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THE BEHAVIOUR OF REAL ESTATE ACTORS AND CYCLICALITY IN THE REAL ESTATE MARKET

by

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Abstract

The proposed research aims to gain a better understanding of the information inefficiencies in the real estate investment milieu through the exploration of the behaviour of real estate actors. The supposition is that a better understanding of the real estate actor behaviour in the context of market cyclicality should add to the body of knowledge on the pro-active mitigation of real estate investment losses. The exogenous factors causing market cyclicality such as the sub-prime mortgage crises of 2007/2008 is used analogously to an independent variable with the focus on the behaviour and interrelation of real estate actors or endogenous causes of market cyclicality.

A phenomenological approach in the context of constructivist ontology is followed in a connected mixed method research strategy, i.e. a quantitative to qualitative sequential explanatory design to explore the behaviour of the real estate user, - developer and - investor. The quantitative data analysis takes the form of descriptive statistics of office vacancy rates, - areas and - capitalisation rates of seven nodes in Cape Town. Although inferential statistical methods, such as the nonparametric Kruskal-Wallis Test, linear tend analysis and measures of linearity are used it is still used in the form of descriptive statistics to understand phenomena and extrapolate results to other situations. Qualitative data are collected through semi-structured interviews and analysis is done with Giorgi's descriptive phenomenology approach to synthesise a general psychological structure based on the constituent of the participant's experience.

The study found that regular periods of over- and underbuilding in the real estate market may be influenced by the real estate actor because of the bounded nature of information and bounded capability of the actor. Real estate actors display behaviour actively avoiding the negative impact of market cyclicality through the use of agency. An agency based model is developed through this study showing that the real estate actor use *specialisation* to confine the unknown nature of information and to liberate the bounded ability of the real estate actor through *working the network*, *engaging the network* and *signalling*.

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Nomenclature

ANN	Adaptive Non-linear Networks
ANT	Actor-network Theory
Cap Rate	Capitalisation Rate
CAS	Complex Adaptive Systems
CBD	Central Business District
CoCT	City of Cape Town
DCF	Discounted Cash Flow
GIS	Geographic Information System Software
IPA	Interpretative Phenomenological Analysis
IRR	Internal Rate of Return
GDP	Gross Domestic Product
GNI	Gross National Income
REIT	Real Estate Investment Trust
SAPOA	South African Property Owners Association
SARB	South African Reserve Bank
SoP	Structure of Provisions Model
UCT	University of Cape Town
UK	United Kingdom of Great Britain and Northern Ireland
US	United States of America

Chapter 1: Introductory Chapter

This research studies the behaviour of real estate actors. The meaning of behaviour in this study is similar to a psychical phenomenon, which is perceptible only by each individual and bound to the immediate moment or a context (Uher, 2016). The context of the study is property market cyclicality and the study aim to understand if the behaviour of real estate actors in real estate investment decision-making influence regular periods of over- and under building. The behaviour of banks and their agents contributed significant to the contraction in the world economy between 2007 and 2010, known as the sub-prime mortgage crisis (Brunnermeier, 2009; Allington *et al.*, 2012). This event had a noticeable impact on the Cape Town property market. Figure 1 shows a contraction of growth in the Cape Town property market after the sub-prime mortgage crises with lower growth after the crises than before. This sub-prime mortgage crisis is therefore seen as a valuable moment in time to define the context period for the exploration of the perceptions of real estate actors in investment decision-making, which is taken from beginning of 2000 to mid-2017.

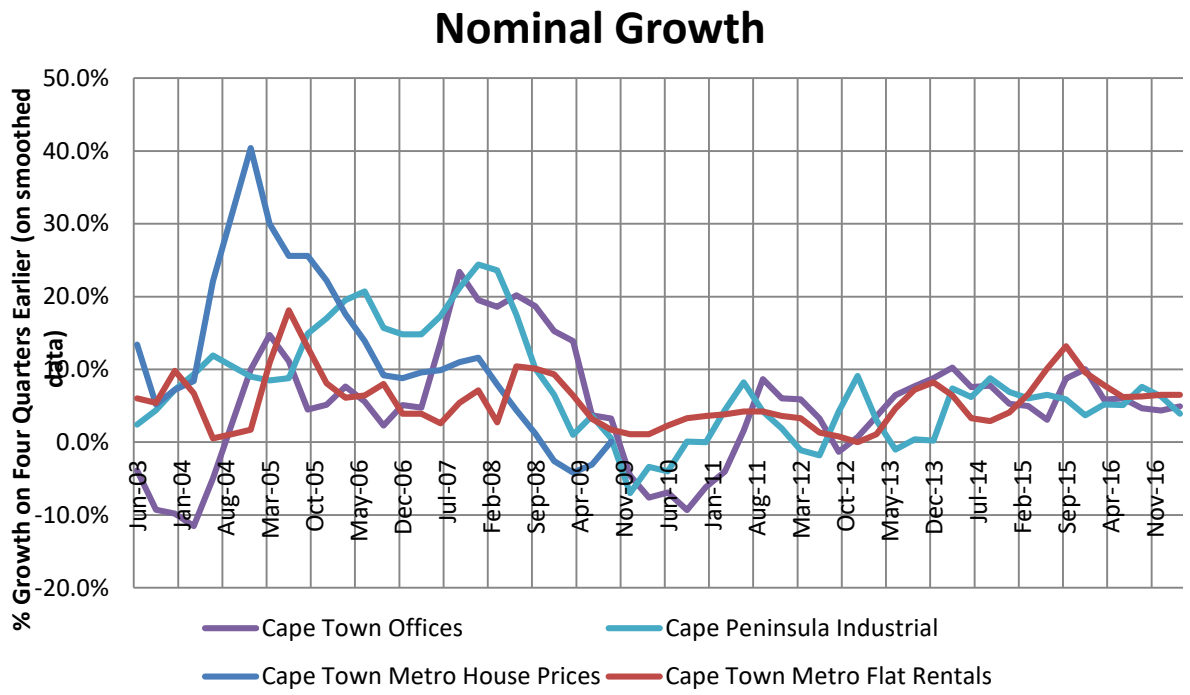


Figure 1: State of the Property Market in Cape Town

Source: (Rode, 2017)

1.1 *Background to the Study*

In the review of literature on property cycles after the sub-prime mortgage crises Grover and Grover (2013) refers to the destabilising impact of cycles on the economy and the need for developers and investors to respond appropriately to peaks and troughs. They stress the importance of the debate in this matter to enable efficient decision-making by real estate actors and policy makers.

This is because cyclicality in the property market is a cause of investment losses and may result in loss of wealth by society as a whole (Pyhrr *et al.*, 1999; Brunnermeier, 2009; Allington *et al.*, 2012; Grover and Grover, 2013). Cyclicality in the market is attributed to exogenous shocks or endogenous causes. There are numerous studies exploring the relationship between exogenous shocks and real estate performance, such as DiPasquale and Wheaton (1992); Dehesh and Pugh (2000); Schatz and Sebastian (2009); Clayton and Peng (2011); Davis and Zhu (2011); Bouchouicha and Ftiti (2012); Hahn *et al.* (2016). The events leading up to the sub-prime mortgage crises resulted in more attention to endogenous causes of cyclicality in the market (Grover and Grover, 2013; Brzezicka and Wisniewski, 2014).

Initially the causes of fluctuations in the economy was seen as exogenous, such as a change in population, war or the introduction of new technology (Schumann, 1938; Burns and Mitchell, 1946). Recently, especially after the sub-prime mortgage crisis, endogenous factors are examined as causes of cyclicality. The reasons for cyclicality in the property market is therefore seen as ranging from behaviour of real estate actors as a result of their use – and interpretation of information as posited by Weber (2016) to 'hard' real estate parameters such as the output growth rate; the depreciation rate; construction lag; the combined transmission coefficient linking vacancy to development starts; and the demand elasticity on the occupancy rate as modelled by Barras (2005).

This study is concerned with the description of the perceptions of real estate actors in real estate investment (endogenous causes), a phenomenological approach (Welman *et al.*, 2009: 191). Brzezicka and Wisniewski (2014) contribute to the

debate by confirming that risk in real estate investment emanates not only from the uncertainty of business trends and – cycles (exogenous shocks) but also from the behavioural determinants (endogenous causes) of real estate actors. This study's thesis is that the endogenous causes are a result of the subjectivity of real estate actors in the use of investment information in the development system.

The work of Weber (2016) comes the closest to the exploration of the idiosyncratic judgements, beliefs and preferences of real estate actors in the real estate development system. Weber (2016) focus on the network of real estate actors, namely brokers, appraisers, investors and planners and argued that there is material incentives for the real estate actors to actively perform real estate cycles. The ways in which cyclical thinking is performed in the real estate market is explained as:

> First, property markets are set up to cycle because of their reliance on professional's use of 'market devices', such as the concept of obsolescence, that contain within them assumptions about the appropriate timing of investment, disinvestment, and reinvestment. A second means of performing property cycles involves acting collectively in concert. The sociology of crowds contributes to the smoothness observed in cycles as actors enrolled in the production of property assets have incentives to imitate each other's behaviour. Lastly, cycles are performed because the cycle analogy itself articulates an ordering of time that makes the future appear less threatening. Cycle knowledge operates as a signal for present-day speculations (Weber, 2016: 588).

Weber (2016) sees the network of real estate actors as one entity and did not consider the interrelation between the actors nor their corporate or institutional situation that may impact or determine their behaviour. This research strives to gain insight into the interrelation between real estate actors.

DiPasquale and Wheaton (1992) and (Ball *et al.*, 1998) conceptualise the actors in real estate investment as users and investors. Investors, operating in the asset market is differentiated into a yield that investors demand to hold real estate or price of real estate and construction of real estate or cost of construction. A threefold classification of the real estate actor is therefore logical, namely the user or real estate space market, real estate investor and real estate developer.

According to Guy and Henneberry (2002: 5) the development system " … is a complex process which entails the orchestration of finance, material, labour and expertise by many actors within a wider, social, economic and political environment". Loizou and French (2012) emphasise the human sub-system as the most important in the real estate development system, reinforcing the focus of this study into the exploration of the judgements, beliefs and preferences of real estate actors in investment decision-making.

1.2 *Problem Statement*

The problem is that there is a poor understanding of how, and the degree to which, the behaviour of the actors involved exacerbate real estate cycles (Grover and Grover, 2013; Weber, 2016). Wheaton (1999) demonstrates that real estate agents that forecast a future real estate market leads to stability or reduction of the destabilising impact that oscillations can have on the economy, while myopic behaviour by agents promotes oscillations or cyclicality in the real estate market.

A better understanding of how, and the degree to which, the behaviour of the user or real estate space market, real estate investor and real estate developer exacerbate real estate cycles will assist developers and investors to develop appropriate responses to peaks and troughs. The purpose of which is to protect investments and to anticipate the market better. The knowledge gained may also allow policy makers to improve adjustment mechanisms in order to reduce oscillations in the market (Grover and Grover, 2013)

1.3 Research Questions

Does differences in the interpretation of investment variables of real estate actors in real estate investment decision-making influence regular periods of over- and under-building?

1.4 Research Aim

The research aims to analyses the behaviour of real estate actors in their investment decision-making, and thereby adds to the body of knowledge on endogenous causes of real estate cycles as a result from the behavior of the real estate actors.

1.5 Research Proposition

Endogenous causes of real estate market cyclicality are a result of the subjectivity of real estate actors in the use of investment information in the development system.

1.6 Research Objectives

The research objectives for this study are:

a) Verify the variables used by real estate actors to determine the value of an envisaged real estate investment.
b) Explore the use of models of judgment / procedural methods employed by real estate actors to ascertain the feasibility of a real estate investment.
c) Explore the institutional environment imposed on real estate actors in real estate investment process and decision-making.
d) Describe the interrelationship between different real estate actors to infer if there is an influence on cyclicality in the real estate market.

1.7 Research Methodology

The research approach is connected mixed methods with a quantitative (descriptive statistics) to qualitative (field survey) explanatory research design.

1.8 Limitations

a) The real estate actors considered in this research are, real estate user or – market, real estate developers and real estate investors.
b) The type of real estate market under consideration is office properties (Chapter 2, Literature Study and Chapter 3, Methodology explains the delimitation of the property market to the office sector).
c) The real estate market is limited to Cape Town.
d) The time period of the study is from 2000 up to mid-2017, which represent a significant expansion and contraction of the Cape Town income producing property market.

1.9 Structure of the Research Report

The research report will be structured as six chapters.

Chapter 1 contains a brief outline of the research topic, followed by statements of the research problem; the research questions; and the research proposition. The aim, objectives and limitations of the research are described.

Chapter 2 covers a review of the literature pertinent to the behavior of real estate actors within the real estate investment milieu contextualised in a cyclical market. This chapter discusses the current literature on the research topic, provides a theoretical foundation for the research, substantiates the research problem and justifies the research's contribution to the existing body of knowledge and frames the research method and methodology.

Chapter 3 consolidates the principal issues raised in the previous chapter, and proposes a quantitative to qualitative sequential explanatory, connected mixed method research design to address the research question: Does the behavioral determinants of real estate actors in real estate investment decision-making influence regular periods of over- and under-building?

An analysis and interpretation of the data gathered from published property reports, the City of Cape Town and the semi-structured interviews is covered in **Chapter 4**, in

the form of a narrative exploring the trends discovered in the quantitative data analysis and thereafter the themes discovered in the qualitative data analysis. **Chapter 5** describes a coherent whole of the two data analysis in the discussion of the findings.

The report is concluded in **Chapter 6**, with the conclusions drawn and suggestions for further research. This chapter is followed by a full list of **References** for the research report and **Appendices** containing the information sheet & consent form and questionnaire used in the semi-structured interviews and approval of the ethics in this research project.

Chapter 2: Literature Review

2.1 *Introduction*

The heart of this research is real estate, which according to D'Arcy *et al.* (1999); French (2001); Brueggeman and Fisher (2011) has a physical, legal and financial aspect or character. An understanding of the physical nature, rights and financial aspects of the property is important in making a real estate investment (Brueggeman and Fisher, 2011). There are several terms contained within the real estate concept. These are:

> … the term **real estate** is used to refer to things that are not movable such as *land* and *improvements* permanently attached to the land, and **ownership rights** associated with the real estate are referred to as real property. … We generally refer to **property rights** as the right of a person to the possession, use, enjoyment, and disposal of his or her property. … The value of a particular parcel of real estate can be viewed as the total price individuals are willing to pay for the flow of benefits associated with all of these rights (Brueggeman and Fisher, 2011: 2).

Of particular interest to this research is how real estate development actors evaluate and consider the benefits associated with real estate. The theoretical approaches to the study of real estate, conceptualization of the working and performance of the real estate market and categorization and contextualization of real estate actors and their decision-making behavior is explored in the literature to infer a framework within which to study the idiosyncratic judgments, believes and preferences of real estate development actors. This progression via the exploration of the literature is shown in a diagrammatic roadmap as Figure 2.

Real estate is complex, not only because of the terms above. Real estate and real property is essential to life and society as it is considered as both a tangible physical commodity, source of wealth and a factor of production (The Appraisal Institute,

2013); "The stock of physical property will influence urban economic activity through its direct role as input into production and consumption processes" (D'Arcy *et al.*, 1999: 918). Disciplines of law, economics, finance, sociology and geography have therefore an interest in the study of real estate and real property. A common understanding of the attributes of real estate includes: each portion or lot of land is unique in its location and composition; it is physically immobile; it is durable; the supply of land is finite; and land is often useful to people (The Appraisal Institute, 2013).

