CRISES & COMMERCIAL REAL ESTATE

An impact analysis for both facility manager and commercial real estate owner

Abstract

In this bachelor thesis an overview of the relation between the impact of crises on commercial real estate and strategy making for facility managers and investors or owners of commercial real estate have been researched to be able to be better prepared for future crises and have a better understanding of possible implications for facility management and therefore the implications on exploitation and valuation of commercial real estate.

Stef Koning

Bachelor thesis

Crises & Commercial Real Estate:
An impact analysis for both facility manager and commercial real estate owner

Research question:
"Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

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Duration: 01-09-2020 until 14-12-2020

Internship organization: BDO Netherlands

Preface

In a world which is filled with opportunists, speculators and optimists the economy is floating on a ship full of these people with a course determined by them. Nothing is what it seems and everything is built on a foundation that consists of ingredients created by people, our very own people. This is also the case in the commercial real estate market. A market full of speculation and illusions. A market mostly driven by money and short-term thinking. Mark Twain wrote in the Wall Street Journal on September 11th 1929:

"Don't part with your illusions; when they are gone, you may still exist, but you have ceased to live." – Mark Twain, September 11th 1929 in The Wall Street Journal (Galbraith, 1954, p.142)

Coincidence or not but 72 years later after the publishing of this quote, two really iconic towers were destroyed in the city center of New York. Commercial real estate took, just like that month in 1929, a really great hit from an unexpected event, force or tragedy. It's just the perspective you want to address. Why am I pointing this out? Well it's plain and simple and really easily explained by Adam Blinder in his great book about the financial crisis in the beginning of this decade:

"*We humans, it appears, are prone to over-confidence, herding behavior, unwarranted extrapolation of recent trends, and contagious waves of wishful thinking – all key ingredients of bubbles*."(Blinder, 2014, p.265)

Of course this represents not everyone but it seems to be the case that learning from earlier events is not in the best habit of people. In line with this thought I went to the library, took a few books about crises and started to read. Page after page more and more insights on the developments of crises started to occur. It would be crazy if commercial real estate were not affected during these crises but the remaining question was still not be answered. What was my remaining question? After reading a lot about crises, the performance of commercial real estate during these crises and normal theory about impact, my remaining question was:

Why has there never been an in dept critical view on what's really happening within commercial real estate during crises in order to make a really good strategy to avoid problems in future crises for both facility managers (business continuity) and owners (return on investment) of commercial real estate?

It is not that I now see myself as some kind of God who is going to solve a super complex problem like this just as easily, but I am going to give it a try. After all, it aroused my interest during my research and hopefully it resulted in a beautiful and useful outcome. I hope the outcome can provide a better picture of commercial real estate and the appreciation that is given to it. I hope this research can help facility managers and commercial real estate owners in making strategy for the future and finally having attention for the impact of crises on commercial real estate.

I would like to thank the Hague University of Applied Sciences for a great time at university and the acquired knowledge that I can carry and use for the rest of my life. In line with this I would like to thank Frans Joosstens and George Soebiantono for reviewing my thesis and helping me along the way. I would like to thank BDO, and in particular Joost Daalmans, for this fantastic graduation place that gave me the space as a person to develop myself and to be able to present this final product. I also want to thank Sarah, my girlfriend, for the peace, space and patience during my sometimes complex research. Thanks to her support I got through it well and I was able to enjoy other activities in addition to moments of toil.

My knowledge and imagination have been enriched but which of the two is more important? Einstein has made up his mind about this a long time ago but it is up to yourself.

"Einstein said that imagination is more important than knowledge because knowledge is limited to all we know and understand." – Scott Nations (Nations, 2017, p.xiv)

I hope you will enjoy reading my research and maybe someday we will meet in person and have a laugh and conversation over a cup of coffee about it.

Kind regards,

Stef Koning

Management summary

This research provides an impact analysis for both facility manager and commercial real estate on the consequences and impact of crises on commercial real estate.

Building blocks impact analysis and conceptual approach

The building blocks of the impact analysis must be: KPIs, risk assessment and change factors. Subsequently, these must all be placed along, for example, a DCF model to gain insight into the consequences of the building blocks as part of the impact analysis to gain insight into the risks and their possible effects on the demand and daily exploitation of commercial real estate, hence facility management, resulting in a change of the building blocks of the DCF-model and thus the value of commercial real estate. There is now a conceptual approach of a more detailed DCF model, and in relation to this the impact the various elements of the exploitation of commercial real estate have on the risk build-up for the discount rate. Based on valuations and changes in valuations just before or after crises in history and future, it could be investigated what impact these particular events have on the risk build-up of the discount rate.

Recommendations and consequences

The first recommendation is to do more research on the deeper impact and understanding of the possibilities that the formulated building blocks offer to be prepared for and manage the possible effects on facility management, the exploitation of commercial real estate and its value. The second recommendation is addressing new valuation methods. This must come after the first recommendation which stated doing a follow-up research about the impact factors as a result of crises on the exploitation and ownership of commercial real estate.

The consequences of the recommendations from an organizational / social perspective are fairly broad-based. The crux here lies in the fact that, should this innovation of valuation be applied, many organizations will adopt a different approach to commercial real estate. The reason for this is that the valuation of commercial real estate is therefore not only viewed from a return perspective, but also actually at what happens within the commercial real estate. Business processes and organizational structures suddenly become a lot more important for the valuation of commercial real estate. So this concerns and impacts facility management because business processes within commercial real estate will be of more value and impact towards valuation methods and addressing the exploitation of commercial real estate from another angle.

The consequences of the recommendations from a financial perspective are clear. There will be a different way of valuing for commercial real estate if taken this seriously. This means that the value proposition of commercial real estate will be looked at in a different way. More emphasis will be placed on the exploitation of commercial real estate, as well as its business processes. Entire cash flows and financial strategies will be differently approached than before. The role of the commercial real estate owner and investor will become more important and these have to work more together with the facility manager. Both can’t work without the other and new valuation methods comes with a new approach of commercial real estate. Strategies must be made together.

The result of the follow-up research should be that, because of an accurate index scale and other approach of valuations, together with a different approach of the discount rate and DCF-model, commercial real estate will be totally different approached by facility managers and commercial real estate owners. Strategy making for both will be differently, maybe more cooperation between the two and a tool is developed in order to help them making strategy for future crises and avoid big impact on their business continuity. Using three steps, a radar and DCF model could give some tools for both to determine what the possible effects are on the exploitation and therefore facility management and value of the real estate.

Added value for facility management

The added value of the two recommendations for a facility manager can be described in different facets. First of all, the added value of doing more research on this subject is important for a facility manager in making and determining strategy. By knowing which impact drivers and factors influence commercial real estate and business continuity, the facility manager can determine and determine his long-term strategies for the real estate and the business operations within the real estate. If the exploitation of commercial real estate is looked at more specifically, the short-term profit thinking of investors and commercial real estate owners will be forgotten for a while. The long-term of commercial real estate and the business processes within commercial real estate become more important and as a result of that the facility manager can continue to think in terms of concepts and can contribute to supporting the primary process. The customer journey can then receive even more attention and in this way facility management can still continue to add its value.

The added value of taking a more critical look at the valuation methods of commercial real estate also ties in well with the customer journey and the role of the facility manager. Because the customer journey and corporate integrated management with people, planet and principles as its starting point, continues to receive more prestige from both the user and the owner of commercial real estate, the valuation methods whereby often purely is looked on the basis of rental flows must no longer be founded on the basis of profit from this time. The added value of the customer journey and of corporate integrated management for real estate must therefore also be translated into the valuation methods. The commercial real estate sector will have to look into this together with the IVSC, but above all should also allow facility managers to take a look at this. The added value of corporate integrated management is not only for the customer journey, but also for the tough euros and cash flows. Therefore it is important for a facility manager, that he or she can apply this journey in to strategic facility management.

Added value of facility management

In this conceptual approach the facility manager can be the bridge between the commercial real estate owner and the users of commercial real estate. Taking into account both their requirements for the building performances and employee concerns, and therefore the return on investment, means that the facility manager is of high added value for both exploitation and ownership of commercial real estate. Facility managers can help making strategy for future response towards crises for both exploitation and ownership of commercial real estate. Being the bridge between satisfaction, strategy and management the facility manager is of added value in strategy making for future response towards crises from exploitation perspective as well as from ownership or investor perspective.

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Introduction

In the last decade numerous crises have occurred and often these had impact on the commercial real estate market. During the year 2020 a new crisis has occurred, the COVID-19 crisis (Hesselink, 2020). This crisis has a total different impact and way of approach according to normal economic crisis because the foundation of this crisis is a health problem, not a financial and/or economic problem. As a result of this the commercial real estate market reacts in a different way on this crisis than it reacted on previous crises.

As Hesselink (2020) showed, the commercial real estate market dropped tremendously in the beginning of the COVID-19 pandemic outbreak. During the development of the pandemic, several different approached of how to use an office has been thought of and provided. This new approach, but moreover, this uncertainty of the commercial real estate market about what crises could mean for the exploitation and ownership of commercial real estate, is the foundation for this research.

This research takes crises in a total other perspective and must lead to a new approach towards making strategy for the exploitation, and therefore facility management, and valuation of commercial real estate. The research focusses on what the impact was of six major crises in the past on commercial real estate for both facility manager and commercial real estate owner. This forms the basis for analyzing this impact on commercial real estate as a result of crises and analyzing what the impact factors of crises could mean for facility managers and commercial real estate owners in order to make strategy for the future to avoid big risks for business continuity.

In consultation with the Real Estate Valuation Services department of BDO, the following research question has been drawn up for the report on the basis of the established reasons and objectives:

"Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

The answer on this research question must provide tools for a facility manager to use these parts of an impact analysis in order to make strategy for the future for a correct response towards crises. The parts of an impact analysis also must provide insight for commercial real estate owners in light of its valuation. Hopefully, in an additional study, a model can be developed that can provide a clear insight into what kind of influence the various parts of an impact analysis have on the exploitation and valuation of commercial real estate.

Preview chapters

In the first chapter the background and cause of the research will be explained. In the second chapter the methodology will be described. The third chapter will provide the necessary theory to understand the research. In chapter four the research results will be described. In chapter five the research results will be analyzed and explained. In chapter six a conclusion will be drawn. In chapter seven recommendations, business consequences and the implementation of the recommendations will be given. After that, in chapter eight, a critical review on the research will be drafted. In the appendix an overview of the history of crises and the workplace will be provided together with an explanation of business continuity management, the DCF model and the transcriptions of the held interviews. In the last section some extra figures have been added in addition to the text in the research.

1. Background and cause

In this chapter the background and cause of the research will be described by explaining what kind of organization BDO is and what the department Real Estate Valuation Services focusses on. Subsequently, the motivation for the research and the relationship towards the problem for commercial real estate and facility management will be discussed. In this part it will describe both internal and external motivation. In line with this, the problem analysis will be displayed based on the 6-W formula of Verhoeven (2007). This chapter will end with the demarcation of the research.

1.1. BDO

BDO is part of BDO Global and originally focusses mainly on (tax) consultancy and accountancy. Today, BDO is active in various industries. This includes construction and real estate, media and entertainment, financial services, retail and technology. With 17 offices in the Netherlands and more offices in 150 other countries around the world, BDO is one of the five major players when it comes to accountancy, tax advice and consultancy, alongside PWC, Deloitte, EY and KPMG. In the Netherlands, BDO focuses on different market areas like SMEs and family businesses but so-called corporate clients also make use of the expertise of BDO. This means that there is a distinction here, because a family business like a local garage is helped but also a large family business such as Van der Valk Hotels. The public sector is also one of the big market areas. Social housing corporations and municipalities work together with BDO. BDO is market leader in the Netherlands for social housing (BDO, 2020).

BDO has four core values (BDO Vision, 2020):

- Individuality;
- Passion;
- Professionality;
- Pragmatism.

To achieve the strategic objectives, the management of BDO expects to see these four core values reflected in every employee in their work performance. By building strong relationships with customers and colleagues and by offering well suited solutions in the various industries where BDO is active, BDO likes to show that the service is mainly focused on the people.

The vision of BDO Global is “Time to lead”. Underlying this vision, due the observance of the strategy determination, the following focus areas are important (BDO strategy, 2020):

1) Consultants of the future;
2) Leader in its own markets;
3) Leader through innovation;
4) People helping people achieve their dream.

In other words, these four underlying elements form the foundation of BDO and describe its identity. In addition, BDO has set up a number of programs to reinforce the vision. These four programs have been developed by BDO:

1) BDO Horizon: The aim of this program is the realization of a BDO-wide quality-oriented culture. This goes through a school, including its own BDO Academy (BDO Horizon, 2020).

2) Diversity: Due to an increasingly diverse society, work environment and labor market, BDO is tackling this point of attention. BDO wants to continue to develop as an organization through a diverse workforce, management and board (BDO Diversity, 2020).

3) Leadership: There is currently a "Leadership on the move" program in which shared leadership is the main focus point. It is important that individuals can exert influence within a group to achieve the group and / or organizational goals. At the moment 18 employees are working on this, but the aim is to expand this to more than 250 employees within 2.5 years (BDO Leadership, 2020).

4) BDO Next: Through this platform employees are informed about major IT projects within BDO, but also IT developments within the business (BDO Next, 2020).

1.2. Department Real Estate Valuation Services

The graduation research will be carried out at the Real Estate Valuation Services (REVS) department. This department is part of the tax consultancy practices within BDO. The main activities performed by the REVS department are (BDO REVS, 2020):

- Checking appraisal reports that substantiate the market value of real estate that is on the balance sheet of companies, as part of the audit team that performs an audit;
- Checking the valuation-technical and tax-legal principles that apply to the determined WOZ value and decisions imposed by Dutch municipalities;
- Supporting the MT of, for example, housing corporations and other companies in taking strategic decisions by advising on the basis of self-built models for the valuation and exploitation of real estate;

1.3. Research cause

The reason for this research is questions about the questions of the COVID-19 crisis that broke out at the beginning of 2020 and which has as a result that many real estate owners have no insight into the possible effects of this crisis on operational and supporting business processes within commercial real estate. Therefore the valuation and return on investment of commercial real estate is hard to motivate. The urgency for this research is high because it is for facility managers and owners of commercial real estate really important to set up a strategy for future crisis like COVID-19 because of the devastating effects. Hopefully in the future both stakeholders can benefit from this strategy. The effects of COVID-19 and future crises on both exploitation and ownership of real estate is also difficult to estimate because various factors are influential, such as (Berry, 2020):

• Cash flow;
• Business processes within the object: How is business continuity in commercial real estate guaranteed?;
• Decrease or increase of commercial real estate on the market;
• Trends: What kind of demands have both tenants/users and owners for commercial real estate?;
• Risks for both tenants/users and property owners: Long or short lease contracts? Investments and maintenance? Return and valuation? What impact can these risks cause?

Such a crisis makes it difficult for organizations to estimate the consequences for the value and return of the commercial real estate market and it is precisely in this area that commercial real estate owners and facility managers need clarity. This clarity is needed for business continuity in commercial real estate and thus for the facility manager. On the other hand insight on the possible effects is needed for the owner or investor in commercial real estate because of the valuation and return on investment of commercial real estate and to prepare for eventual consequences or to prevent further damage for their commercial real estate.

A second reason for this research is that a much more clear advice can be given towards commercial real estate owners and facility managers within commercial real estate of how to deal with the use of facility management and valuation of commercial real estate in times of crisis in the future. It is important to understand the possible risks of a crisis for both exploitation and ownership of commercial real estate. Because of the shift in economic dependencies through globalization this has become much more complex while there are many parties involved.

Nowadays banks, governments, real estate owners, big facility companies, end users with demands, even churches are involved in investing, owning or exploiting commercial real estate.

1.4. Problem analysis

In this section the analysis of the problem will be described due the 6 W scheme of Verhoeven (2007). In this way, the answers on the following questions can be described to achieve a well formulated problem analysis:

- What is the problem?
- Who has a problem?
- When has the problem occurred?
- Why has the problem occurred?
- Where has the problem occurred?
- What is the cause of the problem?

1.4.1. What is the problem?

The problem of not knowing what the current crisis and possible future crises means for business continuity within real estate is on the hand of facility managers. With difficulties in estimating this, a facility manager cannot easily make a strategy of how to continue business in commercial real estate.

On the other hand not knowing what the current crisis and possible future crises means for commercial real estate is also hard for the owners/investors of commercial real estate. They have difficulties with estimating what it means for the value of their real estate and the return on their investment (Berry, 2020).

The underlying problem of this all is that the question of how to continue business in commercial real estate after crises hasn't been answered until nowadays. Furthermore, is it at least strange that the commercial real estate market and sector doesn't seem to learn from earlier crises and mistakes.

1.4.2. Who has a problem?

The problem is that it is difficult for BDO to foresee what the current COVID-19 crisis and future crises mean for business continuity management within the exploitation of commercial real estate and the valuation and return of investment on commercial real estate. This is not only difficult for BDO but for the whole commercial real estate sector and the facilities industry. As the UNDP[1] stated in their article, leadership is needed during the COVID-19 crisis and future crises (UNDP, 2020). Business continuity has a relation with both exploitation and ownership of commercial real estate. This relation must be made understandable in order to be able to adapt a strategy for the future. Both facility manager and commercial real estate owner must learn from each other, previous crises and try to map the problems for their sectors in order to make strategy for the future.

1.4.3. When has the problem occurred?

The problem occurs every time there is a crisis, but the real problem is that after a crisis, most investors or owners of commercial real estate fall back into the pre-crisis patterns (see CH3 and CH6). This means that little account is taken of the possibility of a new crisis and that the return on investment and the value of commercial real estate will gradually return to the old level. In other words, the strategy for the future is not intended for a new crisis.

1.4.4. Why has the problem occurred?

The problem is now re-emerging because, for example, many retail and catering outlets are forcibly closed because they can no longer pay the rents and the return on investment for the investors on the real estate is no longer profitable. The fact that this problem came back to the surface is because a global pandemic has developed (UNDP, 2020) (Berry, 2020).

[1] UNDP: United Nations Development Programme (UNDP, 2020)

1.4.5. Where has the problem occurred?

The problem has occurred all over the world. Most business and investors have difficulties with making strategy for how to deal with their commercial real estate for the current pandemic but also for future crises. The uncertainties of a crisis for commercial real estate and the demand of the users within commercial real estate is an unfortunate outcome with which facility managers and real estate owners have to deal with.

1.4.6. What is the cause of the problem?

The cause of this problem is that the business continuity within commercial real estate, in relation to valuation and return on investment of commercial real estate, depends on so many factors that in history not many have tried to research this topic. Research like Berkhout (2019) has done, was little done in history. Mainly because it is really difficult because every object and every case has its own specialties and uniqueness. Besides that, valuations will be performed by different people and those people are still arguing about what is the best way to valuate commercial real estate. This is not only the case in the Netherlands but in the entire industry around the world.

Besides the dependencies, one of the most important factors is that the valuation and exploitation of commercial real estate after a crisis normally gets back to its original level. Another fact is that before the COVID-19 pandemic, there has never been a decrease of demands in office spaces because of health issues and a pandemic outbreak (see A.1). Business failed mostly because of monetary problems not because of change in requirements imposed by facility managers and end users on commercial real estate. In other words, the cause of this problem is that a crisis with this impact on the economy and world never has existed before and as a result there is a lack of knowledge on how to deal with it. An example is SARS in Asia (Wong, 2008) which resulted in more caution on the market but not in an overreaction. This means that even when SARS came by, the response of the market was good and not panicking. The COVID-19 outbreak caused panic and overreaction and that's why the world has never faced a crisis like this before.

The problem for facility managers is that most crises were a result of financial or economic problems, not health issues. Most of the time facilities will be degraded first in line as a result of crises. An example of this could be a bank's portfolio. The commercial real estate that is owned is still used during a crisis, but the real estate that is rented is disposed of as soon as possible. The same goes for employees: long time contracts will stay but lease contracts or part-timers will be disposed. The real problem here for facilities, and thus for facility managers, is that most of the time its short term thinking and mostly in terms of finances and costs. Looking more closely and with more attention to this when making strategy, maybe lots of costs and profits could be saved in future crises.

1.5. Summary

In chapter one, the role of BDO is explained and the role of the department of Real Estate Valuation Services. The research cause is the outbreak of COVID-19 and the uncertainties it comes with for both facility managers and owners of commercial real estate and their strategy for the future. The problem is that it is difficult for organizations like BDO, and thus for facility managers and owners of commercial real estate as well, to foresee what the current COVID-19 and future crises mean for business continuity management in commercial real estate and the valuation and return on investment on commercial real estate. The demarcation of the research is build up in four steps as shown above.

Preview

In the next chapter the methodology, accountability and demarcation of the research will be described, along the use of resources. Also the relevance and validity have been explained.

2. Methodology

In this chapter the objectives of this research will be explained. In addition to this a research question and sub questions has been developed on the basis of the problem analysis of the previous chapter. In line with this, the relevance of this research will be explained. In relation to this relevance, the research methodology will be described. This chapter concludes with an overview of the validity and reliability of this research.

2.1. Objectives

The objective for this research for BDO can be divided in two different parts. The first part focusses on providing insight on the basis of an impact analysis of what kind of influence a crisis can have on the demand and exploitation of real estate, and therefore the value for commercial real estate owners. This is for BDO important because BDO gives advice in financial strategies for commercial real estate owners. This means that BDO needs to understand the impact of a crisis in terms of valuation of commercial real estate but also in terms of the return on investment of commercial real estate, to make an accurate advice and strategy for commercial real estate owners for future investments or developments. Also the advice and strategy making for the use of commercial real estate can be more accurate by learning from the impact of crises.

The second objective for this research is providing insight on the basis of an impact analysis of what kind of influence a crisis can have on the exploitation of commercial real estate for a facility manager. This is for BDO important because BDO gives advice in business continuity management in combination with commercial real estate management. This means that BDO needs to understand the impact of a crisis in terms of the exploitation of commercial real estate to make an accurate advice and strategy for facility managers or boards of businesses for how to combine exploitation and commercial real estate to make future strategies for their businesses.

Both insights are connected and can possibly be put into a model that is related to the exploitation and therefore cashflow of commercial real estate. The research must provide information to develop such a model. To develop such a model this research therefore must provide an impact analysis of what crises can cause for the exploitation of commercial real estate. The facility manager can use this information and a model to make strategy for the future in order to avoid great impact of crises on the exploitation of commercial real estate.

2.2. Research question and sub questions

The following research question was formulated on the basis of the problem analysis and the objectives set:

"Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

The research question can be divided into different concepts and issues, which is why they deserve further explanation. Based on this, a demarcation (2.6) of the research can be made. Delimitation of the research question:

• Policy level: This means that at the level of strategy, considerations and choices are made to ensure that, in this case, the real estate is used and used in a certain way, so that the exploitation, and therefore the valuation, will go in a certain direction.

• Crisis: This is a flexible term and have to be explained and divided into the different forms of crises that have been so far in the history of the economic market and the world in which we now live. The starting point is the Great Depression (1929-1933) and the ending point is the COVID-19 pandemic in 2020.
• Exploitation: Exploitation in this study is understood to mean the use of, and facility management needed for, commercial real estate. As a result, business continuity is described in various facets.
• Ownership: In this research, ownership is understood to mean the ownership and valuation of commercial real estate. From this point, the return and the financial position for the real estate owner of the commercial real estate are described.

In order to be able to give an answer on the research question, the following sub questions were formulated:
1. What impact and response did the different types of crises between 1929 and 2020 have on the world economic market and commercial real estate and what relation is there with exploitation and valuation of commercial real estate?
2. Which risks as a result of crises affect commercial real estate and, as such, the exploitation and ownership of commercial real estate?
3. Which factors arising from the stated risks for the exploitation and ownership of commercial real estate are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate?

2.3. Research methodology and accountability
In this section the methodology which will be used for each sub question will be described. Furthermore the used theories and resources to be able to answer the sub question will be viewed. Besides that, the accountability, reason and relevance for the use of these theories and resources are explained.

This research is a quantitative research because it must provide insight on what risks as a result of crises there are for commercial real estate and what impact these risk factors have on commercial real estate for both exploitation and ownership of commercial real estate. Future research must provide insight into the actual impact of these risk factors on commercial real estate and the weight that can be assigned to these factors in order to determine to what extent these factors influence the cash flow and thus the valuation of commercial real estate. In the appendix (A.5) an overview of the variety of resources and used methods is drafted. First of all, to be able to give an answer on the first sub question different types of crises will be overviewed and relevant theories from exploitation and ownership perspectives will be used. The sources of the Federal Reserve (FED, 2020) and Kadaster (Kadaster, 2020) will mostly be used to provide insight into the developments and response of commercial real estate in times of crises as well as a variety of articles.

In order to be able to answer the second sub question, various interviews were conducted within the professional field with different disciplines in order to gain a better picture of what the interviewees think about the developments, risks and important characteristics for the exploitation and ownership of commercial real estate. Besides the interviews, research on risk development, business continuity management within commercial real estate and investing in commercial real estate has been done.

The third sub question has been answered through the vision of the interviewees, analyzing the answers and results of the two sub questions before and research on important factors for both exploitation and ownership of commercial real estate during crises. During the analysis the scope of crises will be valued and with the help of an impact analysis and an analysis on a DCF model[2], a good overview of the ability of strategy making will be given.

[2] DCF model: A discounted cashflow model is often is used in valuations of commercial real estate but also in the value proposition of a business (Maverick, 2020).

2.4. Relevance

The relevance in this research lies in the main question itself and the era in which the research is conducted. During the research there is a pandemic around the world called COVID-19. This pandemic has meant that the world economic market has been hit hard and that the valuation and use of commercial real estate had to change. Not all workplaces may no longer be used, the value of commercial real estate is more difficult to determine, partly because of this, and it's not the first crisis the world had to face in the last twenty years.

It is relevant to do research on this topic, because it seems that the world economy, investors and users of commercial real estate may have not learned from previous crises. Many business had a hard time how to deal with the pandemic. Most business still do not know how the way of working during this pandemic will have effect on the way of working in the future and in line with that what effects this possible other way of working can have on the valuation of commercial real estate in the future. Therefore it is interesting to research the possible risks of crises on both exploitation and valuation of commercial real estate in order to be better prepared in the future when new crises occur.

2.5. Validity and reliability

To increase the validity and reliability of this research a few steps have been taken during the research. During the research only scientific articles have been used. The liability of the research becomes more valid when only using scientific articles. With every detail or statement, an scientific article is used. To do so, the background of the different authors have been checked just as the database or source.

The first interview was held after research has been done into the relationship between facility management and real estate. This professional works for a company that does a lot of research into market segments and influences and has published a nice report on the relationship between crisis, commercial real estate and facility management. This professional has been a welcome addition and has a broad view of the playing field of these three concepts that came together in that research (Interview 1).

I held the second interview with a professional who has been working in the financial sector for years in various roles. This professional has consciously experienced a number of crises and has a highly developed knowledge of what a crisis does to real estate valuation, but also to the market sentiment of real estate investors. This professional has therefore been of great value in explaining why investments are made in commercial real estate, but also what the relationship is between crises and the valuation of real estate (Interview 2).

I held the third interview with a professional who has worked for many years in various financial and facility functions and who also had a background in facility management. The broad view of this professional's playing field clearly highlighted the relationship between the operation and use of real estate, as well as the valuation and investment requirements of real estate investors. This professional is of added value to the research through an enormous knowledge of both sides, namely the exploitation of commercial real estate and the valuation of commercial real estate. The relationship between these has been extensively discussed with this professional (Interview 3).

The fourth interview was done with a professional who works in banking. This professional has been chosen to look at what drives banks to finance real estate and what their value judgment is about achieving returns. The addition of this interviewee is therefore indispensable for determining what drives financial institutions to finance. It can also provide professional insights into market developments in commercial real estate (Interview 4).

The last interviewee was approached because he works and has worked from different roles as an appraiser and consultant. Currently working for an organization that works with a lot of data analysis and which develops and publishes many outstanding reports on developments within the commercial real estate sector (Interview 5).

This variety results into description of different angles and point of views from the interviewees towards the research question. All the interviews have been transcribed. Sometimes names and dates of interviewees have been left out because of privacy arrangements. The knowledge of the interviewees has been used during the research. In this research a triangulation has been made. Three different perspectives in order to come to an analysis of the interviews.

2.6. Demarcation of the research

This research mainly focusses on one group: facility managers. Before explaining the steps that have been taken in this research, it is important to mention that two major global crisis events: WOI and WOII haven't been taken into account during this research. Also just a few crises have been selected because these are the most known by the public. Furthermore, this research has a step-by-step structure. First of all, there is a start with explaining what a crisis exactly is, which crises have taken place in history and what kind of impact these crises might have had on commercial real estate. Besides that, the definition of different concepts will be described. The crises that are researched:

1. The Great Depression: 1929-1933;
2. Energy crises 1970s and early 1980s recession;
3. Black Monday 1987 and early 1990s;
4. Dot-com bubble: 2000-2002 and September 11^{th} attacks;
5. Financial crisis: 2007-2009;
6. COVID-19 pandemic: 2020.

The second step is explaining what elements and parts of a crisis form a risk for the exploitation and valuation and return on investment of commercial real estate. The third step explains the relation between these elements and parts and the business continuity and valuation and return. In the last step, the fourth step, the key factors for facility managers and commercial real estate owners or investors to make strategy will be explained.

2.7. Summary

In chapter two the methodology of the research is described. At first the two objectives are described:

- Providing insight on the basis of an impact analysis of what kind of influence a crisis can have on the value and return on investment for commercial real estate owner;
- Providing insight on the basis of an impact analysis of what kind of influence a crisis can have on the exploitation of commercial real estate for a facility manager.

After that the research question and sub questions have been formulated. The sub questions and answers must result in an answer on the research question. The research question of this thesis is:

"Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

The research methodology and accountability have also been described. The various ways how the research have been conducted and which resources will be used is explained. At last the validity, reliability and demarcation of the research have been explained.

Preview next chapter

In the next chapter the theoretical framework will be explained. In order to do so, crises and their history, the history of the workplace, several key parts for this research and an answer on the first sub question will be answered and explained.

3. Theoretical framework

In order to be able to do research and therefore give an answer on the research question, different aspects of the research will be described to understand the fundament for this research. During this theoretical framework, information will be provided to formulate at the end of this chapter an answer on the first sub question. This historical overview is needed in order to understand the research and its analysis. In this chapter the basis and history of crises, workplaces, the stock market, commercial real estate and business continuity will be given. Also the added value of commercial real estate and the role of the DCF model will be described. This will be done by text and figures. These descriptions results in the following sub question:

"What impact and response did the different types of crises between 1929 and 2020 have on the world economic market and commercial real estate and what relation is there with exploitation and valuation of commercial real estate?".

To be able to give an answer on this sub question, the following path will be followed during this chapter. At first the history of crises and workplace will be defined. After that the role of the stock market will be explained. In order to understand what impact means, the meaning of an impact analysis will be described and explained, all together with what business continuity management is. In order to understand the role of investors or owners of commercial real estate, the principle of valuation and return on investment will be explained. Most of the obtained data is from the United States of America. In line with this, most of the conclusions are drawn based on this data.

3.1. Crises and their history

Nowadays the COVID-19 crisis has a huge impact on the lives of people, but what is a crisis? What is the original meaning of the word and what kind of crises had society to deal with in the past?

According to the Cambridge Dictionary (2020) "crisis" is derived from the Greek word "krinein", which means "separate or choose". Ancient Greek philosophers like Aristotle refer with this word to a precise moment during a serious illness when there is the possibility of getting better or getting worse (Aristotle & Ross, 2009). In other words, the word crisis refers to a decisive moment in which there is room for the possibility of great harm and great change, but after this moment things can no longer be the same. In real life this means that a critical incident will lead to a crisis. In 1929 this was the crash of the stock market at wall street (Galbraith, 1954), in the 2007-2009 financial crisis this was the fall of the Lehman Brothers on September 15th 2008 (Blinder, 2014) and in 2020 it was the start of a COVID-19 pandemic when on January 30th the Director-General declared the outbreak a public health emergency of international concern (WHO, 2020).

To fully understand each crisis, time, place, development and world order must be taken into account. An example of this is that the dot com crisis could have never occurred in 1929 because the technology hadn't developed like how it was during the dot com crisis. Another example is that during the Roaring Twenties and The Great Depression the dependencies in the economy and globalization were way less than nowadays during the COVID-19 pandemic outbreak. Logistics, technology, partnerships between countries, organizations but even the food chain now is totally different than in every other crisis the world has faced in the past. Each crisis is unique for its time but the foundation of each crisis is most of the time the same: a decisive moment with a huge impact on economy, society and law and order with both a positive or negative outcome and with no possibilities of going back to the situation before this decisive moment. The several major crises between 1929 and 2020 and its complete explanation can be found in the appendix (see A.1).

The most important lesson that can be drawn from the history of crises, is that the economy nowadays can't be compared with the economy of, for example, 1929. Globalization, digitalization but other factors as well have such an impact on the economy that it is really difficult to compare each crisis. In chapter 4 the results of the research on crises, its impact on commercial real estate and their history will be further explained.

3.2. Different types of workplace and the history of employment

Besides understanding crises and their history, it is important to understand the workplace and environment during each crisis. Understanding this, the step towards understanding the possible risks factors for both facility managers and owners of commercial real estate during a crisis can be better mapped. In line with this, the explanation of the commercial real estate market in each crisis is more complete. The whole history of the workplace and employment in short can be found in the appendix (see A.2).

For this session the role of a facility manager, commercial real estate and the role of the workplace are combined. The next figure (Figure 1) shows that owner and operator of commercial real estate were not always separated like most of the time nowadays. During time in history the role of these two developed. Its key to understand that the change of these roles normally parted with major changes in society. These changes identify itself for example after World War II when expense rose faster than rents or after the energy turmoil and the economic downturn as a result of this (Goss & Campbell, 2008) (Saval, 2014).

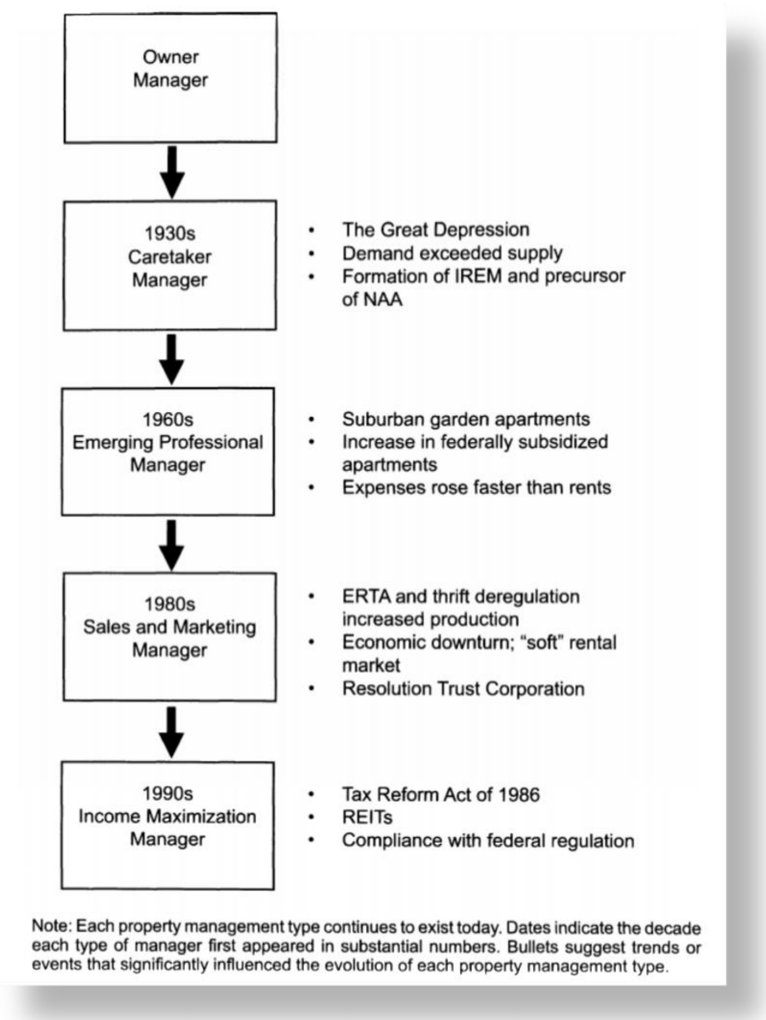


Figure 1: Evolution typology of the property manager (Goss & Campbell, 2008, p.15)

The more important role of the upcoming of technology also formed new workplace concepts. The role of the employee and owner became more separately and entire floors got major changes because of this.
In the beginning of this decade “Het Nieuwe Werken” was introduced. A concept in which employee was the central point of view. The employee must be happy, has the opportunity to develop itself and work on a flexible workplace. In line with this “Corporate Social Responsibility” was introduced. A form of entrepreneurship that mainly focuses on ‘profit’ but with respect for 'social' and dependent on various ecological preconditions that are set (Veldhoen and company, 2020) (Al Halbusi & Tehseen, 2017).

In every decade, in every crisis and every big (technological) development in history changes occurred on the workplace. Most importantly of all of this, is that managing commercial real estate wasn’t always like how it is done nowadays, but nowadays a few key management aspects are present. Krumm (2001, p.284) states that the four forms of management: general management, asset management, facility management and cost control are reality. Of course this was in the beginning of this decade and there were more developments and the role of technology, data information and workplace have increased but in essence it still remained the same (Palm, 2017).

According to Palm (2017) the role of the commercial real estate manager nowadays consists of two functions: in-house or outsourced. Market orientation and customer capabilities are the foundation of effective management of commercial real estate. The complexity of commercial real estate and its management is often because of an increasing demand of customers and tenants and new technology developments. In line with this it is nothing less than logical that loyalty amongst tenants and using information provided by customers is an asset for commercial real estate managers in providing the best possible care for everyone around their property. Because of this development, routines and checklists of these managers are the foundation of good work. If property managers can perform really well, the decision making process in their work will be handled way shorter and the customers will feel that their comments will be heard (see A.2).

