of law. It is therefore likely that the valuators are affected by other individuals' cognitive capacity and they do have to make their own interpretation of these individuals' statements. Remarkably, there were different opinions whether or not the law aspect is a systemic limitation. One reason for this could be that some respondents did not perceive it as a limitation and thus associated the term 'limitation' with something negative. They seemed eager to accentuate that they were not limited by law, despite their probable lack of sufficient knowledge in the field.

Technology in this context concerned, as mentioned, the valuators' access to and possibility to use systems in the valuation process. This could be an internal system such as the valuation model, which none of the valuators considered as a limitation in itself. Also, technology can concern an external system including useful information for the valuation, as the majority of the valuators considered as a limitation. If the respondents did perceive errors in external systems, they used alternate systems. However, errors in internal systems were not thought of as a limitation and thus none of the respondents stressed how they evaluate and develop their internal systems in order to mitigate cognitive risk, which should be a continuous process within each valuation firm.

5.6   Failure/Human error

Human error and failure seemed to be random and they could therefore not be reduced to recognisable problems, as stated by Reason (1990). The respondents addressed failure and human error in terms of stress, communication issues and information issues, as accentuated by Wofford et al. (2011). Whether or not this is related to Miller's (1956) theory regarding that the human mind can only process seven segments of information at the same time, is hard to determine. However, as can be seen in Figure 11 in Section 4.6, stress seemed to be the main cause for failure followed by information issues and communication issues. Stress seemed to be connected to different periods of time during the year due to quarterly and annually final accounts, which were not highlighted by Wofford et al. (2011). Stress might thus result in unreliable and inaccurate valuations due to its impact on the valuators' cognitive capacity. The respondents did not have any strategy to deal with stress, other than including disclaimers in the contract stating that the valuation is only an indicative value. However, this could not be regarded as a risk mitigation strategy, since it is rather an internal security made in the interest of the external valuation firm. Maybe communication with the client is the primary risk mitigation strategy, as the majority of the respondents stated.

Information issues were addressed as the second most impacting aspect due to the frequent situations where the valuators do not get all necessary information from their clients. According to the respondents, in these situations they will have to look for the missing information elsewhere, which includes another party being brought into the valuation process. This implies higher impact on the valuators' cognitive capacity since they will have to process information from different parties. Thus, the valuators could be thought to make the different kinds of information comparable in order to use them concurrently in the valuation process. Moreover, since Miller (1956) stated that the human mind is only able to analyse seven segments of information at the same time, it is likely that valuators use mental shortcuts and assumptions in conjunction with the level of missing information.

Recalling the discussion concerning stress related to communication, which was the third most impacting issue, communication error was addressed by all respondents. The respondents stressed the difference between different clients and they seemed to relate communication issues mostly to non-professional clients due to their lack of sufficient knowledge of the real estate business. Therefore, the challenge of establishing good communication should be prioritised from the valuators' side since they are the party that possesses the competence in the field. Hence, they should have the ability to guide and interact with their clients in order to reach the best possible outcome.

5.7   High reliability organisations

Highly reliable organisations were addressed in terms of quality and quality assurance, according to what Hollnagel et al. (2006) have stated. Quality was accentuated in terms of local knowledge, supported assumptions and well-written reports, which were not mentioned by either Hollnagel et al. (2006) or Wofford et al. (2011). Recalling the description of highly reliable organisations, as presented in Section 3.3.3, these organisations are characterised by an attention to failure, a reluctance to simplify and disregard, compassion to operations and commitment to flexibility (Wofford et al.,

2011). The majority of the valuators stressed these aspects as they emphasised peer review as a risk mitigation tool. Reliance on peer reviews seemed to depend on the size of the organisations since one respondent from a smaller valuation company claimed that his organisation did not use peer review. Instead the valuators supported each other during the valuation process, which could be regarded as an informal variety of peer review.

Also in larger valuation companies there seemed to be often more than one valuator involved in the valuation process, which the respondents accentuated as a risk mitigation strategy. However, if two individuals or more make similar interpretations and assumptions it is an increased risk that these will not be questioned and analysed further, despite their uncertain reliability and validity. An alternate approach for valuators might be to support each other from the beginning, as done in the smaller organisations, and thereby avoid the risk to simplify and disregard. Authors such as Wofford et al. (2011) and Hollnagel et al. (2006) have stressed flexibility in highly reliable organisations, however without proposing how flexibility should be managed in practice, such as by peer review or internal support.

5.8   Time

The time aspect of valuations was addressed in terms of local plans and cognitive risk was related to the current status of plans. Since the respondents accentuated a higher risk in areas where there is a local plan in progress or no local plan available, local knowledge was stressed as an important aspect for risk mitigation. Mueller (2013) stated that time and change are more observable in growing cities and since the respondents operated primarily in the major Swedish real estate markets, theory and practice seemed to agree. However, two respondents did not believe that local plans had an impact in the valuation process as they stated that the clients already have considered this in their required rate of return. Whether or not the clients have done a proper analysis of future change before they have decided their required rate of return was not considered or discussed further.