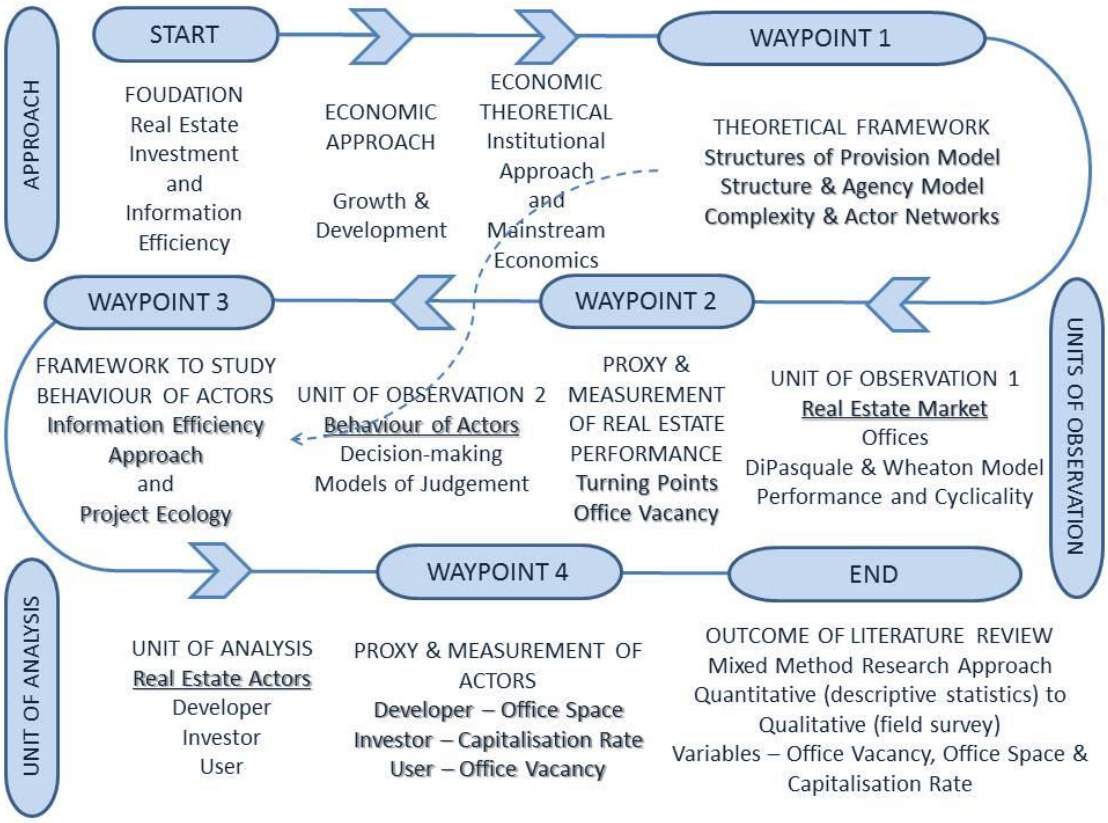


Figure 2: Roadmap of the Literature Review

The common understanding of the attributes of land is convoluted with the dynamic nature of real estate and real property, namely that the use of the land or nature of improvement can change. The change in land use or change in nature of improvement on land is a lengthy process meaning a future market must be anticipated; the durability of real estate means a long life span and high cost to change; (D'Arcy *et al.*, 1999); real estate is traded in a private market leading to high

information costs, higher than is presume under an *efficient market hypothesis*; as a result of the attributes of land or *lumpy* nature, investment is normally built one property at a time through the use of agents and intermediaries which is expensive and time consuming resulting in low number of transactions over time, significantly less than for instance on the stock exchange; and the low number of transactions and deal-by-deal approach means it is difficult to compare real estate investment to alternative investment strategies (Viezer, 2010).

Another layer of complexity is added to the convoluted common understanding of the attributes of land with the social and political interest and concern with the production of property development. This interest and concern stem from the belief that the nexus of complex relations between planning interventions, land and property development processes and distributive outcomes holds the potential for improved well-being for society at large (Healey, 2003), also known as *physicalism* (Batty and Marshall, 2009). Thus not only the decision-making behaviour of real estate developers is of interest but also the complex social and institutional networks and *rules of the game*.

There is two general approaches to study the real estate market, namely allocative efficiency or operational efficiency and property investment or informational efficiency (Keogh *et al.*, 1999). The belief that the behaviour of actors is more pronounced within a dynamic situation support the selection of the study period around the sub-prime mortgage crisis. This research thus focussed on the processes and behaviours during the creation of new property with specific interest on the use and value attributes of information employed by real estate development actors in their real estate investment ventures, therefore more on information efficiency than allocative and operational efficiency.

2.2 Significance of this Research

The proposed research aims to get a better understanding of how, and the degree to which, the use and value attributes of information by real estate actors exacerbate real estate cycles. Real estate is seen as the underlying reason for the sub-prime

mortgage crisis which extended to society as a whole in the form of loss of wealth (Grover and Grover, 2013). It is argued that the behaviour of banks and their agents caused a property boom and bust (Brunnermeier, 2009; Allington *et al.*, 2012) leaving investors with asset prices with no underlying value. The intriguing inquiry by extension is then what about the impact of real estate actors' behaviour on real estate market cyclicality.

A better understanding of how, and the degree to which, the behaviour of real estate actors exacerbate real estate cycles will assist developers and investors to develop appropriate responses to peaks and troughs. The purpose of which is to protect investments and to anticipate the market better. The knowledge gained may also allow policy makers to improve adjustment mechanisms in order to reduce oscillations in the market (Grover and Grover, 2013)

Real estate as an asset class is important for institutional investors as "… real estate offers attractive risk-return characteristics, provide important diversification benefits within mixed-asset portfolios, and act as a hedge against inflation" (Clayton, 1996: 347). The significance of a better understanding of the relationship between real estate behaviour and real estate market cyclicality is therefore extended to having an impact on the wealth of society at large.

The literature review starts by pinpointing the broader economic philosophy within which the real estate development process is embedded.

2.3 *Economic Theoretical Approach to this Research*

Real estate investment and/or development fall within the theories of economic growth and development. The theorists contributing to this school of economic thought, inter alia Harrod (1900 – 1978) and Domar (1914-1997), who established the Keynesian growth model, Solow (1924-) is attributed with a neoclassical growth model, Schumpeter (1883-1950) developed theories of economic development and institutional change and Nurkse (1907-1959) and Lewis (1915-1991) provided seminal ideas on economic development (Brue and Grant, 2007). The theories of Schumpeter, which "…explain both business cycles and the theory of economic

development" (Brue and Grant, 2007: 479) is seen as influential for this research. Schumpeter's theory can be summarized as:

> The key process in economic change is the introduction of innovations, and the central innovator is the entrepreneur. Innovation is defined as changes in the methods of supplying commodities, such as introducing new goods … opening new markets … or carrying out a new organization of industry …The entrepreneur is the person who carries out new combinations and who introduces innovation (Brue and Grant, 2007: 479-480).

The unit of analysis is the real estate actor, specifically real estate user, real estate investor and real estate developer, who are seen as similar to the entrepreneur described by Schumpeter. There is a direct correlation between economic development and level of entrepreneurial activity (Nieman and Nieuwenhuizen, 2009), which supports the notion of this research residing within the theories of economic growth and development. Barras (2009: 83) statement that "(b)uilding investment helps to expand productivity capacity, increase the capital intensity of production and raise labour productivity" is another way of explaining economic growth and development, reinforcing the positioning of this research.

It is however impossible to analyse the real estate entrepreneur without observing the performance of real estate in parallel. There are thus two units of observation in this research, namely the behavior of real estate actors and the performance of the real estate market. New building development occurs to address constant challenges of building depreciation, building obsolescence as a result of new and continuously changing building technology and infrastructure together with changing behavior of building space users. A prominent characteristic of the performance of real estate is a cyclical nature, which "… have been proven to be volatile, complex and persistent" (Pyhrr *et al.*, 1999: 35). The influential nature of Schumpeter not only on the real estate developer but also on the real estate market is acknowledge by Barras (2009) when he based his exploration and discussion of the real estate

cycle on Schumpeter's thoughts and ideas. The belief of cyclical fluctuations as "… an intrinsic characteristic of economic growth" (Barras, 2009: 11) is fundamental to this research.

The performance of the real estate market is embedded within the performance of the general economy. Economic growth and development is defined as the continual rise in the performance of the economy measured by the real gross domestic product (GDP) or real gross national income (GNI) (Salvatore and Dowling, 1977; Lipsey and Chrystal, 2007; Mohr, 2012). One of the reasons for this definition is the easy availability of statistics. This definition of economic growth is however seen as problematic as other concepts associated with development are not measured such as the level of industrialization, state of the technology, abundance of resources, character of the people and political traditions (Salvatore and Dowling, 1977). The same is true of measuring the performance of the real estate market. The influence of the character of people and political or institutional traditions on real estate performance is important for the outcome of this research.

The next section will explore theoretical approaches to the real estate research. The emergence of an institutional emphasis, i.e. behavior of actors and institutions within econometric analysis is shown and the inherent challenges in researching the real estate market with an institutional emphasis, as explained by the literature are highlighted.

2.4 The Theoretical Approaches to Real Estate Development

Macroeconomic statistics are used as proxies for economic growth. Economic growth exhibits "…(p)eriods of rapid growth or expansion (which) are invariably followed by periods of lower growth or decline" (Mohr, 2012: 69), which describe the cyclical fluctuations in the growth of the general economy. There are numerous studies exploring the relationship between macroeconomic situation and real estate performance, such as DiPasquale and Wheaton (1992); Dehesh and Pugh (2000); Schatz and Sebastian (2009); Clayton and Peng (2011); Davis and Zhu (2011); Bouchouicha and Ftiti (2012); Hahn *et al.* (2016) all of them using analytical models

employing econometric data to explore the relationship between general economic performance and real estate performance. The purpose of these analyses is to explain real estate development and/or performance characteristics or derive generalizations about their patterning. These analytical models are a simplification of the very complex economic – and real estate market system. This analytical process is described as:

> ...it takes complexity and simplifies it by finding a formal structural analytical model – an equation, or set of equations – that fits the data. The model is then tested by comparing the predictions of the model with the empirical data, using formal statistical techniques. These models are generally linear and static, since they are only ones with unique, deterministic solutions. To test the models classical statistical tests are generally used (Colander, 2009: 3)

The process described above is considered as the pure econometric or mainstream economic approach to research.

2.4.1 Mainstream Economics and Institutionalism

Healey and Barrett (1990), Ball (1998) and Guy and Henneberry (2000) is considered as the main protagonists in reviewing the pure econometric or mainstream economic approach to research on real estate development processes. They support an institutionalist approach with the focus on the real estate actor and how they respond to the legal environment and in particular the economic environment. Behaviour of actors is largely excluded in mainstream economic analysis of the real estate development process because of the absence of clear, universal and theoretically grounded methods and methodologies (Henneberry and Parris, 2013). Behaviour of actors is not ignored in the mainstream economic academic literature. As far back as the 1970's Graaskamp (1972) consider behavioural matters as one of the elements to determine feasibility in the real estate development process. The model of Graaskamp (1972) to describe feasibility by

using nature and man as the *context*, with the physical, financial, legal, and behavioural matters as the *form.* (Graaskamp, 1972).

The operation of this model is illustrated as:

> The configuration and performance of a real estate project, or any other enterprise, represents a negotiated consensus between … the power of the environment to dictate the form and the behaviour of the organisation on the one hand, and the power of the organisation to decide for itself what its conformation and behaviour will be, on the other (Graaskamp, 1972: 514)

The essence of the argument by Graaskamp (1972), which intersect with the reviewing of the mainstream economic approach is the idea of *satisfying.* Satisfying adds the facets of judgement and irrational needs of man in considering the feasibility of a real estate investment (Graaskamp, 1972).

Harris and Cundell (1995: 77) support the view of incorporating behaviour in the analysis of the real estate and confirm the absence of clear, universal and theoretically grounded methods and methodologies when they argue more than two decades after Graaskamp (1972) that property research "... must move from retrospective mind-set to a prospective, anticipatory framework ...". They put forward the argument that property research could become irrelevant to the market unless it change from a supply led framework, or econometric approach to investigate the supply-demand relationships or institutional approach (Harris and Cundell, 1995).

The motivation for the review of the mainstream economic research approach is further explained as:

> [While mainstream economics] provide useful directions for understanding the development process, they lack the capability to address a fundamental dimension of our understanding of the development process. This is the relation

> between the way actors behave in deploying resources to realise specific investments, with which much of the real estate literature is concerned, and the broader process which drive the strategies and interests of the various actors involved (Healey and Barrett, 1990: 89)

Ball *et al.* (1998) recognised this approach to *relation* and *behaviour* of real estate actors and the *process* which drive the *strategies* and *interests* of the various actors as *institutionalism*.

The detailed understanding of the underlying institutional framework in the study of economic phenomenon found support in pure economic analysis as well with the discussion of the collapse of Long-Term Capital Management by Allington *et al.* (2012: 558), where they argue "[s]ometimes, a case study sheds more light than any number of regressions". A case study is one of the qualitative research methods (Welman *et al.*, 2009) and the point in the context of this research is not case studies but the emphasis on qualitative research methodology as appose to quantitative or pure econometric or mainstream economic methodology.

Ball *et al.* (1998) does not see the economics of property markets and the institutional approach opposing each other. He argues for a continuum of issues rather than an opposition. When Guy and Henneberry (2000) argues for an alternative to mainstream economic analysis or positivist methodologies in favour of an understanding of the wider institutional context of the development process, Ball (2002: 1454) defended the "broadly economic approach towards property markets against views that rely on institutional power as the major determinant of property market outcomes". The motivation used by Guy and Henneberry (2000: 2411) for the alternative research method is worded as:

> ... human agents are creative, experiential beings and their contexts of action are constantly shifting. For this reason, extensive research programmes, commonly adopted in the empiricist/positivist research tradition, often fail to untangle the

dynamic and contextual relational links between social action and economic structures.

In defending the mainstream economic approach Ball (2002: 1454) also "... argue for the importance of institutional analysis within property market research: not as an alternative to existing economic approaches as Guy and Henneberry (2000) would argue but, rather, as a complement to them". Mishkin (2010) backs the argument of Ball (2002) by explaining the key role played by institutions in improving economic efficiency. This is done by reducing transaction – and information costs. Transaction costs are reduced through the use of economies of scale and employment of expertise, while tools are employed to address asymmetric information problems, i.e. when one real estate actor's insufficient knowledge about the other actor makes it impossible to make an accurate decision.

The institutional research approach is more complex than econometric analysis because it attempts to simplify a unit of observation that is creative, experiential and constantly shifting actions. The intricate nature of econometric analysis is not questioned but the institutional approach without doubt presents another level of complexity. The argument of Guy and Henneberry (2000) for an alternative methodology may therefore hold on some level. The shift from econometric research approach to *relation* and *behaviour* of real estate actors and the *process* which drive the *strategies* and *interests* of various actors research approach can be described as: "Instead of trying to find a formal analytical model, with a formal solution for these complex phenomena, complexity theory looks for patterns that develop when non-linear processes are repeated for long periods of time" (Colander, 2009: 4). Colander (2009) however, accepts structural simplicity whenever it can be achieved and that the complexity approach also desire simplification, but it differ from econometric analysis in the proposed simplification process.

The research approach of using both mainstream economics and institutionalism, as posited by Ball *et al.* (1998) is favoured and supported by Amaratunga *et al.* (2002) with his motivation for mixed methods in research. The next section explores the position of institutionalism within the broader literature.