3.3. History of the stock market

The stock market and commercial real estate are very closely linked. As can be seen in the image by Plaizier (2009, p. 3) (A.6, Figure 54), the commercial real estate market is determined by a number of factors:
- Rent flows;
- Cap rates;
- Transaction price;
- Appraisal based;
- Vacancy rates.

The stock market is also driven by a number of factors:
- Liquidity;
- Momentum;
- Leverage;
- High volatility.

When combining the stock market and commercial real estate, Real Estate Stock (REIT, see A.1.5.2) has definitely its impact on the real estate market and therefore is important in analyzing the risk factors for the exploitation and valuation of commercial real estate. Different actors, both investors and end-users are impacted by a stock market crash. Employment rates will differ afterwards and investors will be more cautious (Plaizier, 2009). Numerous factors of why the stock market is important for commercial real estate are written in A.1 and A.2. Crises and the stock market show that they both affect the commercial real estate market from both exploitation and valuation perspective.

3.4. Business continuity management and impact analysis

The idea of business continuity is understanding what your business is, strategy making with the knowledge of what your business is and making plans out of these strategies in order to be able to overcome disruptions and recover quickly afterwards (Sterling et al., 2012, p.1-18). According to Sterling et al. (2012, p.9) there are six principles for business continuity and to follow are:

1. Business impact analysis: Understanding the business, describing what's really important to it and a description of the activities that produce this. In this step the identification of the key products and services, but also the critical activities on what they depend are described.
2. Description of maximum tolerable disruption time, recovery time and recovery point: when is work resumed, what time does it cost and the level/point to which it need to be resumed.
3. Risk assessment: what risks are there for the critical activities of the key products and services.
4. Supply chain: what influence is there on the supplier, what to do to make the key products and services more resilient towards failure.
5. Building resilience: Strategy making to ensure the continuity and possible recovery of the critical activities.
6. Business continuity plans: Record the first five steps into plans. To do so, the business knows what to do whenever disaster strikes.

Four of these will be further explained in the appendix (see A.3): business impact analysis, risk assessment, resilience in the supply chain, selecting right continuity strategies and developing business continuity plan. For the impact analysis a risk assessment will be performed (see A.3.2) in combination with the different factors learned from the crises that have happened in the past. This combination must lead towards an overview of which factors must be valued to be able to describe what impact crises had in their time on commercial real estate, what the response of commercial real estate was during a specific crisis and which factors are coming back each crisis. These factors are important to be able to give an answer on the main research question.

3.5. Commercial real estate

3.5.1. What is commercial real estate?

Commercial real estate is real estate which is not used for residential purposes and implies a case in which owner and user differ. Residents are often part of portfolios of real estate investors and funds. Offices, shops and business premises, but also industrial objects, power plants, agricultural objects, hospitals, schools and hotels are commercial real estate. In this research the focus is on commercial real estate. This means that the market value is the starting point for current properties such as offices, shops and other commercial real estate. This market value is calculated using, among other methods, the rental value capitalization method and discounted cashflow model (DCF). For unsalable objects it concerns the replacement value, adjusted for technical and functional obsolescence. Unsalable objects are most of the time hospitals, schools, labs and power plants. These objects will be not be used during this research. This research is only about **commercial real estate** (Waarderingskamer, 2020). A good overview of the role of commercial real estate in nowadays economy is provided by Eurostat (2007, p.20).

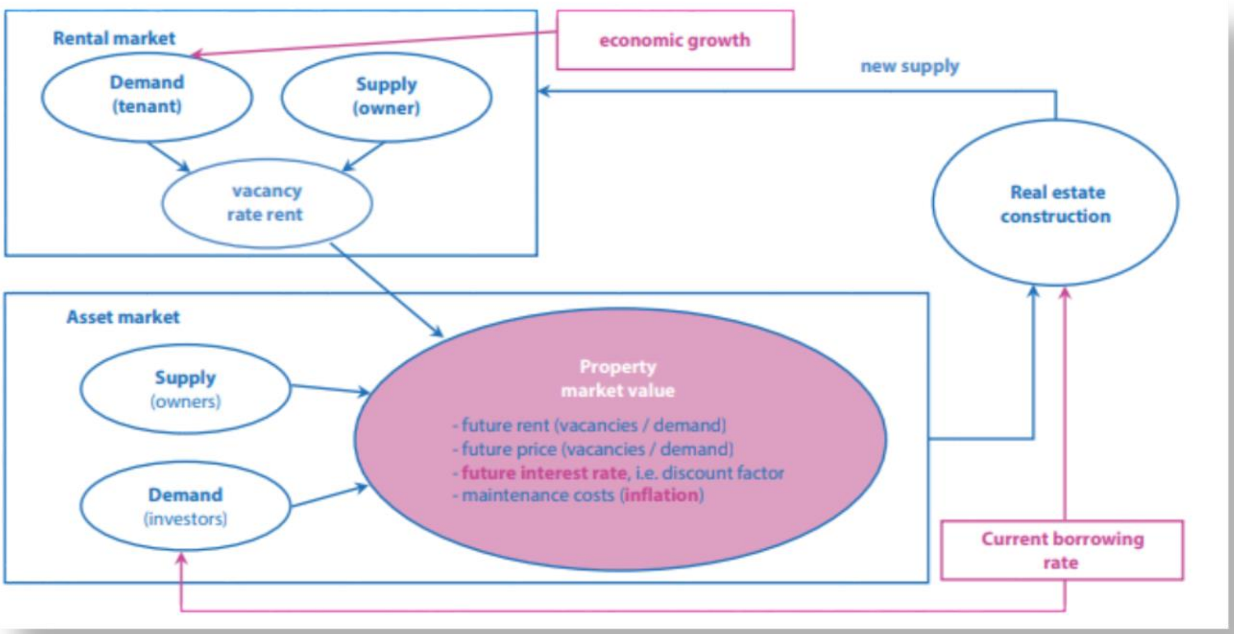


Figure 2: The role of commercial real estate in the economy (Eurostat, 2017, p.20)

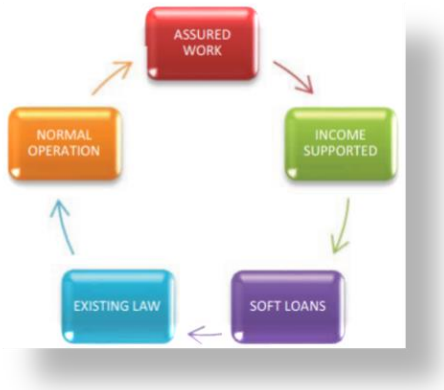
3.5.2. Added value of commercial real estate

On the other hand, commercial real estate can also be of value for strategy making for an organization. Commercial real estate adds value towards businesses and their management. From different perspectives it adds value towards an organization. It can reduce costs and earn profits, support the users activities, improve the conditions within the building and even support the identity and role of the organization (see A.6 Figure 56).

Real estate decisions but also business strategies can lead to added value for organizations. Therefore commercial real estate can be of added value for both exploitation and valuation of commercial real estate. From different perspectives and angles an overview is provided by several figures (see A.6, Figure 55 and Figure 56 and Figure 57). It is key to understand that real estate decisions always have an impact on the wellbeing of an organization. In line with this, the return on investment can be achieved by different types of strategy but also by a good real estate strategy in combination with asset management, facility management and property management. Revenue growth and productivity growth will maximize the wealth of the shareholders. When looked after competitive advantage, productivity, sustainable development and profitability, real estate objects can be of high value towards an organization (Jensen et al, 2012) (Jensen et al, 2013) (Lindholm & Levainen, 2006).

The exploitation of commercial real estate is explained by Hoendervanger et al. (2012) and then cast in a model in which three core components: aim, arrange and perform, are combined. These three components are the basis for good real estate management and can contribute to commercial real estate as a service and strategy (see A.6, Figure 58). Besides that, Golob et al. (2012) have written an interesting article about the real estate market in Slovenia, mostly about residential property. Nonetheless, a description of these dependencies of real estate in the economy were provided and these dependencies can also be used for commercial real estate. These dependencies between banks, politics, real estate market, construction companies and investors provide a really solid overview of the different actors and factors whom are important within the economy and commercial real estate (A.1 for more information).

An example of these dependencies are shown in ← Figure 3 and Figure 4. Both figures give a good example of how all the different actors are reacting and aligned together within a crisis. Banks, politics, investors but also constructors and commercial real estate owners are really depending on each other.



← *Figure 3: (Commercial) Real estate market before the financial crisis (Golob et al., 2012)*

Figure 4: (Commercial) Real Estate market during the financial crisis (Golob et al., 2012) →

Taking into account the added value of commercial real estate, the interdependence of the actors on each other and the interrelationship between commercial real estate, stock prices, crises and the way of working, it cannot be stated otherwise than that commercial real estate can even provide economic growth. By looking carefully at the figure of Eurostat (Figure 2), there is a confirmation of this.

The interweaving of commercial real estate and a flourishing economy within the game of thrones all over the world is so great that all actors and their share cannot be seen in isolation from each other. That is why commercial real estate has a large economic, social and environmental share in our current society, even if this does not seem to be the case at first glance.

3.6. Skandia Navigator model and Intellectual Capital

The Skandia Navigator model is a non-monetary model and can be seen as a likewise model as the Balanced Scorecard of Kaplan & Norton (Boersch & Elschen, 2007, p.137-138). The model provides management insight in the performance management of the value of their intangibles and doesn't look only towards the financial values but also other performance indicators. The model divides intellectual capital (IC) into two main components: human capital and structural capital (see A.6 Figure 59). Market value for an organization its commercial real estate therefore is split in financial capital and intellectual capital. This model can help providing insight in the key performance indicators of the exploitation and ownership of commercial real estate.

Human capital is the combination of knowledge and the skills of employees to adapt to different tasks for organizations. Structural capital is the combination of any other intangibles except the human capital. This could be for example databases, software or trademarks. The most important generator of intangibles is human capital. The combination of knowledge, experience, talent and skills is a constant transformation of human knowledge into structural capital. So in other words structural capital is more "tangible".
It can be used by organizations as an asset or tool to generate future incomes. Structural capital is nothing less than everything that remains at an organization when employees leave (Marsel, 2014) (Marr et al., 2004).

In the Skandia Navigator model a 'navigator' must lead an organization towards the right decision making. Hiding the so called 'intangibles' can result into wrong decision making. In the model five perspectives are used: financial focus (1), customer focus (2), process focus (3), human capital focus (4) and innovation focus (5). For each perspective four different indicators are used to measure the performance: cumulative, competitive, comparative and combined measures. In Figure 5 the Skandia Navigator model is introduced with the five perspectives (Marsel, 2014) (Marr et al., 2004).

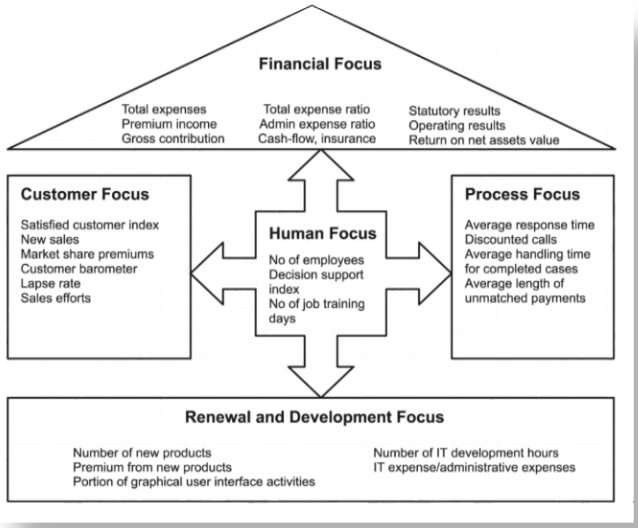


Figure 5: Skandia Navigator model (Marsel, 2014) (Marr et al., 2004)

To relate towards the exploitation of commercial real estate the Skandia Navigator model states that human focus is the starting point form where the rest will follow and learn. In order to do so, the other focus points generates also value towards an organization or in this case towards commercial real estate. This models shows perfectly that the key performance indicators of the exploitation of commercial real estate starts with adapting the idea that the people inside commercial real estate are the starting point.

In line with this Brooking (1996) made an IC Audit model to calculate dollar value for the non-tangible parts of the organization. Brooking states that intellectual capital contains a few components:

- Market assets: brands, contracts, distribution channels or licensing;
- Human-centered assets: knowledge of the people within the organization;
- Intellectual property: corporate assets expressed in financial terms, like copyright, patterns or service designs;
- Infrastructure assets: technologies, methodologies and processes.

Three approaches can be used to calculate a monetary value for intellectual capital (Brooking, 1996):

1. Cost-based approach: the value of an asset is determined by its replacement costs;
2. Market-based approach: the value of an asset is determined by obtaining consensus about what others have valued this particular asset;
3. Income-based approach: the value of an asset is determined by the income-producing capability of an asset.

3.7. Discounted cashflow model in relation to commercial real estate

The DCF-method often is used to get information about the value of commercial real estate. By providing an explanation of the DCF model, more insight on the relation between strategy making for both facility manager and real estate owner in relation towards possible future crises can be provided. In chapter 5 the analysis of the research will be described in which the DCF-method is a tool to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate.

In the appendix (see A.4) the whole DCF-method is explained. The discounted cashflow model must provide an organization with information about the future incomes and expenses approximately over 10 or 15 years. At the end of the calculated period a residual value will be calculated. This model is mostly used by real estate valuers and at first hand it seems a perfect methodology to get a good market value for an asset. Nevertheless, this model can be fuel for discussion. Therefore a new view on this model will be provided in chapter 5 (Grevelink, 2015).

In the DCF-method a section is reserved for “exploitation costs”. It is this section that will be overviewed in chapter 5. The reason for this is that it is precisely this aspect of the DCF model that deals with the activity within commercial real estate. It is important that attention is paid to this in order to make better strategic choices for both the facility manager and the commercial real estate owner. This will make both exploitation and the valuation of commercial real estate much more accurate.

3.8. Summary, conclusion and preview

“What impact and response did the different types of crises between 1929 and 2020 have on the world economic market and commercial real estate and what relation is there with exploitation and valuation of commercial real estate?”.

The answer on this first sub question can be divided in two parts. The first part is the impact and response as a result of crises on and towards commercial real estate. The second part is the relationship between this response and exploitation and valuation of commercial real estate. In the various crises that have been dealt with, different reactions have come from commercial real estate towards crises. Often the result of a crisis for commercial real estate is that the valuation falls, the vacancy rate increases and the construction of new property falls. Several crises have occurred throughout history, however, all of these have had factors that have impacted commercial real estate. Factors such as inflation, CRE asset price fall, vacancy rate rise, more caution in providing loans are all examples of factors that played a role during crises (more information A.1).

Despite the fact that since 1970 several crises have arisen which have had a global impact on the economy, society and commercial real estate, it seems that the recurring pattern of thinking like "after a crisis the economy will slowly going back to the situation before the crisis" cannot be broken turn into. As a result, the problems that come to light during each crisis are often only half or not resolved. The effect of this is that a crisis always has an impact on the exploitation and valuation of commercial real estate, but in the end commercial real estate often comes out stronger after a crisis. This is simply due to two factors:

1. The speculation of the market and the return that is expected to be obtained from commercial real estate remains unchanged and the confidence in the value of commercial real estate is accompanied by this. Plus speculation has shown to grow over time, which makes it much more complicated.

2. Organizations often continue to think in terms of short-term returns, a quickly filled wallet, but forget that the long term, and therefore more looking at the exploitation of commercial real estate, can sometimes be much more profitable. The DCF is a good example of this. Some can argue that the knowledge of a valuer over a time period of 15 years in the valuation of commercial real estate is questionable.

In short the foundation for each crisis is that an event happens, like in 1929 the crash of the stock market or in 2008 the fall of the Lehman Brothers. The reaction of commercial real estate often comes with a fall of the valuation. Working places are most likely to react later on and are more dependent on the development of technology and increasing demands of the users of commercial real estate. Yet there is a relationship between crises, exploitation and valuation. They all rise and fall with speculation, strategic thinking in return on investment and the demand of the users. Besides that, politics, the stock market, access to several resources and banks also have high influence on the impact of crises on commercial real estate in terms of exploitation and valuation. Also an explanation of several concepts have been provided to get a better foundation for understanding this research.

Preview next chapter

In the next chapter the research results will be presented. A view of professionals on commercial real estate and a KPI description of exploitation and commercial real estate ownership will be provided. A risk assessment will be performed to show the risks of crises for commercial real estate.

4. Outcome field research

In this chapter the research results will be presented and in the most optimal and possible way an answer is provided on the sub question below:

"*Which risks as a result of crises affect commercial real estate and, as such, the exploitation and ownership of commercial real estate?"*.

Risks as a result of crises and the affection of them on commercial real estate from both perspectives can be provided by a risk assessment, but first the collected information of interviewees and research on the key performance indicators of exploitation and commercial real estate ownership will be provided to make a more specific risk assessment. Also the description of all the crises has been used to make an accurate assessment (A.1). This is needed because in that way every possible type of crises from the past since 1929 has been taken into account. This is important because in this way one can learn from the different factors and actors of past crises. This makes it possible to look at crises with a fresh and learned view and as such a strategy can be made for the future, which for a change also looks at mistakes from the past.

4.1. Results interviews

Various questions and themes were discussed with the various interviewees and from there more knowledge was gained about why commercial real estate is attractive, what the role of facility management is in this and how investors view commercial real estate. In the various interviews, passages are highlighted that were important or inspiring for the research. For each interview, the main findings or comments are detailed below. These findings have been compared with each other in order to contribute to answering the sub question. During the analysis the whole interviews have been used.

Interview 1

The main findings from the first interview were a number. In this conversation it became clear that an accelerated different way of working has arisen due to the current crisis and that the question of whether we still need our own office is becoming increasingly important. A more flexible approach to the workplace is an important issue here. In times of crisis, the first cut is often made on the use of the number of square meters and various facilities offered. This cut is not always correct because by cutting out quality, the bill will be returned to the organization later. In the future, it will probably become increasingly important that more and more functionalities and facilities come together in areas, which makes facility management increasingly important. Banks play an important role in financing and offering future prospects and consultants can contribute to the awareness that companies must help each other and that the facility manager can also work more closely with a property owner.

Interview 2

During this interview it emerged that the quality of a location is everything that determines an investor. The better the location, the lower the risk, but the return is often somewhat lower. Furthermore, the government and banks always have a role to play in helping the market during crises because they can provide tailor-made solutions in offering (financial) solutions. Investing in real estate is often a direct return. This as a result of rental income. The cash flow from this rental income is most important to investors along with the location. It was clear that because of the lack of knowledge about the exploitation of commercial real estate, the problem is that investors only look at their return and not at the business processes insight commercial real estate. This interview has confirmed that investors only see commercial real estate from return perspective.

Interview 3
During this interview, the emphasis was from the outset on that real estate also has a social function and that the customer journey is equally important. Not only during COVID-19, but also other crises, it has been important to fulfill the housing needs differently. Initially, all rented square meters are often the first to be disposed of, but social cohesion remains very important in the reconstruction. More attention needs to be paid to the long term, which is why it is important that facility managers keep thinking in terms of concepts. According to the interviewee, sustainability means living together and thinking together about a livable environment. For the investor, minimizing the risk is the most important. However, if we look at the long term, the residual value of a property can be important. In this we must therefore look more at the time dimension in which we are. Together with this, look more at what is produced in buildings, as this does indeed increase the market value and therefore not only look at the rental flows. Too much attention is paid to a building as a product, because a product generates money.

Interview 4
During this interview it became clear that cash flow is important for a bank in financing. However, banks are also increasingly advising that maximum return is not always the best return. Relationships between investors and tenants are therefore becoming increasingly important. The stability of the rental flows is still important and the disappearance of cash flows can cause issues. At the moment, an important driver of the market is still the opportunism of the investors. The appraisers are currently still too conservative and often have the story that there is too little evidence to demonstrate, for example, an increase in value through sustainable developments in a building. The value is now based on cash flows, but we should actually look more at the game between the investor and the user. This may well be the case in the future. After all, the facilities are becoming increasingly important.

Interview 5
During this interview it emerged that data driven analyzes are very important and that governments, banks, but also appraisers and consultants must be able to make a value judgment based on their knowledge and expertise. The added value of business processes will probably influence the valuation in the future and it is in any case clear that meeting places and social interaction will still remain important for people to use real estate. Getting together is too important for that. In the long term, real estate should be viewed as a strategic asset.

Analysis and conclusion of the various interviews
Facility management or asset management, and therefore the exploitation of commercial real estate, has as a challenge to match the utilization of commercial real estate as best as possible with low vacancy and high satisfaction of the tenants. From ownership perspective this is important for the value of commercial real estate, for the exploitation it is important for production and occupancy rate optimization. This playing field is very dynamic and in every crisis this means that this match has to be performed again or differently every time.

Commercial real estate from ownership perspective is an investment product that looks for the highest possible return. Exploitation is a part of the value of commercial real estate but the market shows that it is not only supply and demand anymore but here the customer journey approach and demand becomes more and more important. Real estate service providers are increasingly looking at what exactly this customer journey is and should be and how best to respond to it. The central question in this is what the customer actually needs to achieve its primary business goals through good facility management.. The service provision will therefore increasingly focus on the user who ultimately takes care of the exploitation. The owner generally doesn't do much about this.

Developments in technology can optimize the workplace concepts and have shown that if everyone can work on any place that a crises can have a marginal impact on how workplace concepts will be utilized. It is therefore that crises only have impact on how people behave and give their turn on these concepts. Strategy for the future of commercial real estate must therefore be made with this in mind.

Culture and behavioral change have had impact because of crises. These also have impact on the utilization of commercial real estate after a crisis. ‘Het Nieuwe Werken’ and other workplace concepts like these will develop mostly because of two factors: the development of technology and the need for social cohesion and behavioral change. Social cohesion is a returning habit after crises, therefore a crisis in short term can mean change in demand of building performances or the amount of commercial real estate that is needed but on the long term emotions and workplace concepts will always adapted because social cohesion is important towards people.

This means that most of the owners of commercial real estate will think in short term gain and profit, but that facility managers need to stay focused on the long term concept thinking and not necessarily short term cost reduction. Corporate real estate integrated management, also known as the integral use of the various business functions and practices, can therefore help in sustainable, long term and circular thinking for making future strategy. The overall use of the various assets and resources, for example humans, capital and real estate, for the long term will result in more profit for both the exploitation but also ownership of commercial real estate.

4.2. KPI’s exploitation and ownership

In this section an overview of the different key performance indicators (KPI) of both exploitation and ownership of commercial real estate will be provided. Before these indicators are described, an explanation of what key performance indicators are drafted.

The basis for organizational capabilities is knowledge. Knowledge has become a resource to form the foundation of organizational capabilities. This is the result of individual and organizational activities. The individual level is the personal knowledge, skills and talents, while the organizational level provides infrastructure, networking relationships, technologies, routines, procedures and culture (Marr et al., 2004). The wealth of an organization is based on the knowledge of its own people. It is not without reason that there has been a war on talent for years in a well-functioning economy (see interview 1). The competitive advantage for most organizations is send by the execution of successful strategies. These strategies can only be successful when an organizations knows its capabilities. Capabilities are substantiated by knowledge and knowledge lies with the people of the organization (Marr et al., 2004). The driving factors of our economy is also highly depending on knowledge (see A.6, Figure 60). Through the years knowledge is the largest piece of the pie for economic growth.

The key performance indicators come in place as a result of the knowledge provided by the people of an organization. To make an accurate overview of the key performance indicators for the exploitation of commercial real estate, the Skandia Navigator model will be used in combination with the IC Audit model (Marsel, 2014) (Marr et al., 2004) (Brooking, 1996).

To make an accurate overview of the key performance indicators for ownership of commercial real estate, the read literature and information conducted during interviews will be used.

4.2.1. *Skandia Navigator model: key performance indicators for the exploitation of commercial real estate*

Using the model of Brooking (1996) in combination with the Skandia Navigator model (CH3.6) can provide a much more clear vision of the intellectual capital for an organization and therefore generates insight in the key performance indicators of commercial real estate from exploitation perspective. In this research, exploitation focuses how the use of commercial real estate is and what type and kind of business take place within it.

The first key performance indicator for the exploitation of commercial real estate is the knowledge, skills and talent of the people in it. The value of this can be seen from income which is produced by these people, the replacement of these people with people with other knowledge and skillset or the consensus of the market of the value of these people as an asset.

The second key performance indicator for the exploitation of commercial real estate is the process focus. The performance of the processes like response time, handling time of the work within the commercial real estate and the insight in bottle necks within these processes form an added value towards commercial real estate. The replacement costs and market consensus about the value of the processes can be drafted. It is really difficult to actual measure the income produced from the process itself.

The third key performance indicator for the exploitation of commercial real estate is the customer and its response. Is the customer of commercial real estate satisfied, does it react on new market insights, sales or developments and is it willing to go far for what's happening within the particular case of this type of commercial real estate. This is a good example of a market based approach. The customers define the value towards it. Also they can generate income by making use of the business within the commercial real estate. Replacement costs are hard to define, unless looking form the perspective that another way of doing business can be valued as replacement costs.

The fourth key performance indicator for the exploitation of commercial real estate is the focus on new developments, renewals within the market and the adaptation of these within the business which is held within commercial real estate. Replacement of old technologies or methodologies for new ones are easy to measure, together with the income these generate. It is hard to define a market value because these technologies and developments are part of the business within commercial real estate.

The last and (maybe) least important, but nonetheless affecter of the performance of commercial real estate, is the financial role of commercial real estate. The cash flow, the operating results, the expenses, the income but also the return on investments are of value towards the exploitation of commercial real estate. In this key performance indicator the three approaches of Brooking (1996) all come along. It is therefore more important to focus on the previous four key performance indicators from the perspective of combining the Skandia Navigator model with the approaches of Brooking. In nowadays way of valuating commercial real estate it is a habit of valuing commercial real estate mostly only from the financial focus and perspective.

All the four other perspectives are of less or tiny value towards the overall valuation of commercial real estate. Looking at the DCF model (see CH3.7 and A.4) the exploitation costs mostly are sorted by the amount of rent and the duration of tenant contracts. What can be certain, is that there is nowhere something to find about the role of the people, the processes, the developments and the customers(reaction).

4.2.2. Key performance indicators for the ownership of commercial real estate

According to all the literature read, interviews with professionals and analyzing the DCF-model a few KPI's were conducted from the view of the owner of commercial real estate (RICS Red Book, 2019) (Nations, 2017) (Blinder, 2014) (Dalio, 2018) (Rubinsohn, 2020) (also see interviews). According to NuWire (2016) there are seven KPI's for successful property management. Along these seven performance indicators of NuWire and the knowledge gathered through research, seven KPI's have been put together.

The first key performance indicator from the perspective of the owner for commercial real estate is the turnover on the amount of properties. How many are there lost or won during time. The bigger the increase, the bigger the profit. This can be measured by the amount of properties that have survived a crisis or not. Another indicator is the vacancy rate within the property.

The second key performance indicator is the occupancy rate. When the market is strong this is nearly 100%, when the market is weak or unstable this will be lower. Sometimes owners use incentives to keep tenants happy. The indicator for this is the vacancy rate together with the amount of incentives that a commercial real estate owner has to provide in order to keep the tenants at its real estate.

The third key performance indicator is the average of outstanding debt tenants have with the owner. The more the debt is, the more uncertainties arise for the benefits and profits of this tenant. Monitoring this can provide well knowledge about good and bad tenants and must provide a certain stability for strategies in the future. The indicator for this is the amount of cash flow from tenants towards the commercial real estate owner.

The fourth key performance indicator is in line with the third but is about the amount of tenant turnover. When everything is going well, the tenants has no reason to leave. Tenants will be satisfied when they will be handled according their standards and that the owner listens to their demands. If everything is properly provided by the owner of commercial real estate, the tenant turnover will be low because their expectations have been managed well enough to stay. Also the amount of visitors of their property can be an indicator for the amount of tenant turnover. If this becomes less frequent this could be a sign.

The fifth performance indicator is the net income generated by the leases. Rent is just one revenue stream but the most important one, besides that revenue streams such as maintenance, lease of parking spaces, fees charged for services like catering and cleaning (when not in lease) could also be of high influence.

The sixth key performance indicator is the fee of property management. This is highly depending on the lease terms and the amount of service that is provided. It is also combined with a competitive advantage when doing very well. It could be a benefit for an owner to look closely to this with their own property but also towards their competitors.

The seventh key performance indicator but definitely also of high value, is the revenue growth over time. How is the value of the building developing over time, how is the rent value growing over time, which factors needs to be reckoned with. Monitoring all the above key performance indicators can result in more revenue growth over time.

The described key performance indicators must help owners of commercial real estate and making business decisions and strategy for the future. Along these key performance indicators and the obtained knowledge about crises, the ownership and valuation of commercial real estate can be put in strategy terms and goals in order to avoid problems as a result of future crises. An owner of commercial real estate can use these performance indicators when validating objects and invest in objects.

4.3. Risk assessment crises on commercial real estate

To make a risk assessment of crises on commercial real estate the KPI's of both perspectives will be used in relation to the risks and the (performance) history of commercial real estate. The risk assessment will performed according four steps approached with IERR mnemonic (A.3.2) (Sterling et al., 2012, p.75). Of course this is from organizational perspective but the steps can also be applicable for identifying risks as a result of crises towards exploitation and ownership of commercial real estate. This analysis should provide insight into the main risk factors for both. As a result, a more targeted strategy can be drawn up in the future to respond to these risk factors and the avoidance of these risks. A risk in this case is defined like this:

A risk factor in this case is a factor as a result of a crisis that has such an impact on the exploitation or ownership of commercial real estate that it cannot function as intended. *– S. Koning*

In other words does this mean that from exploitation perspective parts of the business operations within commercial real estate can no longer function as intended. From the perspective of the ownership of commercial real estate, this means that the return on investment, value and proposition of commercial real estate change in such a way that it reaches an irreversible point. This means that it reaches a point in where it cannot function as intended. This has impact on both valuation and use of commercial real estate.

To perform an accurate risk assessment, a little extra must be explained. Economy normally translates itself into business cycles and therefore in trendlines. These trendlines were always assumed to come back after a while but new research has shown otherwise. Cerra & Saxena (2017, p.5-16) has found that the traditional view on the recovery of an economy in history cannot be supported by what actually has happened after crises in history. Their research (see A.6, Figure 61) shows the traditional view on the recovery of an economy and the actual trend of recovery. This shows that in the case of how it actually is, that there is a permanent output loss as a result of recession.

This data is conducted from the period 1960-2001. The evidence shows that the recovery after a recession consists of a return of growth towards the long-term expansion rate but without a rebound back to the initial trends. This does mean that the output of a shock results in a complete shift in trendlines. So the business cycle, is not a cycle anymore, maybe it hits the same trendlines but at another level. This is in line with the permanent output loss. The traditional view on business cycles is therefore not totally accurate. The output of a shock has therefore a really huge impact on the valuation of commercial real estate.

4.3.1. Risks crises on exploitation of commercial real estate

In this section the risks for the exploitation of commercial real estate will be explained. The first step in this risk assessment is the identification of the risks out of crises for the exploitation of commercial real estate. Exploitation of commercial real estate is mainly based on the cashflow of rental incomes for the commercial real estate owner during the valuation of commercial real estate. Nonetheless, this is not the entire truth. Much more factors come in place and have impact on the exploitation of commercial real estate. The most important factors conducted from the research about crises will be described.

The risk factors or critical success factors for the exploitation of commercial real estate can be described mainly from financial consequences arising from crises. Economy is a game of supply and demand, but our current economy is no longer as easy to reason and interpret as it was in the 1930s. There is no longer a reality for a business cycle as has been discussed for years. After the financial crisis, these cycles are increasingly questioned (Cerra & Saxena, 2017).

Using the IERR mnemonic some risk factors can be identified. The exploitation costs of commercial real estate consists of different factors. NEN 2699:2017, derived from ISO 15686, states that exploitation costs are derived from (NEN 2699, 2017):

1) owning immovable (commercial) real estate;
2) maintaining immovable (commercial) real estate ready for use;
3) the partial or full use of immovable (commercial) real estate.

In this standard a division is made between real estate and services and resources. The real estate part focusses on the building costs, municipality taxes, insurances, energy use and real estate management costs. Services and resources focusses on risk management, cleaning, IT infrastructure, administrational management and services and facilities within the different departments (NEN 2699, 2017).

Besides that understanding the change factors, drivers and its implications is of high value for the exploitation of commercial real estate (Harris, 2020). These drivers (see A.6, Figure 62) have impact on all commercial real estate sectors. As an example, artificial intelligence will push itself towards a more important role and the climate change will have an impact on change in environments and behaviors.
In combination with the changing workplaces and role of organizations (see A.6 Figure 63) , this will lead to a total new environment within commercial real estate. The modern work environment will be much more flexible, attractive and retraining the skill of people and this will lead to a change of demand for space. The modern workplace is a web of many activities: people can move around, meet each other, collaborate in different areas and can constantly interact with each other. The main driver of all this is the crazy developments of technology. This will lead to a totally new evolvement of the corporate landscape (see A.6 Figure 64) (Harris, 2020).

As showed in Figure 5, when explaining the KPI's, the main focus point is the employee and they determine the evolvement of the corporate landscape in the future. Relationships, knowledge, connections and structures will define and shape the futuristic' s of commercial real estate. Therefore the exploitation of commercial real estate, in other words facility management, will add so much more value towards commercial real estate than before. During the research about the workplace, crises and possible risk factors a few of these came to attention.

These risks are risks attracted because of crises but also towards the exploitation of commercial real estate. As a result of crises and the conducted KPI's, these possible risks and results for exploitation, and thus facility manager, were conducted (See A.1 and A.2 and A.3):

- Possible increasement of building costs and insurances because of economic instability.
- Possible increasement of costs for services and resources as a result of a different demand by employees.
- Possible increasement of costs for organizations for disposing of buildings because of a worse economy.
- Possible increasement of costs for the workplace because of the shift in decreasing density of the workplace for employees and more employees working from home.
- Possible lower rental costs as a result of more incentives because of the hope on a more quick recovery of businesses after crisis.
- Possible increasement of costs for developments and training because of a shift in supply or demand as a result of crises.
- Possible increasement of costs for keeping track on new trends and emerging and acquiring the knowledge which is needed for the 'new' exploitation of commercial real estate.
- A permanent output loss results in a slower recovery after a crisis for organizations and businesses.
- A shift in the view on building performances, other demands and other driven factors such as knowledge, wellbeing, environmental performances and social value.

All these possible risks must be evaluated, recorded and given a quick and thoughtful respond to. By identifying, the three steps after the identification can lead to strategy to avoid such problems in the future. The above risks can be summarized in three categories: building performances, employee concerns and a shift in approach for the exploitation of commercial real estate. All of these will possibly lead to cost increasing activities but the backlash of this can be avoided when organizations will take this into account within their multi-year maintenance and strategy plan. The risk analysis will be performed according the principles described in 3.4 and A.3.2.

4.3.2. Risks crises on ownership of commercial real estate

In this section the risk factors resulted from crises and the conducted KPI's for the ownership of commercial real estate will be described. For owners of commercial real estate the most important point of view on their commercial real estate is value retention and an increase of it.

In relation to the changing landscape for the exploitation of commercial real estate, the approach of value will change and that's really important for the owners of commercial real estate. As Harris (2020) stated, 'value' normally is defined in financial terms but this will change for the owners and investors of commercial real estate. The expectations of the end users on their commercial real estate are shifting to an approach were the performances, wellbeing and social value from the buildings are more important. Of course costs and functions remain of value and are also critical for good valuations of commercial real estate, but crises, especially nowadays crisis, can lead to shifts in demands from the end user towards the owner.

The possible downfall of commercial real estate prices is another risk, because of more vacancy, more caution by investors and banks, higher loan rates and rising debt by their tenants because of economic instability. This factor looks like an open door, but as history has shown commercial real estate does not take precautions to absorb the problem.

In line with this the permanent output loss has never been considered after crises and taken into account for the valuation of commercial real estate and to prevent a high downfall of value in the future (Cerra & Saxena, 2017) (Berry, 2020) (Barkham, 2020) (Harris, 2020) (Schnure, 2020) (Blinder, 2014) (Nations, 2017).

Factors like construction, political instability, market shocks, money tightness or overkill, demographics and wellbeing have never had that much of a value for investors because 'everything would get back to normal' after a short recession. Nonetheless this has impact on the value of commercial real estate, and especially with nowadays crisis in mind, must be taken into account for valuations of commercial real estate in the future. Therefore these also form a risk for investors and must be weighted when making strategy for the future.

4.4. Summary, conclusion and preview

"*Which risks as a result of crises affect commercial real estate and, as such, the exploitation and ownership of commercial real estate?"*.

The answer on this second sub question is substantiated with research on the key performance indicators for exploitation and ownership of commercial real estate and collected information of interviewees. These interviewees are professionals whom have a broadened knowledge about commercial real estate and exploitation and/or valuation of commercial real estate. The collected information of the interviewees and the research of the KPI's were the basis for mapping the risk factors arising from crises on commercial real estate. Therefore, the answer on this sub question is in twofold: risks resulted from crises on the exploitation of commercial real estate and risks resulted from crises on the ownership of commercial real estate. Before pointing these risks out, it is important to understand that both cannot function without each other. The owner of commercial real estate is highly depending on how the exploitation of its commercial real estate is founded and the exploitation of commercial real estate is highly depending on the commercial real estate owner and its view on reasonable fees, incentives and valuations of commercial real estate.

The risks resulted from crises on the exploitation of commercial real estate can be defined in three categories: building performances (1), employee concerns (2) and a shift in approach (3). The avoidance of a backlash on these three must be described in the multi-year maintenance and strategy plan. The most important driver for avoiding these risks can also be knowledge and keeping up with trends and relationships. A well performed exploitation of commercial real estate starts with human focus and mapping every possible risks for them.