Interestingly, some respondents stated that their organisation had developed a risk matrix in order to address and mitigate cognitive risk associated with time and change, a method that was not mentioned by either Mueller (2013) or Wofford et al. (2011). The function of these risk matrices was not explained in detail by the respondents and it is therefore hard to analyse their applicability and impact in the valuations process. That these organisations have applied this type of risk analysis and mitigation tool, it is evidence of attention and reluctance to failure, similar to the features of highly reliable organisations.

5.9   Summary of Chapter 5

Developing the presented cognitive risk management framework in the earlier Figure 6 from the results and analysis, results in Figure 14 below. Figure 14 illustrates the cognitive risk management framework including addressed impacts and mitigation aspects. Some of these aspects are also re-appearing in several of the cognitive risk management fields. Client communication, for instance, was discussed by all of the interviewees as probably the main aspect for cognitive risk mitigation. Client communication is crucial for the failure discipline since it can prevent stress and solve

information issues. It is also the main aspect for systemic error as well as it is important for futuring and strategic foresight. Besides client communication, internal and external support was highlighted as an important mitigation aspect. Highly reliable organisations assure quality by using peer review, internal assistance and sometimes the valuation process includes more than one valuator. Technical support and law support are used internally as well as externally and complement the single valuator's lack of sufficient knowledge in the valuation process.

Consequently, the framework does answer the two research questions stated in Section 1.2, representing an analytical tool to be used in external real estate valuation processes. Hence, Figure 14 fills the gap in current research since it illustrates cognitive risk management in terms of risk mitigation.
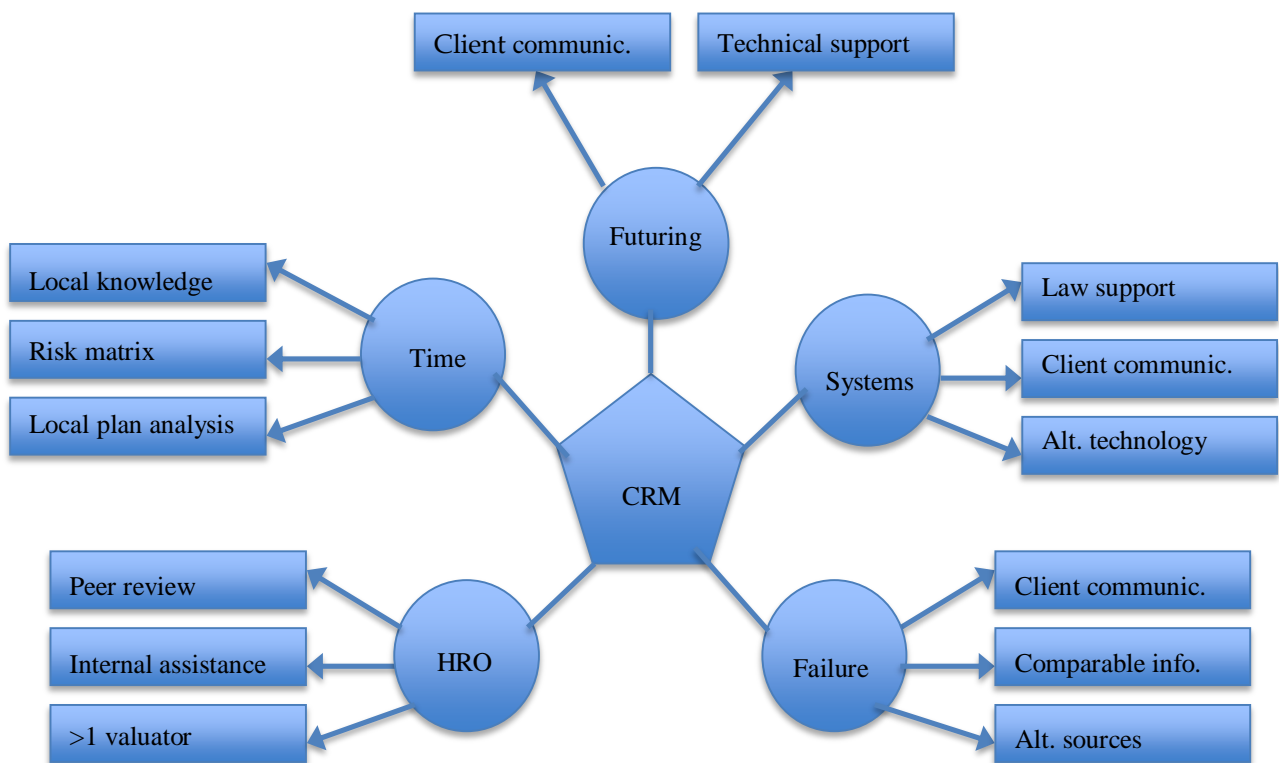
Figure 14. Cognitive risk management framework including mitigation aspects

6 Concluding remarks

The aim of this chapter is to provide a few concluding remarks. Firstly, suggestions for real estate companies based on the developed cognitive risk management framework are given. Secondly, proposals for future research within the field are made. Finally, reflections on the thesis are presented.