2.4.2 *Institutional Approaches within the Broader Literature*

Henneberry and Parris (2013) position the institutional approaches within two main streams, namely how institutions are viewed and how markets are viewed as institutions, see Figure 3 for diagrammatic representation of this classification.

The rational perspective on institutionalism, named Neoinstitutional Economics by Eggertsson (1990) is constraint with contributions that are true to the econometric approach, with particular mention of the rational-choice model. This view of studying institutions sits uncomfortable with this research given the discussion in the previous section. The view of institutions as social and normative is more congruent to this research. Lowndes (2002) argues that *normative* and *rational choice* variants share characteristics, forming the social normative institutionalist approach. This approach explores the "... impact of institutions upon ... behaviour, and ... the interaction between individual actors and institutions" (Lowndes, 2002: 77).

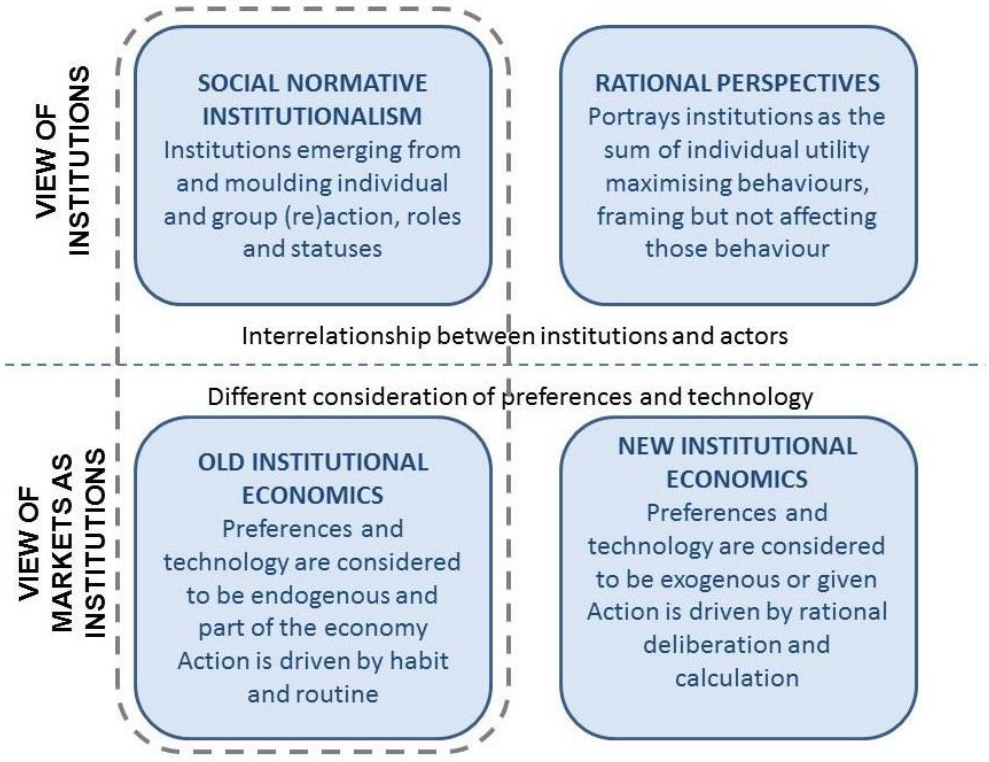


Figure 3: Institutional Approaches within the Broader Literature
Sources: (Henneberry and Parris, 2013: 229)

Positioning this research within the social normative view of institutions and the old institutional economics view of markets, see Figure 3 is confirmed by Henneberry and Parris (2013) as this approach "... brings together the social and economic aspects of property research through the interpretation of the institutional forms, relationships and dynamics of the property development industry" (Henneberry and Parris, 2013: 229). Henneberry and Parris (2013) sees the structure and agency model of Healey and Barrett (1990) and the structures of building provision model of Ball (1998), cultural institutionalist perspective of Guy and Henneberry (2000) and political economy of institutionalism of Adams *et al.* (2012) as congruent with the social normative view of institutions and old institutional economics view of markets.

The models of the real estate development process is explored in the next section for finer textured exploration of real estate development processes and positioning of this research within the real estate development theory.

2.4.3 Models of the Real Estate Development Process

Gore and Nicholson (1991) and Healey (1991) reviewed models of the development process. Although both reviews identifies four models of the development process there is an overlap of only three models, namely the description of the development process as a sequence, approaching the development process from the real estate actor's perspective and understanding the development process through the way capital flows into and out of different sectors of the economy. Gore and Nicholson (1991) discuss in addition the 'structures of building provision' (SoP) approach of Ball (1998) and Healey (1991) discuss the equilibrium models of which the conceptual framework of the real estate market of DiPasquale and Wheaton (1992) is a well-known application.

The conclusion of Healey (1991: 236) on the capacity of these models of the real estate development process to analyse the detail of agency relationships in the negotiation of development projects is: "In only some of these conditions might market conditions prevail. Nor do these models adequately address the way the interest and strategies of actors are actively constituted as circumstances change

and how this relates to broader structural shifts". She supports an institutional perspective and suggests a new descriptive model of the development process, which studies the interplay of the development process between the structuring dynamics of legal, environment and economics of real estate with the behaviour of real estate actors with their interest and strategies in mind (Healey and Barrett, 1990), which she name 'agency and structure'. This does not mean that some of the models of the real estate development process can be dismissed. Each model offer a different level of understanding of the real estate development process (Gore and Nicholson, 1991). In exploring the behaviour of real estate actors the 'agency and structure model of Healey (1991) and structures of building provision' (SoP) approach of Ball (1998) as reviewed by Gore and Nicholson (1991) provides the most appropriate level of understanding.

The 'agency and structure' model has several problems according to Ball (1998), namely that while it is meant to be universally applicable it is more likely to be successful in locally based studies as there is no precise definition of what constitutes a 'structure', an 'agency' or an 'institution'; the assumption that the agent's strategy coincide with the institution's strategy may not be correct in all cases; and the outcomes of strategies may be as a result other than the strategy such as external economic - or other forces. He sees the 'agency and structure' model as addressing a "… practical research question rather than theoretical niceties..." but acknowledge the normative content of the agency and structure model with the development of objectives prior to the study against which to compare agency behaviour and outcomes (Ball, 1998: 1512).

Ball (1998) categorise the institutional perspective into four theories, namely mainstream economics, power, structure-agency and structures of provision. The Structure-agency approach to institutionalism corresponds to the agency and structure model as conceptualised by Healey (1991) and Healey and Barrett (1990). The 'structures of building provision' (SoP) is proposed by Ball (1998: 1513) as a methodological theory to explore the *relation* and *behaviour* of real estate actors and the *process* which drive the *strategies* and *interests* of various actors. The SoP is

able to overcome the dichotomy of agency and structure in the 'agency and structure' model as organisations and the market constitute the structure, and is able to account for behavioural constraints and rules, associated histories, continual change due to the market, technologies, tastes and policies which is not possible with econometric analysis (Ball, 1998). The difficulty with the SoP is to define the contemporary network of relationships associated with the provisions of particular type of buildings at specific points in time because it is continually changing over time. The second problem also identified by Ball (1998) is to determine when and how to use SoPs.

The SoP, with the 'agency and structure' model holds the most potential as a methodological theory for this research with the purpose to gain an insight into the interrelation between real estate actors with the aspiration to learn if their behaviour contributes to the expansion and contraction of the property market.

Some of the approaches to institutionalism under the 'mainstream economics' and 'power' categories as explained by Ball (1998) may be of use as the "[o]ther theories … needed to understand particular research questions formulated within [the institutional] framework" (Ball, 1998: 1514). This research does not observe economies of scale nor transaction costs or conflict institutionalism. Economies of scale and transaction cost may nonetheless come to the fore to explain the behaviour of real estate actors. Mishkin (2010) explains how high transaction cost influence financial structure and how intermediaries or financial institutions solve this problem through the use of economies of scale. Similarly conflict may explain characteristics of real estate development actor behaviour. These approaches will, however not be pursued as a theory to explore the behaviour or real estate development actors. Therefore only 'game theory' and 'information theory' under the mainstream economic approaches to institutions and 'behavioural institutionalism' under the power approach to institutions is seen as intersecting with the description of the behaviour of real estate actors as envisaged in this research.

Game theory has hardly been used in real estate development process literature (Ball, 1998). Game theory is the analysis of conflict and cooperation of real estate

actors within a competitive situation or "… the study of multi-person decision problems" (Ziegler, 1999: 1) founded by John von Neumann. Ziegler (1999) demonstrates how game theory analysis of options is used to analyse strategic interaction within the fields of corporate finance and financial intermediation. Option pricing is concerned for example with the valuation of options with the purpose of determining the value of corporate securities or the firm's asset value, to evaluate the value of managerial flexibility and/or time decisions, the latter known as *real options* (Ziegler, 1999). The strategic interaction among actors in game theory are usually analysed with the help of *game trees*, which is a graphical representations of a sequence of possible choices linked to points in time (Ziegler, 1999). The purpose of the game trees is to trace "… the sequence in which these choices are made, and the payoffs resulting from any combination of choices" (Ziegler, 1999: 2). The action selected by an actor at each stage of the game is governed by a rule, called a *strategy*. The principle of *backward induction* is used to solve the question of which strategy the actor choose. The game is thus solved starting with the last decision made, working backwards to find the respective actor's optimal choices. The research of Grenadier (1996) and Bulan *et al.* (2009) is discussed later to demonstrate how game theory analysis of options is used to analyse the interaction of real estate development actors from a mainstream economic perspective.

Information theory deals with the tension between the need of information for real estate investment against the bounded nature of information as the future is unknown. This brings to the fore the attitudes of actors towards risks, which influence the structure of the institutions to mitigate these risks. Property market risk explains specific property industry structures (Ball, 1998). *Information asymmetry*; when one real estate development actor does not know enough about the other real estate development actor to make accurate decisions (Mishkin, 2010), may motivate opportunistic behaviour which leads to *moral hazard*; the problem created by asymmetric information *after* the transaction occurs, i.e. the risk/hazard that a real estate development actor may engage in activities that are undesirable/immoral from another actor's point of view (Mishkin, 2010). *Adverse selection*; the problem created by asymmetric information *before* the transaction occur and may result in

decisions not to invest in real estate development even though there are good development risk in the real estate market. What Ball (1998) calls 'information theory' is according to Mishkin (2010) 'agency theory'; "The analysis of how asymmetric information problems affect economic behaviour…".

Signalling is the final concept of information theory. It occurs when a real estate actor "… wants to indicate a characteristic in the market place, and so they signal it through some understood form of behaviour" (Ball, 1998: 1505).

Behavioural institutionalism is the theory of understanding how people make economic decisions or "... examine situations in which a decision-maker faces a number of economic options, from among which he needs to select his preferred choice" (Mallard, 2016: 48). Daniel Kahneman and Amos Tversky is seen as the founding researchers of behavioural economics (Barberis, 2013; Mallard, 2016), with their presentation in 1979 of a new model of risk attitudes called *prospect theory*. Prospect theory challenge the main stream economics approach as a descriptive model of decision making (Kahneman and Tversky, 1979). The focus of behavioural economics is on the study of economic decision-making developed out of the "... discontent with the descriptive and predictive power of the standard economic model of rational choice ..." (Mallard, 2016: 2), which is also found in the work of Healey and Barrett (1990); Healey (1991); Ball (1998); Guy and Henneberry (2000).

Barberis (2013: 173-174) note the "... relative few well-known and broadly accepted applications of prospect theory in economics", which he attributes to the difficulty of applying the theory, a fact noted by Gore and Nicholson (1991) and Healey (1991) more than a decade earlier. Mallard (2016) concur with this view and calls it a fundamental criticism levelled at behavioural economics with an array of ad-hoc and context specific applications as a result. This is not only confirmed by Loewenstein (1999) but he claims leads to good internal validity and vulnerable external validity. The roots of the term validity within the research paradigm is found in quantitative research, which according to Golafshani (2003) may not apply to a qualitative research paradigm or behavioural economics. Within a qualitative research design the replicability, i.e. external validity is not of primary concern, but rather precision,

credibility and transferability (Golafshani, 2003). The reliability and validity of research will be explored when discussing the research method in Chapter 3. Mallard (2016) presents an abstract behavioural framework, which according to him overcomes this criticism of weak external validity. This abstract behavioural framework is premised on the literatures of behavioural economics and bounded rationality. This means that not only is information in the real estate development process bounded but also the behaviour of the real estate development actor. Simon (1999: 24) describes the bounded rationality of the real estate development actor as "... the limits upon the ability of human beings to adapt optimally, or even satisfactorily, to complex environments".

The similarities and differences of behavioural economics and bounded rationality are described as:

> Both the literatures of bounded rationality and behavioural economics are concerned with decision-making that is suboptimal from the perspective of the standard model of rational choice. However, the focus of the bounded rationality literature tends not to be on the decision-making *per se* but on the theoretical effects that such decision-making has on the wider economic situation, while the focus of behavioural economics tend to be on actual decision-making processes and on the psychological fundamentals that underpin them (Mallard, 2016: 55-56).

The abstract behavioural framework of Mallard (2016) is based on two elements, namely:

> First, it views decision-making as a two-step process, with the decision-maker allocating his limited cognitive reserve in the first step (the 'higher-order' decision), which then constrains the accuracy of his actual choice in the second step (the 'lower-order' decision). Second, it shifts the focus of analysis from

> that of identifying the precise option selected in the lower-order decision to that of identifying the degree of optimality with which that option is selected (Mallard, 2016: 66).

The framework is premised on decision fatigue with a number of assumptions and propositions.

The literature reviewed so far focussed on the mainstream economic and institutionalism dualism in real estate development models. An observation is that the main protagonists appear dated with their work done almost three decades ago. Drane (2013) observes a respite in the research into models of the real estate development process post early 1990's after significant activity since the 1970's. The research activity into development models is attributed to boom and bust phenomena in the decades of 1970 to 1990 with a shift in policy direction given as reason for the less research done on the topic after the early 1990's (Drane, 2013). In 2000 the debate in the literature is still stuck on the dualism of mainstream economics and institutionalism in real estate development theory, with location theory by Schiller (2001) the only notable other contribution according to Drane (2013). Although fascinating, the work of Schiller (2001) deals with models such as Central Place Theory, Gravity Models and the forces of land uses or activities to cluster and to disperse. The work of Schiller (2001) thus does not add significant to the exploration of the behaviour of the real estate actor.

A recent study contributing to a framework for the exploration of the behaviour of real estate actors is the complex systems / network approach paradigm. This paradigm developed within a context of land redevelopment by Doak and Karadimitriou (2007) provides further refinement or development of the agency and structure by Healey and Barrett (1990) and SoP by Ball (1998) institutional research approaches discussed earlier. Doak and Karadimitriou (2007) present their conceptual framework as:

> Insights from actor network theory can be conjoined with notions of complexity and chaos to build an understanding of

> the ways in which actors actively seek to shape these structures and systems, whilst at the same time being recursively shaped by them in their strategies and actions (Doak and Karadimitriou, 2007: 209)

The approach of Doak and Karadimitriou (2007) is based on a complete understanding of social phenomena as put forward by Capra (2004) by integrating the perspectives of *form*, *matter*, *process* and *meaning*. "Networks (form) and interaction (process) are the cause and the 'glue' that gives rise to and sustain phenomena, 'generating' meaning which is then embodied into matter" (Doak and Karadimitriou, 2007: 210). This approach reminds of the approach by Graaskamp (1972) embodied in the concepts of *context* and *form*, only in a more dynamic and elaborate sense. The network based approach provides a solution to the structure and agency dichotomy, allows for dynamic exploration of markets and can easily incorporate the role of *culture* as proposed by SoP according to Doak and Karadimitriou (2007) and is further able to accommodate different spatial and temporal levels.