The risks resulted from crises on the ownership of commercial real estate is a downfall of the valuation of commercial real estate and a changing landscape in the demand of its end users. When the valuation of commercial real estate is reasonable for both owner and the operator of commercial real estate, risks will be less for both. Also the owner of commercial real estate must take into account a permanent output loss of value on its commercial real estate. It's not that this will immediately lead to loss in market value, but indirect values, the amount of tenants for example, will have impact.

On the other hand could crises mean a shift in the value approach for commercial real estate. A good example of this are logistics distribution centers during COVID-19. The value of these have increased because of a shift in customer demands, the downfall or retail and the rise of e-commerce.

Another risk for commercial real estate owners is the shift in demands from its tenants and end users. Crises often lead to other approaches or a shift in demand of building performances. A commercial real estate owner must take this into account. The development of technologies and solutions for different aspects of the workplace and the need for social cohesion and behavioral change of people towards the workplace and environment are changing the demands of the building performances.

Preview next chapter

In the next chapter an analysis on the research will be done. The relationship between business continuity management, the conducted risk factors and the exploitation and ownership of commercial real estate will be explained. After that the most important factors will be related to strategy making at policy level for the future. After that the return on investment by earning capabilities of commercial real estate from DCF perspective will be explained. The explanations of these analysis will be substantiated with the use of the DCF model, a self-developed index scale and the research results.

5. Result analysis

In this chapter the results of the performed research and the explanation of the different concepts will be combined in making an analysis. This analysis must result in an answer on the third and last sub question:

"Which factors arising from the stated risks for the exploitation and ownership of commercial real estate are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate?".

At first the relationship between business continuity management, risks and the two perspectives: exploitation and ownership will be addressed. After that the important factors from the risk assessment for strategy making at policy level for the future will be described and an index for these factors will be drafted. Finally, the return on investment by earning capabilities of commercial real estate with the use of the DCF-model (see 3.6 and A.4) will be explained. Furthermore, an index and impact analysis along the DCF model for the return on investment for earning capabilities on commercial real estate will be provided.

5.1. Relationship business continuity management and risks exploitation and ownership

To be able to make strategy at policy level for the future of the return on investment by the earning capabilities of commercial real estate, business continuity management and the outcome of the risk assessment from exploitation point of view are important to relate. Understanding this relationship is the foundation and starting point from where strategy can be made for facility managers. Besides that it's the basis for the explanation of the important factors for facility managers, as a result of the risk assessment, and the index of these factors. This index in combination with an impact analysis along the DCF model will be used to analyze the impact of the risk factors for the future of return on investments by the earning capabilities of commercial real estate.

Business continuity management is used in order to make strategy for the future of an organization, avoid high risks for business operations and manage the whole organization in a healthy and tactful way. During this process, a risk assessment must be performed in order to make strategy in a way to avoid these risks and always take them into account (Sterling et al., 2012).

The relation between business continuity management and the risks for exploitation of commercial real estate is high because it is interconnected and depending on each other. As a result of the risk assessment and a response towards these risks strategy will be made for the future. These responses form the strategy (Sterling et al., 2012) (see A.3.2). The five strategies for response can help an organization for the avoidance of future problems for commercial real estate. The five types of strategic responses are (Sterling et al., 2012, p.91):

1. Prevention: Terminate the risk by other business performances and remove the risks with by putting measures in place to ensure that the risk won't reoccur. This will result in the prevention of impact of these risks on the business activities. An example could be a pest during the harvesting of crops. By placing a greenhouse or growing it in temperatures where this pest cannot survive, other business performances and strategies are thus used to prevent the risk.
2. Reduction: The risk will be treated in taking action to control the risk in a way that the likelihood of a development of the risk is limited and the impact on the business activities is acceptable.
3. Transference: Managing the risks is passed to a third party via for instance insurance policies. The risk will remain a risk when this third party is unable to help.
4. Acceptance: The risk will be tolerated because the impact is on an acceptable level or there can't be done anything towards it because of costs.
5. Contingency: Actions planned and organized to come into play when the risk occurs.

The mentioned five points above can also apply for the ownership of commercial real estate but in this case it is more relevant for the exploitation of commercial real estate because it is more on operating level. The owner of commercial real estate doesn't necessarily need to make strategy in this debt. The exploitation of commercial real estate must take into account this level of debt because of all the business activities it need to take into account.

Business continuity management and the outcome of the risk assessment from ownership point of view are important to relate. This is in order to understand the impact of the index and factors for the return on investment. The most important relationship between business continuity management and the insights in risks on the ownership of commercial real estate is that the owner of commercial real estate must have a good view on the reliability, costs and its reputation to value the risks and business continuity within its commercial real estate. So when the owner of commercial real estate has access to a good overview of how its tenants perform, the reliability on its tenants and the businesses within the commercial real estate, there is a good overview of how well risks can be managed and the continuity of the business is going on.

In other words, this means that the difference between owning commercial real estate and the exploitation of commercial real estate in relation towards business continuity management is that the exploitation of commercial real estate is viewing this from operational level and the owner of commercial real estate will view this from financial and tactical level.

5.2. Important factors from the risk assessment to make strategy at policy level for the future

5.2.1. Factors

In chapter 4 the different KPI's and the risk assessment for both exploitation and ownership of commercial real estate has been explained and described. In line with this several factors resulted from this research can be analyzed in order to make an index of these factors to make strategy at policy level for the future. To understand these factors a flow chart is made in order to understand the process towards these factors.

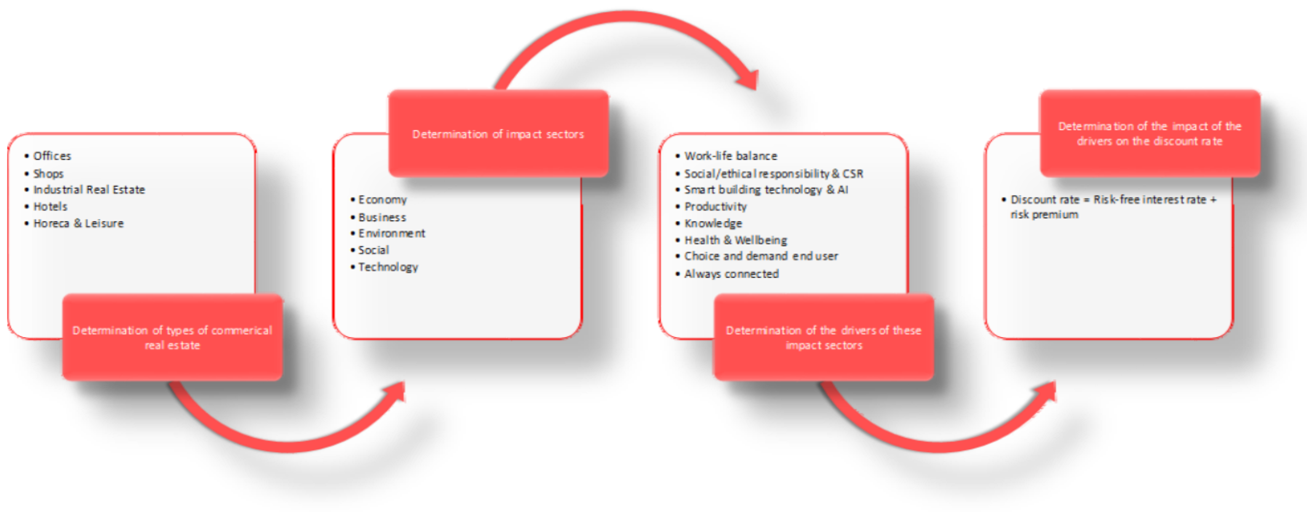


Figure 6: Flow chart towards index of important factors for making future strategies[3](Koning, 2020)

Many factors are related towards crises and the development of commercial real estate. In the conclusion of the previous chapter the most important ones have been described. Building performances, employee concerns in various ways, a shift in approach towards commercial real estate and the downfall of or influence on the valuation of commercial real estate can be seen as key risk factors. Nonetheless there are so much more factors which must be held in account when strategy at policy level for the future will be accurately made.

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[3] Self-made flow chart about the decisions made in order to make an index for future strategy making (Koning, 2020).

The determination of the factors is step three out of four for making an index for making future strategies (Figure 6). Before this determination, the types of commercial real estate must be determined. This is important because different types have different risks. After that the angle of approach will determined through five sectors: economy (1), business (2), environment (3), social (4) and technology (5). These five sectors are key for commercial real estate. This is also stated by RICS (Figure 62, Harris, 2020). After that the risk factors will be described and the impact of the drivers on the discount rate can be described. The impact on the discount rate is important because this will determine the amount of fee which will be appointed towards risks of commercial real estate in a DCF-model (see A.4).

The outcome of research on risk factors in relation towards strategy making can therefore be of high importance for both exploitation and ownership of commercial real estate. It is for this reason that it is important to understand the several steps that must be taken to come there. To summarize these steps an overview is provided in Figure 7.

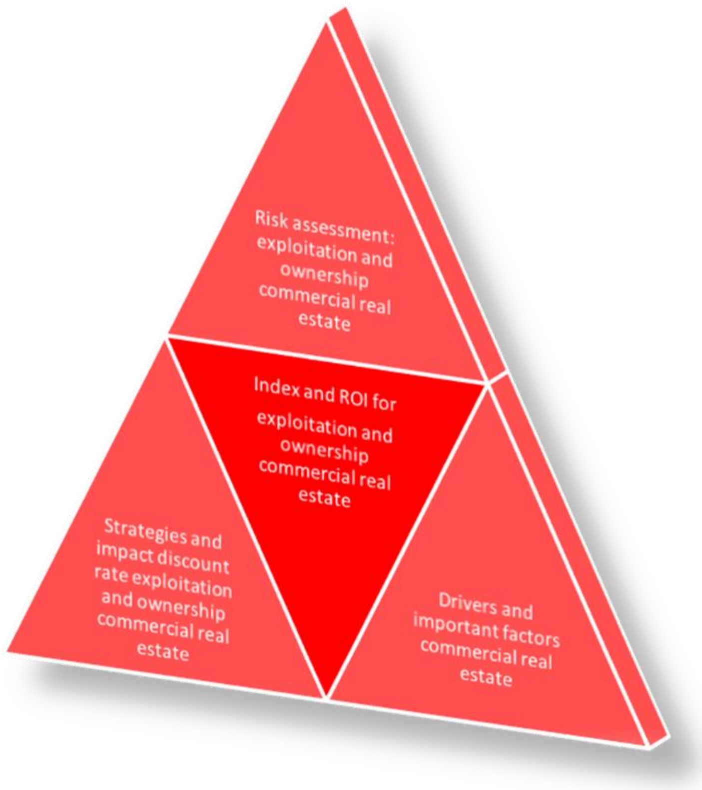

Figure 7: Segmented pyramid - steps towards index and ROI for exploitation and ownership of commercial real estate[4](Koning, 2020)

5.2.2. Index of the (risk)factors

The index of the several (risk)factors is important for future strategy making and therefore for both exploitation and ownership of commercial real estate. To make such an index, extra research must be performed in order to make an accurate overview of why and how the index must be build up. For future research an explanation of the various important parameters for this index is given. An example of such an index is provided in Figure 8. The index consists of three main components:

1. Commercial real estate type;
2. Change factor;
3. Impact drivers commercial real estate.

[4] Self-made pyramid about the steps that must be taken to actually have good performances in terms of exploitation and ownership of commercial real estate (Koning, 2020).

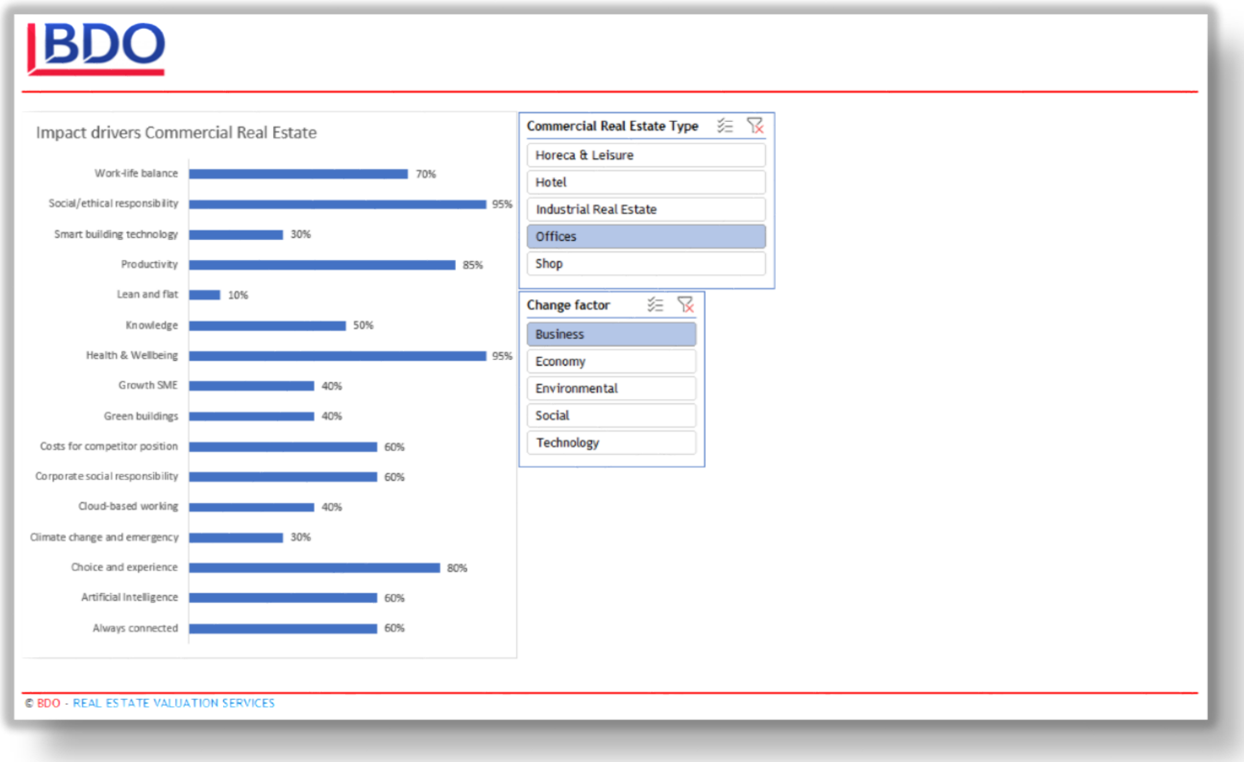

Figure 8: Example of model for impact drivers and index[5](Koning, 2020)

The three main components can make a good index, the data behind these components are much more complex. Many different factors have influence on the drivers and change factors. Besides that maybe the types of commercial real estate will vary or differ from now in the future. The foundation for the example in Figure 8 is that the fluctuation of the economy, politics and environment in nowadays society is high. Globalization has made that everything is connected with one another. This means that the dependencies and approach within the commercial real estate market also fluctuate. Therefore it is important to take in account these factors by making future strategies. An index of these factors with parameters which can be changed easily when there is a change within the market is therefore desirable in order to have a more accurate and complete overview of these factors and its impact on commercial real estate. Crises develop over time and in the future it is likely that crises will occur more often because of the dependencies in the world and especially in the commercial real estate market.

This index can also provide a basis for more in depth calculations for commercial real estate. The index can be a foundation for a discount rate to support the DCF-model in order to make a much more accurate valuation of commercial real estate because trends, economic and social developments and crises in past and possible future have been taken into account. In the next section the relation between this approach of the DCF-model and the return on investment will be provided in order to give a complete answer on the third and last sub question of this research. Also an explanation of the index for supporting the discount rate, part of the DCF-model, will be given. At last a scenario sketch of the possible impacts on the exploitation and ownership of commercial real estate in relation towards the return on investment by earning capabilities of commercial real estate is provided.

[5] Example of an early stage draft of an index for a more in depth and accurate valuation, and understanding, of commercial real estate (Koning, 2020).

5.3. Return on investment by earning capabilities of commercial real estate from DCF-perspective

5.3.1. Gravity center for exploitation and ownership within DCF-model

The use of a DCF-model as a valuation-method for determining the value of commercial real estate is not especially new or extraordinary. The use of this model can provide a lot of information for both exploitation and ownership of commercial real estate, but a more in depth approach with this model can possibly lead to a more in depth and accurate valuation of commercial real estate. In section 3.6 and A.4 the whole meaning and definition of the DCF-model according to RICS is described (RICS Red Book, 2020).

In Figure 9 an example of a DCF-model is provided. This model shows that it mainly consists of three parts, in which two are of real importance towards the exploitation of commercial real estate and/or the ownership of commercial real estate. The gravity point for both will be explained and described. Along this path, an explanation of the discount rate an a possible index with the information extracted from the research can be made. In line with this the impact on both exploitation and ownership of commercial real estate of this changing discount rate, the role of the index and the gravity point for both sides can be described. This will give sight on the return on investment by earning capabilities for commercial real estate from DCF-perspective.

Discounted Cashflow Model

Cashflow	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Netto cash flows	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Net present value cash flows	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Total gross income per year	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Rent	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Rent incentives	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Vacancy	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Additional cashflow	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Structural vacancy	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Exploitation costs per year	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Maintenance	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Fees/Premiums	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Management costs	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Transaction costs	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Service costs	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Rental commission and / or PR and marketing	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Renovation costs	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Diverse	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Expected Value	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Figure 9: Example of a DCF-model (Koning, 2020)

First of all, the DCF-model will be unraveled to explain the gravity center for exploitation and ownership of commercial real estate. For the owner of commercial real estate, during this research, the most important factors are vacancy, income and the value of the commercial real estate itself. Therefore along the DCF-model it is that the income gathered by the object is the most important flow for the owner of commercial real estate. This thrives the owner for buying and investing in commercial real estate. Though, this approach can maybe differ after explaining why the exploitation of commercial real estate and its drivers in the DCF-models are also important towards owners of commercial real estate. Before explaining this, the exploitation of commercial real estate in relation to the DCF-model does make sense and mostly consists of the exploitation costs per year. The exploitation is thriving on how well a building is performing, how the employees within the building feel and think and how the approach and demands for the building are.

These points, in the first place, are mainly of importance towards the exploitation of commercial real estate but this doesn't necessarily mean that they have no value for the owner of commercial real estate. Especially when it comes towards the income part.

The income is mainly driven by tenants, tenants are the group which is the group that will look after how the building is performing, how people will do within the building and these tenants can make or break the approach towards a building. Tenant demand is commercial real estate demand. Commercial real estate demand is influence on the market rent and the influence on the market rent determines the value of commercial real estate. Here is a value for the owner as well, because a part of the valuation of commercial real estate is driven by what tenants are willing to pay for the property. This means that when the building is properly managed by the owner, tenants are more likely to pay more and this is good for the valuation of the property.

The importance of the discount rate for the DCF-model and therefore for the exploitation and ownership of commercial real estate and the vision on the return on investment of commercial real estate will be explained. The discount rate is the rate used to discount future cash flows by a DCF-model analysis. It expresses the time value of money and can express the difference in whether an investment is financially viable for investors or not (Scott, 2020).

The discount rate is the estimated investment result at the time of acquisition, expressed in a percentage and that during a considerable time frame can be achieved on an investment in commercial real estate. Often this is explained as the return requirement. This return requirement is a money-weighted average to express the return on investment. It is average because it is the return over an entire time in the investment horizon of the DCF-model. In addition, there is an expected return, provided by the investor and which is based on knowledge about the commercial real estate market, taking into account the important factors that will affect the value and cash flow of commercial real estate in the coming years. The discount rate must be derived and supported by market-based reference transactions that have taken place over time (Discount Rate Working Group, 2015).

5.3.2. Index of the discount rate

The discount rate consists of four components (Lusht, 2001, p.392):

- The actual return as a result of delaying consumption. This is for every type of investment equal (bonds, stocks etc.).
- A risk premium for the unexpected inflation because of the purchasing power of consumers inflation can erode.
- A risk premium that is basically a compensation for the business risk that is taken by an investor (1), a premium for the unexpected inflation (2) and a compensation for the lack of liquidity because it is a horrible job to convert a real estate investment into cash (3).
- A premium for other costs like management costs, acquisition costs and transactions costs.

In line with this research the approach of the discount rate can be different than before because for future strategy it is important to take into account the different (risk)factors as a result of crises for commercial real estate.

A possible other approach of a new index for the discount rate is provided in Figure 10. The change factors are the four components of the discount rate and the impact drivers are a little different than the impact drivers for the index of the (risk)factors. The relationship between the change factors and the impact drivers is that they are all intertwined, but are aimed at being able to fit into the discount rate for a DCF model. With this different approach to the discount rate, it is therefore important to once again look at what type of commercial real estate it concerns and what the different impact drivers in relation to the change factors influence this type of commercial real estate. In this way, as a result of the previously acquired knowledge about crises, a more accurate determination of strategic choices can be made in order to provide commercial real estate as such with a better valuation in the future. The discount rate and giving more attention to this can therefore ensure a better bandwidth on which is valued, so that strategy making on policy level for the exploitation and ownership of commercial real estate is determined.

The facility manager and the owner of commercial real estate have as a result of this more to do with this in order to go into more depth in the future to ensure a good policy for the commercial real estate. In this respect it is therefore very important to understand that the various risk factors that arise from crises are properly understood, mapped out and weighted. Because of this weighting, a weighting of these factors can also be related to a new discount rate index. The facility manager must weigh the risk factors in order to make strategy for the exploitation of real estate. By determining the risks the facility manager can be the bridge between the users of commercial real estate and the owner of commercial real estate. It must weigh both their requirements and facilitate the highest quality from both perspectives. Therefore the facility manager is key towards both owner and user of commercial real estate and therefore is for both of added value. The impact analysis of these risks will be done in the next section.

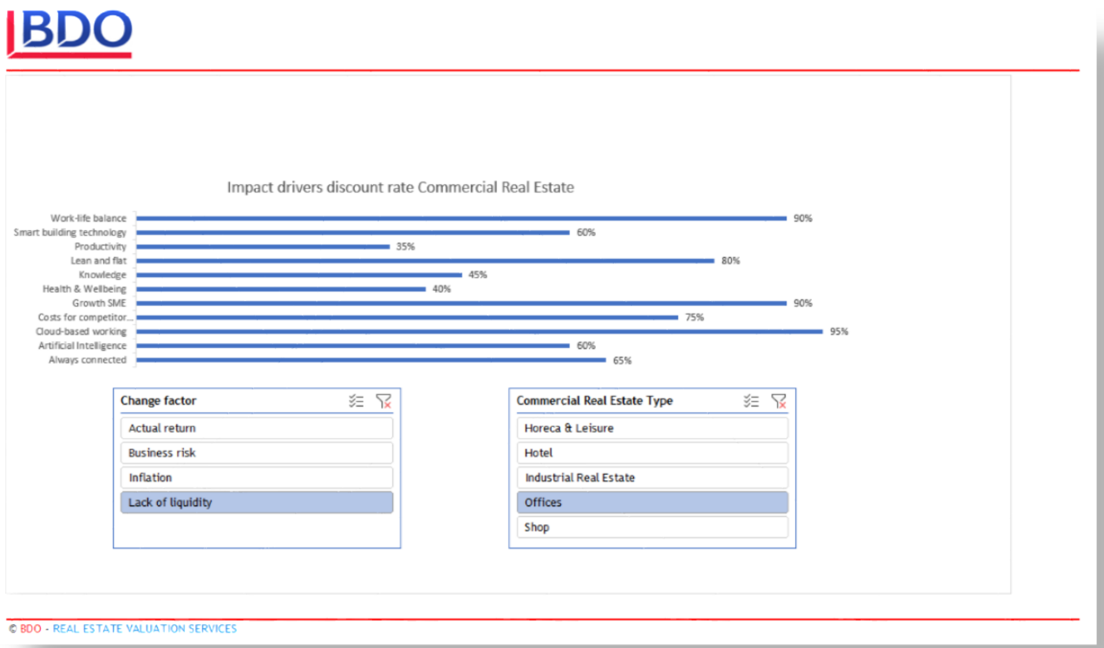


Figure 10: Example of an index for the discount rate (Koning, 2020)

5.3.3. Impact analysis exploitation and ownership along DCF-model on the return on investment

As described in the previous sections, there are several factors that influence the exploitation and ownership of commercial real estate. The exploitation of commercial real estate is part of the overall valuation and use of commercial real estate. In order to make future policy for commercial real estate, but also to gain insight into the return on investments for commercial real estate, it is important to make an impact analysis for commercial real estate based on the DCF-model. In this way, all important aspects involved in making strategy at policy level for the future of commercial real estate come together.

The change factors for change implications in commercial real estate are economy, business, technology, social and environment. The impact drivers are various between for example work-life balance and artificial intelligence. The most important difference between the view from exploitation and ownership perspective, is that it's driven from two different angles after a crisis will occur. The owners will respond with a question how tenants won't leave and how profit can still be stabilized. The exploitation will respond from a more social angle and will question the employee and building performances in relation towards collaboration, management, social cohesion and social responsibilities. All of this together with the DCF model as a guideline must lead to much more insight on the possible return on investment after a crisis and with new and more accurate strategy formations by looking more into these factors. Based on the DCF model, consequences can be drawn from the change factors in relation to the cash flows, which in turn are related to the impact drivers. These change factors will have an impact on cash flows. This approach, and thus the adjusted cash flows, will lead to adjusted valuations for commercial real estate.

5.4. Summary, conclusion and preview

"Which factors arising from the stated risks for the exploitation and ownership of commercial real estate are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate?".

The answer on this third sub question is double sided. The first answer is that the factors are much more in depth than now possibly can be argued but for the exploitation and ownership of commercial real estate there are definitely factors that will be part of strategies for the future. To make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate, it is of great importance that the steps in the flow chart (Figure 6) and the segmented pyramid (Figure 7) will be taken into account. At first the response towards an event, or in this case a crisis, is step one in order to be able to make strategy. After that the determination of several impact and thus change factors (Figure 62, CH4), namely economy, business, technology, social and environment, the drivers of these impact factors must be unraveled in order to be able to make an index for how these must be weighted. This index can give order in the chaos and can provide a much more accurate overview of the real impact of these drivers on the change factors for commercial real estate.

The second answer is that the impact of the several change factors, after an analysis and weighting of their impact by means of a possible index, must be compared to the DCF model to determine what influence these change factors have on the return on investment for commercial real estate. In other words the change factors as mentioned above are the factors arose from the stated risks that are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate.

The key elements of a DCF for the arisen factors form the stated risks are all provided in Figure 9, but the most important ones are:

- The cashflow as a result of the difference between income and exploitation costs;
- The income which is mostly the rental income from tenants;
- The exploitation costs, which are maintenance, fees/premiums, service costs, management costs but also renovation costs.

These form the basis for a DCF model but also can be the bridge between a facility manager and commercial real estate owner. When looking closely to the DCF model, a cashflow can be beneficial for both facility manager and commercial real estate owner when working together and look more in depth towards building performances and business processes within commercial real estate.

Preview next chapter

In the next chapter an overview of the research results will be provided along the conclusions and answers throughout the research of the three sub questions. After that an overall conclusion will be provided in order to be able to give an answer on the research question.

6. Conclusion

In this chapter an overview of all the conclusions will be provided and the best possible answer on the research question is given. During the research as many information about commercial real estate, crises throughout history and the impact of crises on commercial real estate has been gathered. The research question is:

"Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

The three sub-questions to support and substantiate the research question are:
1. What impact and response did the different types of crises between 1929 and 2020 have on the world economic market and commercial real estate and what relation is there with exploitation and valuation of commercial real estate?
2. Which risks as a result of crises affect commercial real estate and, as such, the exploitation and ownership of current commercial real estate?
3. Which factors arising from the stated risks for the exploitation and ownership of commercial real estate are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate?

Sub question one
The answer on the first sub question can be divided in two parts. The first part is the impact and response as a result of crises on and towards commercial real estate. The second part is the relationship between this response and exploitation and valuation of commercial real estate. In the various crises that have been dealt with, different reactions have come from commercial real estate towards crises. Often the result of a crisis for commercial real estate is that the valuation falls, the vacancy rate increases and the construction of new property falls.

Despite the fact that since 1970 several crises have arisen that have had a global impact on the economy, society and commercial real estate, it seems that the recurring pattern of "after a crisis the economy will slowly going back to the situation before the crisis" cannot be broken turn into. As a result, the problems that come to light during each crisis are often only half or not resolved. The effect of this is that a crisis always has an impact on the exploitation and valuation of commercial real estate, but in the end commercial real estate often comes out stronger after a crisis. This is simply due to two factors:

1. The speculation of the market and the return that is expected to be obtained from commercial real estate remains unchanged and the confidence in the value of commercial real estate is accompanied by this.

2. Organizations often continue to think in terms of short-term returns, a quickly filled wallet, but forget that the long term, and therefore more looking at the exploitation of commercial real estate, can sometimes be much more profitable.

In short the foundation for each crisis is that an event happens, like in 1929 the crash of the stock market or in 2008 the fall of the Lehman Brothers. The reaction of commercial real estate often comes with a fall of the valuation. Working places are most likely to react later on and are more dependent on the development of technology and increasing demands of the users of commercial real estate.

Yet there is a relationship between crises, exploitation and valuation. All they rise and fall with speculation, strategic thinking in return on investment and the demand of the users. Besides that, politics, the stock market, access to several resources and banks also have high influence on the impact of crises on commercial real estate in terms of exploitation and valuation. Also an explanation of several concepts have been provided to get a better foundation for understanding this research.

Sub question two
The answer on this sub question is in twofold: risks resulted from crises on the exploitation of commercial real estate and risks resulted from crises on the ownership of commercial real estate. Before pointing these risks out, it is important to understand that both cannot function without each other. The owner of commercial real estate is highly depending on how the exploitation of its commercial real estate is founded and the exploitation of commercial real estate is highly depending on the commercial real estate owner and its view on reasonable fees, incentives and valuations of commercial real estate.

The risks resulted from crises on the exploitation of commercial real estate can be defined in three categories: building performances (1), employee concerns (2) and a shift in approach (3). The avoidance of a backlash on these three must be described in the multi-year maintenance and strategy plan. The most important driver for avoiding these risks can also be knowledge and keeping up with trends and relationships. A well performed exploitation of commercial real estate starts with human focus and mapping every possible risks for them.

The risks resulted from crises on the ownership of commercial real estate is a downfall of the valuation of commercial real estate and a changing landscape in the demand of its end users. Also the owner of commercial real estate must take into account a permanent output loss of value on its commercial real estate. Another risk for commercial real estate owners is the shift in demands from its tenants and end users. Crises often lead to other approaches or a shift in demand of building performances. The development of technologies and solutions for different aspects of the workplace are changing the demands.

Sub question three
The answer on the third sub question is double sided. To make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate, it is of great importance that the steps in the flow chart (Figure 6) and the segmented pyramid (Figure 7) will be taken into account. At first the response towards an event, or in this case a crisis, is step one in order to be able to make strategy. After that the determination of several impact and thus change factors (Figure 62, CH4), namely economy, business, technology, social and environment, the drivers of these impact factors must be unraveled in order to be able to make an index for how these must be weighted.

The second answer is that the impact of the several change factors, after an analysis and weighting of their impact by means of a possible index, must be compared to the DCF model to determine what influence these change factors have on the return on investment for commercial real estate. In other words the change factors as mentioned above are the factors arose from the stated risks that are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate.

Overall conclusion
Throughout the research about crises and commercial real estate and trying to find an answer on the research question, several steps have been addressed in order to be able to give an answer on this research question:

“Which parts of an impact analysis are important to enable facility managers and owners of commercial real estate to determine the potential influence and effects of possible future crises on the exploitation and ownership of commercial real estate and make strategy for a correct response? ".

During the research much information about the key performance indicators for both exploitation and ownership of commercial real estate has been conducted. After that a risk assessment for both exploitation and ownership as a result of crises for commercial real estate has been done in order to be able to explain the relationship between business continuity management, strategy making and the return on investment.

To enable facility managers and owners of commercial real estate to make strategy for the determination of the potential influence and effects of possible future crises for commercial real estate on both exploitation and ownership of commercial real estate, a few steps must be taken.

First of all the key performance indicators for both must be mapped to have a foundation from which will be worked on to the strategy making process. After that the risks of crises must be taken into account for both the exploitation and ownership of commercial real estate. Important factors such as economy, business, technology, social and environment must be valued to determine the amount of impact these really have on both exploitation and ownership of commercial real estate by for example an index.

The building blocks of the impact analysis must be: KPIs, risk assessment and change factors. Subsequently, these must all be placed along, for example, a DCF model to gain insight into the consequences of the building blocks as part of the impact analysis to gain insight into the risks for the valuation of commercial real estate. The way in which this can be reflected in the valuation of commercial real estate is to assess the cash flow but also to approach it differently via the discount rate and thus to influence the cash flows again, as is usual with a DCF. The analysis is approached on the basis of the exploitation of commercial real estate and including this in the cash flows. This is translated into a new risk build-up or perception on commercial real estate. This risk build-up is translated into a different approach to the discount rate in order to subsequently arrive at an adjusted valuation of commercial real estate.

There is now a conceptual approach to this discount rate and the impact the various elements of the exploitation of commercial real estate have on the risk build-up for the discount rate. Based on valuations and changes in valuations just before or after crises in history and future, it could be investigated what impact these particular events have on the risk build-up of the discount rate. However, this should be done through a follow-up research.

In this conceptual approach the facility manager can be the bridge between the commercial real estate owner and the users of commercial real estate. Taking into account both their requirements for the building performances and employee concerns, and therefore the return on investment, means that the facility manager is of high added value for both exploitation and ownership of commercial real estate. Facility managers can help making strategy for future response towards crises for both exploitation and ownership of commercial real estate. Being the bridge between satisfaction, strategy and management the facility manager is of added value in strategy making for future response towards crises from exploitation perspective as well as from ownership or investor perspective.

7. Recommendations, consequences and implementation

After the drafted conclusion a few recommendations with possible consequences and a possible implementation plan will be provided. The recommendations are described from three different levels: strategically, tactically and operationally. This must provide the best route to follow for implementing new valuation methods for commercial real estate taking in account the possible consequences for commercial real estate of future crises.

7.1. Recommendations

As a result of this research two important recommendations can be formulated in order to be able to help the commercial real estate market in the approach of crises on the exploitation and ownership of commercial real estate. Both recommendations can be of added value for facility managers to make strategy for the future to avoid huge impact of crises on their business continuity. The first recommendation is to do more research on this topic and look deeper into the factors that arose from this research and use these in order to make a model or a tool to help professionals in the work field. This recommendation is also written out in an implementation plan (7.2). This recommendation is mostly provided for future researchers which are interested in this topic. This can be done in a MSc dissertation. A master student can perform this at BDO (this is the case for 2021). The outcome of this follow-up research is interesting for both facility manager and commercial real estate owner.

The second recommendation is addressing new valuation methods. This can only be done after doing a follow-up research about the impact factors as a result of crises on the exploitation and ownership of commercial real estate. This recommendation has been worked out from different levels in the next three sections (7.1.1., 7.1.2. and 7.1.3.). This recommendation is mostly provided for commercial real estate valuers and the organizations which provide the value methods.

7.1.1. Strategic level: formulate specific goals for new valuation methods

During the research the impact of crises on commercial real estate have been unraveled and an insight in possible solutions for more accurate and in depth valuations of commercial real estate have been provided. Therefore it is in the best interest of the commercial real estate owners and facility managers that there will be looked after how the valuation of commercial real estate nowadays is done. Formulating specific goals for new valuation methods is key for this.

Formulating these goals together with several pathways, a clear vision and a well described ambition can cause a shift in the approach of how valuation methods will be handled in the future. This is in the best interest of commercial real estate market because it can lead to a more strategic foundation for avoiding major risks as a result of crises in the future for the exploitation and ownership of commercial real estate.

A vision normally is a really abstract approach and therefore it can be wise to formulate this not in one sentence but in a more broadener approach. A little story or a clear picture of the vision can provide so much more information for the key players it need to approach. Also in order to formulate specific goals and a well described ambition some steps can be taken in order to have the best possible ways in addressing the commercial real estate market. The formulation of specific goals, which is in the best interest of all the key players in the commercial real estate market, comes with knowledge. There is enough knowledge in the market about this topic so one of the possible steps can be an event or round the table meeting to discuss the pathways and goals in order to come to the best possible formulation of these.

To be able to do all of this, IVSC (2020) must be approached. They handle the survey methods and must be part of the process so the formulation of the vision, goals and ambition can be monitored and lead through the end of the tunnel and make an actual change in the approach of the valuation methods possible.

RICS Red Book is part of such survey methods and handle guidelines which have been formulated and stated by IVSC. RICS is a same organization, as for example the NRVT from the Netherlands, but then in England.

7.1.2. Tactical level: Expressing goals into agreements and rules

On this level different norms and methods are provided by IVSC and the discussion about the approach of the valuation methods. On a tactical level, it is important that the agreed methods and vision are expressed in different means, standards and management methods. This control can be done, for example, by drawing up an extra chapter in, for example, the RICS Red Book in which the agreed goals are expressed in specific agreements and rules. In this way, the entire commercial real estate market can read itself in the new approach to commercial real estate and the change can be initiated at lower levels.

In addition, at a tactical level for various parties who are working on this and also want to have insight into the (financial) consequences of the changes in the approach to commercial real estate, an overview of these consequences can be mapped out on the basis of different financial approach methods. With this, the five change factors: economy, business, technology, social and environment, can be approached from different angles and can also be taken into account.

7.1.3. Operational level: Spreading agreements and rules by different platforms for professionals

At an operational level, it is important that the agreements made regarding a new form of valuing commercial real estate are complied with, and kept up to date with, the tax and legal aspects involved. In addition, it is important that the certified experts will also be informed of the innovations regarding the guidelines and rules for valuing commercial real estate. As well as when there are possible new models or more efficient ways to gain insight into the effects of crises in the future on the use and valuation of commercial real estate. It is important that at this level everyone is kept informed as much as possible by means of various channels about what is expected of them and what changes, if any, will take place or are set in motion. By ensuring the correct information flows, sufficient guidelines and regulations and keeping all information that comes to the table for the experts in the field up to date, we ensure the fair and proper implementation of the insight into the effects of crises in the future on the use and valuation of commercial real estate.