6.1 Suggestions for real estate companies

This thesis has highlighted cognitive risk management and risk mitigation in external real estate valuation. The presented framework stresses aspects such as client communication, internal and external support and similar aspects important for the relationship between external valuation companies and their clients. The following conclusions have been drawn.

Firstly, even if the proposed framework stresses cognitive risk mitigation fields, it could be relevant for real estate companies to hire more than one valuator in order to get valuations from two different organisations. Thus, it is possible to compare internal valuations or base investment decisions on two probably dissimilar valuations. However, since all individuals are affected by cognition issues, it is possible that two valuations will not provide a higher extent of validity than a single valuation.

Secondly, stress has been highlighted as the most impacting factor in terms of human error, and it seemed that it is affected by the time of the year. Thus, real estate companies should not exclusively request external valuations at the end of each quarter or at the end of each year. If, for instance, external valuations are required some weeks earlier than in the normal procedure, the work load at valuation firms are expected to be lower. Therefore the stress aspect might not have the same impact on the valuations. On the contrary, due to the short validity of market value it might be risky to compare internal valuations with external valuations made some time ago, since these are not up to date and thus not reliable. Thereby, real estate companies should consider the impact of stress compared to the impact of the reliability of valuations in their specific market.

Finally, since client communication has been highlighted in several of the risk management fields, real estate companies should try to be proactive by formulating a communication strategy to be used in the relationship with external valuators. It was stated earlier that cognition permeates real estate valuation. Based on the empirics from this thesis, communication issues do permeate cognitive risk management, illustrating the importance of good communication in the relationship between real estate companies and valuation companies.

6.2 Future research

The research presented here could be developed by a more detailed analysis of the valuation models used by the valuators. It would be interesting to compare the different models and thus analyse if and how the models had an impact on the valuators' cognitive capacities. However, it might be hard to get permission from each valuation company to perform the analysis and use the information for risk mitigation purposes. Also, it would be interesting to analyse aspects which the valuators have no possibility

to control, for instance, macroeconomic factors such as political processes and the global economy.

Moreover, the presented risk management fields and the presented mitigation aspects could be analysed further in order to enable a quantitative research approach with a questionnaire to a larger group of external valuators. This approach might develop this study by presenting additional cognitive risk and mitigation aspects which were not addressed by the respondents here.

6.3   Reflections on the thesis

This research has been very interesting from the beginning to the conclusion of it. The presented cognitive risk management framework derives from principles discussed in previous research however without including mitigation aspects. Hence, this thesis has analysed the implications of cognitive risk in external real estate valuation and how valuators address cognitive risk in order to mitigate it in the valuation process. The chosen research approach was fruitful for this kind of study, and the results from the empirics were basically in accordance with previous research. In the initial phase of the study, the available information covering cognitive risk was not thoroughgoing, however this was considered as an opportunity and a challenge rather than a difficulty. Thus, by presenting a cognitive risk management framework including mitigation aspects, this thesis should be seen as a contribution to filling a gap in current research.

The results and recommendations presented here should also be interesting for real estate companies as well as for companies working with external valuation and analysis. Since the framework emphasises communication between valuators and their clients, it could be used as a common tool in the relationship between these parties. By applying the presented mitigation insights, external valuators and clients could jointly reduce the impacts of cognitive risk in the valuation process.

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Appendix: Questionnaire

1. How do you consider market value?

2. How do you consider the relationship between market value and supply-demand?

3. Which valuation method and model do you use?

    a) Do you utilise internal or external methods?

    b) Do you utilise internal or external models?

4. Which are the main purposes with your valuations?

    a) Decision basis for investments?

    b) Decision basis for divestments?

    c) Comparison to internal valuations?

    d) Other purposes?

5. What time span is relevant for your valuations and how do you consider this risk?

    a) What do you mean by short-term?

    b) What do you mean by long-term?

8. In which way are you limited by systems?

    a) Valuation standards?

    b) Regulations and laws?

    b) Available technology?

    d) Other limitations?

9. To what extent do you believe the human factor affects the valuation process?

    a) Experiences from errors in communication with client?

    b) How do you manage unreliable or insufficient information?

    b) How are you affected by lack of time in conjunction with pressure?

    e) How do you consider the importance of a good work environment?

    f) Other experiences?

10. What do you mean by quality in a valuation context?

11. How does your organisation assure the quality of valuations?

12. In the valuation process, how do you consider risks related to change in future demand, i.e. what will be demanded in certain geographical areas?

13. Finally, please evaluate these questions, something important you would like to add or something you felt difficult to answer?