Several theoretical traditions are examined to provide a framework for an institutional approach. The ideas drawn into this framework are non-linear dynamic systems; link up of chaos theory or aggregate complexity with critical realism; the latter concept leads to *complex adaptive systems* (CASs); borrowing from network theory leads to *adaptive non-linear networks* (ANNs) representing a refinement where several CASs and their influences are considered; *actor network theory* (ANT) is the final transformation of this paradigm where ANNs are encompassing the time-space and complex behaviour aspect of networks to form ANT.

Other views of the real estate development process includes Coiacetto (2006; 2009) who show that little is known about the real estate industry's structure, i.e. the makeup and implications for matters such as efficiency, built environment and relationship with city planners. The conclusion by Coiacetto (2006) is industry structure is important and must receive attention to ensure real estate development remains competitive, which is to avoid concentration in the industry. This provides

insight into real estate actors and structures but does not contribute to a real estate development theory. Similarly, the research by Adams *et al.* (2012) of the Scottish Executive and their perception of real estate developers provides insight into real estate development actor behaviour or in the words of Drane (2013: 11) "... there is a more contemporary and perhaps richer view of the property development process but without a contemporary model".

In light of the literature reviewed the intersection of the *structure-and*-agency model, *structures of provision* model and *actor network theory* display the potential to serve as a theoretical framework to analyse the behaviour of real estate actors. These models need to be supported by *game theory*, *information theory* and *behavioural economics* to articulate or explain the behaviour of real estate development actors, see Figure 4.

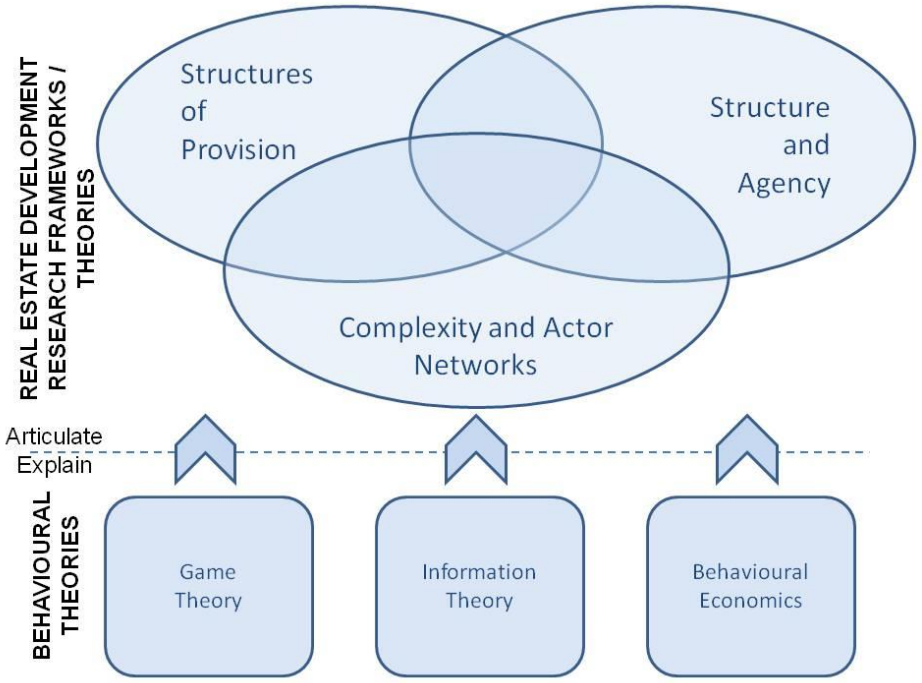


Figure 4: Theoretical Framework for this Research
Sources: (Healey, 1991; Ball, 1998; Ziegler, 1999; Doak and Karadimitriou, 2007; Mishkin, 2010; Mallard, 2016)

This concludes the discussion on the theoretical approaches to real estate development research. The development of the theoretical framework, depicted in Figure 4 into a practical research approach is discussed later in paragraph 2.6. The next section explores the real estate market as a conceptual construct to inform the measurement of the performance of the real estate market, which is one of the units of observation. The other unit of observation, namely the behaviour of real estate development actors is discussed thereafter.

2.5 The Real Estate Market

One of the units of observation in this research is the performance of the real estate market. The purpose of observing the performance of the real estate market is to corroborate inferences about the behaviour of real estate actors. The behaviour of real estate development actors and the performance of the real estate market are interlinked and cannot be explained separately. Bulan *et al.* (2009) shows as an example that real estate developers delay development during times of greater idiosyncratic uncertainty in real estate prices, and at times there is a surge of construction when the underlying demand for space and prices are falling (Grenadier, 1996; Bulan *et al.*, 2009). Grenadier (1996) presents a rational explanation for this seemingly conflicting behaviour as will be explained later.

This section conceptualise real estate market and the real estate market performance.

> Real estate is a unique investment. It can be touched and admired and improved, unlike a stock or a bond. It also depreciates and requires maintenance, unlike gold. However, real estate performance is often summed up in terms of prices rather than cash flow – like saying a business had a great year because its share price increased even if its revenue and profits didn't keep up (Ross, 2016).

This facetious statement by Ross (2016) captures both the nature and performance of the real estate market, however for the purposes of this research the

characteristics of the real estate market and variables used as proxy for real estate performance requires more depth. The following sub-section motivates the real estate sector focus of this research, the discussion of a conceptual framework of the real estate market follows, with an exploration of the literature on the measurement of the performance of the real estate market concluding the discussion on the real estate market.

2.5.1 Delimitation of the Real Estate Market

The property market is formed by inter-related property sectors of different types of property such as commercial, office, industrial and residential property markets. The different property sectors are each unique. Grover and Grover (2013: 512) explain that the different property markets and sectors "... are subject to different influences or, at least, to the changes in key variables affecting them in different ways". Thus not only is real estate actors unique with reference to geographic area (Coiacetto, 2000) but the different property sectors are also unique from each other in their characteristics.

The research is framed against a major expansion in the economy and momentous contraction around 2008. Income generating properties is thus the first distinction, and the residential property market is therefore not included in this study. The second distinction to delimit the property market is to focus the research on a property sector that is expected to be more volatile in the context of an exogenous shock. This is based on the supposition that the behaviour of development actors in such a real estate sector will be more observable as more pronounced behaviour is expected. Grenadier (1996) show that demand volatility and greater time-to-build increase concentrated bursts of development. Offices and commercial have a longer time-to-build than industrial, estimated to be of an average length of 2,5 years in contrast to 6 months (Grenadier, 1996), which means the industrial property sector also falls to the way-side of this research. The demand volatility delimits the focus of the research to office property as the demand for new office space is expected to be more volatile in the context of a major economic expansion and contraction than commercial (Grenadier, 1996).

2.5.2 *Nature of the Office Property Market*

Volatility in the office property market is not only confirmed by Wheaton (1987) but he also provides some explanation for the cyclicality by way of three issues, which provides an insight into the characteristics of the office property market as well. The first issue is that "[r]ents do not move quickly to clear the market but rather respond gradually to market vacancy" (Wheaton, 1987: 293). The explanation for this phenomenon is the long –term lease structure typical of office rental agreements and the behaviour or expectation of the lessor and lessee at leasing time.

> It is likely that the long-term leasing structure of the office market reflects a high cost to moving and relocating business. When firms do move, it usually happens at the time of lease expiration. ... With long-term rental contracts, tenants will likely engage in careful planning as they select office space. Expectations about future economic growth and office market conditions, in addition to present rent levels, may lead firms to lease more or less space than they would otherwise. In a similar manner, landlords will form expectations about future conditions, and this may significantly influence their behaviour with respect to setting rents and lease terms (Wheaton, 1987: 287-288).

The second issue explaining office property market characteristic and cyclicality is the "... supply [of office space] is quite clearly more elastic with respect to market conditions than demand ..." (Wheaton, 1987: 293). It is found that with reduce vacancies or increasing demand, the real estate development actors respond after a time lag with new construction, but when vacancies increase or demand falls the contraction of construction is more sudden and pronounced. The final issue explores the link between the office property market cyclicality to macroeconomic movements. On this issue Wheaton (1987) found a direct response of the office property market to macroeconomic movement with larger movement in the supply of new offices than the demand for office space. The latter is confirmed by Schatz and Sebastian (2009)

more than two decades later with their study of the United Kingdom and German property markets. "Both of these impacts [economic growth rate – demand side and growth of office employment – supply side] likely reflect the formation of expectations by tenants and developers" (Wheaton, 1987: 293). These characteristics and explanation of Wheaton (1987), which appears dated from a pure timeline perspective, is important for this research as it provides valuable insights into the performance of the office real estate market.

It is, however not possible to form a conceptual understanding on the working of the real estate market from the characterisation of Wheaton (1987). The next section explores a long-run equilibrium model of the aggregate real estate market, the DiPasquale and Wheaton (1992) model, which is well respected and generally accepted as an analytical framework for the working of the real estate market (Colwell, 2002; Lisi, 2015), but more importantly, also appropriate to understand the working of the office property market.

2.5.3 Conceptualizing the Real Estate Market

DiPasquale and Wheaton (1992) presents a simple analytic framework to analyse the real estate market. This mainstream economic conceptual framework divides the real estate market into two markets: "… the market for real estate space and the market for real estate assets" (DiPasquale and Wheaton, 1992: 181). Property rents are determined in the real estate space market by the needs of tenants and the type and quality of buildings available. In the real estate asset market new buildings are exchanged between investors, this includes the construction of new buildings. The conceptual framework describes the connections between the two markets with a four quadrant diagram as depicted in Figure 5.

These connections are conceptualised within a general equilibrium, stock and flow model where the demand for space is determined by rent (R) and the conditions in the economy (Economy). The milieu for this research is the asset market where "... the investors are really purchasing a current or future income stream" (DiPasquale and Wheaton, 1992: 187). Thus in the paradigm of mainstream economics there is a

yield that investors will demand to hold a real estate asset. The line $P = \frac{R}{i}$ represents the required yield or capitalisation rate, incorporating four considerations, namely "…the long term interest rate in the economy; the expected growth in rents; the risk associated with that rental income stream, and the treatment of real estate in the [taxation regime]" (DiPasquale and Wheaton, 1992: 187). The price for real estate assets are thus determined in the upper quadrant of the asset market by exogenous factors ((DiPasquale and Wheaton, 1992: 187).

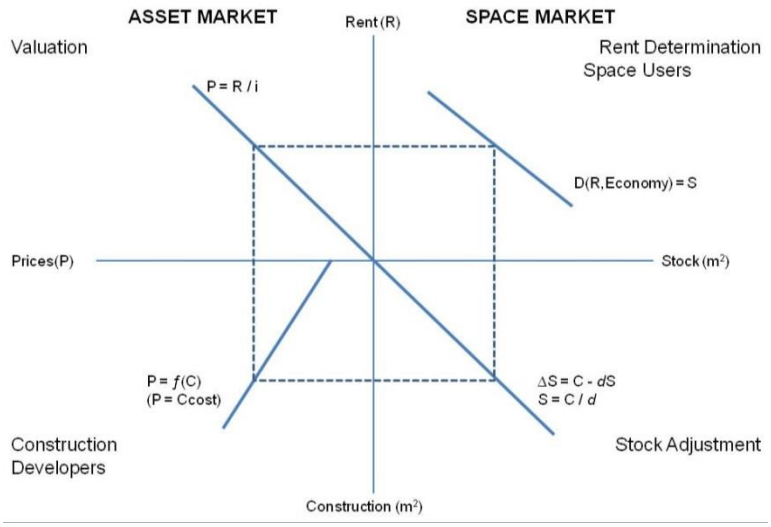


Figure 5: Real Estate: The Property and Asset Markets
Source: (DiPasquale and Wheaton, 1992: 188)

The curve f(C), i.e. the function of construction level, represents replacement cost and/or construction costs (CCost). The level of new construction of real estate is determined by the relation between the price of real estate assets and the cost of construction. The lower quadrant in the space market depicts the flow of new construction to long-run stock (S) in the real estate space market, which is the difference between new construction (C) and depreciation (*d*). Changes in the economy, capitalisation rate and/or construction costs cause a shift in the demand curve for space, the angle of the capitalisation rate and/or angle of level of construction curve respectively or simultaneously to settle in a new equilibrium position, which is different from the previous.

The movement within a long-run equilibrium of the DiPasquale and Wheaton (1992) model is limited in explaining cyclical growth in the property market. The important features of the adjustment process, such as the phase or period of the adjustment process, or did the adjustment process result in an overbuilding – or underbuilt situation, is not explicitly revealed by the model (Colwell, 2002). The other criticism, relevant to cyclical growth is that there is not a differentiation between the 'cap' rate and the reciprocal of the gross income multiplier and the assumption that the 'cap' rate is exogenous (Colwell, 2002). The interaction between the multiplier and accelerator principles is one of the foundations of modern business cycle theory (Brue and Grant, 2007), which in the context of real estate is explained as:

> "[The] ... primary cause for the business cycle ... is the formation of demand for investment goods via the 'accelerator' which constitutes the crucial, endogenous factor sustaining fluctuations in a growing economy. [This] ... argument ... [is] ... based on the distinction between replacement investment, to cover worn out or obsolete capital stock, and induced investment, generated by an increased level of output. The demand for replacement investment is proportional to the size of the existing capital stock, which in turn is proportional to the current level of output. In contrast, what drives the demand for induced investment is the growth in output, which is far more volatile (Barras, 2009: 25).

The induced investment which is more volatile correspond to the finding of Wheaton (1987) that the supply is more elastic than the demand for office space. Grover and Grover (2013) identifies low price elasticity of supply; irreversible development due to sunk capital; accelerator response by the real estate developers to changes in demand and the multiplier effect as weak adjustment mechanisms in the real estate market and therefore plausible causes for cyclicality in the real estate market.

The behaviour of the real estate actors in this framework is assumed to be rational, in self-interest and optimal; the *homo economicus* and is devoid of an institutional

approach. In an effort to introduce a measure of institutionalism into principally econometric modelling Grenadier (1996) and Bulan *et al.* (2009) use game theory together with option theory, similar to the work of Ziegler (1999), discussed earlier. Grenadier (1996) explores what is regarded as irrational real estate market behaviour and contrary to the DiPasquale and Wheaton (1992) model, namely a construction boom in the face of declining demand and property values or overbuilding. This game-theoretic approach to option exercise provides a rational explanation for this seemingly irrational behaviour by real estate development actors, which is premised on the lags and delays inherent to the construction process. The greater the time-to-build the more likely overbuilding occur or the more cyclical the real estate sector, thus the office property market with a construction period from initiation to completion of 2,5 years is more likely to display overbuilding than the industrial property market with a construction period on average of only 6 months (Grenadier, 1996). The explanation for this market behaviour is that "[d]evelopers, fearing pre-emption by a competitor, proceed into a 'panic' equilibrium in which all development occurs during a market downturn" (Grenadier, 1996: 1654).

Bulan *et al.* (2009: 248) explores the opposite of overbuilding, namely a delay in new construction and observe that "... volatility of returns, exposure to market risk, and competition play important roles in the timing of investment". This results in a delay by real estate development actors to initiate new construction during periods of "... idiosyncratic uncertainty in real estate prices and when the exposure to market risk is higher" (Bulan *et al.*, 2009: 248). Competition reduces this sensitivity and may reverse a decision by a real estate development actor not to build. Extending this understanding to business cycles theory it is clear to see how the behaviour of real estate actors can contribute to the cyclicality of the real estate cycle, which Bulan *et al.* (2009: 248) explain as "... [i]f competition is less pronounced in recessions, real options behaviour may lead developers to delay irreversible investments in structures longer than they would in booms when markets are more competitive".