Facility management professionals can be of added value for good real estate management and must therefore be taken into account when spreading the agreements. Facility managers can be the bridge between the tenants and commercial real estate owners but also be the bridge between good and bad real estate management. Making strategy on operational level facility managers can be key in the web of stakeholders and therefore definitely must be approached when spreading agreements and rules.

7.1.4. Possible consequences of other valuation methods

The different recommendations call for a different mindset and different behavior from both field as the entire commercial real estate sector. This may be resisted, posing a risk when implementing the recommendations. It is, first of all to be able to deal with this resistance, important to implement the changes in small steps and not want to change too much at once. Secondly, it is important to keep informing professionals about what is going to change and what they do can expect. Also is it is important to listen to the professionals who resist. They may be asked to do this why they resist, so that they can become the usefulness and necessity of the change explained. Finally, resistance can be reduced by involving the professionals in the process.

The consequences of the recommendations from an organizational / social perspective are fairly broad-based. The crux here lies in the fact that, should this innovation of valuation be applied, many organizations will adopt a different approach to commercial real estate. This is not only a result from a return point of view, but also from a user perspective. The reason for this is that the valuation of commercial real estate is therefore not only viewed from a return perspective, but also actually at what happens within the commercial real estate.

Business processes and organizational structures suddenly become a lot more important for the valuation of commercial real estate. It may also be the case that this will cause a shift in the interest of commercial real estate, a possible way of working and the focal points of various factors that now apply as focal points for facility managers and owners of commercial real estate will therefore also change. The entire view and exploitation of the commercial real estate market can shift as a result of this new approach of valuating commercial real estate.

The consequences of the recommendations from a financial perspective are clear. There will be a different way of valuing for commercial real estate, which means that the value proposition of commercial real estate will be looked at in a different way. More emphasis will be placed on the exploitation of commercial real estate, as well as its business processes.

7.2. Implementation plan

An implementation plan will be presented based on a fictional case. The recommendation is do more research on this topic and therefore a fictional case like below can actually be real. The starting point in this fictional case is that a certain type of crisis will occur in the future and the follow-up research that needs to be done will be described on the basis of a number of steps. Suppose a climate crisis arises in the future, the facility manager and commercial real estate owner can better prepare for this.

Step 1

The first step in the follow-up research should focus on looking at the following impact drivers (Table 1) and the relationship with the five change factors (business, economy, environment, social and technology). During this step it is important to do research on each of the impact drivers and determine their strength and weaknesses. Also using the article of Harris (2020) could help in determining these. After this determination the analysis of the relationship between the change factors and impact drivers must be thoroughly researched. Using literature, using data and market examples could help in this research. In this step an answer of how the impact drivers affect the five change factors must be provided.

Work-life balance	Social/ethical responsibility
Smart building technology	Productivity
Lean and flat	Knowledge
Health and wellbeing	Growth SME
Green buildings	Costs for competitive position
Corporate social responsibility	Cloud-based working
Climate change and emergency	Choice and experience
Artificial intelligence	Always connected

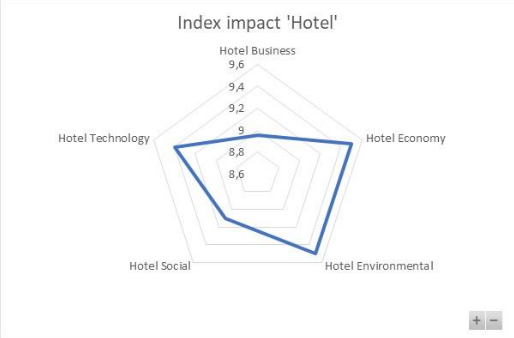
Table 1: Impact drivers commercial real estate (Harris, 2020)

Step 2

Step two in the follow-up research can be determining the relationship between impact drivers, change factors and the type of commercial real estate. In order to do so, an index can be made and 'weight' to each impact driver and change factor can be added. This index can be the foundation of a new discount rate and can be helpful for another approach of the discount rate and DCF-model. During this step an index must be developed together with data of the relationship between the change factors and different types of commercial real estate.

Step 3

Therefor the third step in the follow-up study can be looking more in depth to what this new index can mean for the discount rate and DCF-model. Doing so, the valuation of commercial real estate and strategies for cashflow and business impact of future crises will change instead of how it's approached nowadays. During this step an answer on how the change factors, impact drivers and different types of commercial real estate affect the discount rate and DCF-model, taking into account future crises, must be provided.



← Figure 11: Example index impact 'Hotel' in a climate crisis (Koning 2020)

Figure 12: Example index impact 'Industrial Real Estate' in a climate crisis (Koning, 2020) →

In order to make these three steps and the outcome visible, the climate crisis case will be explained. Let's state a climate crisis will arise in the future and there has been thoroughly research on the impact drivers as in Table 1. Together with the type of commercial real estate and the change factors an index could have been made, it could look like the figures above. In this case heat and water will be the problem for commercial real estate. There are many major fires in the region and river beds often flood and this means that commercial real estate has to protect itself against this.

Radars: indicator of risks for the DCF model

In the radars, an overview of the five change factors and their influence and impact on two different types of real estate as a result of crises have been projected. This possible outcome of the first three steps of the follow-up research could help facility managers and commercial real estate owners in the determination of what is most important for their real estate and business continuity when taking into account the impact of crises. The radar provides indications of the risks towards the DCF model. This results in another approach of commercial real estate and the industry, the commercial real estate market, the commercial real estate valuers and the survey boards of, for example, RICS must take a closer look when valuating industrial real estate.

Two examples with DCF and consequences

The two provided radars are examples of what could be in the future. Take for example the radar of industrial real estate, the environment is scoring high on the scale of impact and importance for this type of commercial real estate. On the other hand the radar of hotel shows also high on economy and environment but it also shows more dependencies on social than the radar of industrial real estate. In this case there are also social dependencies and risks for the outcome of the DCF model. Both DCF models (Figure 13 and Figure 14) provide insights for the same fictive case, from a positive and negative perspective on the outcome of taking into account a climate crisis when making strategy or not.

BDO — Discounted Cashflow Model

Cashflow	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	TOTAL
Netto cash flows	€ 75.000,00	€ 80.730,00	€ 44.994,60	€ 87.794,49	€ 81.130,38	€ 73.421,37	€ 65.889,80	€ 68.887,60	€ 72.915,35	€ -27.026,34	€ 68.563,13	€ 82.684,39	€ 75.338,08	€ 78.524,84	€ 82.745,34	€ 1.011.593,03
Net present value cash flows	€ 73.529,41	€ 77.595,16	€ 42.399,42	€ 81.108,54	€ 73.482,29	€ 65.196,08	€ 57.361,04	€ 58.794,90	€ 61.012,30	€ -22.171,02	€ 55.142,79	€ 65.196,08	€ 58.238,79	€ 59.512,02	€ 61.481,00	
Total gross income per year	€ 167.000,00	€ 170.340,00	€ 173.746,80	€ 177.221,74	€ 180.766,17	€ 162.299,88	€ 165.545,88	€ 168.856,79	€ 172.233,93	€ 175.678,61	€ 179.192,18	€ 182.776,02	€ 186.431,54	€ 190.160,17	€ 193.963,38	
Rent	€ 150.000,00	€ 153.000,00	€ 156.060,00	€ 159.181,20	€ 162.364,82	€ 165.612,12	€ 168.924,36	€ 172.302,85	€ 175.748,91	€ 179.263,89	€ 182.849,16	€ 186.506,15	€ 190.236,27	€ 194.040,99	€ 197.921,81	
Rent incentives	€ 20.000,00	€ 20.400,00	€ 20.808,00	€ 21.224,16	€ 21.648,64	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
Vacancy	€ -2.500,00	€ -2.550,00	€ -2.601,00	€ -2.653,02	€ -2.706,08	€ -2.760,20	€ -2.815,41	€ -2.871,71	€ -2.929,15	€ -2.987,73	€ -3.047,49	€ -3.108,44	€ -3.170,60	€ -3.234,02	€ -3.298,70	
Additional cashflow	€ 1.000,00	€ 1.020,00	€ 1.040,40	€ 1.061,21	€ 1.082,43	€ 1.104,08	€ 1.126,16	€ 1.148,69	€ 1.171,66	€ 1.195,09	€ 1.218,99	€ 1.243,37	€ 1.268,24	€ 1.293,61	€ 1.319,48	
Structural vacancy	€ -1.500,00	€ -1.530,00	€ -1.560,60	€ -1.591,81	€ -1.623,65	€ -1.656,12	€ -1.689,24	€ -1.723,03	€ -1.757,49	€ -1.792,64	€ -1.828,49	€ -1.865,06	€ -1.902,36	€ -1.940,41	€ -1.979,22	
Exploitation costs per year	€ 92.000,00	€ 89.610,00	€ 128.752,20	€ 89.427,24	€ 99.635,79	€ 88.878,50	€ 99.656,07	€ 99.969,20	€ 99.318,58	€ 202.704,95	€ 110.629,05	€ 100.091,63	€ 111.093,46	€ 111.635,33	€ 111.218,04	
Maintenance																
Overall maintenance	€ 25.000,00	€ 25.500,00	€ 26.010,00	€ 26.530,20	€ 27.060,80	€ 27.602,02	€ 28.154,06	€ 28.717,14	€ 29.291,48	€ 29.877,31	€ 30.474,86	€ 31.084,36	€ 31.706,04	€ 32.340,17	€ 32.986,97	
Maintenance as a result of environment changes	€ 4.000,00	€ -	€ -	€ 4.000,00	€ -	€ -	€ 4.000,00	€ -	€ -	€ 4.000,00	€ -	€ -	€ 4.000,00	€ -	€ -	
Maintenance of solar panels	€ 2.500,00	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ 2.500,00	€ -	€ -	€ -	€ -	€ -	
Maintenance of water regulation and protection	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00	€ -	
Maintenance of heat protection	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	
Fees/Premiums																
Premium for air quality	€ 1.000,00	€ 1.020,00	€ 1.040,40	€ 1.061,21	€ 1.082,43	€ 1.104,08	€ 1.126,16	€ 1.148,69	€ 1.171,66	€ 1.195,09	€ 1.218,99	€ 1.243,37	€ 1.268,24	€ 1.293,61	€ 1.319,48	
Premium for building stability	€ 2.500,00	€ 2.550,00	€ 2.601,00	€ 2.653,02	€ 2.706,08	€ 2.760,20	€ 2.815,41	€ 2.871,71	€ 2.929,15	€ 2.987,73	€ 3.047,49	€ 3.108,44	€ 3.170,60	€ 3.234,02	€ 3.298,70	
Premium for water and heat protection	€ 3.500,00	€ 3.570,00	€ 3.641,40	€ 3.714,23	€ 3.788,51	€ 3.864,28	€ 3.941,57	€ 4.020,40	€ 4.100,81	€ 4.182,82	€ 4.266,48	€ 4.351,81	€ 4.438,85	€ 4.527,62	€ 4.618,18	
Management costs	€ 2.000,00	€ 2.040,00	€ 2.080,80	€ 2.122,42	€ 2.164,86	€ 2.208,16	€ 2.252,32	€ 2.297,37	€ 2.343,32	€ 2.390,19	€ 2.437,99	€ 2.486,75	€ 2.536,48	€ 2.587,21	€ 2.638,96	
Transaction costs	€ 6.500,00	€ 6.630,00	€ 6.762,60	€ 6.897,85	€ 7.035,81	€ 7.176,53	€ 7.320,06	€ 7.466,46	€ 7.615,79	€ 7.768,10	€ 7.923,46	€ 8.081,93	€ 8.243,57	€ 8.408,44	€ 8.576,61	
Service costs	€ 40.000,00	€ 40.800,00	€ 41.616,00	€ 42.448,32	€ 43.297,29	€ 44.163,23	€ 45.046,50	€ 45.947,43	€ 46.866,38	€ 47.803,70	€ 48.759,78	€ 49.734,97	€ 50.729,67	€ 51.744,27	€ 52.779,15	
Rental commission and / or PR and marketing	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
Renovation costs	€ -	€ -	€ 40.000,00	€ -	€ -	€ -	€ -	€ -	€ -	€ 100.000,00	€ -	€ -	€ -	€ -	€ -	
Diverse	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	

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Figure 13: Example DCF-model taking into account a climate crisis (Koning, 2020)

Discounted Cashflow Model

Cashflow	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Netto cash flows	€ 3.500,00	€ 3.570,00	€ -214.379,00	€ -97.286,58	€ -118.232,31	€ -101.216,96	€ 1.123,53	€ 2.826,00
Net present value cash flows	€ 3.431,37	€ 3.431,37	€ -202.014,12	€ -89.877,76	€ -107.086,65	€ -89.877,76	€ 978,10	€ 2.411,96
Total gross income per year	€ 89.000,00	€ 90.780,00	€ 44.878,40	€ 45.775,97	€ 46.691,49	€ 47.625,32	€ 101.111,59	€ 103.133,82
Rent	€ 100.000,00	€ 102.000,00	€ 104.040,00	€ 106.120,80	€ 108.243,22	€ 110.408,08	€ 112.616,24	€ 114.868,57
Rent incentives	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Vacancy	€ -7.000,00	€ -7.140,00	€ -55.000,00	€ -56.100,00	€ -57.222,00	€ -58.366,44	€ -7.000,00	€ -7.140,00
Additional cashflow	€ 1.000,00	€ 1.020,00	€ 1.040,40	€ 1.061,21	€ 1.082,43	€ 1.104,08	€ 1.126,16	€ 1.148,69
Structural vacancy	€ -5.000,00	€ -5.100,00	€ -5.202,00	€ -5.306,04	€ -5.412,16	€ -5.520,40	€ -5.630,81	€ -5.743,43
Exploitation costs per year	€ 85.500,00	€ 87.210,00	€ 259.257,40	€ 143.062,55	€ 164.923,80	€ 148.842,27	€ 99.988,07	€ 100.307,83
Maintenance								
Overall maintenance	€ 30.000,00	€ 30.600,00	€ 31.212,00	€ 31.836,24	€ 32.472,96	€ 33.122,42	€ 33.784,87	€ 34.460,57
Maintenance as a result of environment changes	€ -	€ -	€ 4.000,00	€ -	€ 4.000,00	€ -	€ 4.000,00	€ -
Maintenance of solar panels	€ -	€ -	€ 2.500,00	€ -	€ 2.500,00	€ -	€ -	€ -
Maintenance of water regulation and protection	€ -	€ -	€ 7.500,00	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00
Maintenance of heat protection	€ -	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -
Fees/Premiums								
Premium for air quality	€ 1.000,00	€ 1.020,00	€ 1.040,40	€ 1.061,21	€ 1.082,43	€ 1.104,08	€ 1.126,16	€ 1.148,69
Premium for building stability	€ 2.500,00	€ 2.550,00	€ 2.601,00	€ 2.653,02	€ 2.706,08	€ 2.760,20	€ 2.815,41	€ 2.871,71
Premium for water and heat protection	€ 3.500,00	€ 3.570,00	€ 3.641,40	€ 3.714,23	€ 3.788,51	€ 3.864,28	€ 3.941,57	€ 4.020,40
Management costs	€ 2.000,00	€ 2.040,00	€ 15.000,00	€ 15.300,00	€ 15.606,00	€ 15.918,12	€ 2.000,00	€ 2.040,00
Transaction costs	€ 6.500,00	€ 6.630,00	€ 6.762,60	€ 6.897,85	€ 7.035,81	€ 7.176,53	€ 7.320,06	€ 7.466,46
Service costs	€ 40.000,00	€ 40.800,00	€ 80.000,00	€ 81.600,00	€ 83.232,00	€ 84.896,64	€ 40.000,00	€ 40.800,00
Rental commission and / or PR and marketing	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
Renovation costs	€ -	€ -	€ 100.000,00	€ -	€ -	€ -	€ -	€ -
Diverse	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -

Cashflow	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	TOTAL
Netto cash flows	€ 5.532,52	€ -378.757,64	€ -137.202,79	€ -127.196,85	€ -138.740,79	€ 11.414,35	€ 14.292,64	€ -1.270.753,89
Net present value cash flows	€ 4.629,36	€ -310.713,19	€ -110.347,14	€ -100.293,85	€ -107.251,14	€ 8.650,65	€ 10.619,64	
Total gross income per year	€ 105.196,50	€ 49.728,89	€ 50.723,46	€ 51.737,93	€ 52.772,69	€ 117.186,24	€ 119.529,96	
Rent	€ 117.165,94	€ 119.509,26	€ 121.899,44	€ 124.337,43	€ 126.824,18	€ 129.360,66	€ 131.947,88	
Rent incentives	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
Vacancy	€ -7.282,80	€ -65.000,00	€ -66.300,00	€ -67.626,00	€ -68.978,52	€ -7.000,00	€ -7.140,00	
Additional cashflow	€ 1.171,66	€ 1.195,09	€ 1.218,99	€ 1.243,37	€ 1.268,24	€ 1.293,61	€ 1.319,48	
Structural vacancy	€ -5.858,30	€ -5.975,46	€ -6.094,97	€ -6.216,87	€ -6.341,21	€ -6.468,03	€ -6.597,39	
Exploitation costs per year	€ 99.663,98	€ 428.486,53	€ 187.926,26	€ 178.934,78	€ 191.513,48	€ 105.771,89	€ 105.237,33	
Maintenance								
Overall maintenance	€ 35.149,78	€ 35.852,78	€ 36.569,83	€ 37.301,23	€ 38.047,25	€ 38.808,20	€ 39.584,36	
Maintenance as a result of environment changes	€ -	€ 4.000,00	€ -	€ -	€ 4.000,00	€ -	€ -	
Maintenance of solar panels	€ -	€ 2.500,00	€ -	€ -	€ -	€ -	€ -	
Maintenance of water regulation and protection	€ -	€ -	€ 7.500,00	€ -	€ -	€ 7.500,00	€ -	
Maintenance of heat protection	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	€ -	€ 5.000,00	
Fees/Premiums								
Premium for air quality	€ 1.171,66	€ 1.195,09	€ 1.218,99	€ 1.243,37	€ 1.268,24	€ 1.293,61	€ 1.319,48	
Premium for building stability	€ 2.929,15	€ 2.987,73	€ 3.047,49	€ 3.108,44	€ 3.170,60	€ 3.234,02	€ 3.298,70	
Premium for water and heat protection	€ 4.100,81	€ 4.182,82	€ 4.266,48	€ 4.351,81	€ 4.438,85	€ 4.527,62	€ 4.618,18	
Management costs	€ 2.080,80	€ 25.000,00	€ 25.500,00	€ 26.010,00	€ 26.530,20	€ 2.000,00	€ 2.040,00	
Transaction costs	€ 7.615,79	€ 7.768,10	€ 7.923,46	€ 8.081,93	€ 8.243,57	€ 8.408,44	€ 8.576,61	
Service costs	€ 41.616,00	€ 95.000,00	€ 96.900,00	€ 98.838,00	€ 100.814,76	€ 40.000,00	€ 40.800,00	
Rental commission and / or PR and marketing	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
Renovation costs	€ -	€ 250.000,00	€ -	€ -	€ -	€ -	€ -	
Diverse	€ -	€ -	€ -	€ -	€ -	€ -	€ -	

Figure 14: Example DCF-model not taking into account a climate crisis (Koning, 2020)

<u>*Example one:*</u>
Figure 13, an example, shows a DCF model of industrial real estate in which both facility manager and commercial real estate managers have looked closely to the radar and taken premeasures for a future climate crisis. In this case both have decided to put measures and cash in place in order to face the fires and flood of water. The facility manager has put different types of maintenance costs as a result on the DCF model in order to be able to pay for putting these in place. Also the facility manager has decided to take premiums because it knows that someday the crisis will occur and then the commercial real estate is at least insured against some of the consequences of the climate crisis. The facility manager also has decided to reserve some cash for after three and ten years to renovate the commercial real estate because of the climate crisis. In this case the facility manager knows that it is really important towards the business continuity that the machines inside the building and the overall maintenance are really important for this business and type of real estate. Without both, business continuity will perform badly and the type of real estate loses its function.

On the other hand the commercial real estate owner knows that a climate crisis will occur at some point and therefore has offered rent incentives to its tenants and has decided that vacancy and structural vacancy will be the case as a result of this possible climate crisis. The commercial real estate owner is highly depending on its tenants and wants to work with it together in order to keep the cash flow alive.

In this example the facility manager and commercial real estate owner work together and could both foresee that in 15 years there is only one year where the cashflow will be negative. They have worked together and put measures in place and therefore the avoidance of big cashflow problems has been taken away. The environment together with the economic consequences of the climate crisis, like in the radar example, has determined the business decisions of both.

<u>*Example two*</u>:
Figure 14, an example, shows a DCF model of a hotel in which both facility manager and commercial real estate manager have not looked closely to the radar and haven't taken any action or premeasures for the future at all. The facility manager thought it all would be handled when only taking premiums in the first year and keep paying for overall maintenance, management costs, transaction costs and service costs. In the third year all of a sudden the first wave of a climate crisis occurs. This resulted in maintenance costs of different types in that year. The environment is not save anymore and therefore needs extra maintenance.

Another result of the combination of bad management and horrific decision making of the facility manager is that the service costs are doubled because different services for guests are no longer available so must be outsourced to expensive other parties which provides them. Also lots of marketing measures are need to attract new clients. The costs for the management increases because an extra manager needs to be hired in order to restore the business continuity. Since the facility manager in this case doesn't seem to learn from its mistakes the same reoccurs after ten years but the costs has increased even more over time.

On the other hand the hotel owner also hasn't taken any premeasures. It hasn't put rent incentives for its clients and never spoken with the facility manager. The result is a high vacancy rate after three years and ten years, and both has impact for years on the amount of tenants.

In this example the facility manager and commercial real estate owner hasn't worked together at all and could both foresee what the result of this could mean for over 15 years. There are big cashflow problems and environment, economy and socially, like in the radar example, have not been taken into account in their business decisions.

Legal consequences:
The legal consequences of bad use of the provided steps, radar and DCF model are somewhat more difficult to determine but some assumptions can be made. First of all, tenants will keep their contracts close to themselves and when commercial real estate owner and facility managers will not take into account crises that could lead to difficult situations. COVID-19 is an example of this. Does a tenant need to pay rent even when a pandemic outbreak has occurred? That kind of questions can be tackled when, at least trying, taking into account that future crises can occur. Whether this is a health, climate or financial crisis does not matter. All of this can be legally regulated in contracts.

Secondly, service contracts, maintenance contracts, catering contracts and so on all can be questioned when not thought of crises and the consequences of them for these contracts. Facility managers, together with their commercial real estate owner, must always look closely to these types of contracts and what a possible crisis would mean for these.

Overall recommendation
The result of the follow-up research should be that, because of an accurate index scale and other approach of valuations, together with a different approach of the discount rate and DCF-model, commercial real estate will be totally different approached by facility managers and commercial real estate owners. Strategy making for both will be differently and a tool is developed in order to help them making strategy for future crises and avoid big impact on their business continuity. Using the three steps, radar and DCF model could give some tools for both to determine whether decisions are good for business or not.

Added value for facility manager
The added value of the two recommendations for a facility manager can be described in different facets. First of all, the added value of doing more research on this subject is important for a facility manager in making and determining strategy. By knowing which impact drivers and factors influence commercial real estate and business continuity, the facility manager can determine and determine his long-term strategies for the real estate and the business operations within the real estate. So this is where the exploitation comes into play. If this is looked at more specifically and therefore the short-term profit is forgotten for a while, but the long-term of commercial real estate and the business processes within commercial real estate are looked more at, the facility manager can continue to think in terms of concepts and can contribute to supporting the primary process. The customer journey, as also emerged during one of the interviews (Interview 1 and Interview 3), can then receive even more attention and in this way facility management can still continue to add its value.

The added value of taking a more critical look at the valuation methods of commercial real estate also ties in well with the customer journey and the role of the facility manager. Because the customer journey and facility management, or actually as was highlighted in one of the interviews (Interview 3), corporate integrated management with people, planet and principles as its starting point, continues to receive more prestige from both the user and the owner of commercial real estate, the valuation methods whereby often purely is looked on the basis of rental flows must no longer be founded on the basis of profit from this time. The added value of the customer journey and of corporate integrated management for real estate must therefore also be translated into the valuation methods. The commercial real estate sector will have to look into this together with the IVSC, but above all should also allow facility managers to take a look at this. The added value of corporate integrated management is not only for the customer journey, but also for the tough euros and cash flows. Therefore it is important towards a facility manager, it can apply this journey in to its strategies.

8. Critical review

In this chapter the research will be reviewed on critical basis. The used methods, found information and developments during the research will be valued and reviewed. The possible problems and cause of these problems will be described. The effects of these problems on the research will be explained. At the end a personal note on this research will be given.

8.1. Development, problems and effects on research

During the research, there are always ups and downs in finding information or using resources correctly. In this study, it was particularly difficult to find information about crises before 1970 and their influence and impact on the valuation of commercial real estate. In addition, nearly all of the sources used for this are written thoughtfully from the perspective of the commercial real estate market in the United States. This is also the first problem that came to light. Most sources just often use figures from the United States, which makes it difficult to propagate a global impact of crises on commercial real estate. The effect of this on the research is that the writing is mainly from the perspective of the United States, which ultimately gave a good picture, but in some cases may be different than in other countries. This means that any follow-up research must also be written from this perspective, otherwise it will not match.

The second problem of this research is that the commercial real estate market is extremely dynamic, has a lot of impact drivers and the valuation of real estate in general is also heavily dependent on the speculation of the market. This means that actually every object is unique and therefore enjoys a different approach. Of course there are guidelines, but this remains difficult. The impact of this on the research was that it could sometimes really cause headaches in terms of considering which impact drivers were of high importance for this research. In a follow-up study it is important that these can be well framed with a clear explanation.

The third problem is that the way of working within real estate, the trends in this and the developments in work as a result of crises are difficult to map out because they do not always run one-on-one in history. In addition, the information about the way of working within real estate is very limited and it is difficult to translate it into the effects of this on the value proposition of commercial real estate. The effects of this are that it is therefore difficult to create frameworks for this for the commercial real estate market as a whole, without becoming object specific. After all, every object is unique and that is why the way of working within it is often quite unique, at least that is the case for a new way of valuing.

The fourth problem is that interviewing important people from the work field was sometimes difficult. Sometimes these people didn't want it to have it recorded or weren't reachable at all. In the group of interviewees a commercial real estate owner is missing. Banks are commercial real estate owners but mostly view it also from a finance perspective. A major player with many commercial real estate in its possession could have been good to point out all the different aspects and angles of this research.

There are still several small things that were encountered during the research, but the most important thing to mention is that the complexity of this issue causes even more questions at the end of the research. The commercial real estate market is so big, extensive and complex. In addition, each object is so different and unique and the way of valuing is different in many countries. Standards are equal for each country but in reality valuing is practiced differently. Also, all objects are also so dependent on how the market values it. Demography and mobility play a major role in this, two aspects that have not been included in this study because otherwise it would simply become too big.

All in all, it is important that in a follow-up study of the influence of crises on the valuation of commercial real estate, derived from the building blocks (see CH6), very clear frameworks and guidelines are set in advance and that the real estate market is also in line with this.

8.2. Personal note

I couldn't help myself but leave a personal anecdote in this chapter. I think it is important that, should it ever come to that, a follow-up study of this subject in a more diversified bed than I can end up. In addition, I just keep being amazed every day about how the commercial real estate market works. The more you read about it, the more complex and interesting it becomes and the more actors and factors play a role in this. It really is a web of players and stakeholders all trying to influence this to some degree.

I also want to emphasize that the commercial real estate market is now hugely holding on to previous crises and that the market will come out stronger, but the current crisis, COVID-19, is one with such a different kind of influence that I sometimes have my doubts. I think the market should realize that although we may go back to the 'old normal' there has indeed been a huge impact on the commercial real estate market.

Reading all the books and articles about the history of commercial real estate, economic market forces and crises in general have enriched me enormously, but at the same time also sparked a little bit of disappointment in people. To conclude this, I would like to end with a quote from Scott Nations who, like me, wonder how it is possible that every time after a crisis we think that things will go differently afterwards. Crises will occur again and again and we, the people, can avoid that by thinking about the bigger picture than the five square meter around us.

"…how do we keep getting ourselves into situations in which we convince ourselves that this time it's different? Often it's the nature of the contraption that convinces us that much of the risk has been wrung out of the stock market. In the 1920s the investment trust promised professional financial management and diversification, both of which were thought to reduce or eliminate risk, but instead the investment trusts increased risk. In the 1980s a wonder of complex mathematics known as portfolio insurance promised to provide a floor below which the value of a portfolio simply could not fall. Instead it increased the depth and velocity of the drop. Thirty years later, investment bankers and institutional investors were seduced by even more complex mathematics into believing that the value of mortgage-backed securities could not fall below a certain level. While we watch these dangers build, the unknowable or unforeseeable element is the catalyst that will set if off. In 1907 it was as random as an earthquake, while in 2010 it was a riot in a place far away. Each of the catalysts initially seemed to have little, if anything, to do with finance. But our modern economies are intimately connected by finance – insurance in the case of an earthquake on our west coast or the price of crude oil and geopolitical turmoil in the Middle East, or the common European currency when it seems a country is dissolving into violence. These unpredictable catalysts take on critical financial importance." – Scott Nations (Nations, 2017, p.xii)

Bibliography

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   Relevance: This article conducts information about the impact of CSR on the behavior and attitudes from employees. Besides that different aspects of CSR will be explained.

2. Aristotle & Ross, D. (2009) *The Nicomachean Ethics*. Oxford University Press.

   Relevance: This books conducts an explanation of the ethics by Aristotle. This was relevant in the case of explaining the word 'crisis'.

3. Barkham, R. (2020). CBRE: *Global Real Estate Market Outlook 2020*. Requested on 14-12-2020, from: http://cbre.vo.llnwd.net/grgservices/secure/US%202020%20Midyear%20Outlook%20August%202020.pdf?e=1601813852&h=20a3015662e45f216649259f5ed9af00

   Relevance: This article conducts an outlook for the global real estate market for 2020 and further. It provides relevant data and insight about the fluctuation of the commercial real estate market.

4. Barsky, R. B. and Kilian, L. (2002). *Do We Really Know that Oil Caused the Great Stagflation? A Monetary Alternative*. NBER Macroeconomics Annual 2001, Cambridge, Mass.: MIT Press, pp. 137–83.

   Relevance: This paper provides insights about the development of the oil and energy crises during the 1970s and early 1980s.

5. BDO Diversity. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/Diversiteit1/SitePages/Home.aspx

   Relevance: Explanation of the diversity at BDO.

6. BDO Horizon. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/intranet/Organization/Projecten/BDO-Horizon/Paginas/home.aspx

   Relevance: Explanation of the 'Horizon' program at BDO.

7. BDO Leadership. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/intranet/Organization/Projecten/Paginas/Leiderschap-in beweging.aspx

   Relevance: Explanation of the leadership program at BDO.

8. BDO Next. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/intranet/Organization/Projecten/BDO-NEXT

   Relevance: Explanation of the 'BDO Next' project.

9. BDO REVS. (2020). Requested on 14-12-2020, from: https://www.bdo.nl/nl-nl/diensten/belastingadvies/real-estate-valuation-services

   Relevance: Explanation of the department of Real Estate Valuation Services at BDO.

10. BDO Strategy. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/intranet/Organization/BDO/Paginas/Strategie.aspx

    Relevance: Explanation of the strategy of BDO.

11. BDO Vision. (2020). Requested on 14-12-2020, from: https://bdonl.sharepoint.com/sites/intranet/Organization/BDO/Paginas/Strategie.aspx

    Relevance: Explanation of the vision of BDO.

12. Berkhout, T.M. (2019). *Economisch waarderen van vastgoed: Langetermijnwaarderingen van vastgoed*. Requested on 14-12-2020, from: https://www.nvm.nl/media/bi0layry/economisch-waarderen-van-vastgoed-2019.pdf

    Relevance: This paper conducts relevant information about how and why valuating commercial real estate from economical perspective. It also explains a lot in terms of real estate valuations. A welcome asset for my research.

13. Bernhardt, D. & Eckblad, M. (2020). *Stock Market Crash of 1987*. Requested on 14-12-2020, from: https://www.federalreservehistory.org/essays/stock_market_crash_of_1987

    Relevance: A good explanation of the crash of the stock market in 1987. An asset for my research.

14. Berry, J. (2020). *COVID-19 implications for commercial real estate: Preparing for the "next normal"*. Requested on 14-12-2020, from: https://www2.deloitte.com/us/en/insights/economy/covid-19/covid-19-implications-for-commercial-real-estate-cre.html

    Relevance: Insights provided by Deloitte about the implications of COVIDd-19 on commercial real estate.

15. Bertrand, P. & J. L. Prigent. (2001). *Portfolio insurance: the extreme value approach to the CPPI method*, Working paper, Thema University of Cergy.

    Relevance: An explanation of what happened during the crash of 1987 and what was the cause. Mostly the portfolio insurance issue is explained.

16. Bhageloe-Datadin, R. (2012). *De huidige crisis vergelijken met die in de jaren tachtig*. Requested on 14-12-2020, from: https://www.cbs.nl/-/media/imported/documents/2013/37/2012-p19-p226-art.pdf?la=nl-nl

    Relevance: The crisis of the 1980s compared to the financial crisis. Really interesting view on how crises develop.

17. Blinder, A.S. (2014). *After the music stopped: the financial crisis, the response and the work ahead.* Penguin Books.

Relevance: Really good book about the most important reasons for the financial crisis and the response of the world towards it. Great asset for my research. Blinder has got a lot of economist which share the same ideas about the financial crisis.

18. Boersch, C. & Elschen, R. (2007). *Das Summa Summarum des Management.* Wiesbaden: Gabler.

Relevance: Used a few of the pages for my research to get more insight about 'The Balanced Scorecard'. Written in German, my second language.

19. Brooking, A. (1996). *Intellectual capital: Core Assets for the Third Millennium Enterprise*. London: Thompson Business Press.

Relevance: Extra explanation of the Skandia Navigator model compared with an IC Audit Model. The foundation on the research for KPI's from both perspectives: exploitation and ownership of commercial real estate.

20. CBC. (2010). *Dot-com bubble effect on Commercial Real Estate*. Requested on 14-12-2020, from: https://www.slideshare.net/cbcommercial/review-of-cre-dotcom-bubble-5395859

Relevance: Explanation of the effects of the dot-com crisis on commercial real estate.

21. CBRE. (2011). *CBRE Global Office Indices MarketView: Stabilized Growth Q4 2011.* Requested on 14-12-2020, from: https://f.tlcollect.com/fr2/112/76071/CBRE_Global_Office_Indices_MarketView.pdf

Relevance: Used this article to get more insight on the development of the commercial real estate prices after the financial crisis.

22. Cerra, V. & Saxena, S.C. (2017). *Booms, Crises, and Recoveries: A New Paradigm of the Business Cycle and Its Policy Implications.* IMF Working Paper: WP/17/250. Washington: International Monetary Fund.

Relevance: New perspective about business cycles and why they do not exist anymore in the traditional way we have seen it for a long time. Great paper.

23. Chartsbin. (2020). *Historical Crude Oil prices, 1861 to Present*. Requested on 14-12-2020, from: http://chartsbin.com/view/oau

Relevance: Used for a chart about the oil prices during history.

24. Chen, J. & Mansa, J. (2020). *Real Estate Investment Trust (REIT)*. Requested on 14-12-2020, from: https://www.investopedia.com/terms/r/reit.asp

Relevance: Used to understand the principles of a Real Estate Investment Trust.

25. Chu, B. (2020). *US stock market falling faster than during the Wall Street Crash*. Request on 04-10-2020, from: https://www.independent.co.uk/news/business/analysis-and-features/stock-market-dow-jones-index-trump-coronavirus-wall-street-1929-crash-a9412221.html

Relevance: Used an overview of the difference between the crash of '29 and the beginning of the COVID-19 pandemic crisis.

26. Dalio, R. (2018). *Principles for navigating Big Debt Crises Part 1-3*. Westport CT: Bridgewater Associates, LLP.

Relevance: A master piece by Dalio and its Bridgewater colleagues about Big Debt Crises. Lots of numbers, information from different countries and 'easy' to read. Consists in three different parts.

27. Datalab. (2020). *How is the federal government funding relief efforts for COVID-19?* Requested on 14-12-2020, from: https://datalab.usaspending.gov/federal-covid-funding/

Relevance: Used to get insight on the possible impact of COVID-19 on commercial real estate.

28. Discount Rate Working Group. (2015). *Rapport werkgroep discontovoet 2015*. Requested on 14-12-2020, from: https://www.rwseconomie.nl/discontovoet/documenten/rapporten/2016/augustus/augustus/advies-werkgroep-discontovoet

Relevance: Information about the discount rate and explanation of its meaning.

29. Engel, P. (2018). *What happened on 9/11, 17 years ago.* Requested on 14-12-2020, from: https://www.businessinsider.nl/what-happened-on-911-why-2016-9/

Relevance: A really good overview of what happened during 9/11.

30. European Central Bank (ECB). (2008). *Commercial property markets: December 2008.* Requested on 14-12-2020, from: https://www.ecb.europa.eu/pub/pdf/other/commercialpropertymarkets200812en.pdf

Relevance: An overview of the ECB and its conducted data about commercial real estate during the beginning of the financial crisis.

31. Eurostat. (2017). *Commercial property price indicators: sources, methods and issues 2017 Edition.* Requested on 14-12-2020, from: https://ec.europa.eu/eurostat/documents/7870049/8545612/KS-FT-16-001-EN-N.pdf/9e4bbc9b-8c6f-44a9-b686-1083a7a8fa0f

Relevance: Really relevant paper about the indicators for prices of commercial real estate. Also the role of commercial real estate in nowadays economy is explained.

32. FED. (2020). *About the Fed*. Requested on 14-12-2020, from: https://www.federalreserve.gov/aboutthefed.htm

Relevance: An explanation of what the FED is.

33. Federal Deposit Insurance Corporation (FDIC). 1997. *History of the Eighties: Lessons for the Future.* Vol. 1, *An Examination of the Banking Crises of the 1980s and Early 1990s*. Washington, DC: FDIC.

Relevance: Used for an overview of the vacancy rates during the 1980s and 1990s.

34. Galbraith, J.K. (1954). *The Great Crash, 1929*. Boston: Houghton Mifflin.

Relevance: This source is relevant because J.K. Galbraith is one of the best/greatest economists during the 20th century. Also Galbraith has won the Presidential Medal of Freedom more than once.

35. Geltner, D. (2013). *Commercial Real Estate and the 1990-91 Recession in the United States*. Requested on 14-12-2020, from: https://mitcre.mit.edu/wp-content/uploads/2013/10/Commercial_Real_Estate_and_the_1990-91_Recession_in_the_US.pdf

Relevance: Geltner is the associate director of research, center for real estate. This articles gives good insights about the recession during the early 1990s.

36. Glatzl, B. (2016). *The Next Tech Bubble – Lessons from the Dot-com Crisis for Today's Investors*. Requested on 14-12-2020, from: https://www.scss.tcd.ie/publications/theses/diss/2016/TCD-SCSS-DISSERTATION-2016-048.pdf

Relevance: A helpful article about the dot-com crisis.

37. Goetzmann, W. & Newman, F. (2010). *Securitization in the 1920's.* Yale: Yale International Center for Finance.

Relevance: Overview provided by Goetzmann and Newmann of the constructions in the 1920s in New York.

38. Golob, K., Bastic, M. & Psunder, I. (2012). *Analysis of Impact Factors on the Real Estate Market: Case Slovenia*. Requested on 14-12-2020, from: https://pdfs.semanticscholar.org/6fa7/d40fdca0b5d1887c9a617227a910f583d807.pdf

Relevance: Good article about the role and impact of real estate on the economy.

39. Goss, R.C. & Campbell, L. (2008). *The Evolution of Residential Property Management: From Caretaker to Income Maximization Managers, Housing and Society*, 35:1, 5-20, DOI: http://dx.doi.org/10.1080/08882746.2008.11430555

Relevance: Paper about the development of the facility manager in history.

40. Green Street. (2020). *Green Street Commercial Property Price Index*. Requested on 14-12-2020, from: https://www.greenstreet.com/insights/CPPI

Relevance: Used for an overview of the commercial property price index between 2001 and 2016.

41. Grevelink, G.A. (2015). *Marktconforme disconteringsvoet: feit of fictie?* Requested on 14-12-2020, from: https://docplayer.nl/64506945-Marktconforme-disconteringsvoet-feit-of-fictie.html

Relevance: Background information in this thesis form a (old) student at the Amsterdam School of Real Estate.

42. Harris, R. (2020). *The age of unreal estate.* Requested on 14-12-2020, from: https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/the-age-of-unreal-estate_1st_edition.pdf

Relevance: Really good article about the changing role of commercial real estate and its functions, provided by RICS. The importance of people is also described.

43. Hayes, A. (2020). *European Central Bank (ECB)*. Requested on 14-12-2020, from: https://www.investopedia.com/terms/e/europeancentralbank.asp

Relevance: Explanation of the ECB.

44. Hesselink, J. (2020). *COVID-19 impacts on the Netherlands Real Estate*. Requested on 14-12-2020, from: https://www.cushmanwakefield.com/nl-nl/netherlands/insights/covid-19-impacts-netherlands-real-estate

    Relevance: An article about the impact of COVID-19 on the Netherlands real estate.

45. History Editors. (2020). *September 11 Attacks*. Requested on 14-12-2020, from: https://www.history.com/topics/21st-century/9-11-attacks

    Relevance: A good overview what happened during the 9/11 attacks.

46. Ibbotson, R.G. & Harrington, J.P. (2020). *Stocks, Bonds, Bills and Inflation (SBBI): 2020 Summary Edition.* New York: Duff & Phelps.

    Relevance: A 'book' provided for investors about stocks, bonds, bills and inflation. Has a high standard and is looked after each year again by the big investing companies.

47. IVSC. (2012). *International Valuation Standards*. Requested on 14-12-2020, from: https://www.ivsc.org/standards/international-valuation-standards

    Relevance: Background information about the IVSC and what kind of organization it is.

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    Relevance: An article about the added value of facility management.

49. Jensen, P.A., van der Voordt, D.J.M. & Coenen, C. (2013). *How Can Facilities Management Add Value To Organisations As Well As To Society?* Requested on 14-12-2020, from: https://www.cfpb.nl/media/uploads/publicaties/upload/2013_CIBWBC2013_Jensen_et_al_How_Can_FM_Add_Value.pdf

    Relevance: An article about how facility management can add value towards an organization but also towards society.

50. Kadaster. (2020). *Wat doet het Kadaster?* Requested on 14-12-2020, from: https://www.kadaster.nl/over-ons/het-kadaster/wat-doet-het-kadaster

    Relevance: Explanation of what 'Kadaster' is and does.

51. Kaiser, R. (1997). *The Long Cycle in Real Estate*. Journal of Real Estate Research 14(3): 233–256.

    Relevance: Important for a description on the return of investment on commercial real estate throughout history.

52. Katsikakis, D., Rodriguez, M., Smith, D.C. & Leinberger, C. (2020). *Purpose of place: History and future of the office.* Requested on 14-12-2020, from: https://www.cushmanwakefield.com/en/insights/covid-19/the-future-of-the-office-space

Relevance: Used to obtain a figure about the role of knowledge and the way of working throughout history.

53.Klein, A. (2007). *The Cost of Terror: The Economic Consequences of Global Terrorism*. Requested on 14-12-2020, from: https://www.kas.de/c/document_library/get_file?uuid=82f00786-20be-89a4-5383-6f3d43a08ea5&groupId=252038

Relevance: Used to specify the role of portfolio insurances during the dotcom crisis.

54. Krumm, P.J.M.M. (2001). *History of real estate management from corporate perspective.* MCB University Press Vol. 19 pp.276-286.

Relevance: Really interesting article about commercial real estate, the role of commercial real estate during history. Really relevant for my research.

55. Lambert, R. (2008). *Crashes, Bangs & Wallops*. Requested on 14-12-2020, from: https://web.archive.org/web/20081003034410/http://www.ft.com/cms/s/0/7173bb6a-552a-11dd-ae9c-000077b07658.html

Relevance: Relevant for information about the crash of '29.

56. Lindholm, A. & Levainen, K.I. (2006). *A framework for identifying and measuring value added by corporate real estate*. Requested on 14-12-2020, from: http://lib.tkk.fi/Diss/2008/isbn9789512293605/article3.pdf

Relevance: Added value of commercial real estate within businesses is good described by them.

57. Lusht, K.M. (2001). *Real estate valuation: principles and applications.* Pennsylvania (USA): KML Publishing, State College.

Relevance: Explanation of real estate valuation and especially discount rate.

58. Macrotrends. (2020). *Dow Jones Historical Chart*. Requested on 14-12-2020, from: https://www.macrotrends.net/1319/dow-jones-100-year-historical-chart

Relevance: Used for a historical chart of the Dow Jones.

59. Marr, B., Schiuma, G. & Neely, A. (2004). *Intellectual capital – defining key performance indicators for organizational knowledge assets*. Requested on 14-12-2020, from: https://www-emerald-com.ezproxy.hhs.nl/insight/content/doi/10.1108/14637150410559225/full/pdf?title=intellectual-capital-defining-key-performance-indicators-for-organizational-knowledge-assets

Relevance: Used to make an explanation about key performance indicators.

60. Marsel, S. (2014). *The contribution of Skandia Navigator in intangibles measurements: an Albanian case approach*. Requested on 14-12-2020, from: http://ijecm.co.uk/wp-content/uploads/2014/11/21115.pdf

Relevance: Used to make an explanation about key performance indicators.

61. Maverick, J.B. (2020). *How to Use DCF in Real Estate Valuation.* Requested on 14-12-2020, from: https://www.investopedia.com/ask/answers/010715/how-do-you-use-dcf-real-estate-valuation.asp

Relevance: Used for explaining a DCF model.

62. Morris, J.J. & Alam, P. (2012). *Value relevance and the dot-com bubble of the 1990s.* The Quarterly Review of Economics and Finance, Elsevier, vol. 52(2), pages 243-255.

Relevance: Used to explain and understand the dotcom bubble.

63. Nations, S. (2017). *A History of the United States in Five Crashes: Stock market meltdowns that defined a nation*. New York: HarperCollins Publishers.

Relevance: Really well written book about the five impact crashes in the history of the United States that, accordingly to Nations, shaped and defined the United States as a nation.

64. NEN 2699. (2017). *NEN 2699:2017 nl*. Requested on 14-12-2020, from: https://connect.nen.nl/Standard/PopUpHtml?RNR=3430973&search=&Native=1&token=f6f023d1-c3e5-4e59-945b-75752952c8eb

Relevance: To substantiate the explanation of what exploitation of commercial real estate is.

65. Nicholas, T. & Scherbina, A. (2012). *Real Estate Prices During the Roaring Twenties and the Great Depression*. Requested on 14-12-2020, from: https://www.hbs.edu/faculty/Publication%20Files/Anna_tom_59f6af5f-72f2-4a72-9ffa-c604d236cc98.pdf

Relevance: Explains the role of commercial real estate during the Roaring Twenties and the Great Depression.

66. NuWire. (2016). *7 KPIs That Successful Property Managers Measure.* Requested on 14-12-2020, from: http://www.nuwireinvestor.com/7-kpis-that-successful-property-managers-measure/

Relevance: Used for working out the 7 kpi's for the exploitation of commercial real estate.

67. NVM. (2020). *Prijsindex Commercieel Vastgoed.* Requested on 14-12-2020, from: https://www.nvm.nl/nvm-business/prijsindex-commercieel-vastgoed/

Relevance: Used for a chart about the prices of commercial real estate in the Netherlands.

68. OECD. (2020). *Issue Note 2: Corporate sector vulnerabilities during the COVID-19 outbreak: Assessment and policy responses.* Requested on 14-12-2020, from: https://www.oecd-ilibrary.org/sites/6434b1e4-en/index.html?itemId=/content/component/6434b1e4-en

Relevance: Explains the COVID-19 pandemic.

69. Palm, P. (2017). *Incentives in Swedish commercial real estate companies: the property manager function*. Requested on 14-12-2020, from: https://www-emerald-com.ezproxy.hhs.nl/insight/content/doi/10.1108/PM-12-2015-0066/full/pdf?title=incentives-in-swedish-commercial-real-estate-companies-the-property-manager-function

Relevance: Explains the role of the facility manager within commercial real estate.

70. Plaizier, P.L.J. (2009). *What are the relevant factors and risk characteristics that determined the return in the direct and indirect property market?* Requested on 14-12-2020, from: https://assets-eu-01.kc-usercontent.com/a79459c7-7dd8-010a-d5b9-3387db788f4b/6a331796-9826-4d4c-a52d-3d45dc432332/Master%20Thesis%20-%20What%20are%20the%20relevant%20factors%20and%20risk%20characteristics%20that%20determine%20the%20return%20in%20the%20direct%20and%20indirect%20property%20market.pdf

    Relevance: Explains and describes the relevant factors and risks for the return on commercial real estate.

71. RICS Red Book. (2019). *RICS Valuation – Global Standards: Incorporating the IVSC International Valuation Standards*. Requested on 14-12-2020, from: https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/valuation/rics-valuation--global-standards-jan.pdf

    Relevance: Key and legal binding book about how to valuate commercial real estate.

72. RICS. (2019). *Commercial property and financial stability – is the system more resilient to a shock now?* Requested on 14-12-2020, from: https://www.rics.org/globalassets/rics-website/media/knowledge/research/market-surveys/commercial-property-and-financial-stability.pdf

    Relevance: Used for understanding shocks and nowadays shocks in commercial real estate.

73. Riley, A. & Ghiles, F. (2016). *Brexit: causes and consequences.* Requested on 14-12-2020, from: https://www.cidob.org/en/publications/publication_series/notes_internacionals/n1_159/brexit_causes_and_consequences

    Relevance: Explains some consequences of the financial crisis.

74. Rubinsohn, S. (2020). *Economic Outlook for Europe and CEE*. London: Royal Institution of Chartered Surveyors (RICS).

    Relevance: Good enchiridion for understanding the impact of COVID-19 on the commercial real estate market. This was a presentation during a conference I was at.

75. Saval, N. (2014). *Cubed: A Secret History of the Workplace*. New York: Random House LLC.

    Relevance: Really good written and in detail explanation of the history of the workplace.

76. Schnure, C. (2020). *How Has the Lockdown Impacted Commercial Real Estate Sales and Prices?* Requested on 14-12-2020, from: https://www.reit.com/news/blog/market-commentary/how-has-lockdown-impacted-commercial-real-estate-sales-and-prices

    Relevance: The impact of COVID-19 on commercial real estate sales and prices is described.

77. Scott, G. (2020). *Discount Rate*. Requested on 14-12-2020, from: https://www.investopedia.com/terms/d/discountrate.asp

    Relevance: Explains the role of the discount rate for commercial real estate.

78. Segal, P. (2007). *Why Do Oil Price Shocks No Longer Shock?* Requested on 14-12-2020, from: https://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/WPM35-WhyDoOilShocksNoLongerShock-PaulSegal-2007.pdf

    Relevance: Explains the role of oil prices on commercial real estate.

79. Sterling, S., Duddridge, B., Elliott, A., Conway, M. & Payne, A. (2012). *Business Continuity for Dummies*. West Sussex: John Wiley & Sons.

    Relevance: Used to explain 'business continuity management'.

80. Tekateki, E. (2019). *Wall Street during the crash of 1929*. Requested on 14-12-2020, from: https://commons.wikimedia.org/wiki/File:Harga_Saham_Wall_Street_1929_-_1932_menjunam.png

    Relevance: Used for a chart about Wall Street during the crash of the stock market in 1929.

81. Trefis Team. (2020). *Market Crashes Compared: -28% Coronavirus Crash Vs. 4 Historic Market Crashes*. Requested from: https://www.forbes.com/sites/greatspeculations/2020/03/13/market-crashes-compared28-coronavirus-crash-vs-4-historic-market-crashes/#275a29f44ee8

    Relevance: Used for information and a chart about the comparison between COVID-19 and four other historic market crashes.

82. Trumpp, A. (2020). *European property investment update: Which markets will continue to attract investors?* London: Savills plc.

    Relevance: A possible market outlook as a result of COVID-19. This was a presentation during a conference I was at.

83. UNDP. (2020). *COVID-19 pandemic: humanity needs leadership and solidarity to defeat the coronavirus.* Requested on 14-12-2020, from: https://www.undp.org/content/undp/en/home/coronavirus.html#:~:text=The%20coronavirus%20COVID%2D19%20pandemic,to%20every%20continent%20except%20Antarctica.

    Relevance: Gives a timespan of what happened during COVID-19 so far and the different roles it had played so far.

84. Veldhoen and company. (2020). *Het Nieuwe Werken*. Requested on 14-12-2020, from: https://www.veldhoencompany.com/nl/het-nieuwe-werken/

    Relevance: Explains 'Het nieuwe werken'.

85. Verhaegh, J., Lokerse, J., Van Cadsand, C. & Akkerman, A. (2020). *Not a pandemic, but demographics will decide the future and value of the office.* Requested on 14-12-2020, from: https://www.cushmanwakefield.com/en/netherlands/insights/workforce-bepaalt-toekomst-en-waarde-van-het-kantoor

    Relevance: Used for research about the offices and for my interview with Jan Verhaegh.

86. Verhoeven, N. (2007). *Wat is onderzoek? Praktijkboek methoden en technieken voor het hoger onderwijs*. Amsterdam: Boom Onderwijs.

    Relevance: Used for putting this thesis together and used for how to do research.

87. Waarderingskamer. (2020). *Waarderingsmethoden bij niet-woningen*. Requested on 14-12-2020, from: https://www.waarderingskamer.nl/woz-voor-bedrijven/waarderingsmethoden-niet-woningen/

Relevance: Used for the explanation of 'commercial real estate'.

88. WHO. (2020). *Timeline: WHO's COVID-19 response*. Requested on 14-12-2020, from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#!

Relevance: Gives a timeline of what the WHO has decided about COVID-19.

89. Wijffelaars, M. & Loman, H. (2015). *The eurozone (debt) crisis – causes and crisis response*. Requested on 14-12-2020, from: https://economics.rabobank.com/publications/2015/december/the-eurozone-debt-crisis--causes-and-crisis-response/

Relevance: Explains the financial crisis and especially the aftermath of the financial crisis on the economic market of Europe. All from the Europe perspective.

90. Wong, G. (2008). *Has SARS Infected the Property Market? Evidence From Hong Kong.* Requested on 14-12-2020, from: http://dx.doi.org/10.1016/j.jue.2006.12.007

Relevance: A quick explanation of the different reactions of the commercial real estate market on SARS and COVID-19.

91. The World Bank. (2020). *The Global Economic Outlook During the COVID-19 Pandemic: A Changed Word*. Requested on 14-12-2020, from: https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world

Relevance: Economic outlook by the World Bank on COVID-19.

Appendix

A.1. History of crises

A.1.1. *The Great Depression: 1929-1933*

A.1.1.1. What happened?

During the roaring twenties the United States was flourishing, money was well spend and the stock market was booming upon the beginning of 1929 most of the American people were thinking that this could be going on forever. March 25th in 1929, a warning from the Federal Reserve, had to be the point for so many Americans that the excessive speculation in on stock must be put into an end, despite this warning everyone continued with the result that in September of the same year the stock market collapsed tremendously (Galbraith, 1954).

Besides this stock market crash, there were several other problems: the production of steel declined, construction of new buildings was very slow and consumers had really high debts because of easy credits provided by banks. In August of 1929 over 8.5 billion dollars was out on loan. At that time this was more than the entire amount of currency circulating in the United States (Lambert, 2008). Galbraith (1954, p.177) stated in his book that a large number of people placed their entire savings in trusts like "Blue Ridge Trust" of Goldman Sachs which also collapsed on October 24th 1929 and took a loss of two-third of its value before that day. During the early '30s the GDP dropped with a third from before the crash of '29. It even lasted until the end of the '50s before the stock market was on the same level of '29. Different types of views on the market during these days are provided in the next four figures (Figure 15, Figure 16, Figure 17 and Figure 18).

Figure 15: Wall Street during the crash of 1929 (Tekateki, 2019)

Figure 16: Dow Jones historical chart (Macrotrends, 2020)

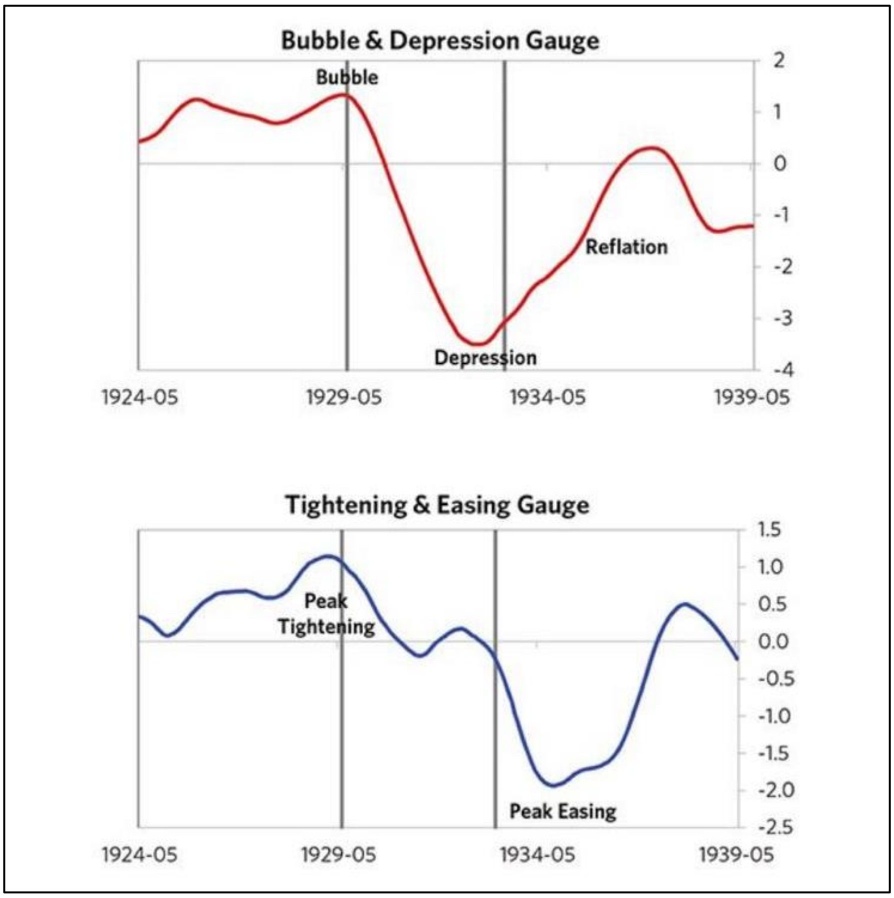

Figure 17: Rough measures of what happened during The Great Depression I (Dalio, 2018, p.11 Part 3)

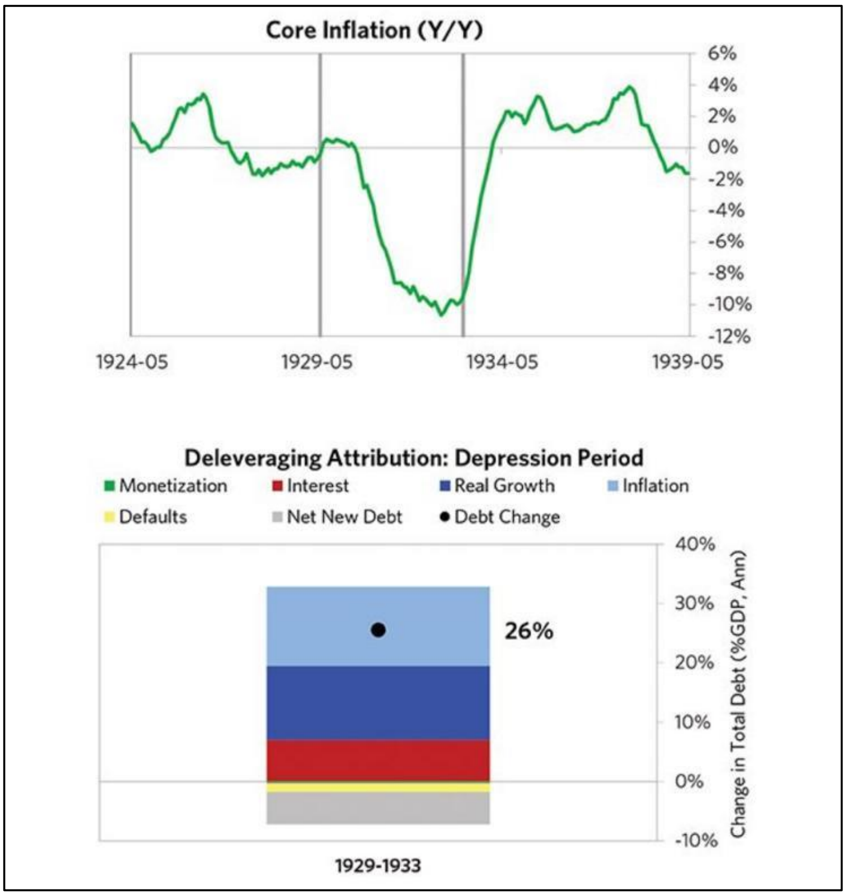

Figure 18: Rough measures of what happened during The Great Depression I (Dalio, 2018, p.11 Part 3)

A.1.1.2. What impact was there on commercial real estate?

In this time period digitalization was a long shot, not even an option, so a real overview on how commercial real estate responded during this crisis is difficult. In line with this three main factors will be used to make an assumption on how commercial real estate responded in during The Great Depression. These factors are: the stock market, the (un)employment rate, housing/land prices in terms of net operating income on rents and the bank capital (Nicholas & Scherbina, 2012).

In 1920 construction activities were slowed down but increased at the end of the 1920s, so before the stock crash of 1929. This relied on the rise of commercial real estate bonds to finance new constructions. An example is shown in Figure 19, which states the amount of new constructions in New York between 1890 and 2010 (Goetzmann & Newman, 2010). In line with this Figure 20 shows that the stock issuance also grew in Manhattan, New York (Nicholas & Scherbina, 2012).

To understand this major increase of new buildings and the wealth during this time period, a nice quotation of Homer Hoyt (1933), a great American land economist, written in his book about this time, covers the total explanation:

"Cash transactions were becoming less frequent ... the illusion of the rising markets was sustained by trades of one type of property for another, in which the price was padded by both parties. The high level of values was also supported by first-and second-mortgage loans, so that owners could borrow up to 80% of the peak value of their property ..." (Nicholas & Scherbina, 2012).

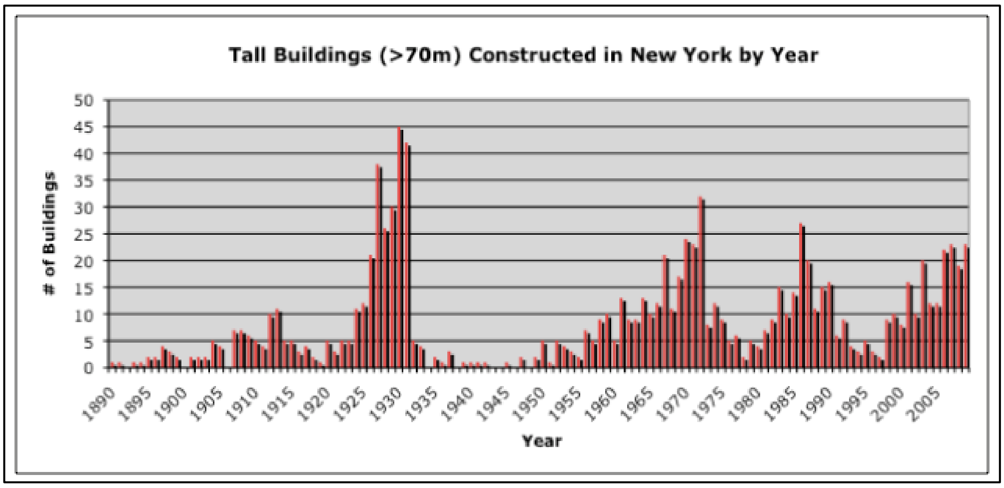

Figure 19: Building construction New York 1890-2010 (Goetzmann & Newman, 2010)

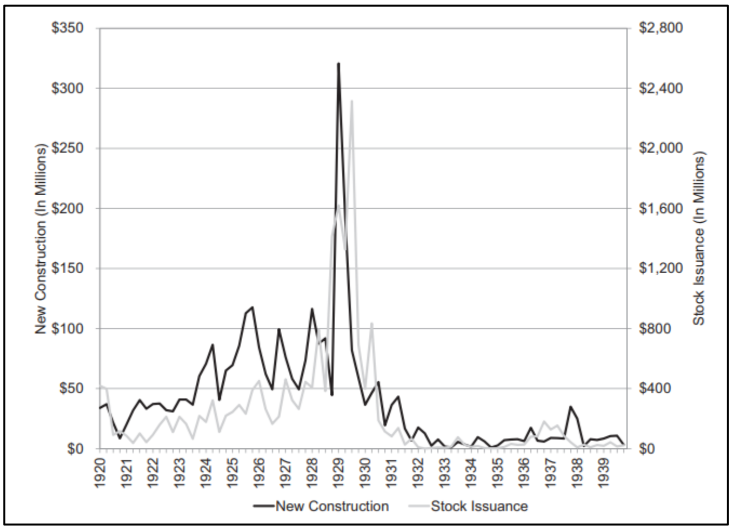

Figure 20: New stock issuance and Manhattan construction activity (Nicholas & Scherbina, 2012)

The effects of the crash in ’29 can be easily seen in the previous figures and next Figure 21, but also seen in the real estate total return studies of both Kaiser (1997) and Nicholas & Scherbina (2012).

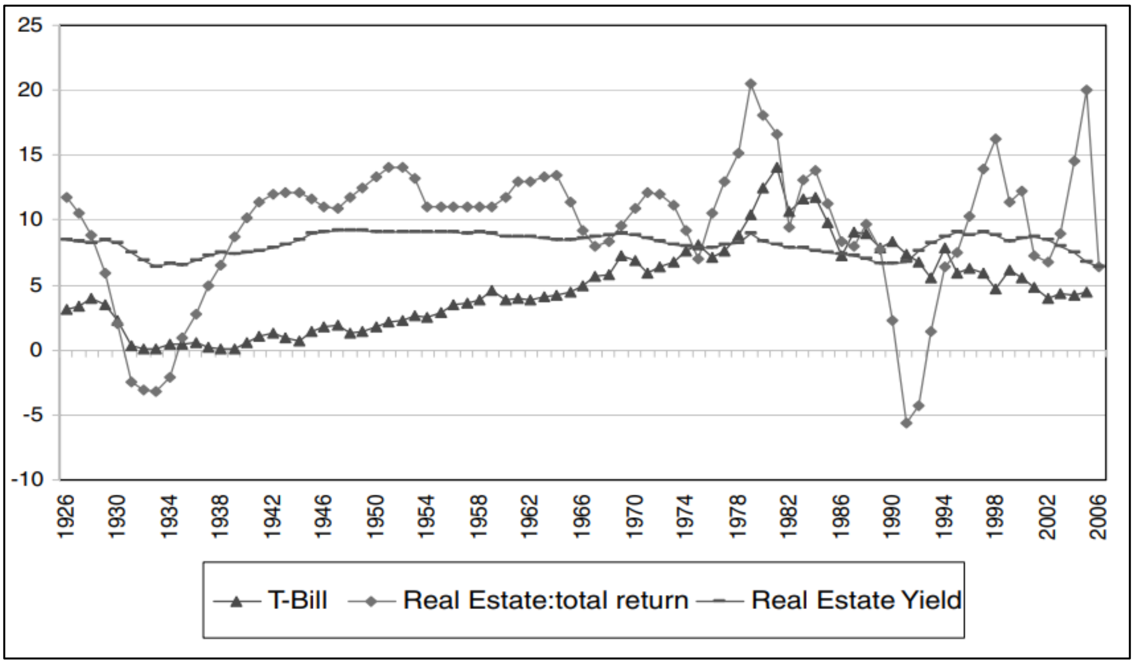

Figure 21: Estimated office yield series 1926-2006 (Nicholas & Scherbina, 2012)

Commercial real estate suffered a lot from the Great Depression, but because of measures performed by the government of the United States, in 1934 there finally was a turn in the fall.

A.1.2. 1970s and early 1980s

A.1.2.1. 1973: oil crisis

The oil crisis of 1973 was in short terms a reaction of the OAPEC, the members of Organization of Arab Petroleum Exporting Countries, towards de United States for re-supplying the Israeli government wit military aid during the Yom Kippur war. The claim of OAPEC was that the shipments of oil towards the United States and other countries would stop if the United States kept supporting Israel in the conflict. Because of the dependencies most industries had on crude oil and OPEC as their main supplier, the economy suffered (Figure 22) for the first time since the Great Depression (Segal, 2007).

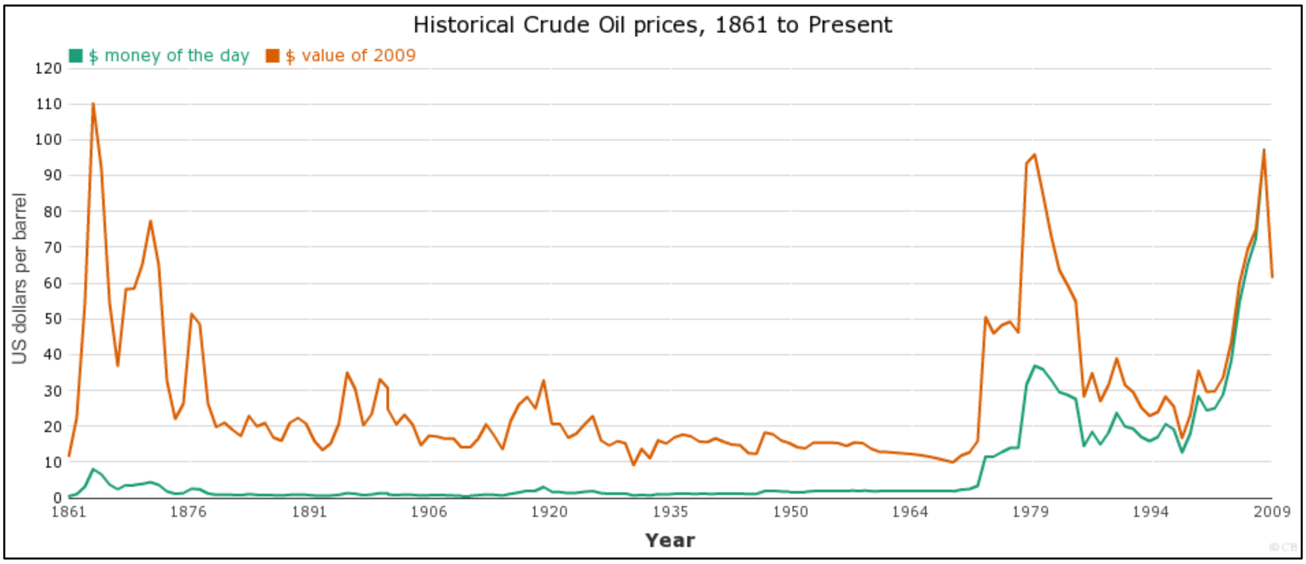

Figure 22: Graph of historical oil prices (Chartsbin, 2020).

A.1.2.2. 1979: energy crisis and early 1980s

During the second oil crisis in 1979 the Middle East was very restless. In Iran there was a revolution going on and because of that the price oil raised tremendously. During that year the price doubled per barrel. On top of that in the early 1980s the Iran-Iraq war started and because of that the oil production in both countries almost stopped. In line with this, an economic recession was triggered. Because of the high oil prices, stagflation was experienced in many countries. Stagflation is a situation in which high interest rates compared with high unemployment rates occur. This recession was the highest recession since World War II (Barsky & Killian, 2002). To see how disastrous this recession was an overview in Figure 23 is given by four liquidity parameters in the United States of America (Barsky & Killian, 2002, p.153).

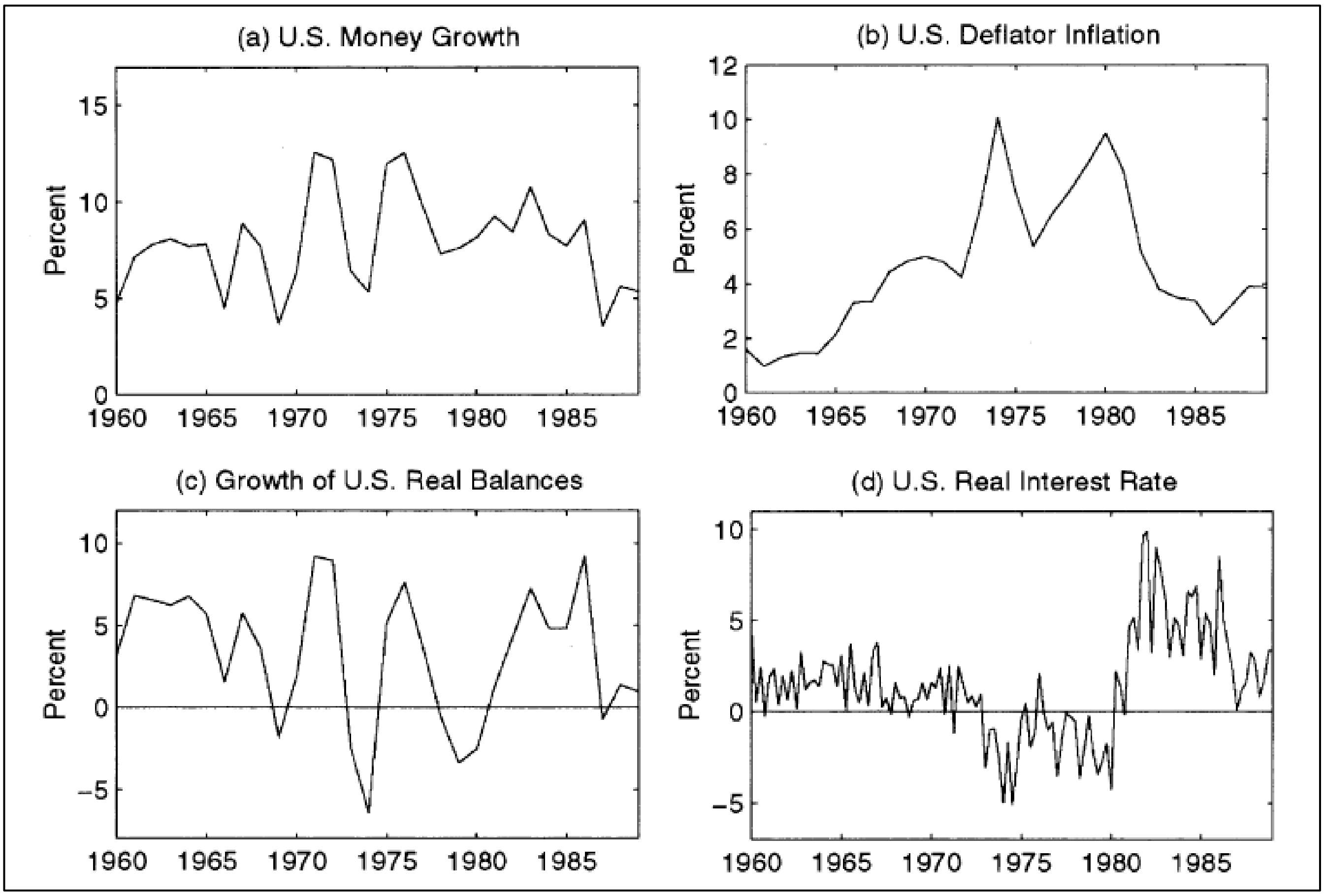

Figure 23: Measures of U.S. Liquidity (Barsky & Killian, 2002, p.153)

A.1.2.3. What impact was there during the 1970s and early 1980s on commercial real estate?