These findings of Grenadier (1996) and Bulan *et al.* (2009) places another layer of analysis on the DiPasquale and Wheaton (1992) model, namely a dynamic system

depicting short run dynamics or intermediate adjustments. The research of Grenadier (1996) and Bulan *et al.* (2009) is concentrated and does not provide, nor intended to provide a descriptive framework of the real estate market. Such a dynamic system would complicate the analysis and spoil the neat simplicity of the four quadrant model (DiPasquale and Wheaton, 1992: 197). However, the findings of Grenadier (1996) and Bulan *et al.* (2009) not only alludes to the influence of the behaviour of real estate development actors on the cyclicality of the real estate market but also points to the limited ability of econometric modelling or mainstream economics to explain the judgments, beliefs and preferences of the different real estate development actors.

The four quadrant model, other than for a description of econometric hurdles rates or metrics in decision making for real estate investment, is not well suited for the exploration of the behaviour of real estate actors. It does however contextualise the working of the real estate market within which the behaviour of real estate actors and the performance of the real estate market is to be described. The next section explores the literature for variables used in research to present the performance of real estate markets.

2.5.4 Real Estate Market Performance

The performance of the market has a marked influence on the behaviour of real estate actors. Grissom and Delisle (1999: 97) recalls a reverse on an increased real estate exposure by investors in early 1990s after a "... pronounced and prolonged decline in commercial real estate values ...". While the real estate market began to recover in 1993-1995, many investors remained on the side-lines with institutional investors only recognising the real estate market as an attractive investment asset class around 1998. Even so, the approach to real estate investment changed from the 'buy and hold' model to a more proactive 'buy and sell' model and greater focus on market cycles in an effort to anticipate a market downturn and thereby avoiding investment losses (Grissom and Delisle, 1999). The same phenomenon is found after the sub-prime mortgage crisis of 2008 where Hahn *et al.* (2016) acknowledge that the impact and the consequences of the financial crisis resulted in a fundamental

change in the real estate markets. Barras (2009: 12) confirms that "…cycle behaviour changes over time; each cycle is uniquely defined by its historical context and its relationship to the trajectory of economic growth". In turn the cyclical behaviour "...have dynamic and complex impacts on the investment variables that determine a project's or portfolio's returns and risks" (Pyhrr *et al.*, 1999: 30) with a resultant change in the behaviour of real estate development actors.

The purpose of this section is to infer a range of variables with the ability to illustrate or describe the real estate performance. The perspective that the "… dynamic in which [economic] growth and instability are inextricably intertwined" (Barras, 2009: 11) is the premise for understanding real estate performance in this research. Variables that can be used to measure this dynamic, according to Grover and Grover (2013) are listed in Table 1.

Table 1: Variables to Measurement for the Performance of the Real Estate Market

Development Market	**Occupancy Market**	**Investment Market**
Land values; Land Subdivisions; Development funding; Design team workloads; Town planning consents; Construction intentions; Construction orders; Construction starts; and Construction completion.	Letting enquiries; Letting transactions; and Vacancy rates.	Yields; Capital values; Rents; Purchase transactions; Mortgage offers; Mortgage advances; Purchase enquiries; and Investment intentions.

Source: Grover and Grover (2013: 512)

There is not only a wide range of variables that can be used as a proxy for real estate performance but there is also different ways in which these variables are employed or modelled for this purpose. Pyhrr *et al.* (1999: 38) distinguish between descriptive models and modelling of real estate cycles on an ex ante basis to "... measure their resultant impact on cash flows, rates of return and risk ..." or the forecasting of key investment variables. This research is concerned with a time period in the past that displayed a pronounced expansion and contraction of the market. A descriptive model is therefore adequate to corroborate the performance of

the real estate market with the behaviour of real estate development actors as no forecasting of key investment variables are required. This stance is supported by Colander (2009), who accepts structural simplicity whenever it can be achieved.

2.5.5 Cyclicality in Real Estate Market Performance

The description of the real estate performance and the behaviour of the real estate development actors are however inseparable intertwined. While it can be said that the structural simplicity is possible with describing the economic performance due to perfect hindsight in this research, the same is not true for the behaviour of the real estate development actor. The real estate development actors suppose a future income for the purposes of making an investment decision. This requisite behaviour has a marked impact on the performance of the real estate market. Barras (2009: 33) explain how Robertson (1915) and Aftalion (1927) "... attributed alternating investment booms and slumps to expectations that are too optimistic and then too pessimistic because they are formed on the basis of current rather than future prices ...". A subsequent contribution by Ragnar Frisch (1933) made a distinction between *exogenous impulses* that cause cycles and the *endogenous propagation mechanisms*, which determine the cyclical nature of the market after the exogenous shock (Barras, 2009). *Investor myopia* is assumed by Michal Kalcki (1935, 1937) to explain cyclicality in a real estate setting in which a long gestation period is required to construct fixed capital and Harrod (1939) built the interrelation between Clark's accelerator and Keynes's multiplier into a growth model to explain cyclicality in the market (Barras, 2009). These economic theories point to the nexus of economic growth, cyclicality of the real estate market and the behaviour of actors / entrepreneurs.

Weber (2016) conceives cyclicality in the real estate market as imagined by actors / entrepreneurs. This suggests an alternative reason for the cyclical performance of the real estate market.

> When looking at property data retrospectively, one often sees a smoothness to it. No matter what indicator is tracked (e.g.

> square footage of new construction, vacancy rates, construction employment, investment performance aggregated across different submarkets), local markets appear to go through long periods where the indicator is either steadily increasing or decreasing (Weber, 2016: 592).

Through the results of an ethnographic study that "... examined the contours of temporality" Weber (2016: 593) "... characterize cycles as actively performed by market actors". The conclusion reached by Weber (2016) is that there is material incentives for the real estate actors to actively perform real estate cycles. The ways in which cyclical thinking is performed in the real estate market is explained as follows:

> First, property markets are set up to cycle because of their reliance on professional's use of 'market devices', such as the concept of obsolescence, that contain within them assumptions about the appropriate timing of investment, disinvestment, and reinvestment. A second means of performing property cycles involves acting collectively in concert. The sociology of crowds contributes to the smoothness observed in cycles as actors enrolled in the production of property assets have incentives to imitate each other's behaviour. Lastly, cycles are performed because the cycle analogy itself articulates an ordering of time that makes the future appear less threatening. Cycle knowledge operates as a signal for present-day speculations (Weber, 2016: 588).

The discussion above not only shows the interconnectedness of the performance of the market and the behaviour of actors but also the different views on the reasons of cyclicality. The cyclicality due to macroeconomic incidents or endogenous factors is accepted in this research. The endogenous factors in the real estate development process causing cyclicality forms the focus of this research and is seen as ranging from the use of pure econometric variables to behaviour of real estate actors alone.

The literature review has so far explored the economic theory and economic approach to real estate development, as well as the conceptual working of the real estate market, a range of variances to describe the performance of the real estate market and the causes of the cyclical performance of the real estate market. The next section discusses cycle theory briefly with a look at the description of real estate cycles to discover the application of cycle theory to real estate investment. The purpose is to identify variables as proxy for cyclicality and performance of the real estate market and to lead the literature review to the final section to learn from the literature about the behaviour of the real estate actor.

2.5.6 Real Estate Cycle Theory and Application

Structural simplicity in describing the real estate performance is intricate. Knowing that the real estate performance is to be described or explained is not all that there is to the corroboration with the behaviour of real estate actors:

> Knowing what one is explaining is important, but ultimately we will want to build statistical and economic models of the variables used ... in order to be able to describe characteristics of the cycle and to provide economic stories about the causes of cycles (Harding and Pagan, 2005: 158).

Moving averages was used in earlier studies to identify cycles, which distorts the analysis as this method is weighted towards the outliers in the time series (Grover and Grover, 2013). While spectral analysis is seen as a more superior method by Grover and Grover (2013) it is considered as too elaborate for this research. The cyclicality of the office real estate market is not the primary unit of observation. The primary unit of observation is the behaviour of real estate development actors, with the performance of the real estate market employed to corroborate their behaviour. Cyclicality is a characteristic of market performance, which is discussed only to understand measurement or description of the primary unit of observation.

Harding and Pagan (2005) identify three ways the literature describe a cycle, namely as a *periodic cycle*, a *serially correlated deviation of output from trend*, and an

approach to recognise a cycle from the *turning points* in the data series. *Peaks* and *troughs* represent these turning points and the *period* between the turning points is classified as expansions and contractions. Figure 6 illustrate graphically these cycle theory concepts.

The output with the periodic cycle focus is the recording of the period of the cycle, thus the expansion and contraction. While the expansion and contraction of the model represents booms and busts in the real estate market, and thus useful, the focus of this research is on when the market change. The supposition is that the differences of interpretation of investment variables and decision-making behavior (idiosyncratic judgments, beliefs and preferences) of real estate actors are heightened during these times and therefore the focus of this research. The serial correlation approach is premised on the subtraction of a permanent component from the time series. Harding and Pagan (2005) dismissed this approach as a serious approach to cycle analysis because the definition of the permanent component can be vague.

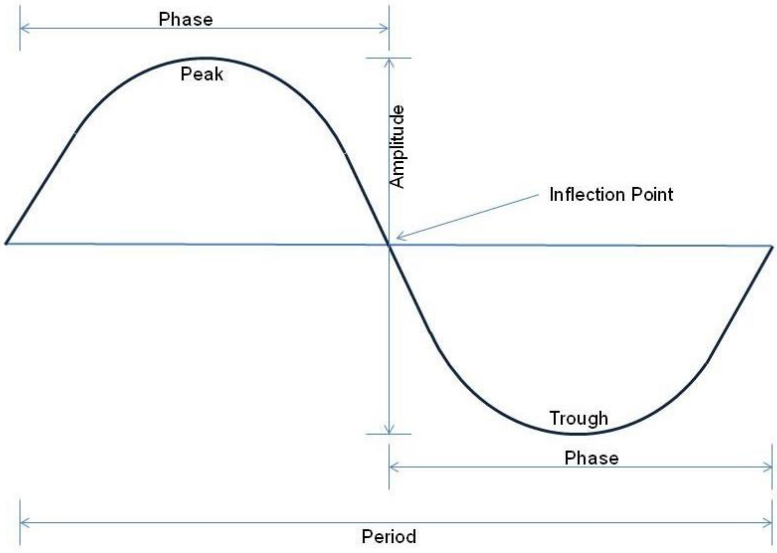


Figure 6: Sine Wave Plot of a Cycle and Its Basic Characteristics
Source: (Pyhrr *et al.*, 1999: 29)

The turning point approach involves the location of local maxima and minima in time series data for which rules are set. The rules involve studying the differences of the series under examination, or a typical growth formula as illustrated in equation (1):

$$\Delta x = \frac{x_t - x_{t-1}}{x_{t-1}} \quad (1)$$

This approach is consistent with the premise for understanding real estate performance in this research, namely the perspective that the "… dynamic in which [economic] growth and instability are inextricably intertwined" (Barras, 2009: 11).

The cycle theory discussed so far is generic and not specific to real estate. Pyhrr *et al.* (1999) explained how Mueller and Laposa (1994) adapted the sine wave construct to a real estate situation. Four phases of a real estate cycle is defined and superimposed on the sine wave construct, namely (1) recession, (2) recovery, (3) expansion, and (4) contraction. Figure 7 present a graphical illustration of the adaptation. The decision rules developed in the Mueller and Laposa (1994) adaptation of the cycle theory to the real estate situation is important. These decision rules, namely comparing observed vacancy rates with equilibrium vacancy rates intersect with the rules that are set in the turning point approach to describe cycles. Observed vacancy rates and equilibrium vacancy rates are clearly important variables in exploring real estate performance.

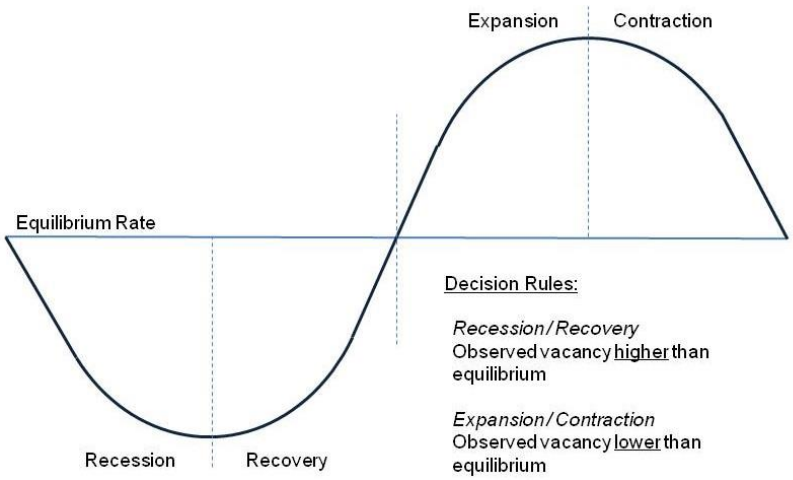


Figure 7: Real Estate Cycle Phase Nomenclature of Mueller & Laposa
Source: (Pyhrr *et al.*, 1999: 31)

Many variables are employed to describe the cyclicality of the real estate market. Pyhrr *et al.* (1999) mentions variables such as rental growth, absorption, vacancy and construction activity. The variables to describe cyclicality in the real estate market is no different from those listed by Grover and Grover (2013) in Table 1.

Pyhrr *et al.* (1999) reviewed eight models providing further insight into the analytical definition of cycles used to measure cyclical impacts on key investment variables. Barras (2009) recognise two modelling traditions in the field of business cycle research, namely *stock adjustment models* and *rent adjustment models.* These modelling traditions converge into *multi-equation models*. These models appear too complex for the purposes of measuring the secondary unit of observation, namely the performance of the office market in Cape Town.

The measurement of the performance of the office market in the context of this research is, nevertheless not consistent to the simplistic textbook definition of the continual rise in the performance of the economy measured by the real gross domestic product (GDP) or real gross national income (GNI) as posited by Salvatore and Dowling (1977); Lipsey and Chrystal (2007); Mohr (2012). The exploration of the behavior of real estate development actors within a major expansion in the market and sudden contraction around 2008 requires the consideration of property cycles. The synopsis of the reviews of Pyhrr *et al.* (1999); Barras (2009) illustrate the wide application of business cycle theory within real estate research and the number and type of variables used.

The intersect of the adaptation of cycle theory to real estate by Mueller and Laposa (1994) in Pyhrr *et al.* (1999) with the explanation of the *turning point approach* of Harding and Pagan (2005) is used to select a proxy for the real estate market. The turning point approach to cycle theory involves the location of local maxima and minima in time series data for which rules are set. The Mueller and Laposa (1994) adaptation infer a decision rule for turning points based on a comparison of *observed office vacancy rates* with *equilibrium office vacancy rate*.

The measurement of the performance of the real estate market is explained from a predominantly mainstream economics perspective. This unit of observation is used to corroborate the primary unit of observation, namely the behaviour of the real estate development actor. The influence of the behaviour of the real estate development actor on the performance of the real estate is alluded to in this section. The next section conceptualise the primary unit of observation.