It is for many countries different but from U.S. perspective, the construction of new commercial real estate took a great hit after the oil crisis of ’73. The recession in the early 1980s took a smaller hit and recovered quickly and grew even faster after it. The demand for real estate investments, and thus loans by banks, grew rapidly. Also because of governmental regulations, the tax returns on real estate investments were lower as part of the Economic Recovery Act of 1981. Because of these regulations, banks rapidly moved al their lending strategies towards lending commercial real estate investments. As a result of this, overbuilding occurred in many markets, so the bubble busted in the late 1980s and real estate values collapsed. The decrease of real estate values caused many banks to fail because of the heavily exposure to real estate lending. These banks had high ratios of commercial real estate loans compared towards their total assets, high ratios of commercial real estate loans to the total of real estate loans, noncurrent commercial real estate loans towards the total of commercial real estate loans and high ratios of real estate charge-offs to the total charge-offs. A charge-off is nothing else than a debt. In line with this whole story, the vacancy rate from the early 1980s till ’94 that is shown in Figure 24, shows that it rises a lot until approximately 1987. The meaning of the turning point will be explained in the next session (FDIC, 1997).

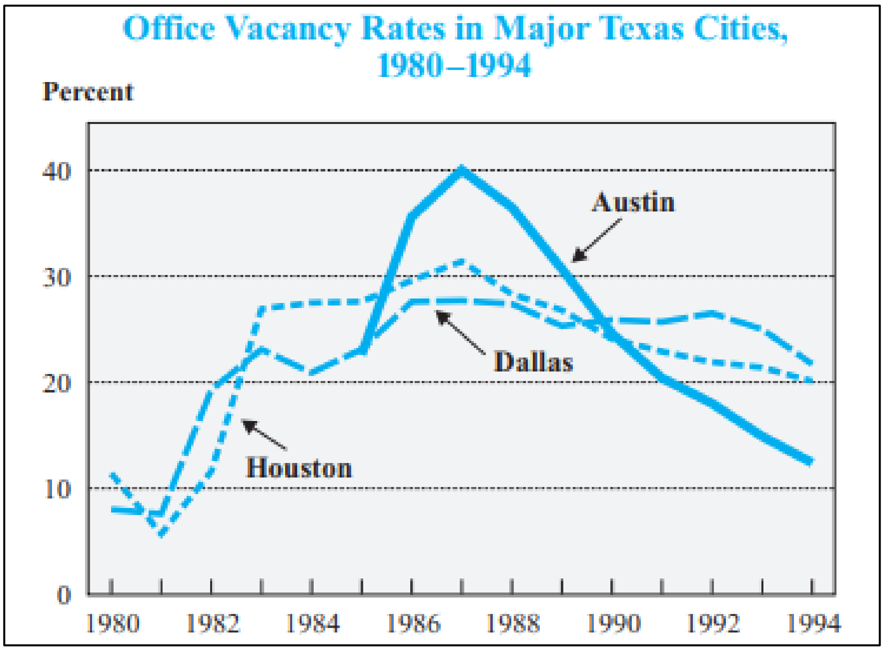

Figure 24: Office vacancy rates in major Texas cities in the United States of America (FDIC, 1997, p.143)

To conclude, commercial real estate did suffer from the oil crisis in 1973 and mainly construction got a huge hit. In the early 1980s both commercial real estate itself and construction of commercial real estate suffered from the recession which occurred. The investments in both times dropped tremendously as can be seen in Figure 25.

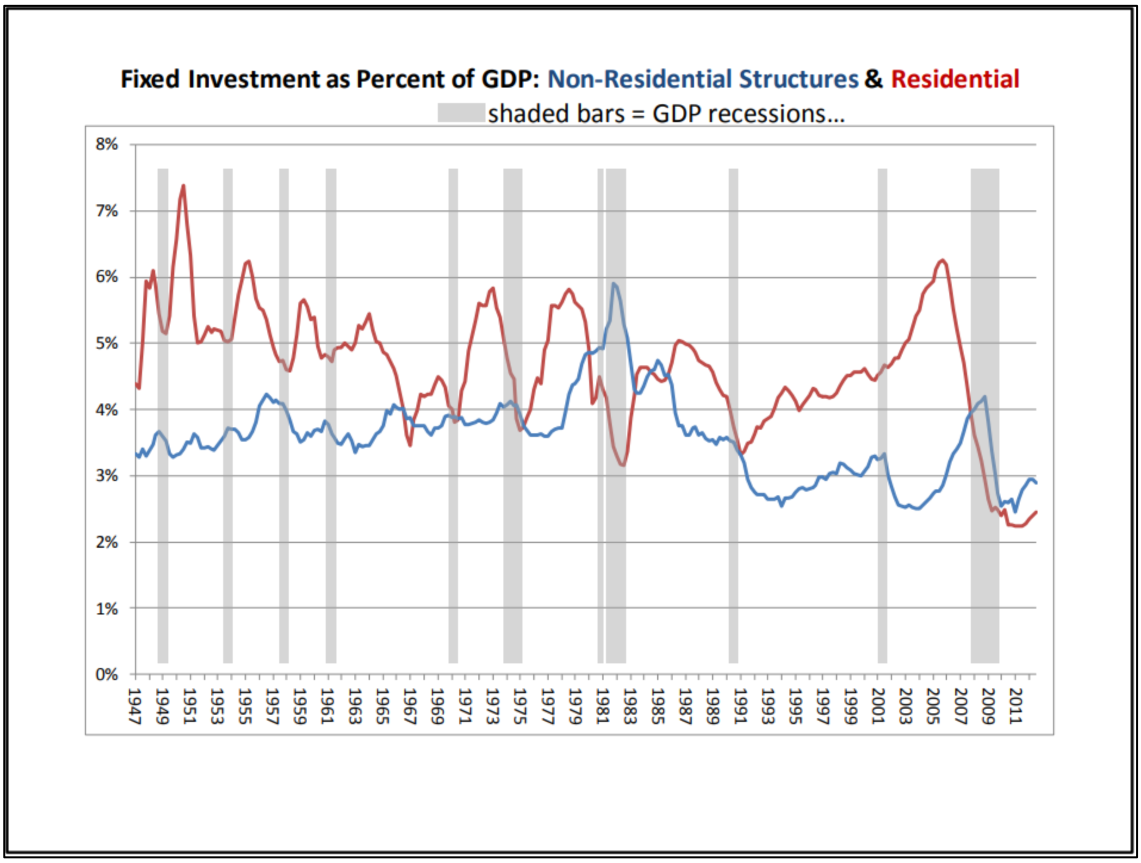

Figure 25: Investment as percentage of GDP: Non-Residential Structures & Residential (Geltner, 2013).

A.1.3. Black Monday 1987 and early 1990s

A.1.3.1. What happened?

1987

Black Monday, 19 October 1987, the Dow Jones collapsed with 22,6%. The highest fall of the Dow Jones in its history, even higher than in 1929. One of the main reasons of this tremendous downfall was the growing uncertainty about the U.S. dollar, the increase of interest rates on short-term loans by the American Federal Reserve and the automation of trading on stock exchanges. Also international investors had become more and more active in U.S. markets and a new product from U.S. investors firms, known as 'portfolio insurance' became very popular. Portfolio insurance is a hedging strategy which is developed to limit the losses of investors when a decline index of stocks will occur by not having to sell these stocks themselves (Bernhardt & Eckblad, 2020) (Bertrand & Prigent, 2001).

It was during this downfall that the international trading market realized that the interconnectedness of markets around the globe had really its impact on the economy. Besides this realization, broker-dealers were less cautious and because of the extensive use of portfolio insurances on options and derivatives – investment instruments that derive their value from the product, for example shares of oil – the pace of the crash accelerated even more (Bernhardt & Eckblad, 2020).

The response of the Federal Reserve was readiness in serving sources of liquidity for supporting the economic and financial scenes. Actually during that time the Federal Reserve encouraged banks to continue to lend money on their usual terms. Two years after the crash, the Dow Jones was back on the same level. 57% of the back track was achieved in the first days after the crash of '87 (Bernhardt & Eckblad, 2020).

Early 1990s

To understand the recession of the early '90s, a little step back in history must be made. During the early 1980s there were a lot savings and loans institutions approximately 4000 with $600 billion in assets. $480 billion were mortgage loans. Many of these loans were fixed during the low interest rates fixed era, so before the increase of short-term loans by the American Federals Reserve in 1987. The S&L's (savings and loans institutions) assets grew between 1982 and 1985 by 56%, compared to commercial banks was this huge because they "only" grew 24%. In other words, the savings and loans were tilted towards financially weaker institutions. These institutions only could attract deposits by offering very high rates to their clients, which meant that they only could afford these high rates by investing in really high risky investments and loans. The two figures (Figure 26 and Figure 27) below give an overview of what the result of all this was for commercial banks and how the S&L crisis was caused (Geltner, 2013).

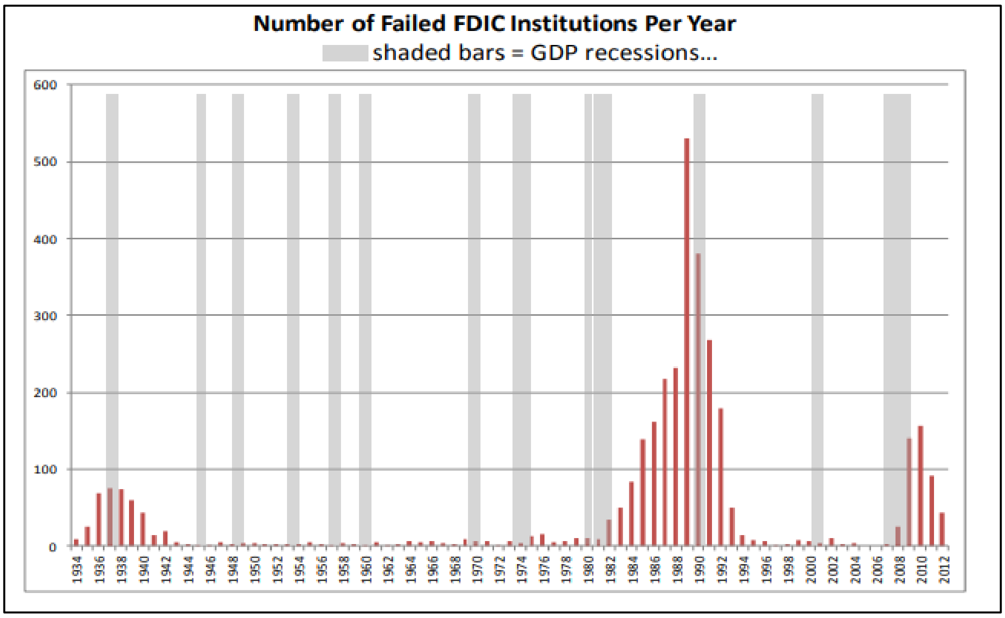

Figure 26: Number of failed FDIC institutions per year (Geltner, 2013)

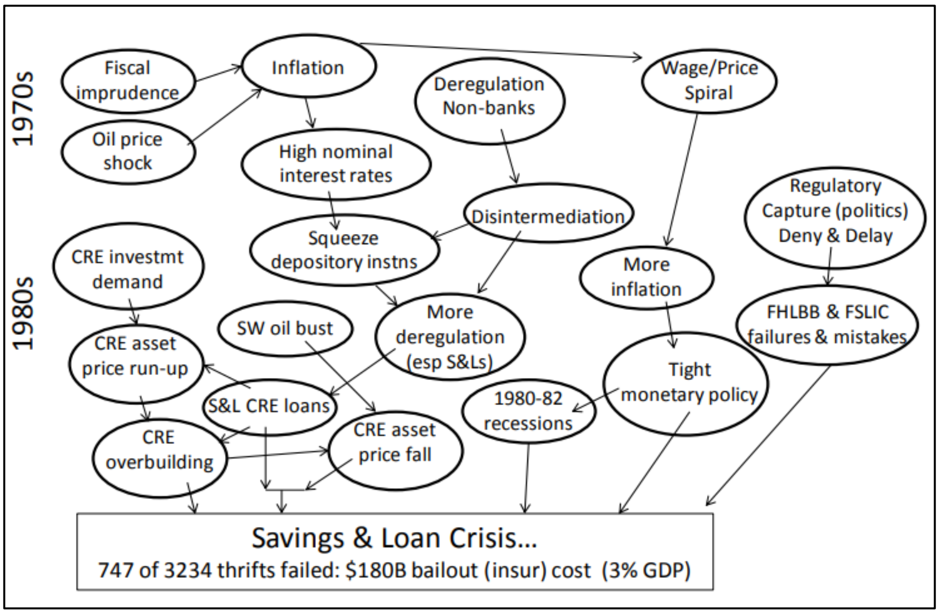

Figure 27: Causal flow diagram for the 1980s S&L crisis (Geltner, 2013)

Together with concerns about inflation, a restrictive monetary policy of central banks, the loss of confidence resulted by the oil shock because of the start of the Gulf war and in the same time the end of the Cold War, the economy came in a recession. The end of the Cold War downgraded the defense expenses of the United States enormously, by the same time the uncertainties of the conflict in the Middle East and the access to oil caused high panic on the economic market. The result of this recession for commercial real estate was spot on. A total overview (Geltner, 2013) of the cause of the 1990-91 recession is given in Figure 28.

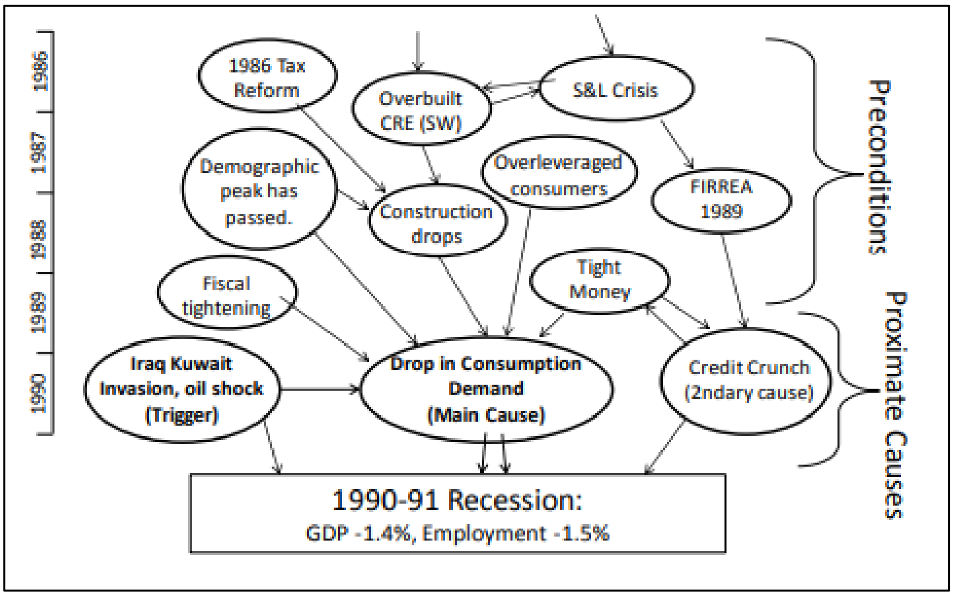

Figure 28: Causal flow diagram of the 1990-91 recession (Geltner, 2013)

A.1.3.2. What impact was there during 1987 and the early 1990s on commercial real estate?

Stated in earlier sessions, during the 1980s there was an overload of construction of commercial real estate. CRE asset price were running up before the overbuild. More S&L commercial real estate loans were provided because of this. During the late 1980s the S&L crisis was there and since then the commercial real estate prices were falling (Geltner, 2013) (Bhageloe-Datadin, 2012). In Figure 29 a causal flow diagram of the commercial real estate asset price boom and bust is given.

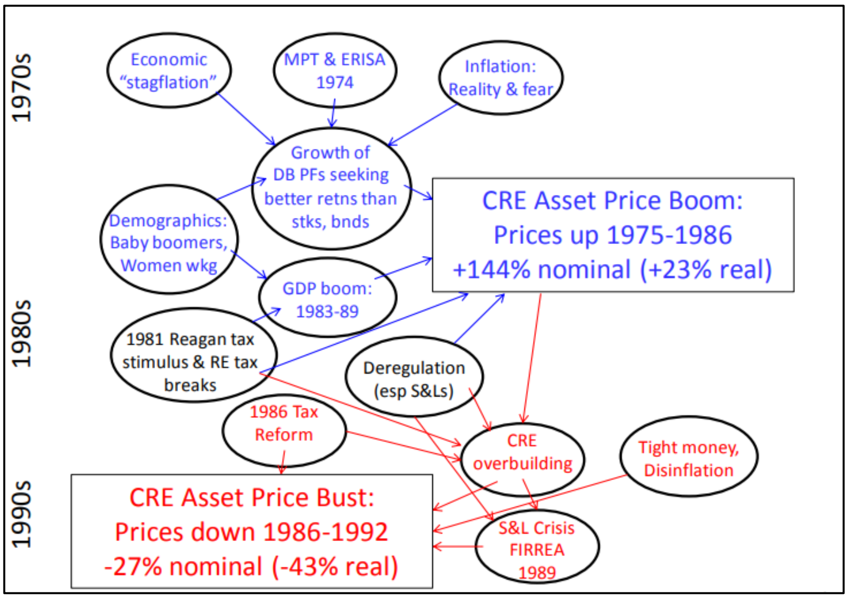

Figure 29: Causal flow diagram of the commercial real estate asset price boom and bust (Geltner, 2013)

In line with the previous founding's, the recession of the early 1990s was not caused by commercial real estate but could be a secondary cause because of their role in the financial crisis of the 1980s which was a secondary cause of the recession. The lending institutions which provided commercial real estate loans had their part in both the crisis in 1987 (1980s) and the early 1990s. But in these times commercial real estate took a great hit, shown in Figure 30 and Figure 31.

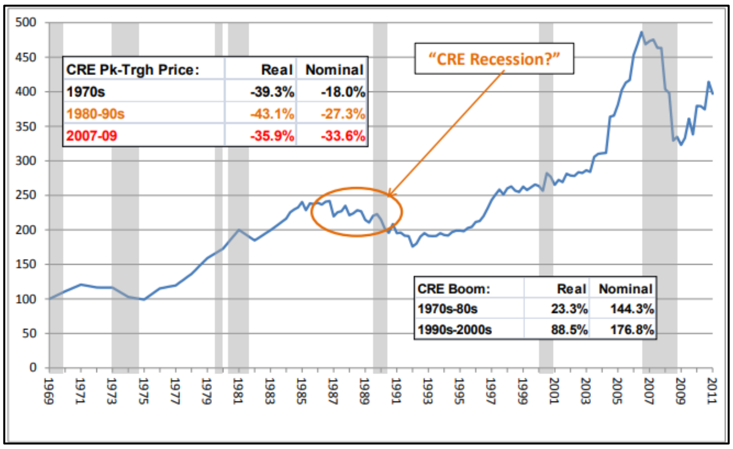

Figure 30: The commercial real estate asset price cycle 1969-2011 (Geltner, 2013)

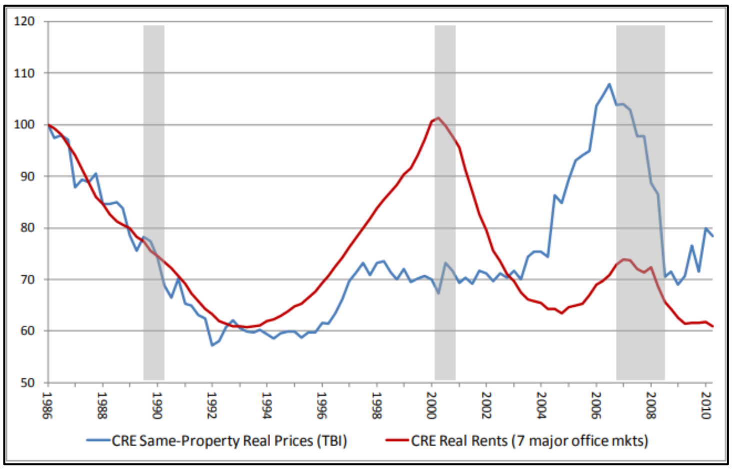

Figure 31: Real commercial real estate prices and rents 1986-2010 (Geltner, 2013)

A.1.4. Dot-com bubble and September 11th attacks

A.1.4.1. What happened?

Dot-com bubble (2000)

Between 1997 and 2000 the shares of tech companies were high because the growth of these companies was expected. Characteristic for this time was that many little companies arose and because of the quick growth of the stock market, large-scale stock market speculation and the easy access towards investment capital (provided by banks etc.) the market grew so fast that people began to regard the ancient economic legal certainties. The traditional corporate structures in which turnover, loss, profit and capital were viewed in conjunction with each other were set aside for a share in the market without consideration of income. Together with the development of new technologies and this euphoric feeling about the stock market, an overvalue of companies was created. The collapse was a consequence of less confidence in these companies but also the strive of every company to become a monopolist in this market. However, a monopoly can only be taken by one party so the majority of the companies created during this time had to fail (Morris & Alam, 2012) (Glatzl, 2016).

September 11th attacks (2001)

The terrorist attacks of 9/11, as they are called, caused a major loss of human life but also a tremendous loss of financial resources, real estate and infrastructure. The event started in the morning, local time, when an airplane flew at 08:46 AM in one the North Tower of the World Trade Center in New York. Seventeen minutes later, at 09:03 AM another airplane flew right into the South Tower of the World Trade Center (Engel, 2018) (History Editors, 2020).

At 09:40 AM a third airplane crashed its way into the Pentagon. Five minutes later the Federal Aviation Administration commanded that all airplanes needed to be on the ground or stay on the ground. It did not prevent a last crash (Engel, 2018) (History Editors, 2020).

An hour after the South Tower in New York, at 10:03 AM, the fourth and last airplane crashed into a field in Shanksville, Pennsylvania. This airplane was believed to be on his way to the United States Capitol, the White House, Camp David or one of the several nuclear power plants along the eastern seaboard but the passengers of this flight gained control over their hijackers after founding out of the other attacks. Unfortunately they weren’t able to get enough control over the airplane to make a soft landing. No one survived. In this event almost 3000 people died, including firefighters, paramedics and police officers who tried to rescue people (Engel, 2018) (History Editors, 2020).

After this tragedy former president George W. Bush Jr. declared a ‘war on terror’ referring to the measures and hunt he wanted that the United States took towards terrorist organizations like Al Qaeda. After this event the United States started to hunt down terrorist groups like never before. The Taliban, tied with Al Qaeda, were hunted down and the mastermind behind the 9/11 attacks, Osama Bin Laden, remained at large until May 2, 2011. He was killed by U.S. Special Forces during this day at his hideout in Abbottabad, Pakistan (History Editors, 2020).

A.1.4.2. What impact had the dot com bubble and September 11h attacks on commercial real estate?

First of all it is important to understand that before, during and after the dot-com bubble and the attacks of 9/11, the rise of new technologies, the movements of political power, the easy access towards information and news, played a huge role in the changing landscape of the economic and commercial real estate world. Nonetheless, both ‘crisis’ had not a huge impact on the value of commercial real estate, though it had on the way of working. The dot-com crisis caused a high vacancy rate (climbing of more than 20%) until 2004 when everything stabilized and the value of commercial real estate rose as never has been as before (CBC, 2010).

During the 9/11 attacks, the market fell over 7,1% and in New York there was a major loss of jobs and wages. Airlines, insurance companies and tourism sector were hit hard. The private security profited a lot from the attacks. In line with this, commercial real estate in New York itself and a few insurance companies with portfolio's full of real estate, had to take losses (Klein, 2007). Globally the effects on the market were short and on the commercial real estate market almost non existing as can be seen in Figure 32.

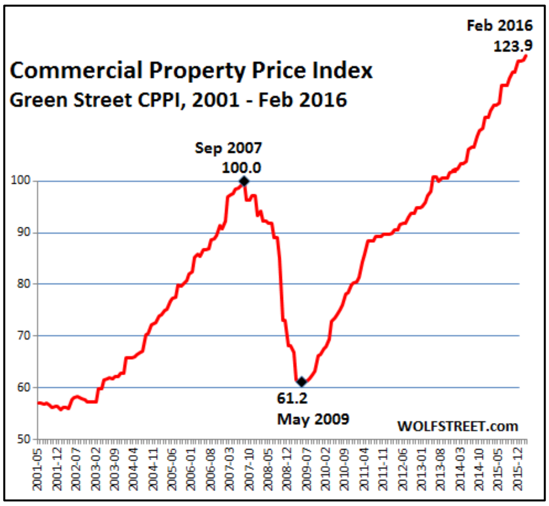

Figure 32: Commercial Property Price Index 2001-2016 (Green Street, 2020)

A.1.5. Financial crisis 2007-2009

A.1.5.1. What happened?

"*We got a double whammy: a sharp recession followed by a week recovery. No wonder most Americans think the recession never ended."* – Alan S. Blinder (2014, p14)

"When an economy is inching along, with employment drifting down, spending weakening, and its financial system reeling from a gut-wrenching year of upas and downs, that economy is in a weak position to withstand any adverse shock. And we got a whopper on September 15, 2008, when Lehman Brothers filed for bankruptcy. Immediately thereafter, the whole U.S. economy fell off the table." – Alan S. Blinder (2014, p.19)

These two quotes define basically the feeling of how most of the Americans must have felt during the financial crisis. No one knew what hit them, how it had hit them and where it came from. The fall of the Lehman Brothers on September 15th 2008 was the tipping point but it is exaggeration to say that this was the moment the financial crisis started. Even the years 2007-2009 can be argued about. But it is without doubt the biggest, most unexpected and most impactful recession since the collapse of the stock market in 1929. Of course in the 1970s and early 1980s there were two recessions as well but the impact of these two were nonetheless nothing in comparison towards the financial crisis (Blinder, 2014) (Nations, 2017, p.177-244).

During the aftermath most of the people were pointing their fingers towards investors and banks and blamed them for the crisis, and of course they played their role, but it is too short-sighted to conclude its only their fold. Blinder (2014, p.27-86) suggests that there are seven *main villains* in this crisis:

1. Inflated asset prices, especially those of houses and securities (the housing and bond bubble);
2. Excessive leverage throughout the financial system and the economy because of the heavy borrowing;
3. Lax of financial regulations in both law and the performance of the regulators;
4. Disgraceful practices of banks in subprime and other mortgage lending;
5. The swamp soil on which those unregulated securities and derivatives were built on to secure and fund these bad mortgages;
6. The terrible performance of statistical rating agencies which provided a nice story to sell the swamp soil;
7. The incorrect compensation system of most of the financial institutions that provided the possibility of creating powerful incentives going broke.

Most of the people still will remember the role of subprime mortgages and the downfall of the housing bubble, but not only is this a mistake, it doesn't tell the whole story. An example is Paribas Day (August 9th 2007), the day French bank BNP Paribas decided to halter withdrawals on three of its subprime mortgage funds. This day did not only trigger the Federal Reserve to do something but also raised the question on that very moment: what is this crisis about?

Before answering this question, as a reader stay in perspective, this event happened more than over **a year** before the fall of the Lehman Brothers on September 15th 2008. According to most during these months in 2007 the crisis was about two things: the technical view was that the world was experiencing a liquidity crisis. In other words investors and financial institutions wanted to get their hands on more cash than was available. The foundation of this thought can be explained in two ways: it partly came because assets which formerly looked safe now looked risky, on the other hand these investors and institutions were afraid that customers might show up to make withdrawals. The broader – and more dark – view the scarcity of liquidity was just the tip of the iceberg and the real problems lurked down the road such as gigantic losses of wealth, massive deleveraging and insolvencies of major institutions and the shadow banking system causing problems. If all this would happen – in August 2007 it still didn't happen – the whole economy would be in severe trouble and would fall into recessions or worse because of a starved credit (Blinder, 2014, p.87-99) (Nations, 2017, p.177-244).

As was written in history the Federal Reserve (FED) and the European Central Bank (ECB[6]) started to dash for cash from this point on in 2007. Lender became an extra, but last resort, for institutions and investors. This was first not the case, it was since March 27th 2008 that the Federal Reserve gave out an actual loan. What the FED did not know, but should have known, is that after the fall of Bear Stearns, an investment bank specialized in mortgage-backed securities and the decision of not helping out Lehman Brothers, caused an effect on the market like never known before: total chaos and panic. Lehman Day, referring to September 15th 2008, caused a dry up of credits, bankruptcy, job disappearance and talks about a Great Depression 2.0. The financial crisis and its recession was a fact because of this turning point (Blinder, 2014, p.100-173).

One of the lessons learned from this crisis is the distinction between insolvency and illiquidity. An organization is insolvent when the value of its liabilities surpass the value of its assets, making the net worth of it all negative. The next stop will probably be bankruptcy. An organization is illiquid when there is a shortage on cash. This doesn't necessarily mean that the balance sheet of the organization is unhealthy. In these cases the organization needs a short-term credit. So in other words: insolvency is a disease, where illiquidity is a (really) bad cold. A high liquidity problem can destroy a financial company like commercial banks or investment banks – their main business is moving cash – even their balance sheet is healthy. Therefore illiquidity can turn into insolvency, like happened at Bear Stearns and Lehman Brothers (Blinder, 2014, p. 103-104) (Nations, 2017, p.177-244).

More lessons must be learned from this crisis, such as more control on how funds, bonds, financial institutions but also entire governments handle business and for that matter "money problems". In the description of the whole crisis above, a few major events were displayed in order to outline the cause of the crisis. To conclude, the cause of this crisis was partly the collapse of the housing market, as a result of which the subprime mortgages were worth a lot less and the financial institutions and investors got into trouble. The uncertainties of not knowing which institutions were to come into trouble, lending was not an option anymore until March 2008. As a result of this many institutions filed for bankruptcy, have been nationalized or taken over by other institutions. Partly the crisis occurred because of the limited availability of liquidity and capital and the confidence loss in the financial institutions because of the failures (Blinder, 2014) (ECB, 2008) (Nations, 2017). Different rates are provided by Dalio (2018) in Figure 33.

[6] European Central Bank (ECB): A central bank of the European Union responsible for monetary policies for its members which have adopted the Euro as a currency (Hayes, 2020).

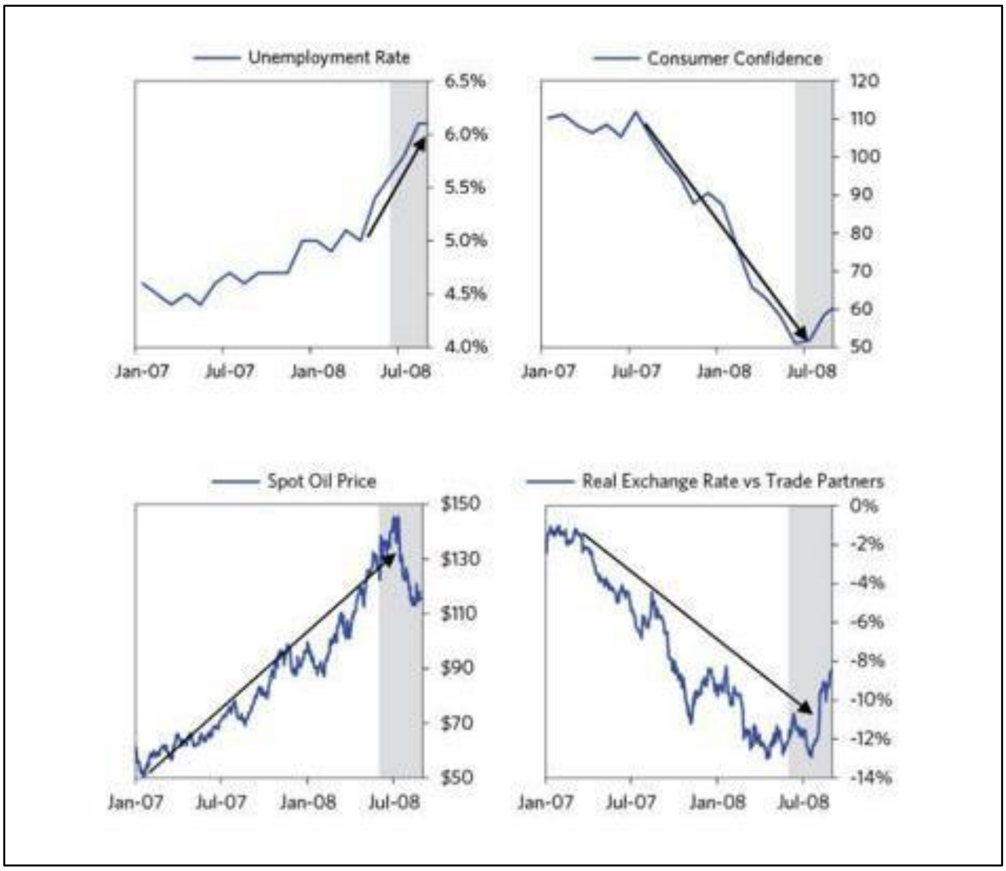

Figure 33: Overview rates financial crisis (Dalio, 2018, p.138 Part 2)

From the beginning of 2010 the crisis changed its subject: there came more and more concerns about the financial position of a number of governments. The Euro crisis was born (see 9.1.5.3).

A.1.5.2. What impact had the financial crisis on commercial real estate?

Because of this really complex, "unforeseen" and "unexpected" crisis, commercial real estate fell down really quick. In a report of CBRE (2011, Figure 34) in the third quarter (Q308) of 2008 is a really quick drop of the global office rent viewed. According to Ibbotson & Harrington (2020, p.30-31) the return on Real Estate Investments Trusts (REIT[7]) dropped since 2007 until the end of 2008 and started to crumble back during 2009 as shown in Figure 35 and Figure 36. This view on commercial real estate during that time also is shown by CBRE (2011).

Most of the downfall is due to the instability of financial institutions, unemployment and the insecurities about the economy in the entire world. Investors became more cautious and still in 2011 (CBRE) the recovery was not full enhanced. According towards figures of Eurostat (2017, p.27) it was until 2016 that the prime commercial real estate values were as high as in the year of 2007 (see Figure 37). Lending towards commercial real estate was back again during 2015-2016 according to RICS (2019, p.2). The investments in commercial real estate were back on the same level as before the financial crisis in 2015 (RICS, 2019, p.3).
The main reason for the downfall of commercial real estate were the problems around solvability and liquidity. The liquidity problem led to problems in financing commercial real estate. The pricing of commercial real estate almost never came about because of this liquidity problem. This made the job of real estate valuation service organizations really difficult during this time (Berkhout, 2019).

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[7] REIT is an organization that owns income-producing real estate. REITs owns most of the times many types of commercial real estate ranging from offices and hotels to warehouses, hospitals and shopping centers (Chen & Mansa, 2020).

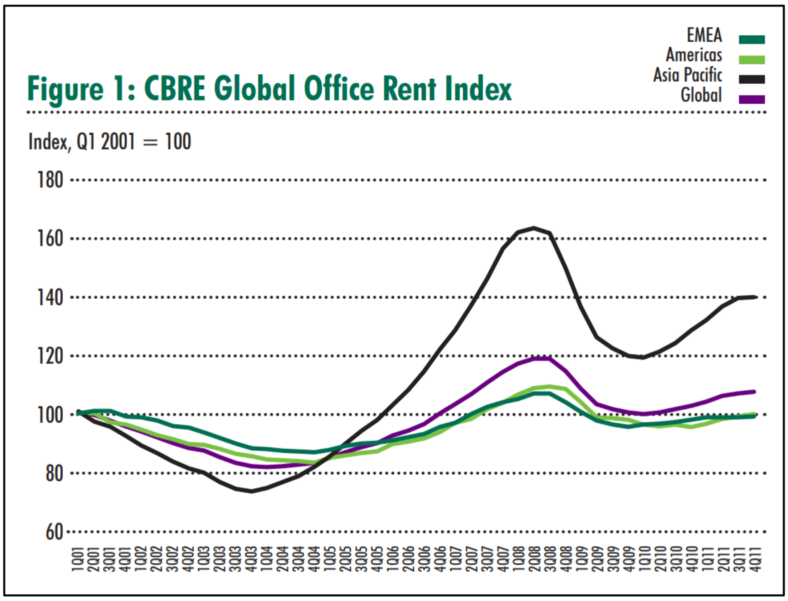

Figure 34: CBRE Global Office Rent Index (CBRE, 2011)

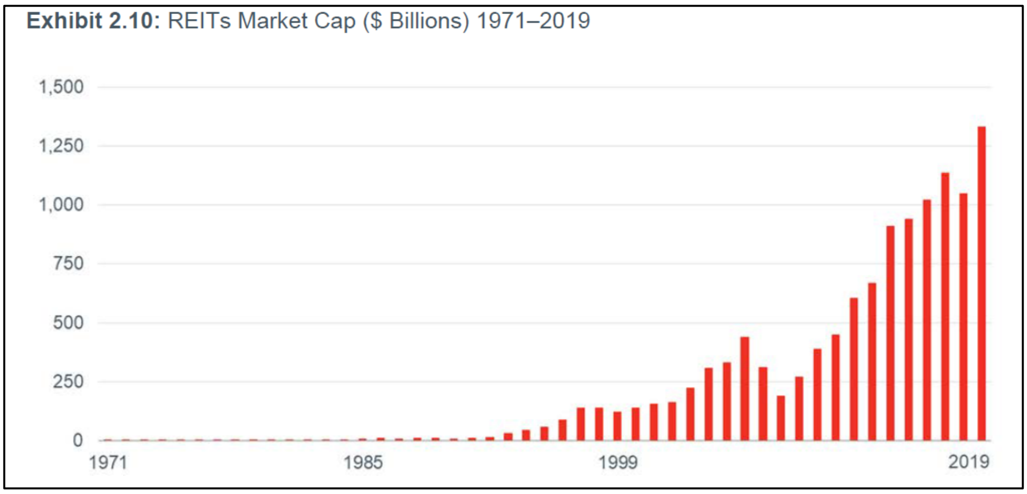

Figure 35: REIT's Market Cap 1971-2019 (Ibbotson & Harrington, 2020, p.30)

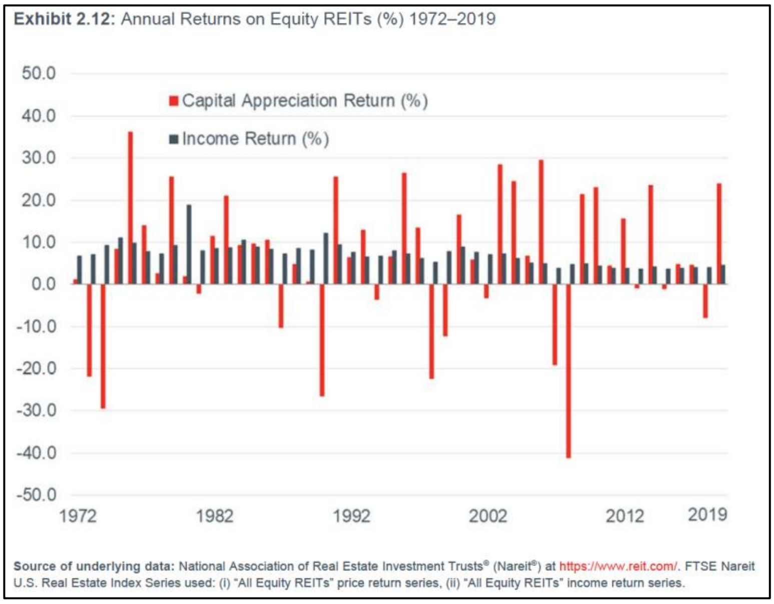

Figure 36: Annual Returns on Equity REITs 1972-2019 (Ibbotson & Harrington, 2020, p.31)

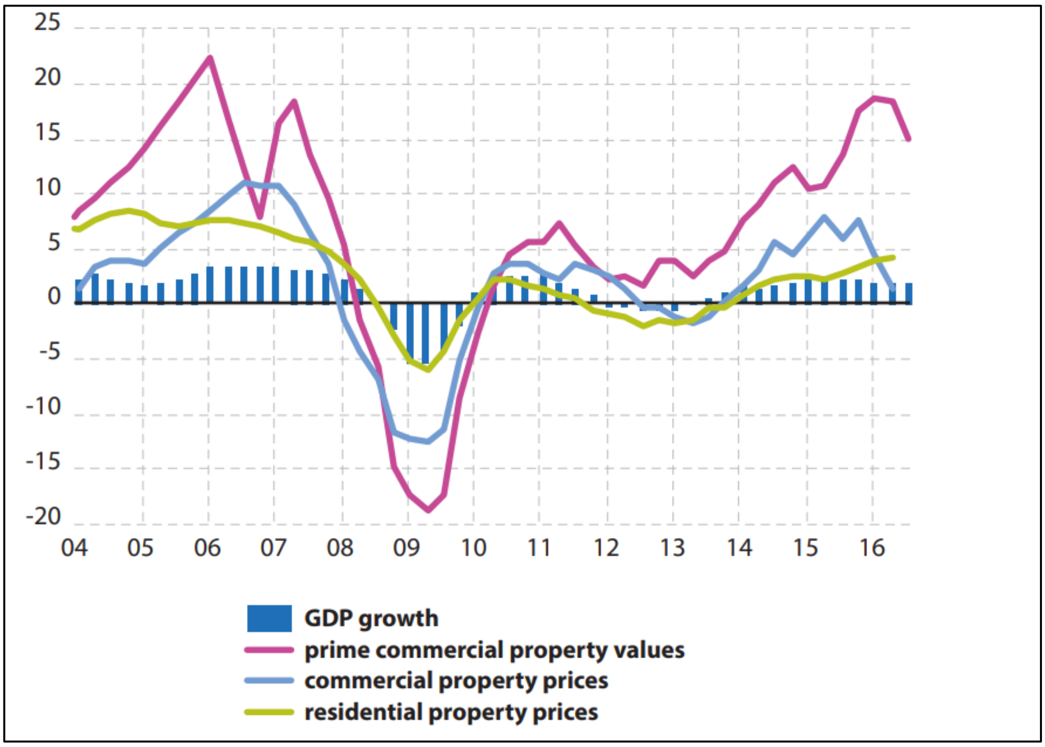

Figure 37: Real GDP growth, prime commercial real estate values and residential property prices in the Euro area (Eurostat, 2017, p.27)

A.1.5.3. The aftermath of the financial crisis

In this session the aftermath of the financial crisis in the EU will be shortly described. A few main reasons of the euro crisis are:

- Rising governments debts as a result of the financial crisis;
- Ignoring treaty rules stated by the European Union by member of the EU;
- Concerns IMF about the EU;
- Risks for foreign investors;
- Different EU members with different perspectives and interests that cannot come to an agreement about supports for other EU members in these times.

As a consequence of the financial crisis, the recovery of most markets were after 2009 possible. In the eurozone this wasn't the case. Because of the many financially failed institutions and losses in the economy, some countries had difficulties by paying their debts. In this case, Greece, member of the European Union, was threatened to no longer be able to pay its debts. Greece got support of the entire EU and the ECB. After the announcement of this on May 2, 2010, a number of other countries were also in danger of falling due to the lack of confidence in the financial market in these countries. During 2011 more countries were in trouble, at the end of 2011 more measures had to be taken which resulted in more crisis. The short effects of the crisis were a highly unemployment rate in the threatened countries. The long-term effects were fragmentation of the capital market within the EU but also some can argue that Brexit is partly nowadays here because of the aftermath of this crisis (Blinder, 2014, p.409-428) (Wijffelaars & Loman, 2015) (Riley & Ghiles, 2016).

Some even argue that the financial crisis is still happening, even during COVID-19. Actual evidence for this is hard to provide because so many actors and factors are involved. What is certain, is that the financial crisis and euro crisis both have had an huge impact on the global economy and society. After just recovered from these crises, another global crisis came along, namely COVID-19.

A.1.6. COVID-19 pandemic 2020

A.1.6.1. What happened?

During the first quarter of 2020, a global pandemic broke out (WHO, 2020). This unexpected outbreak caused huge panic (see Figure 38 and Figure 39) on the financial market. The World Bank (2020) is providing lots of data and the conclusion is that in the first months of COVID-19 the market's reaction on the pandemic are far worse than during the financial crisis at the beginning of this era. The dropdown of GDP globally is far more worse and the expectations are way more uncertain because nobody knows when this pandemic will stop. This is certainly fed by the uncertainties about a vaccine for this virus.

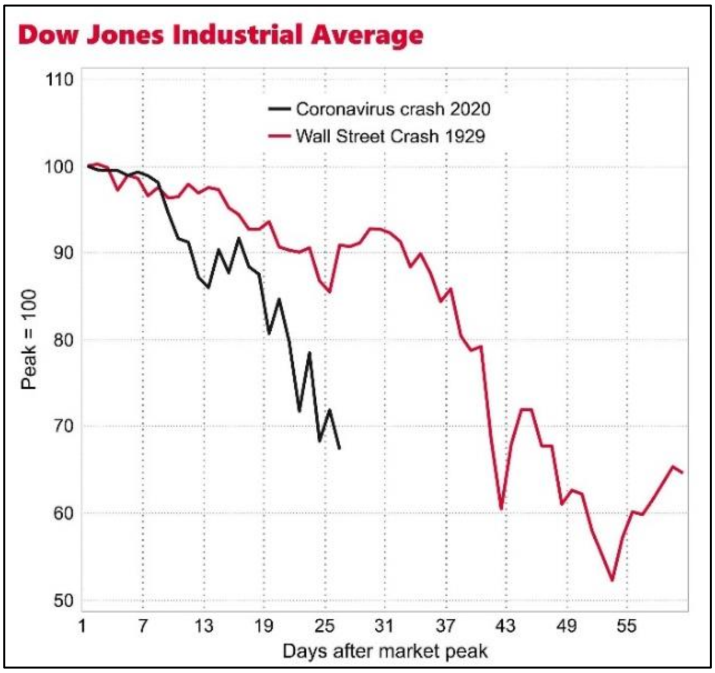

Figure 38: Dow Jones stock market comparison crash of '29 and COVID-19 (Chu, 2020)

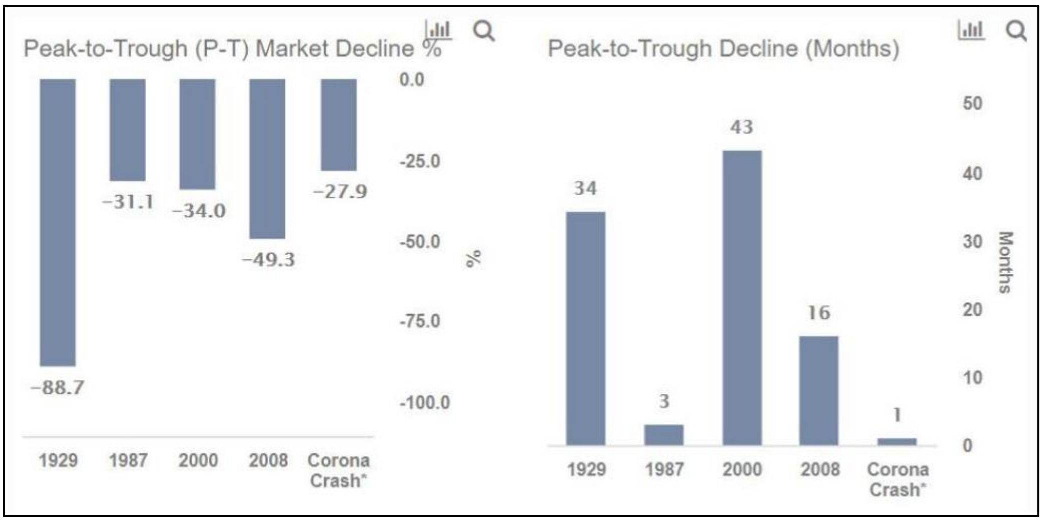

Figure 39: Sell-off in the Dow Jones through various market crises (Trefis Team, 2020)

In the beginning of the outbreak most countries went in lockdown, airplanes stayed on the ground, travelling was almost impossible, restrictions were provided by governments on going to work or a walk for shopping. Wearing masks, keep social distance from each other and a total other approach of how to work were introduced by most organizations. On the other side the digital economy was boosted because of the other approach of working (Barkham, 2020). In Figure 40 of The World Bank (2020) can be seen that the combination of economies in recessions are at the highest rate since the beginning of the stock market in 1871.

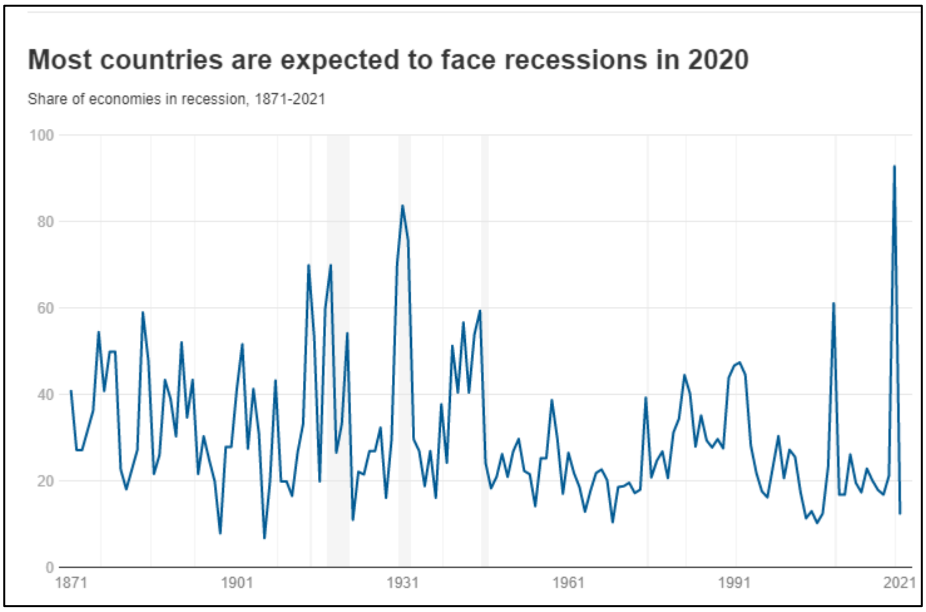

Figure 40: Share of economies in recession 1871-2021 (The World Bank, 2020)

The development of the COVID-19 pandemic and its impact on the entire economy are uncertain. The expectation is that when the virus can be imbedded by a vaccine that most of the economies will recover "quickly". Most of the outlooks state that the recovery will take at least two full years until 2023, maybe 2024, but this only can be achieved by having control over the virus (The World Bank, 2020) (Barkham, 2020).

The COVID-19 crisis is a total other crisis than the global economy has faced before. Most of the crises in history occurred because of financial problems and low confidence in the financial market. This crisis is the other way around. Because of the restrictions, caused by the pandemic, most organizations can't continue their business and because of that these organization got financial problems. In line with this, it is expected that banks and financial institutions will get problems (OECD, 2020). To compare the last financial crisis and this crisis, the next quote says it all:

"*In 2008 the banks failed and because of that the local restaurant owner lost his entire pension. During COVID-19 the local restaurant loses clients because of restrictions and therefore his income. As a result, banks get less money to invest."* – J. Meester (2020)[8]

In other words the COVID-19 pandemic is a health crisis, which can be overcome by other measures than solvency or liquidity crisis like the financial crisis during 2007-2009 (OECD, 2020).

A.1.6.2. What is the expected impact on commercial real estate caused by COVID-19?

"*Lockdown causes global recession."* – Barkham (2020).

Of course there are more effects of COVID-19 than only health issues. Staggering of jobs, reduces consumer spending and business closures are also effects of this pandemic. The uniqueness of this pandemic is that each country has its own policies and strategies for responding towards the pandemic. One thing that can be stated for sure is that most of the major economies have instituted a tremendous amount of money to stimulate the economy (IMF, 2020). The United States for example already have put $2.59 trillion in new budgetary resources (Datalab, 2020). This amount of money is, according to U.S. governmental standards, needed to solve the problems for liquidity for the "local restaurant owner".

[8] *This quote was obtained during a conversation about my research with both of my research controllers, J. Daalmans and J. Meester. The conversation was about the differences of the financial crisis and the COVID-19 pandemic crisis.*

Because of the stimulations of governments, the recovery of commercial real estate can be quick. According towards Barkham (2020) the year of 2021 can be seen as turning point and investments in commercial real estate globally will rise. The retail and hotel sector was hit most hard, with a total of 85% from December the hotels were the highest decline for investors in commercial real estate (Schnure, 2020).

Retail and hotel & lodging are expected to have a really hard time because of COVID-19. Offices are depending on how the demand for office use will change. Also because of the increase of density per employee for office space, it can be argued that the need of social distancing will likely lead towards more office space per employee and thus other use and maybe increasing demand of office space (Schnure, 2020) (Barkham, 2020). A forecast provided by RICS (Rubinsohn, 2020, Figure 41) and Savills (Trumpp, 2020, Figure 42) during the CEE Property Forum September 23th 2020, gives a prognosis of the development of the commercial real estate market.

The future will eventually determine what will really happen to commercial real estate as a result of the COVID-19 pandemic outbreak. One conclusion can be drawn, regardless of the further outcomes, and that is that commercial real estate will never be the same and that a lockdown, as Barkham (2020) states, in many countries cause short or long recessions. The economy will suffer a short-lived or long-lasting blow from this measure.

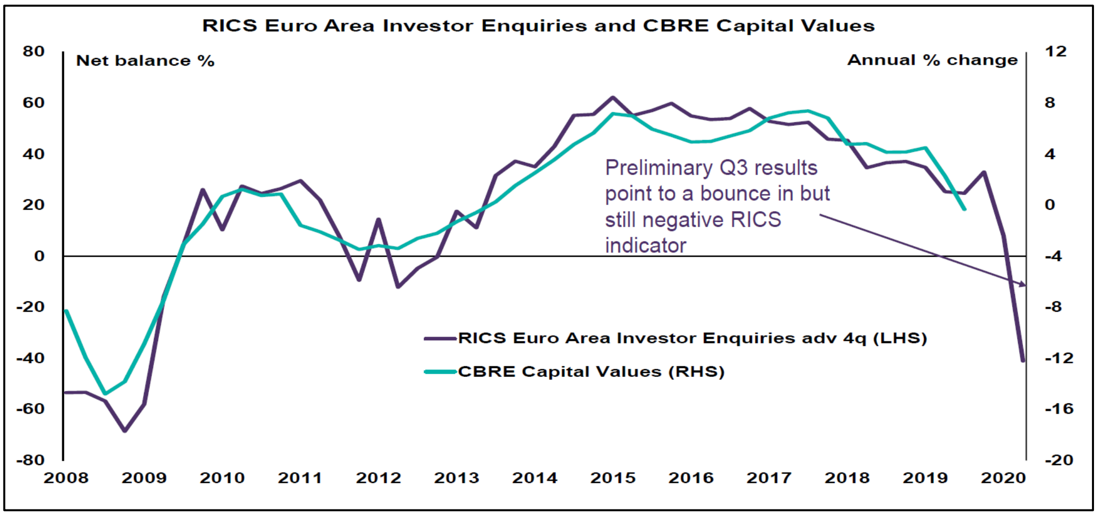

Figure 41: Euro Area Investor Enquiries on commercial real estate (Rubinsohn, 2020)

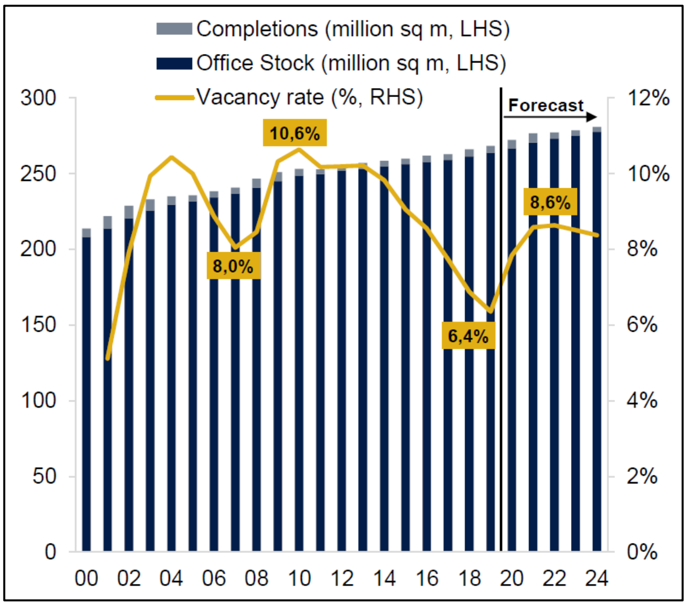

Figure 42: Forecast office market recession on vacancy levels (Trumpp, 2020)

A.2. The history of the workplace and employment

A brief history of the workplace must be provided in order to understand the relationship between exploitation and valuation of commercial real estate.

Roaring Twenties and The Great Depression

During the Roaring Twenties, almost 88% of the people in offices were woman. Also in this period it was common for directors and board member to encourage the study on behavioral science in offices. The office became a playground for architects and their ideas of how a workplace could cause less social disturbances (Saval, 2014, p.78-91).

During The Great Depression businessmen insinuated that women were ruining the office. This idea was widely supported (Saval, 2014, p.91-92). The generalized idea and fear that the combination of men and women working together could lead to a great disturbance, the office became spotless. In other words, the woman and men got different entrances, hallways, elevators and stairways. The people were kept busy by clocks ticking and the work was distributed that it wouldn't stop. Talking, laughing or even a quiet conversation was not possible, all out of fear of men and woman would get the attention of each other and disturb each other (Saval, 2014, p.93-95).

Figure 43: Impression of the workplace during 1920s (Saval, 2014, p.95)

Figure 44: Impression of the workplace during 1920s (Saval, 2014, p.104)

Besides that the caretaker manager was introduced. Banks had lots of property but also problems and did not know how to manage their property. That's why the introduction of the caretaker manager was a solution. The caretaker manager collected the rent, did the maintenance and looked after the day-to-day needs of the tenants. Unlike today, caretaker managers did not provide some marketing strategies or leasing contracts. This was still in the hands of the property owner (Goss & Campbell, 2008).

In the 1930s mostly departments were created in buildings, the best known arguments for this set up are according to Krumm (2001, p.278):

- control construction activities, both technically and financially;
- standardise building design;
- guarantee the availability of skilled employees; and
- create and maintain a corporate image through the architecture of their buildings.

Late 1960s, early 1970s

During the sixties cubicles were introduced by Robert Propst (Saval, 2014, p.187). The office must became a facility based on change. *Bürolandschaft* was also developed. The idea was that more than 12 employees were together working in one space. The idea grew because of the idea of democratization (Saval, 2014, p.256).

Figure 45: Prescient image of the future in the film "Playtime" in 1967 (Saval, 2014, p.188)

The figure presenting the prescient image of how in films the future must have been looking like, is presenting for people nowadays maybe a little throwback. Before the change a typical landscape of the workplace looked like below (Figure 46).

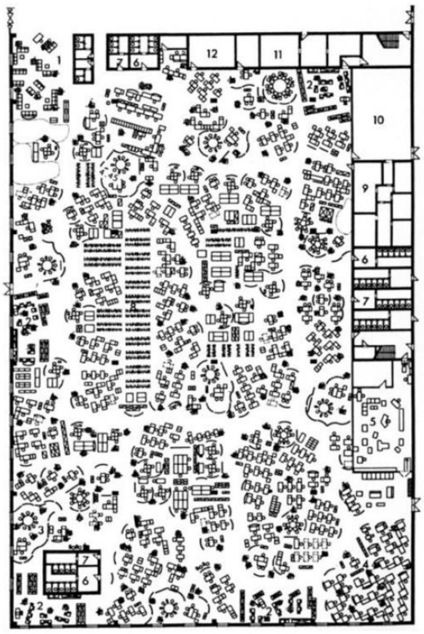

Figure 46: Typical work landscape early 1960s (Saval, 2014, p.207)

Propst was arguing that the workplace must be actionable. Two examples are provided in Figure 47 and Figure 48.

Action Office I (1964). *Courtesy of Vitra Design Museum*

Figure 47: Action Office I by Propst in 1964 (Saval, 2014, p.210)

Action Office II (1968). *Courtesy of Herman Miller*

Figure 48: Action Office II by Propst in 1968 (Saval, 2014, p.215)

The promotion of this type of office with working spaces can be combined with a few keywords (Saval, 2014, p.217):

- Visual triggers;
- Immediate accessibility;
- Position in space;
- Blunted edges;
- Varied physical attitudes.

It was also during the 1960s that the property manager was introduced. The rental industry was booming and all the short-term leases and the high demand of marketing and leasing needs of buildings kept the property owners to busy. The caretaker manager was no longer sufficient because of the high demand. Most of the property owners did not only have commercial real estate but also housing estate. Because of the baby boom and the more subsidized housing most of the expenses rose faster than the rents. In these years there was still one problem: economic diversity and minorities were less important. Commercial Real Estate was likewise. The properties in the center of the city were taken good care of, the more outside the city, the less was done to keep up the quality of the buildings (Saval, 2014) (Goss & Campbell, 2008) (Krumm, 2001).

During this period there was a slide decreasing of attractiveness of investing in the housing industry which triggered institutional investors to start to invest capital in commercial real estate. Parallel to this development service providers started to enter the commercial real estate market. The deteriorating of corporate financial resources, combined with the rising of the construction costs for commercial real estate, caused an increase of demand for renting accommodation within commercial real estate. This caused a knew extra party to the field: service providers for activities within commercial real estate (Krumm, 2001).

Late 1970s, early 1980s

Propst (Saval, 2014, p.221-224) was worried and panicked because what he saw in the performers of his design, easily defining and accountable cost savings of the workplace took over. This meant that his entire idea became more different (see Figure 49)

Action Office II (1978)—the denouement. *Courtesy of Herman Miller*

Figure 49: Action Office II by Propst in other shape 1978 (Saval, 2014, p.222)

In the 1970s a study showed (Saval, 2014, p.227) that two important traits in performance ratings were driving people: "initiative and enthusiasm" and "personal service orientation". The work must be organized in such a way that it could be entirely personalized. Prestige only came because of status of higher people and the limited opportunities for advancement in their work.

Besides these drives, the oil crisis of 1973 caused a rising of costs for accommodation in commercial real estate, this stimulated the attention of investors. This transition of demand because of high costs and the attention for real estate, resulted in the idea that commercial real estate can add value (Krumm, 2001).

The downside of this recognition of added value of commercial real estate was that organizations were looking for alternative ways to lower the costs of supporting activities and services within commercial real estate. This rising of the construction costs, the introduction of the computer and other information technologies in main business processes and the globalization of the markets were a really fundamental basis for the establishment of a management approach to buildings and building services (Krumm, 2001) (Saval, 2014).

From 1980s until 2000s

The management of departments which held commercial real estate within their portfolio profited from the increasing rental incomes and the increasing capital value of their property. In the early 1990s there was the decrease of value but this wasn't the case for how the work environment had to look like, even though the vacancy rate was high. The reason for this was the upcoming of many innovations. Because of these innovations the costs of managing commercial real estate reduced (Saval, 2014) (Krumm, 2001).

However, the decrease of value of commercial real estate and the increase of vacancy caused that many organizations economized on the services within commercial real estate but also in the amount of employees. After reducing both, new strategy for how to run commercial real estate could be made (Krumm, 2001).

2000s up to now

In the beginning of the 21th century, the idea of a new work environment started to develop itself. Because of the fast emerging of new trends, more technology which could help people in working spaced and areas and the rising demands of end-users, flexibility of the work environment is needed. Veldhoen and company (2020) created in the beginning of this century a vision and model based on this flexible way of working. "Het Nieuwe Werken" as it is called in Dutch, spread slowly around the globe. In the Netherlands an organization called *Interpolis* embraced "Het Nieuwe Werken" as first. The idea was flexible workplaces and more reliance on the individual and its competences and collaboration in the office. It's based on five key components:

1. Satisfied and happy employees;
2. Innovation;
3. Reducing cost per square meter;
4. Improved collaboration;
5. Healthy work environment.

Since 2010 Corporate Social Responsibility is important for most of the organizations. All over the world many types, in combination with initiatives, of Corporate Social Responsibility are handled. Corporate Social Responsibility is a collective term for dealing more actively and more consciously with the economic, social and environmental consequences of business decisions. Many business take commercial real estate to a totally new level and certify them. Corporate Social Responsibility must make organizations much more aware of their impact on society and environment. The fast growing digital industry, the highly development of technology and the increasing demands of tenants and customers within commercial real estate are all factors which organizations must take into account by building strategy for their commercial real estate (Al Halbusi & Tehseen, 2017) (Palm, 2017).

A.3. Business continuity management

A.3.1. Business impact analysis

Identifying the key products and services is the first step. In order to identify this, the mnemonic "FORCES" can be used. These six factors, Financial, Operational, Reputation, Customers and suppliers, Environment and Staff, determine the key products and services by attributing scores to each one (Sterling et al., 2012, p.53-70).

Table 4-1 The Impact on the Bakery's FORCES Sectors for Each Product

	Cakes		Biscuits		Pastries	
	In Shop	Wholesale	In Shop	Wholesale	In Shop	Wholesale
Financial	*	***	*	**	—	*
Operational	*	***	*	*	—	*
Reputation	***	***	*	*	—	*
Customers and suppliers	**	***	***	**	—	*
Environment	***	***	*	*	—	*
Staffing	*	***	*	**	—	*
Total	**11**	**18**	**8**	**9**	**0**	**6**

** Minimum Impact; ** Some Impact; *** Maximum Impact*

Figure 50: Example of FORCES impact analysis on business (Sterling et al., 2012, p.57)

Key questions and components of each of the six factors:

1. Financial: What profitability by product? Financial penalties for not delivering product or service?;
2. Operational: Anticipating on production problems;
3. Reputation: Business name maintenance;
4. Customers and suppliers: consideration of players in the supply chain;
5. Environment: Keep up the competitiveness within the market;
6. Staffing: Keep employment (Sterling et al., 2012, p.58-62).

The second step is identifying and prioritizing the critical activities through a business impact analysis. To work out each critical activity for each key product or service in a certain time, failure during a disruption will be stopped. Besides this, an understanding of the business as a whole will be gained and the processes and resources within the business can be mapped. The different dependencies in each process and the impact on each process can be prioritized in order to describe the steps towards recovery of these dependencies. This process is really helpful for the next step, determining the business continuity strategies. Information is key towards strategy making (Sterling et al., 2012, p.64).

In order to make a perfect BIA (business impact analysis), Sterling et al. (2012, p.65) described a few steps to take to have a powerful one (see Figure 51).

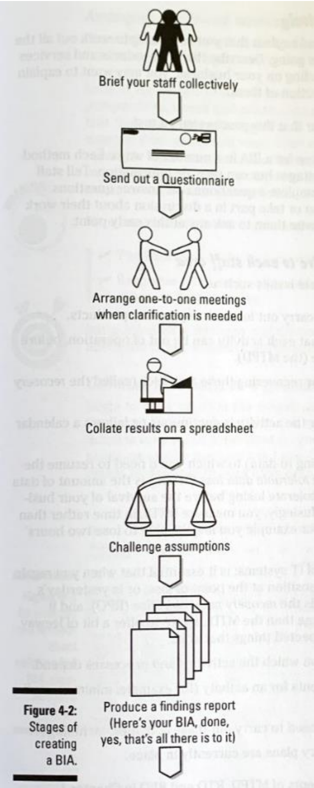

Figure 51: Stages of creating a BIA (Sterling et al., 2012, p.65)

A.3.2. Risk assessment

For a risk assessment different approaches can be used. In order to understand risk management, one of the approaches is a simple mnemonic IERR, which stands for (Sterling et al., 2012, p.75):

1. **Identify** the risks that your organization faces.
2. **Evaluate** those risks.
3. **Record** those risks into a risk register.
4. **Respond** so the organization can be on top of new and emerging risks.

In the first step the risks of the environment will be identified. Three scales must be handled to achieve this (Sterling et al., 2012, p.77):

- Wider environment: all the elements from the outside of the environment which impact the organization;
- Immediate environment: external to the business and organization but direct links with it;
- Internal business environment.

In this step all the risks will be identified and described as detailed as possible. Also the narrowing down of the risks will be valued. In other words, a closer look on the risks must result in what really the problem is and take away some factors which has little to do with the actual problem (Sterling et al., 2012, p.76-85).

The second step, evaluating the risks for the business, can be done according to a risk-impact scoring scale. An example of these scores can be (Sterling et al., 2012, p. 86-88):

1 = Limited
2 = Minor
3 = Moderate
4 = Significant
5 = Company crushing

To be able to create a likelihood overview, the risk-likelihood scoring scale can be helpful to put words into percentages. In Figure 52 an example of this scoring scale is given.

Table 5-1 Simple Risk-Likelihood Scoring Scale

Score	*Descriptor*	*Likelihood Over 5 Years*	*Likelihood Over 5 Years*
1	Low	> 0.005%	> 1 in 20,000 chance
2	Medium Low	> 0.05%	> 1 in 2,000 chance
3	Medium	> 0.5%	> 1 in 200 chance
4	Medium High	> 5%	> 1 in 20 chance
5	High	> 50%	> 1 in 2 chance

Figure 52: Risk-likelihood scoring scale (Sterling et al., 2012, p.87)

In step three, the recording of the risks into a register, a relationship between the impact and risk-likelihood will be drawn. This can provide a clear visual of what must be prepared for or ignored by the organization.

In step four, responding towards the risks, a strategy must be formulated to be able to identify the different types of activities the organization has to follow in order to take away the risks. Sterling et al. (2012, p.91) have formulated five types of response in strategic types (see Figure 53).

Table 5-2 Five Strategic Types of Response

Strategic Type	*Response Description*
Prevention	Terminate the risk by doing things differently and removing the risk. Put measures in place that stop the threat or problem from occurring or prevent it having any impact on your critical activities.
Reduction	Treat the risk by taking action to control it in some way that reduces the likelihood of the risk developing or limits the impact on your critical activities to an acceptable level.
Transference	This is a form of risk reduction where the management of that risk is passed to a third party via, for instance, an insurance policy or penalty clause. Nonetheless, if your critical activities come to a halt and your insurance is unable to help you recover, the risk is still yours and your critical activities have still come to a halt. The same applies if your supplier fails to deliver; you may get paid later but you're still at a standstill for now. And you remain the business that fails to supply your customer.
Acceptance	Tolerate the risk, perhaps because you can't do anything at a reasonable cost to mitigate it, or the likelihood and impact of the risk occurring are at an acceptable level.
Contingency	These are actions planned and organised to come into force as and when the risk occurs.

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Figure 53: Five strategic types of response (Sterling et al., 2012, p.91)

A.3.3. Resilience in the supply chain

To manage the suppliers of the organization at best, a deep focus on the actions for the most benefit can be of high value for the organization. Four key principles provided by Sterling et al. (2012, p.95-106) must bear in mind when striving to encourage resilience in the supply chain of the organization. These four principles brings the most benefit for the least effort:

- Concentrate on the identified key products and services as described in A.3.1;
- Consider secondary suppliers for critical activities to producing the key products and services. This could give more reassurance;
- Failure points which could lead to let the entire chain collapse, exists in every supply chain. Recognize these points of failure and support them;
- Prepare to reassure the supply chain in such a way your business expects likewise from your suppliers to reassure your business.

To manage the suppliers five aspects are of great value, based on the mnemonic “CHAIN” (Sterling et al., 2012, p.99):

1. **C**ontracts and relationships
2. **H**ierarchies
3. **A**ssurance
4. **I**nitiative
5. **N**eeds

If these five aspects are well valued, thought about and covert, the supply chain is prepared for resilience.

A.3.4. Select the right business continuity strategies

Before selecting the right business continuity strategies, the previous steps such as identifying the key products and services, an overview of the critical activities, an understanding of the possible risks and an awareness of the supply chain need to be followed to make strategy (Sterling et al., 2012, p.107-125).

The business continuity strategy response can be worked out in three stages. Before adapting these three stages make sure that everything within your business and from different angles is considered. Examples are the balancing costs or extra effort from staff because of some decisions. The first stage is an emergency response and incident management stage. These strategies must form immediate actions in times of emergency. The second stage is the continuity stage. This stages ensures the continuity of delivering the critical activities and turn deliver of key products and services during a disruption in the form of strategies. The third stage consists the recovery and resumption. These strategies from the recovery of critical activities into a sustainable leading level to the resumption of operations to what the organization describes as a normal business environment. The three stages require different strategies. In order to identify these strategies, six phases can be processed to response to the information that is gathered and make strategy (Sterling et al., 2012, p.110-111).

In phase one the necessary information must be collected before start assessing strategies to keep the critical activities going on. In the second phase a continuity response must be created to have a foundation for your strategy decisions and acts. In this phase the connected areas and links between strategy options for critical activities must be found and explained. During phase three, the most important phase, the actual strategy is selected. In this phase people, premises, resources and suppliers must be overthought, valued, used and selected. Make sure these four factors held up, are insured and mapped (Sterling et al., 2012, p.111-123).

In phase four towards six considerations and checking will be performed. Phase four is assessing progress and tactical consideration of the strategy. This tactical consideration can reveal some hick ups in your strategy. The process therefor allows it to look at different strategies for the element that could be a hick up for the critical activity keeping going on. The fifth phase is listing the general considerations so reliability, costs, reputation and needs can be overviewed and valued to make good strategy. The sixth and last phase is checking and reviewing the decisions for the business continuity strategy responses. It is important that the recovery requirements are aggregated, the selected strategies don’t conflict with others and furthermore there is room for evaluation, agreements and motion work programmed to ensure that the selected continuity strategies are correctly put in place and are reviewed from time to time (Sterling et al., 2012, p.123-125).

A.4. DCF Model

According to RICS Red Book (2019, p.162), the discounted cashflow model is:

"Under the DCF method the forecasted cash flow is discounted back to the valuation date, resulting in a present value of the asset."

The DCF method must provide information about the present value of the asset but can also have other values included:

"In some circumstances for long-lived or indefinite-lived assets, DCF may include a terminal value which represents the value of the asset at the end of the explicit projection period. In other circumstances, the value of an asset may be calculated solely using a terminal value with no explicit projection period. This is sometimes referred to as an income capitalisation method."

The key steps in the DCF method and understanding underlying components are (RICS Red Book, 2019, p.162-166):

"DCF-method (RICS Red Book, 2019, p.162-163)
(a) choose the most appropriate type of cash flow for the nature of the subject asset and the assignment (ie, pre-tax or post-tax, total cash flows or cash flows to equity, real or nominal, etc),
(b) determine the most appropriate explicit period, if any, over which the cash flow will be forecast,
(c) prepare cash flow forecasts for that period,
(d) determine whether a terminal value is appropriate for the subject asset at the end of the explicit forecast period (if any) and then determine the appropriate terminal value for the nature of the asset,
(e) determine the appropriate discount rate, and
(f) apply the discount rate to the forecasted future cash flow, including the terminal value, if any.

Type of Cash Flow (RICS Red Book, 2019, p.163-164)
When selecting the appropriate type of cash flow for the nature of asset or assignment, valuers must consider the factors below. In addition, the discount rate and other inputs must be consistent with the type of cash flow chosen.