2.6 The Real Estate Actors

The focus of this section is to find in the literature an operational or practical method to explore and describe the behaviour and decision-making of real estate actors as the intersection of the *structure-and-agency* model, *structures of provision* model and *actor network theory*, also called *complexity and actor networks*, is too abstract, see Figure 4. The categories of real estate actors are the real estate investors and the real estate developers on the supply side of the office market with real estate users on the demand side of the office market.

2.6.1 The Real Estate Developer

Henneberry and Parris (2013) found the following categories of real estate developers in the literature, namely dealers, developer-dealers or trader-developer, developer-investors, investor-developers, contractor-developers, owner occupier developers and the public sector. The criticism against such categorization of the developer is that the interrelation between the actors remains unexplained. Despite marked differences in behaviour of real estate development actors there is limited consideration of their strategies according to Gallimore *et al.* (2000) and Gore and Nicholson (1991: 721) highlight the "… little attention … paid to the ever-changing relationships of conflict and collaboration that exist between social agents or to the institutional and other structures within which such relationships are played out". This criticism is part of the bigger debate of the inability of mainstream economics research paradigm to explain the behaviour of actors and their interrelationships and use as impetus to shift towards institutionalism discussed earlier.

Coiacetto (2001) categorise observed behaviour of real estate developers into six types, namely *passive local property owning developers*, *'means to a mission' developers*, *specialised client developers*, *showpiece developers*, *'eye on the street' builder-developer*, and *value adding opportunity developers*. This categorisation of types of developer behaviour is useful as it provides an insight into the behaviour of different category real estate development actors. However it is limited in explaining the relation and behavior of developers with other real estate actors and the process

which drive the strategies and interests of the various actors. It does illuminate to some extent the risk mitigation strategies that the different categories real estate developers employ in their approach to real estate development. The categories of real estate developers are however not the unit of analysis, but the real estate developer as one of the actors is.

The DiPasquale and Wheaton (1992: 189) conceptual model explains the operation of the real estate developer as the interplay or trade-off between construction costs and the price of real estate and demand by users. The outcome of the interplay of cost with price and demand translates into square meters created. Office space created in square meters serves thus as a good proxy for the behavior of the real estate developer. The expectation is an indication of when real estate developers were active or when they employ a 'hold-and-wait' strategy with the plotting of change in office space over time. However an institutionalism or qualitative research approach is still needed to explore and describe the interrelation with the other real estate actors.

2.6.2 Real Estate Investor

The fourfold categorisation of the income producing property developer by Adams *et al.* (2012) namely; dealers; developer/dealers; developer/investor and investor/developers alludes to the overlap between the real estate developer and real estate investor. Guy *et al.* (2002) describes two categories of actors on the supply side of the market that provides a clearer differentiation between a real estate developer and real estate investor, namely an 'independent property developer', which is in the business of constructing properties and the 'institutional property developer' that is in the business of real estate investment often represented by institutions such REIT's or other types of investment fund companies, which may include insurance and finance.

The focus of the institutional property developer is more on the yield of the real estate investment to compare this yield to alternative investment opportunities. DiPasquale and Wheaton (1992) explains that the current yield that the real estate

investor demand to hold real estate assets is represented by the ratio of rent and price, also known as the capitalisation rate. One of the advantages of the capitalisation rate is that it often express market thinking (The Appraisal Institute, 2013), which makes it a useful proxy for real estate investor behaviour. An institutionalism or qualitative research approach is again needed to explore and describe the interrelation with the other real estate actors.

2.6.3 Real Estate User

The real estate investor and real estate developer operates in the real estate asset market or in the supply of office space. The real estate user act or operate in the property market for the use of space or the demand side of the real estate market. The demand for office space is a function of rent and economic conditions with the price of offices per square meter and stock of office space or available office space the determining factors for rent levels (DiPasquale and Wheaton, 1992). A parsimonious view is that the real estate investor and real estate developer reacts to the behavior of the real estate user, while the real estate user reacts to the general economy and available office space. The aim of this study is to explore endogenous factors that may influence over- and under building in the office real estate market. The general economy is an exogenous factor to the real estate market and will add a level of complexity that may obscure a clean and focused study of the behavior of real estate actors.

Three proxy variables are identified above, namely office vacancy as proxy for office market behavior, change in office space in square meter as proxy for the real estate developer and capitalization rate as proxy for the real estate investor. The interplay of the proxy variables for the real estate investor and real estate developer serves as determining factors for rent levels. The acceptance of the user of the resultant rent level, given the economic conditions, is displayed in the take-up of the office space in the real estate market or vacancy factor. Vacancy factor is, therefore a useful proxy for the behavior of office space users. Using vacancy factor as proxy for the office real estate market as well as for the office space user is supported by the principal of structural simplicity (Colander, 2009), accepted earlier in the study.

As with change in office space and capitalization rate, the vacancy factor analysis is unable to explore and describe the interrelation with the other real estate actors. The next section discuss a practical research methodology from the literature to explore and describe the relation and behaviour of real estate actors (investor, developer and user) and the process which drive the strategy and interest of these actors.

2.6.4 Information Efficiency Approach

The approach of this research on property investment or informational efficiency rather than allocative efficiency or operational efficiency as described by Keogh and D'Arcy (1999) means that the behaviour of real estate actors are studied in a real estate development or construction of new offices context. Real estate investment is normally executed one property at a time due to its *lumpy* nature with the aid of agents and intermediaries. This is analogous to a temporary project, which allows for the "... most flexible and task-specific allocation of resources" (Grabher, 2004: 1491). The most flexible and task-specific allocation of resources is needed to execute real estate investment one property-development-project at a time.

This communality allows the exploration of the notion of *project ecology* as conceived by Grabher (2004). The purpose of this contextual understanding of projects is the analysis of the "... process of creating and sedimenting knowledge accrue at the interface between projects and organizations, communities, and networks in and through which projects operate" (Grabher, 2004: 1491). The analogy between the project ecology framework and the real estate development research framework of *complexity and actor networks* is striking. Both study the interface between actors/projects and organisations by means of networks. The definition of the actor network theory (ANT), one of the theoretical traditions in the complexity and actor network research framework, namely: "... heterogeneous networks as an active process of actor enrolment in which people / things are drawn into a stable relationship or understanding with each other to pursue an objective" (Doak and Karadimitriou, 2007: 219) is corresponding to the nature and definition of a project.

Henneberry and Parris (2013) use the project ecology of Grabher (2004) to contextualise the property development network within which the real estate development actor is embedded. Their adaptation of the project ecology to a real estate development context moves the institutional research approach from an abstract complexity - and actor network theory to a more operational or practical method of research that allows for the exploration of the interrelations between real estate actors in the real estate development process (Henneberry and Parris, 2013).

The adaptation of the project ecology framework in project management to the real estate development process by Henneberry and Parris (2013) provides an opportunity to move the theoretical frameworks developed to deal with the complexity of the real estate development process, discussed earlier, to an appropriate level of detail to support in-depth research and analysis on a consistent basis (Henneberry and Parris, 2013).

The practicality of using project ecology in this study is explained by the following *terms* used in this framework: Real estate project networks develop from *latent networks* because latent networks facilitate effective and efficient information, acts as informal education systems, enable the coordination of complex tasks and mobilize *swift trust* or professional interrelationship rather than individual interaction. The project ecology framework refers to the interdependencies or interrelation between real estate development projects, firms, actors, localities and corporate networks from which resources are drawn to unfold in a temporary real estate development project organization and physical space (Henneberry and Parris, 2013). Conceptually it is depicted existing in two layers, namely an *organizational layer* and *social layer*, see Figure 8 below. The core, the most stable network of the organizational layer is temporarily engaged in the real estate development project with the firms providing resources and actors such as clients, funders, regulators and stakeholders making interventions in the project as part of the *epistemic community*. The personal networks of the actors in the organizational layer, whether professional or private constitute the social layer within which the temporary real estate project is embedded.

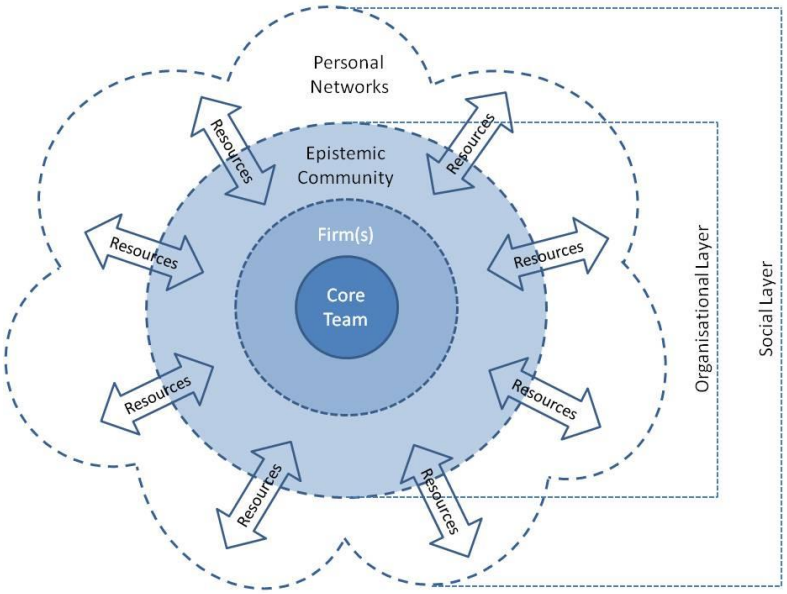


Figure 8: The Project Ecology

Source: (Henneberry and Parris, 2013: 232)

The social layer is not directly involved in the temporary real estate development project but latent. It is also not distinct and static but evolves over time from which other real estate development projects develop, which is illustrated conceptually in Figure 9.

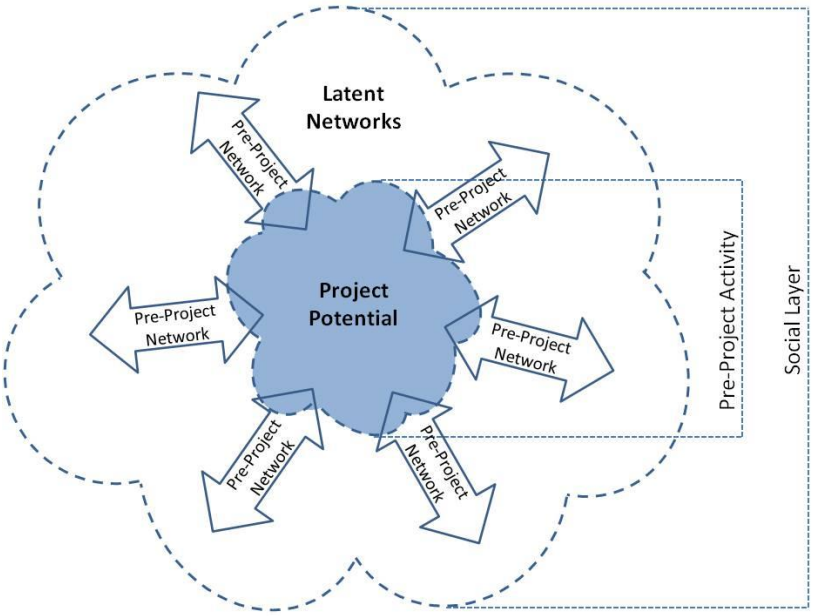


Figure 9: The Pre-Project Ecology

Source: (Henneberry and Parris, 2013: 234)

There are three types of personal networks within the social layer from *network of communality*, which is the strongest meaning they can lay dormant for long periods and are drawn upon when dealing with personal issues, to the more numerous professional networks, named *networks of sociality*, to the thinnest, weakest type on network, namely *networks of connectivity*.

Table 2: Types of Personal Network

Type:	**Description:**
Networks of communality	Relations are personalised and experience-based, built over long periods with mutual experiences or a common history, such as school or university friends, former work colleagues and so on.
Networks of sociality	Relations forged with other practitioners, characterised by variety, difference, serendipity and accident and rely on reputation derived from the judgement of other network members.
Networks of connectivity	Relations primarily unfold in virtual forms of interaction that are most commonly utilised to aid learning and to find solutions to specific issues.

Source: (Henneberry and Parris, 2013: 233-234)

The project ecology framework guides empirical investigation into the "… interdependencies between projects and firms, personal relations, localities and corporate networks and how these are established, dissolved and subsequently reconfigured" (Henneberry and Parris, 2013: 235).

This is thus a useful and pragmatic framework to explore the behavior of real estate actors in their investment decision-making and to analyse the differences of interpretation of investment variables and decision-making behavior (idiosyncratic judgments, beliefs and preferences) of real estate actors to ascertain if it influence regular periods of over- and underbuilding. Decision-making in the real estate development process is the only remaining element to explore in the literature.

The intention of the narrative above is to illustrate the 'fit' of the project ecology framework to real estate investment decision making - and execution process as a means to explore the behavior of real estate actors.

2.6.5 *Real Estate Investment Decision-Making*

The decision-making behaviour of the real estate development actors is sub-optimal and less than efficient. The real estate development actor and the real estate development company or institution display heuristics and biases (in this case the reference is to *judgement heuristics* and this type of heuristics and biases leads to errors in judgement as theorised by Tversky and Kahneman (1974) and confirmed by Fiedler and von Sydow (2015)) such as behavioural momentum; the fear of regret; and an aversion to realise sunk cost (Gallimore *et al.*, 2000). These heuristics and biases play itself out within the context of bounded nature of information as the future is unknown and bounded rationality, which acknowledge the "... limits upon the ability of human beings to adapt optimally, or even satisfactorily, to complex environments" (Simon, 1999: 24). Mallard (2016) expands on the bounded rationality concept in an abstract behavioural framework with the terms *limited cognitive reserve* and *decision fatigue* of the real estate actor, discussed earlier.

All actors never-the-less strive to make decisions that are optimal and efficient. The mainstream economics of *homo economicus* and *rational choice model* may be short of capability to explain a fundamental dimension of our understanding of the development process, namely the interrelation between real estate development actors and the broader process of strategies and interest in deploying resources to realise a return. However, the same cannot be said for mainstream economic explanation of the aspiration of real estate development actors to receive optimal and efficient returns.

The property investment or informational efficiency approach of this research means the type of decision-making under consideration is real estate development investment decision, which is conceptualised as the commitment of resources in the expectation of a future return. The literature defines "[p]roperty decision making ... [as] ... a theory of analysis that attempts to provide a framework in which investors can make decision to maximize their wealth" (Gallimore *et al.*, 2000: 603). The literature suggests that this normative real estate investment decision-making unfolds as follows:

> [T]he definition of goals and objectives, and a comprehensive search for alternative projects that meet the initial criteria ... the formulation of a fully-defined strategy and criteria for the selection and assessment of property ... individual projects should then be assessed against these criteria and decisions based on strategy and maintenance of performance (Gallimore *et al.*, 2000: 604).

Executing a normative investment decision-making methodology is complex. There is an acknowledgement that the diverse and competitive nature of real estate investment appears to sometimes preclude normative investment decision-making (Gallimore *et al.*, 2000). The key criteria on the operational level of real estate investment decision-making are the assessment of risk, expected return and diversification benefits (Nappi-Choulet, 2006). However, the principle of time complicates real estate investment decision-making:

> The evaluation of a capital investment project starts with the principle that the productivity of capital is measured by the rate of return we expect to receive over some future period ... For this reason we cannot calculate the rate of return realistically unless we take into account (a) when the sums involved in an investment are spend and (b) when the returns are received (Hertz, 1964: 95).

The perception of Hertz (1964) is a pure mainstream economics perspective and risk is not explicitly considered in this rate of return description. Overlaying the behaviour of real estate actors over the mainstream economic input into decision-making raise the complexity because:

> The quality of the output is directly correlated to the quality and the appropriateness of the input variables that tend to be of debatable quality. The development system ...consist of a multitude of complex human, physical and legal

interrelationships, the most important of which are “human (Loizou and French, 2012: 207).