(a) Cash flow to whole asset or partial interest: Typically cash flow to the whole asset is used. However, occasionally other levels of income may be used as well, such as cash flow to equity (after payment of interest and principle on debt) or dividends (only the cash flow distributed to equity owners). Cash flow to the whole asset is most commonly used because an asset should theoretically have a single value that is independent of how it is financed or whether income is paid as dividends or reinvested.
(b) The cash flow can be pre-tax or post-tax: The tax rate applied should be consistent with the basis of value and in many instances would be a participant tax rate rather than an owner-specific one.
(c) Nominal versus real: Real cash flow does not consider inflation whereas nominal cash flows include expectations regarding inflation. If expected cash flow incorporates an expected inflation rate, the discount rate has to include an adjustment for inflation as well.
(d) Currency: The choice of currency used may have an impact on assumptions related to inflation and risk. This is particularly true in emerging markets or in currencies with high inflation rates. The currency in which the forecast is prepared and related risks are separate and distinct from risks associated with the country(ies) in which the asset resides or operates.
(e) The type of cash flow contained in the forecast: For example, a cash flow forecast may represent expected cash flows, ie, probability-weighted scenarios), most likely cash flows, contractual cash flows, etc

The type of cash flow chosen should be in accordance with participant's viewpoints. For example, cash flows and discount rates for real property are customarily developed on a pre-tax basis while cash flows and discount rates for businesses are normally developed on a post-tax basis. Adjusting between pre-tax and post-tax rates can be complex and prone to error and should be approached with caution.

When a valuation is being developed in a currency ("the valuation currency") that differs from the currency used in the cash flow projections ("the functional currency"), a valuer should use one of the following two currency translation methods:
(a) Discount the cash flows in the functional currency using a discount rate appropriate for that functional currency. Convert the present value of the cash flows to the valuation currency at the spot rate on the valuation date.
(b) Use a currency exchange forward curve to translate the functional currency projections into valuation currency projections and discount the projections using a discount rate appropriate for the valuation currency. When a reliable currency exchange forward curve is not available (for example, due to lack of liquidity in the relevant currency exchange markets), it may not be possible to use this method and only the method described in para (a) can be applied.

Explicit Forecast Period (RICS Red Book, 2019, p.164)
The selection criteria will depend upon the purpose of the valuation, the nature of the asset, the information available and the required bases of value. For an asset with a short life, it is more likely to be both possible and relevant to project cash flow over its entire life.

Valuers should consider the following factors when selecting the explicit forecast period:
(a) the life of the asset,
(b) a reasonable period for which reliable data is available on which to base the projections,
(c) the minimum explicit forecast period which should be sufficient for an asset to achieve a stabilised level of growth and profits, after which a terminal value can be used,
(d) in the valuation of cyclical assets, the explicit forecast period should generally include an entire cycle, when possible, and
(e) for finite-lived assets such as most financial instruments, the cash flows will typically be forecast over the full life of the asset.

In some instances, particularly when the asset is operating at a stabilised level of growth and profits at the valuation date, it may not be necessary to consider an explicit forecast period and a terminal value may form the only basis for value (sometimes referred to as an income capitalisation method).

The intended holding period for one investor should not be the only consideration in selecting an explicit forecast period and should not impact the value of an asset. However, the period over which an asset is intended to be held may be considered in determining the explicit forecast period if the objective of the valuation is to determine its investment value.

Cash Flow Forecasts (RICS Red Book, 2019, p.165)
Cash flow for the explicit forecast period is constructed using prospective financial information (PFI) (projected income/inflows and expenditure/outflows).

As required here above, regardless of the source of the PFI (eg, management forecast), a valuer must perform analysis to evaluate the PFI, the assumptions underlying the PFI and their appropriateness for the valuation purpose. The suitability of the PFI and the underlying assumptions will depend upon the purpose of the valuation and the required bases of value. For example, cash flow used to determine market value should reflect PFI that would be anticipated by participants; in contrast, investment value can be measured using cash flow that is based on the reasonable forecasts from the perspective of a particular investor.

The cash flow is divided into suitable periodic intervals (eg, weekly, monthly, quarterly or annually) with the choice of interval depending upon the nature of the asset, the pattern of the cash flow, the data available, and the length of the forecast period.

The projected cash flow should capture the amount and timing of all future cash inflows and outflows associated with the subject asset from the perspective appropriate to the basis of value.

Typically, the projected cash flow will reflect one of the following:
(a) contractual or promised cash flow,
(b) the single most likely set of cash flow,
(c) the probability-weighted expected cash flow, or
(d) multiple scenarios of possible future cash flow.

Different types of cash flow often reflect different levels of risk and may require different discount rates. For example, probability-weighted expected cash flows incorporate expectations regarding all possible outcomes and are not dependent on any particular conditions or events (note that when a probability-weighted expected cash flow is used, it is not always necessary for valuers to take into account distributions of all possible cash flows using complex models and techniques. Rather, valuers may develop a limited number of discrete scenarios and probabilities that capture the array of possible cash flows). A single most likely set of cash flows may be conditional on certain future events and therefore could reflect different risks and warrant a different discount rate.

While valuers often receive PFI that reflects accounting income and expenses, it is generally preferable to use cash flow that would be anticipated by participants as the basis for valuations. For example, accounting non-cash expenses, such as depreciation and amortisation, should be added back, and expected cash outflows relating to capital expenditures or to changes in working capital should be deducted in calculating cash flow.

Valuers must ensure that seasonality and cyclicality in the subject has been appropriately considered in the cash flow forecasts.

Terminal Value (RICS Red Book, 2019, p.166)
Where the asset is expected to continue beyond the explicit forecast period, valuers must estimate the value of the asset at the end of that period. The terminal value is then discounted back to the valuation date, normally using the same discount rate as applied to the forecast cash flow.

The terminal value should consider:
(a) whether the asset is deteriorating/finite-lived in nature or indefinite-lived, as this will influence the method used to calculate a terminal value,
(b) whether there is future growth potential for the asset beyond the explicit forecast period,
(c) whether there is a pre-determined fixed capital amount expected to be received at the end of the explicit forecast period,
(d) the expected risk level of the asset at the time the terminal value is calculated,
(e) for cyclical assets, the terminal value should consider the cyclical nature of the asset and should not be performed in a way that assumes "peak" or "trough" levels of cash flows in perpetuity, and
(f) the tax attributes inherent in the asset at the end of the explicit forecast period (if any) and whether those tax attributes would be expected to continue into perpetuity.

Valuers may apply any reasonable method for calculating a terminal value. While there are many different approaches to calculating a terminal value, the three most commonly used methods for calculating a terminal value are:
(a) Gordon growth model/constant growth model (appropriate only for indefinite-lived assets),
(b) market approach/exit value (appropriate for both deteriorating/finite-lived assets and indefinite-lived assets), and
(c) salvage value/disposal cost (appropriate only for deteriorating/ finite-lived assets).".

A.5. Research method table

Sub question	Method	Example of resources
What impact and response did the different types of crises between 1929 and 2020 have on the world economic market and commercial real estate and what relation is there with exploitation and valuation of commercial real estate?	Literature research	The Great Crash of ’29 (1954) Business Continuity Management (2012) When the music stopped (2014) Waarderingskamer (2020) Kadaster (2020) Federal Deposit Insurance Corporation (2020)
Which risks as a result of crises affect commercial real estate and, as such, the exploitation and ownership of commercial real estate?	Literature research Interviews	RICS surveys (2020) When the music stopped (2014) Various interviewees from the professional field, such as: - Banks - Real Estate Valuer - Professor - Head of facilities
Which factors arising from the stated risks for the exploitation and ownership of commercial real estate are important for facility managers and real estate owners in order to be able to make strategy at policy level for the future of return on investments by the earning capabilities of commercial real estate?	Literature research Interviews	Various papers and analyses of commercial real estate, facilities and sorts during crises Impact analysis Explanation DCF model and relation with exploitation and ownership commercial real estate Various interviewees

Table 2: Research method sub questions

A.6. Additional figures

Figure 54: Characteristics of the Direct and Indirect Real Estate market (Plaizier, 2009, p.3)

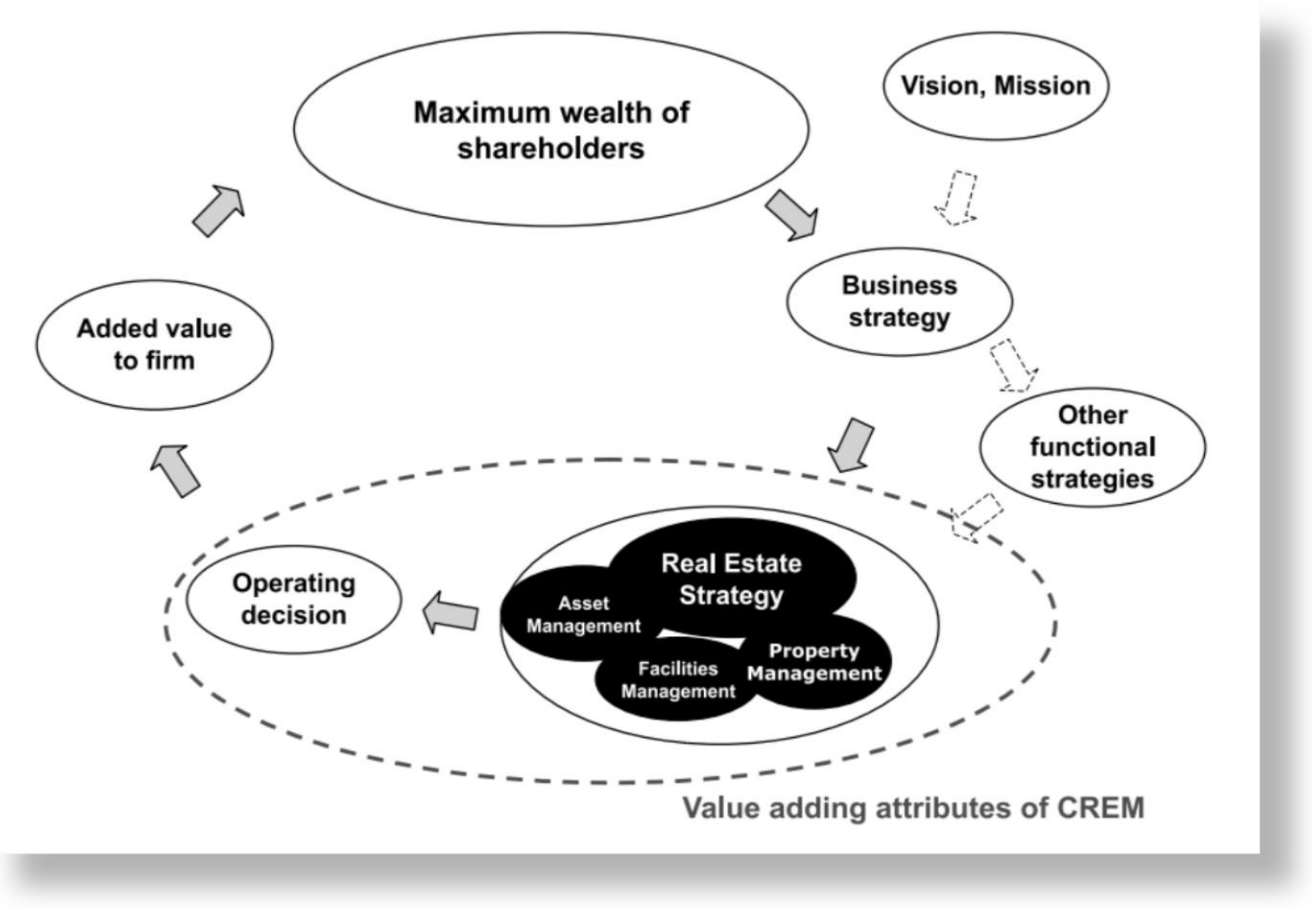

Figure 55: Value adding attributes to corporate real estate management (Lindholm & Levainen, 2006)

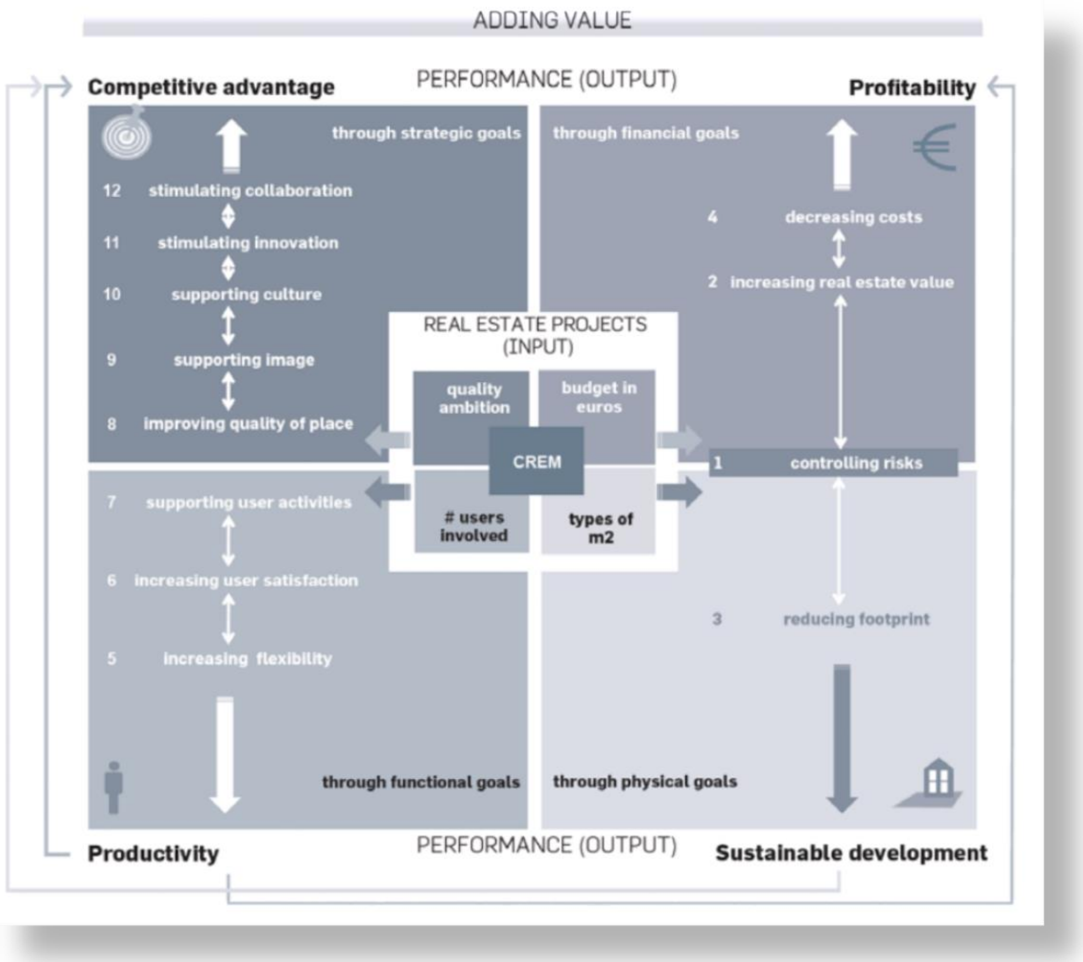

Figure 56: Conceptual model of added value real estate (Jensen et al., 2013)

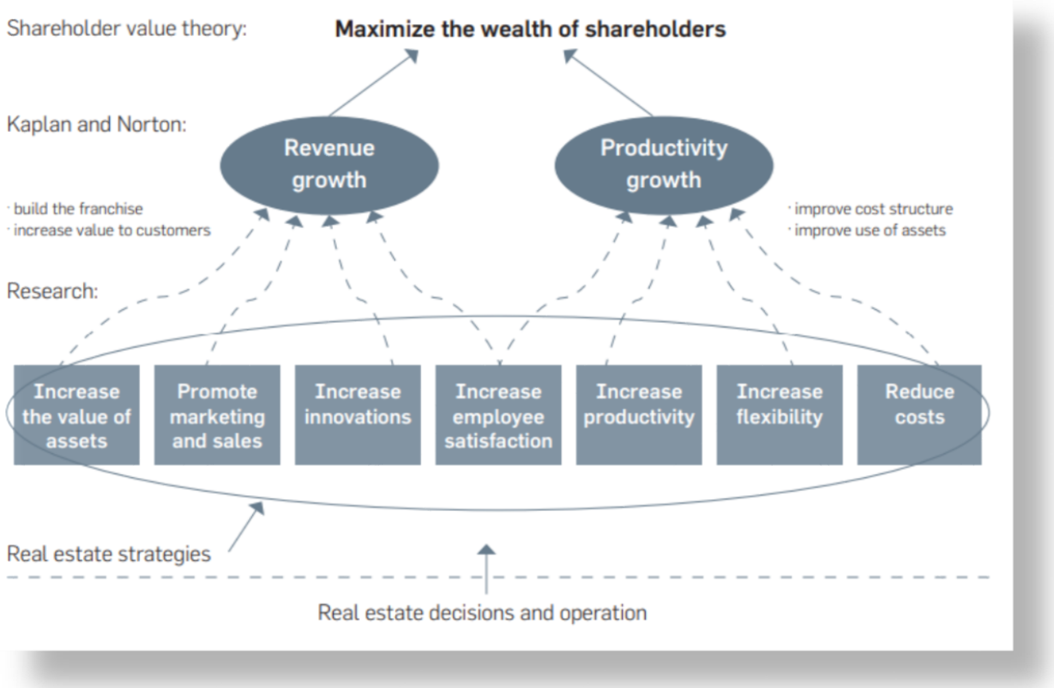

Figure 57: Added values of real estate decisions for the support of corporate strategies and core objectives (Jensen et al., 2012)

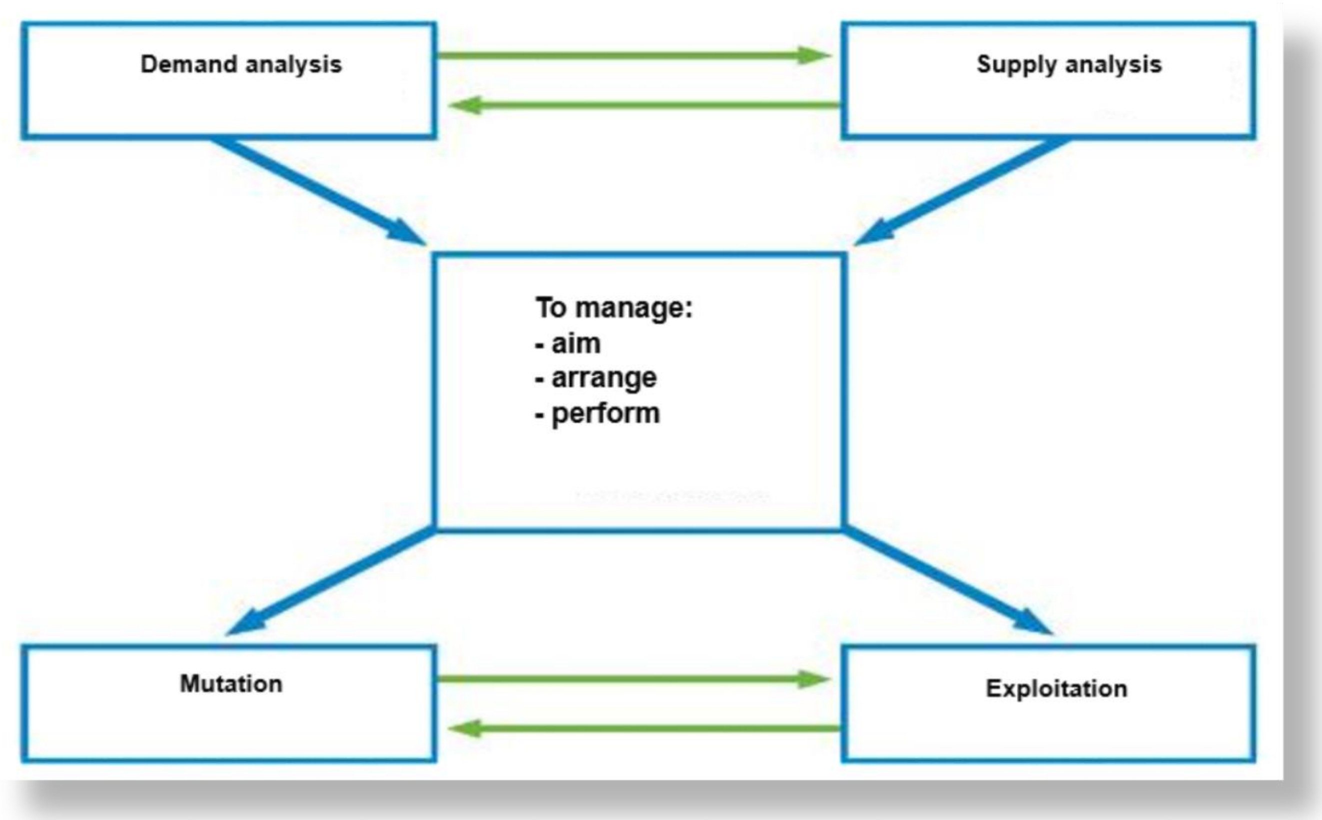

Figure 58: Three core components real estate management (Hoendervanger et al., 2012, p.12)

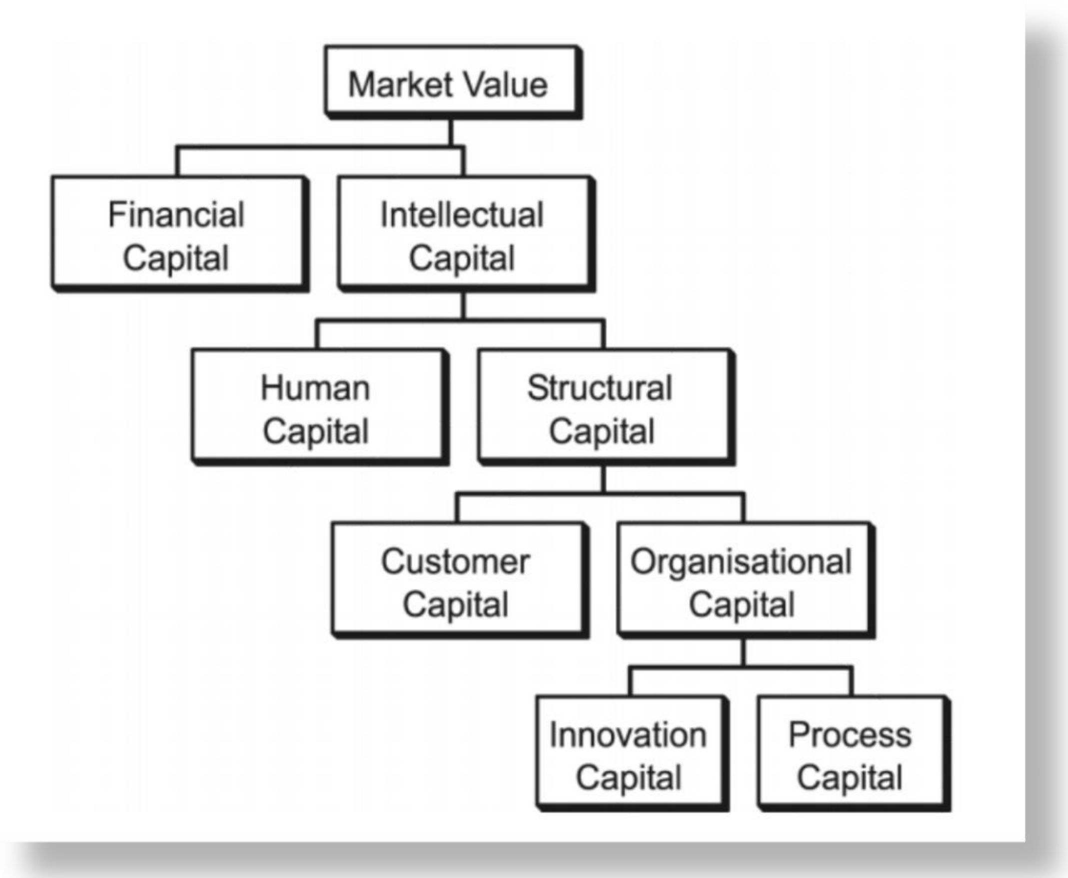

Figure 59: IC Components (Marr et al., 2004)

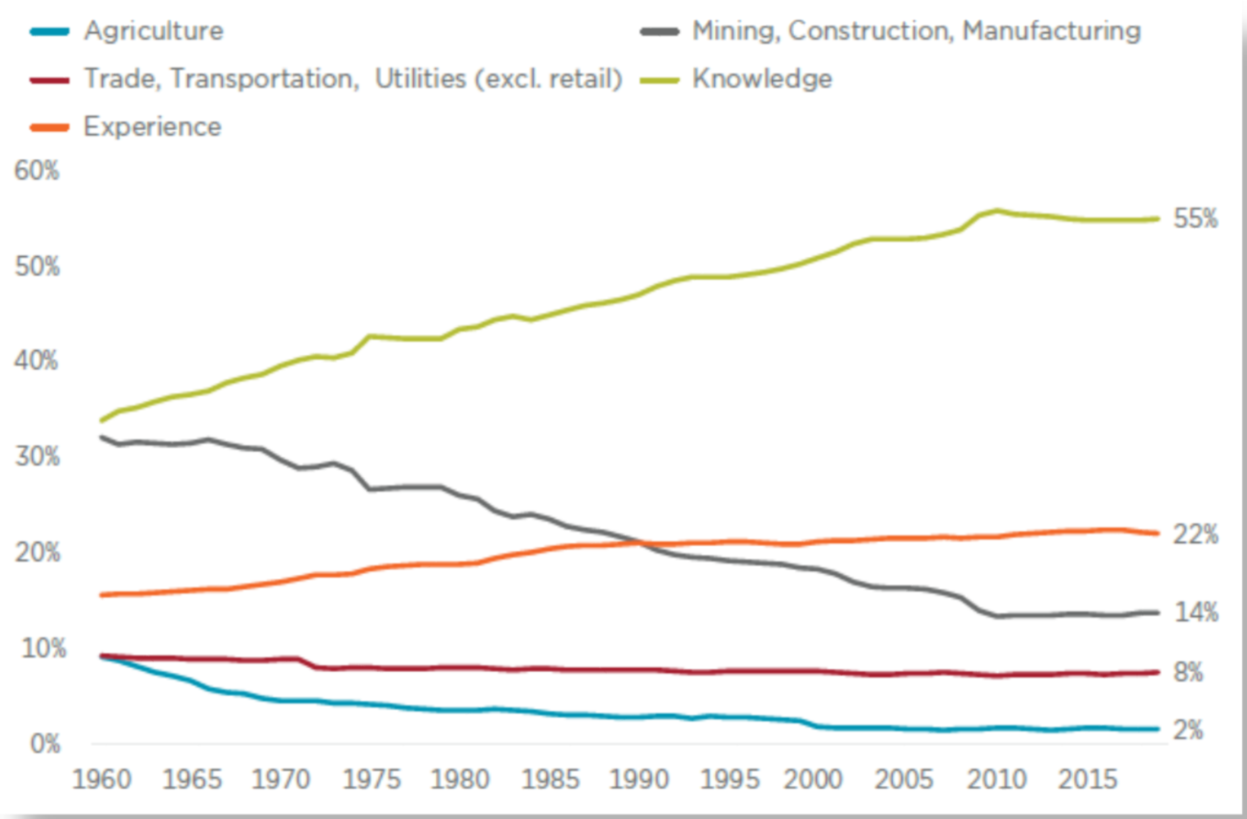

Figure 60: Knowledge and experience economies' growth: U.S. employment by sector 1960-2019 (Katsikakis et al., 2020)

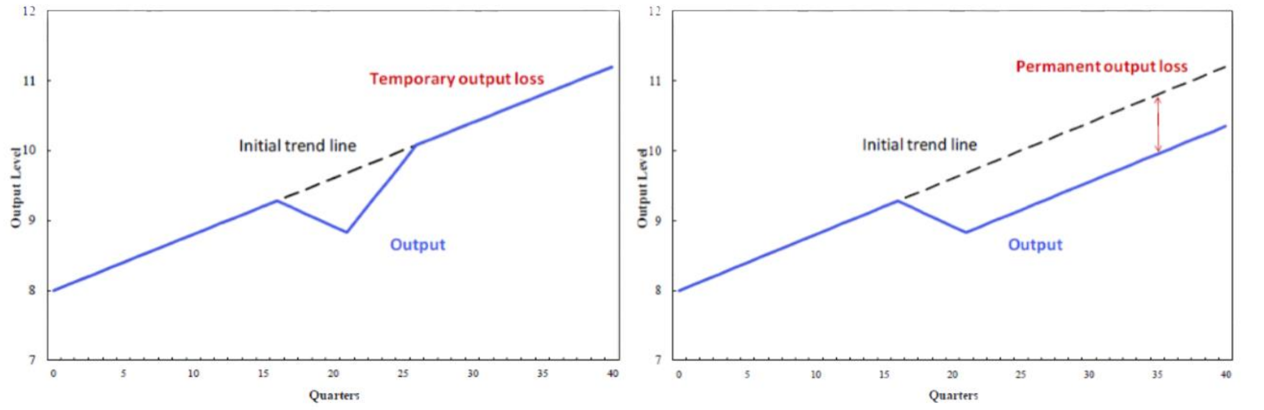

Figure 61: Concept of business cycle (Cerra & Saxena, 2017, p.6)

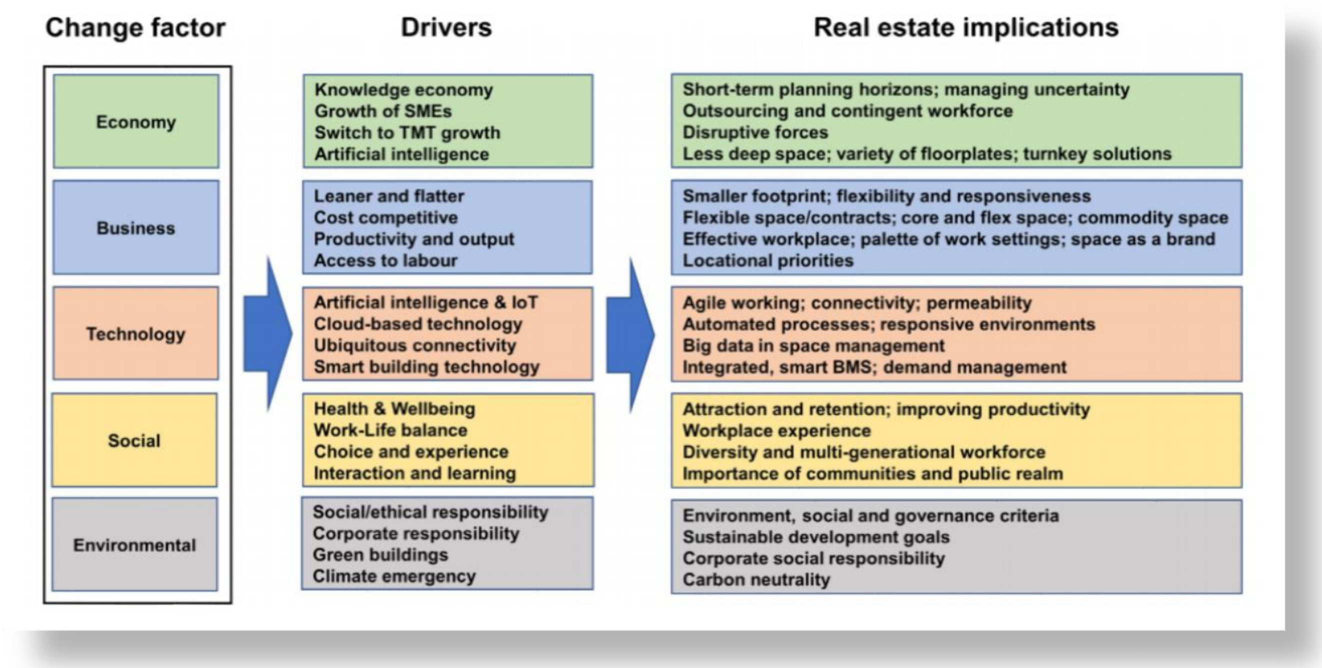

Figure 62: Drivers of change and real estate implications (Harris, 2020)

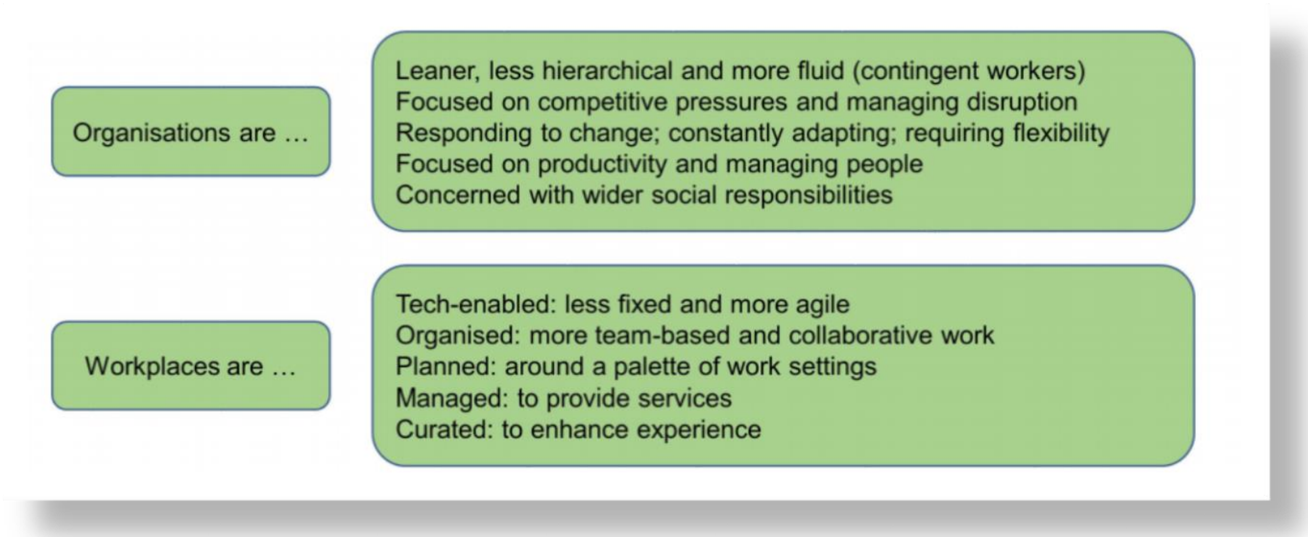

Figure 63: Changing organizations and changing workplaces (Harris, 2020)

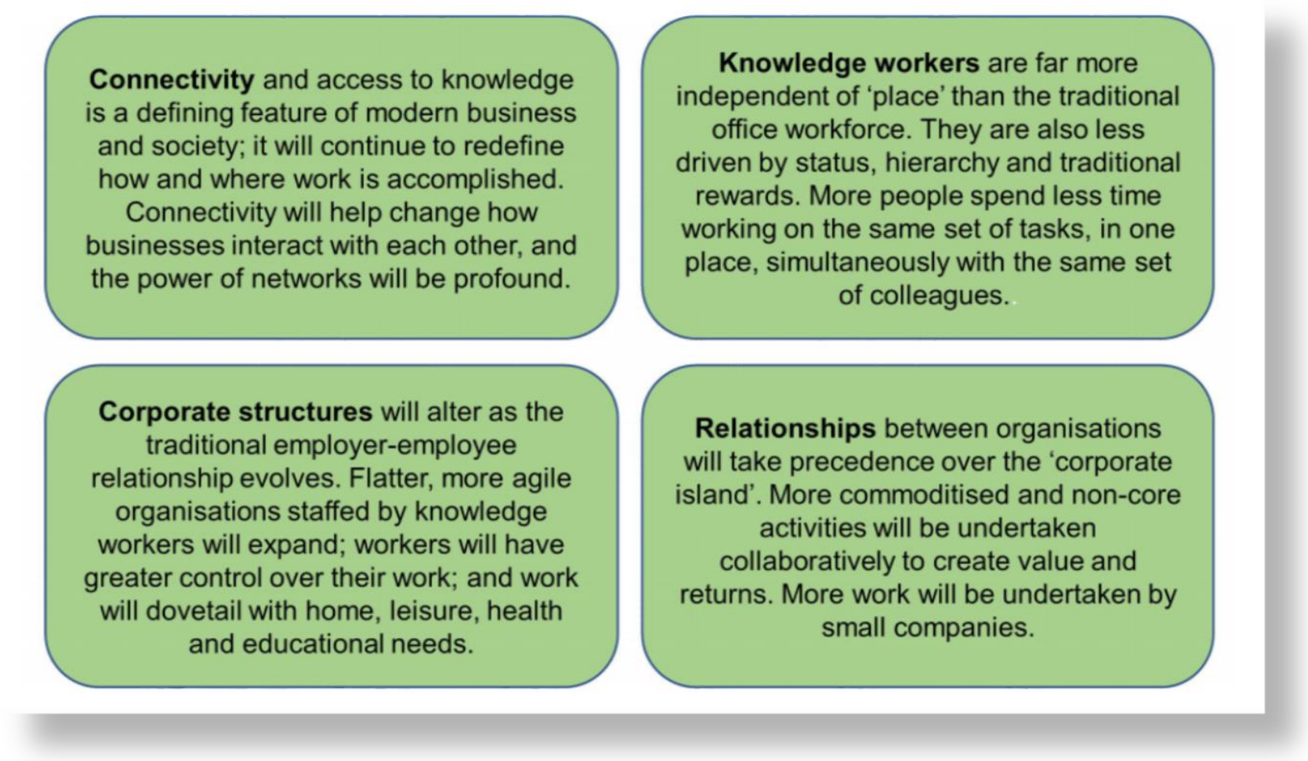

Figure 64: The evolvement of the corporate landscape (Harris, 2020)