While it is possible to calculate the rate of return and diversification benefits to a large extent through the simplification of the very complex economic – and real estate market system or econometric approach the same cannot be said of ascertaining the risk of a real estate investment, which is done on a more subjective basis (Brzezicka and Wisniewski, 2014). Ball *et al.* (1998) explains that risk has an influence on the property industry structure or the form of real estate development institutions. The consideration of risk is thus significant in the real estate investment context. French (2001), however show that the real estate development actor’s perception and attitude towards risk shows a difference between theoretical exposure levels and pragmatic business considerations, which is supported by the findings of Gallimore *et al.* (2000) in their research into decision-making in small real estate investment firms. An important aspect of this research is then the idiosyncratic judgment, beliefs and preferences of real estate development actors in evaluating real estate investment risk.

Brzezicka and Wisniewski (2014: 38) noticed that real estate investment actors “... are creators of risk and uncertainty, as well as the receivers”. Decisions and behaviour within this context of risk and uncertainty can be categorised “… as either *deterministic* - real estate variables are certain, *probabilistic* - real estate investment variables are uncertain but the uncertainty can be quantified or qualified and *assumed under conditions of uncertainty* - where the real estate investment variables are completely unpredictable” (Brzezicka and Wisniewski, 2014: 31). Choices or decision-making in a state of uncertainty is the study discipline of the *theory of subjective utility* which ask that the statistical or quantitative analysis be supported by the institutionalism approach (Brzezicka and Wisniewski, 2014).

The exploration of the real estate development actor from an institutionalism perspective is addressed above and the categories of decisions and behaviour within this context of risk and uncertainty are to be explored within the *project ecology framework*. The discussion above also shows the mainstream economic approach

as a fundamental component in investment decision-making. However, a framework or paradigm to inform the exploration of the econometric decision-making of real estate investment is still unexplored. This literature review is concluded with an exploration of econometric decision-making framework of real estate development actors.

2.6.5.1 (Econometric) Models of Judgment

The econometric decision theory can be described as the "... study of models of judgement involved in, and leading to, deliberate and (usually) rational choice" (French, 2001: 399). The econometric decision-making methodology is not devoid from the consideration of risk as shown by the facetious comment about decision-making in real estate investment:

> Traditionally, because of the difficulties, the dislike, or the lack of knowledge of how to deal explicitly with risk in decisions, most people concentrated on a few key assumptions about the future, examined a few rules of thumb, mulled over the situation, and then decided. Although some of the risk considerations were explicit, most of the mathematics of risk was left to the four horsemen of the implicit decision-making apparatus: judgement, hunch, instinct, and intuition (Pyhrr, 1973: 48)

The essential concept in this part of the discussion is the employment of mathematical modelling in ascertaining the risk, expected return and diversification benefits to infer a typology of decision-making methodology employed by real estate development actors. The elemental input variables in ascertaining a real estate investment venture are descriptions of value. Pagourtzi *et al.* (2003) distinguish within the real estate appraisal discipline methods ranges from traditional to advance.

Within the specific realm of real estate development the *residual valuation* is considered as one of the established methods to assess the profitability of a real estate development (Isaac *et al.*, 2010). This is a simplistic mathematical model as it

produces a single value / cost or point estimate. Cash flow modelling, also a traditional valuation method (categorised under investment / income and/or contractor's - / cost method) use forecasts as this method deals with future costs and revenues and incorporate market expectation or risk through a discount rate. It is considered as a more sophisticated mathematical model as it also consider the future value of money (Isaac *et al.*, 2010). A forecast however introduce subjectivity as the future is unknown but needs to be predicted to make real estate investment decisions (Hanke and Wichern, 2005).

The advance valuation methods incorporate judgments, beliefs and preferences of real estate development actors by simulating their thought processes. This transform the modelling methodology from a normative to a descriptive model (French, 2001). These methodologies are quantitative as it employs mathematical and statistical techniques but are distinct from the traditional methods in simplifying around iterative processes and studying patterns. The significance of the advance valuation methods is the potential of a more dynamic attribute where the modelling extends beyond description to prescription where the emphasis is on the heuristic advantages (the type of heuristics in this case refers to *evaluation heuristics*, which is used to judge the desirability of the feasible investment choices):

> Statistical reasoning is an art and so demands both mathematical knowledge and informed judgement. When it is mechanised, it loses much of its predictive accuracy. It is therefore important that the ... simulation model is used as prescriptive model that builds on the original elicitation procedures; produces initial results; allows for detailed sensitivity analysis and then remodels as required. In short, to be fully effective, the ... simulation model needs to be used in a complementary fashion with an understanding of human judgement and decision making (Loizou and French, 2012: 208).

A final distinction to infer a typology of decision-making methodology employed by real estate development actors is a requisite model. French (2001: 399) defines the requisite model as a model that "... works, whilst not necessarily being perfect". Real estate development investment is not primarily about mathematical modelling. The focus is informational efficiency and the diverse and competitive nature of real estate investment does not require or does not allow a perfect and complete model.

In the context of this research the endeavour is to learn what models of judgment are used by real estate actors. The literature present various types of models of judgment, from a naive model and normative model to models that explore the judgements, beliefs and preferences of decision-makers in relation to the real estate investment decision facing them in the framework of requisite - and/or prescriptive models as meant by French (2001). Another distinction offered by the literature is a point estimate versus a calculation that simplify around an iterative processes, study patterns, and employ mathematical and statistical techniques as explained by Colander (2009).

2.7 *In Conclusion*

There is limited academic literature on the interrelation between real estate actors in real estate investment decision-making and their possible influence upon regular periods of over- and under-building. A recent contribution by Weber (2016) on this area of interest suppose cyclicality in the real estate market as imagined by actors and/or entrepreneurs. Cycles is according to Weber's study characterised as actively performed by market actors. The interrelation between the real estate actors is not differentiated in this ethnographic study that explored the contours of temporality in real estate development process. The inferences relate to the behaviour of real estate development actors as a whole or one block.

Decision-making in real estate investment is not always fully explored or less than ideal. Gallimore *et al.* (2000) explores decision-making in small real estate development companies and concludes that the diverse and competitive nature of the real estate market precludes at time rigorous decision-making strategies.

Satisficing is mentioned by Gallimore *et al.* (2000) as a dimension of investment opportunity search where real estate actors focus on one property development opportunity rather than continually compare several investment opportunities. This is a reflection of the limited resources and the diffuse nature of information within the real estate market, but also due to the characteristics of real estate being *lumpy*, high value and low number of transaction. Brzezicka and Wisniewski (2014) explore the behaviour of real estate actors under the conditions of risk and uncertainty and found that real estate development actors are both creators of risk and uncertainty, as well as the receivers.

French (2001) present various types of models of judgment from the literature. The prescriptive models, which incorporates an understanding of human behaviour to enable *evaluation heuristics* is favoured within a framework of requisite models. Requisite models is a decision-making mathematical model that works, whilst not necessarily being perfect, which leads back to the finding of Gallimore *et al.* (2000) that small real estate companies employ less than complete decision-making strategies.

A mixed method research approach is inferred from the literature for this research. An *institutionalism* research approach is found to be the most appropriate to explore the behaviour of the real estate actor, the one unit of observation in this research. Mallard (2016) infer an abstract behavioural framework, which hold the potential, together with *game theory* and *information* theory to explain the behaviour of real estate development actors within the institutional theoretical framework as conceived by Healey and Barrett (1990); Healey (1991); Ball (1998; 2002); Doak and Karadimitriou (2007). The practical application of this institutional theoretical framework is unclear. The *project ecology* as presented by Henneberry and Parris (2013) is congruent with the institutional theoretical approach whilst providing a practical research method.

The most appropriate research approach to describe the performance of the real estate market, the other unit of observation in this research to corroborate the behaviour of real estate development actors, is through mainstream economic

methods. This stance by Colander (2009), accepts structural simplicity whenever it can be achieved is possible with measuring the real estate performance as it is historic data and only used to corroborate observed behaviour. The literature presents a multi-equation stock flow model by DiPasquale and Wheaton (1992) as a well-respected conceptualisation of the real estate market, with the *turning points* in *time series data* as described by Harding and Pagan (2005) to measure cyclicality in the office real estate market in Cape Town. The inference of the research method and methodology from the literature is illustrated in a composite diagram in Figure 10. The diagram shows the progression from a broad theoretical base of economic thought to economic theory to associated theoretical frameworks to research methodology to explore the real estate actors and performance of the real estate market, see also Figure 2. The next chapter, Chapter 3 Methodology explains the application in this research.

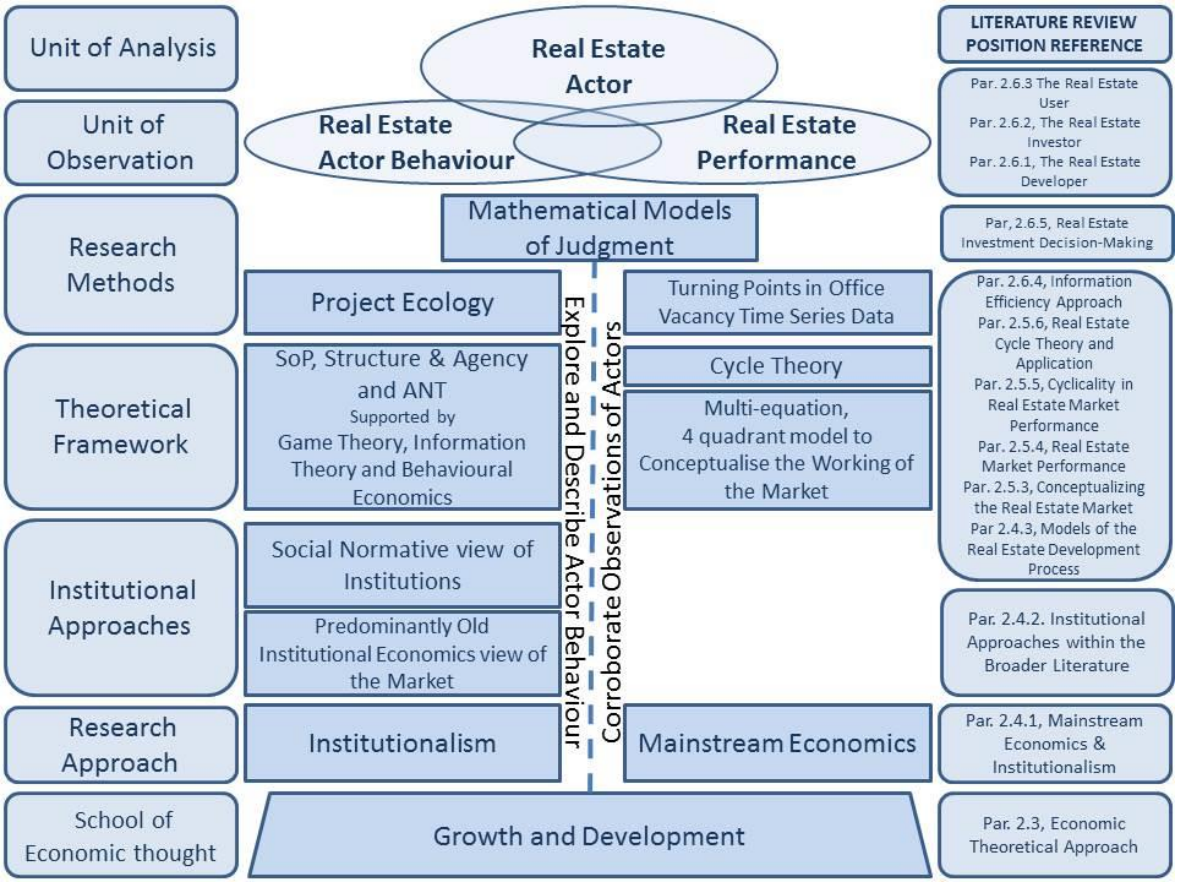


Figure 10: Inference from the Literature for a Research Method and Methodology

Chapter 3: Methodology

3.1 *Introduction*

The aim of the research is to study the behaviour of real estate actors in the context of property market cyclicality. The proposition is that endogenous causes of real estate market cyclicality are a result of the subjectivity of real estate actors in the use of investment information in the development system. The purpose of the study is to gain an insight into the interrelation between real estate actors. This research problem emerged from the observation of a significant contraction in the performance of the property market after the sub-prime mortgage crisis of 2007, see Figure 1 and review of academic literature relating to cyclicality of the property market (Wheaton, 1987; DiPasquale and Wheaton, 1992; Pyhrr *et al.*, 1999; Wheaton, 1999; Barras, 2005; Harding and Pagan, 2005; Barras, 2009; Grover and Grover, 2013; Weber, 2016).

The research question is phrased as:

> Does differences in the interpretation of investment variables of real estate actors in real estate investment decision-making influence regular periods of over- and under building?

This chapter further describes the research design used for this study, including:

i) The chosen research methodology;
ii) The research methods;
iii) Data collection; and
iv) Measurement of data.

3.2 *The Research Approach*

The review of academic literature on the debate of mainstream vs. institutional approach to study the office property market (Healey and Barrett, 1990; Gore and Nicholson, 1991; Healey, 1991; Ball, 1998; Ziegler, 1999; Guy and Henneberry, 2000; Doak and Karadimitriou, 2007; Henneberry and Parris, 2013), and behaviour

and decision-making of the real estate actor (Hertz, 1964; French, 2001; Loizou and French, 2012; Brzezicka and Wisniewski, 2014; Mallard, 2016) points to a non-positivist research paradigm, also called the phenomenological approach (Welman *et al.*, 2009).

The approach of the proposed research paradigm or procedural framework recognises the need to explore the behaviour of real estate actors, each in its unique real estate investment or institutional context. Welman *et al.* (2009) and Amaratunga *et al.* (2002) explains how the positivist approach, which studies objects, leaves the interpretation of events or processes unexplained. Therefore the positivist research approach is less successful in explaining the behaviour of real estate actors.

The research is executed in the context of constructivist ontology. Constructivist ontology assumes each real estate actor has their own understanding of the real estate development market or social construct and that the perception of reality differs between the categories of real estate actors (Denzin and Lincoln, 2000). Within this context, the researcher used interpretivist epistemology, which attribute meaning to human behaviour and allows for the subjective interpretation of reality by each participant (Schwandt, 2000; Lopez and Willis, 2004).

3.3 *Research Design*

This research paradigm leads towards the use of qualitative data. Qualitative data is more appropriate for the study of phenomena in the real estate market, and an interpretation of this phenomena from the perspectives of the different categories of real estate actors (Denzin and Lincoln, 2000; Welman *et al.*, 2009). Although quantitative variables forms part of the data, the research is still qualitative as the purpose of the quantitative variables will be to understand phenomena and extrapolate results to other situations and not to predict and generalise results as in the case with pure quantitative research or the positivism approach (Denzin and Lincoln, 2000).

Real estate lends itself to quantifiable data such as square meters, vacancy rates, rents and interest rates for example. “However, properties do not make deals with

each other, people do" (Bell and Bell, 2015: 310). The use of quantitative data in this research is therefore to examine the behavioural component of the office real estate market in Cape Town, which Amaratunga *et al.* (2002) confirms as an appropriate research method. Vacancy factors of office properties in seven office nodes in Cape Town are used as a proxy for real estate market performance and the real estate user. Capitalisation rates of office properties in the seven office nodes are used as a proxy for real estate investor behaviour and the change in office areas data in these nodes serve as proxy for the behaviour of real estate developers.

Table 3: Nodal Definitions of the Office Nodes in Cape Town

Office Node:	Area Description:
Bellville	Jip de Jager / Mike Pienaar to the West, Voortrekker Road to the South, Old Oak to the East and Van Riebeeck to the North.
CBD Cape Town	Chiappini Street to the West, Gardens suburb to the South, Tennant Street to the East and Harbour Freeway to North.
Century City	Properties within the Century City mixed use node; includes office located either side of Ratanga Road up to Century Boulevard.
Claremont	Highwick / Pine to the South, Protea / Campground Roads to the North, Palmyra to the East and the M3 to the West.
Pinelands	Encompasses the Pinelands Office node and the Black River Park precinct. Bounded by Settler Way to the South, Jan Smuts to the North and East and Liesbeek Parkway to the West.
Rondebosch / Newlands	Protea / Campground Road to the South, Woolsack Road to the North, Campground Road to the east and the M3 to the West.
V & A Waterfront	Properties within the V & A Waterfront precinct.

Source: (SAPOA, 2006-2017)

The use of both quantitative and qualitative data analysis is called the mixed research approach by Amaratunga *et al.* (2002). A mixed research approach allows the researcher to use the significant contributions of both and to overcome their weaknesses and is supported by Amaratunga *et al.* (2002) and Golafshani (2003). One of the major criticisms of qualitative data analysis is the reliability and validity of this research procedure. Through the mixed method approach triangulation is possible, which overcomes this weakness of qualitative data analysis (Golafshani, 2003). In this research the behaviour of real estate actors in the office market of Cape Town is examined with the use of quantitative data. The knowledge gained however fails to explain the processes and meaning of the behaviour. Qualitative data is thereafter used to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the quantitative data (Amaratunga *et al.*, 2002). Figure 11 illustrates this research strategy graphically and the following paragraphs provides an explanation of the grahpic.

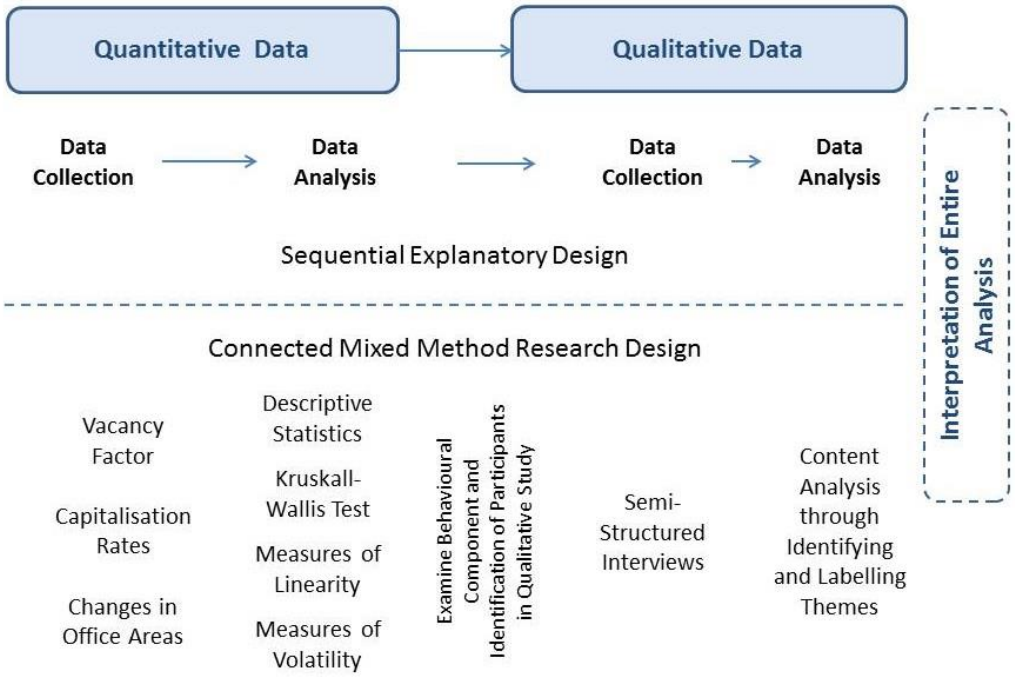


Figure 11: Research Strategy
Source: Adapted from Creswell (2009: 209)

Creswell (2009) describes six major strategies of a mixed method study, namely quantitative to qualitative sequential explanatory design, qualitative to quantitative

sequential exploratory design, sequential transformative design, concurrent triangulation design, concurrent embedded design and concurrent transformative design. A two-phase research project is executed in this study. The study starts with a quantitative phase and the analysis of the data. One of the outcomes of the quantitative analysis is the identification of the participants for the qualitative data collection in the follow-up research stage. This strategy is called a connected mixed method research design (Creswell, 2009). The two data bases are kept separate and the mixed method strategy employed is a quantitative to qualitative sequential explanatory design (Creswell, 2009).

3.4 Data Collection

Quantitative data is collected from four sources, namely the City of Cape Town, the quarterly Rode Reports, the quarterly South African Property Owners Association (SAPOA) Office Vacancy Report and the South African Reserve Bank (SARB).

Table 4: Quantitative Data Sources and Application

Variable:	Source:	Application:
The South African Business Cycle	SARB	To understand the South African business / economic environment and to extrapolate to other situations.
Office Vacancy Factor	SAPOA Rode Reports	To understand the Office Real Estate Market and to extrapolate to other situations.
Cape Town Office Real Estate Cycle	SAPOA Rode Reports	To understand the Office Real Estate Market and to extrapolate to other situations.
Capitalisation Rate	Rode Reports	To understand the Office Real Estate Investor and to extrapolate to other situations.
Office Areas in Square Meters	SAPOA Rode Reports	To understand the Real Estate Developer and to extrapolate to other situations.
Non-residential Building Plan Submission Data	City of Cape Town	To identify participants for the qualitative data collection.

The data used in this study are available through this internet link https://drive.google.com/file/d/1CMIGMWM_2PSatuYbaXJ1Ndq_c44QWjOD/view?usp=sharing.

Data on the South African Business Cycle in South Africa is obtained from the SARB website (SARB, 2017). The South African Business Cycle is not fundamental to this research but is included to gratify inquisitiveness on the difference between the general business cycle and office real estate cycle.

Data on the capitalisation rates for the seven office nodes in Cape Town is sourced from the Rode Report on the South African property market. The quarterly Rode Report on the South African property market explains the Cape Town Office Market by collating data on office rentals, capitalisation rates, operating expenses, and office demand & vacancies in Cape Town office nodes. The motivation of using the capitalisation rate as proxy for real estate investor behaviour is explained in Chapter 2, Literature Review above.

SAPOA's quarterly office vacancy report and the quarterly Rode Report on the South African property market are used to collect office vacancy factor data for the Cape Town office market. SAPOA use third party research service providers, previously IPD and most recently MSCI, to compile the office vacancy report. The vacancy factor is calculated by expressing the office area available for leasing as factor of total rentable area for seven office nodes in Cape Town. Table 3 provides an area description of the seven office nodes in Cape Town. Rode use the SAPOA office vacancy factor in their reports. The reason why both data sources are used in this study is because the Office Vacancy Surveys of SAPOA is only available from 2006 to date on their website. Office vacancy factors for the period from 2000 to the end of 2005 were obtained from Rode reports.

The office vacancy factor of the office nodes in Cape Town serves as a proxy for the office market. This proposition is premised on the work of DiPasquale and Wheaton (1992), which use the interplay of office area and price to explain the working of the

office market. The opposite of the vacancy rate is the occupancy rate, meaning that a low vacancy rate equates to a good performing property or market and the inverse equates to a poor performing property market. The use of the vacancy rate further ties in with the Mueller and Laposa (1994) adaptation to infer a decision rule for turning points in the property market based on a comparison of *observed office vacancy rates* with *equilibrium office vacancy rate* (Pyhrr *et al.*, 1999), which is employed to explore the cyclicality in the Cape Town office market in the next section.

The office vacancy factors are used to infer the office real estate sector cycle for each office node. The long run average vacancy rate approach, as explained by Parli and Miller (2014), is employed in this study to calculate an equilibrium vacancy rate for each of the seven office nodes . The equilibrium vacancy rate for each node is thereafter used to plot expansion and contracting phases of the office property market in Cape Town.

The total office areas in square meter as obtained from the SAPOA Office Vacancy Report are used to explore the behaviour of real estate developers / investors and office construction market. Specifically the change in total office area for each office node is used as proxy for the behaviour of the real estate developer / investor and construction market.

The non-residential building plan submission data for each of the office nodes is explored to identify participants for the subsequent qualitative data collection phase. Geographic Information System software (GIS), with the assistance from the UCT GIS Lab, was used to extract building plan submission data for the seven office nodes in Cape Town.

The cyclical behaviour of the office property market in Cape Town together with marked changes in office areas serves as prompts to identify new office development within an office node. Large office developments, relative to other office developments in the node, within this period of marked change are identified as potential participant properties. Century City and V & A Waterfront is treated

differently as there is one real estate developer / investor active in each node, namely the Rabie Property Group and V & A Waterfront Developments (Pty) Ltd part of the V & A Waterfront group of companies, respectively. No participating property was selected from Rondebosch / Newlands Node as the building plan data were inadequate. Claremont Office node situated in the same geographic area and directly adjacent is seen as representative of the Rondebosch / Newlands Office Node.

The process of selecting participants for the qualitative data collection is a non-probability sampling technique. Through an internet search and enquires to property brokers the real estate actors responsible for the new office development identified could be found. All the real estate actors found in this way were invited to participate in the study. Further participants in this study is identified through a sampling method called snowball sampling (Welman *et al.*, 2009). In the first phase of the snowball sampling, the real estate actors initially found act as informants to identify other real estate actors for inclusion in the semi-structured interviews. The latter may, in turn, identify a further set of real estate actors. Care was taken through the selection of other individuals to ensure that qualitative data were collected on all categories of real estate actors, namely the real estate user, - investor, and – developer.

Qualitative data is collected through semi-structured interviews as this research method allows the exploration of the real estate actors' decision-making behaviour within a framework of themes. The four stages of conducting a semi-structured interview, of *preparing for an interview*, which includes the preparation of an interview guide; *pre-interview*, which entails the setting up of the personal visit in such a way to ensure unbiased and true information; the *interview* where the actual data collection takes place; and a *post-interview stage* where care is taken to ensure all important points and facts are recorded and the interview is reported and transcribed with the purpose of understand the phenomena and to extrapolate results (Welman *et al.*, 2009), is employed.

The intent of the semi-structured interviews is to understand the essence of the experience of the real estate actors. Morse (1994) as cited by Denzin and Lincoln (2000) suggest that six participants in the semi-structured interviews will suffice to achieve this. Six semi-structured interviews were thus conducted for this study.

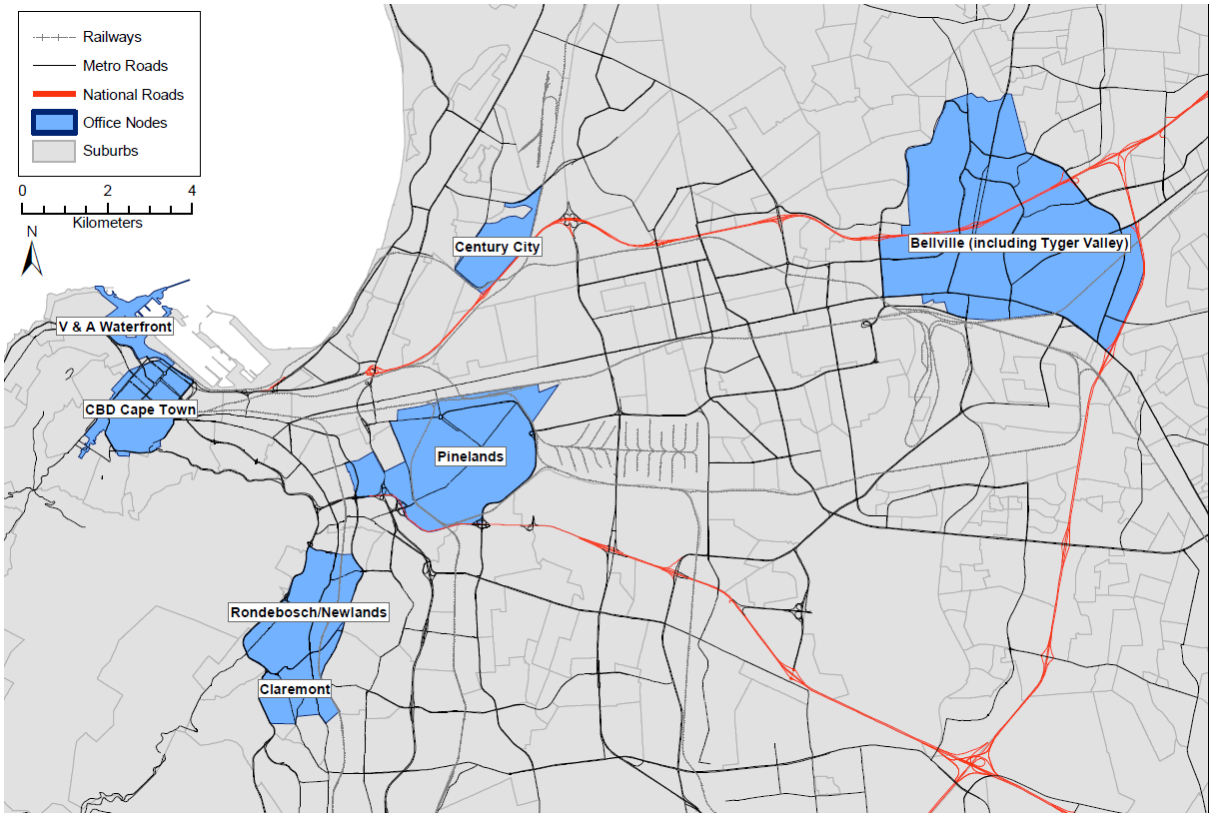


Figure 12: Shape Files of the Office Nodes in Cape Town Created in GIS to Extract Building Plan Data

Note: The Pinelands Office Node as depicted includes the Black River Park precinct added in the SAPOA 2017:Q2 report.

Source: With assistance from UCT GIS Lab

The study is executed within an emergent research design, meaning that the results of the quantitative data analysis were used to adapt the qualitative data-collecting process. The researcher informed the data-collecting procedure during the second step of the sequential explanatory design with presenting the results of the quantitative data analysis to the semi-structured interview participants. The qualitative data-collecting step therefore benefitted from data generated during the research process itself.

The qualitative data-collecting stage started after the quantitative stage with compiling the semi-structured interview information sheet & consent form and semi-structured interview questionnaire with guidelines, see Appendices A and B. The themes and guidelines used to structure the exploration of the real estate actor's reality or experience of phenomena are informed by the literature review. The themes are variables used in real estate investment decision-making, methods or models of judgment used in real estate investment decision-making, the social, corporate or institutional context within which these decisions are made and the typical project ecology employed in real estate investment projects of the participant. The latter theme contains a subservient purpose, namely assisting with the snowball sampling technique employed in selecting participants. The guidelines are finer grain categories or scales of the themes. The information sheet and consent form was made available to the semi-structured interview participant at time of setting up the face-to-face conversation, meaning the participant had an opportunity to be familiar with the study in advance of the date of the data collecting event.

The intent with the qualitative data-collection is to describe the real estate actor's experience of the interrelation between actors and the differences of interpretation of investment variables and decision-making behaviour (idiosyncratic judgment, beliefs and preferences). The lived-context as meant by Broome (2011) is followed with the qualitative data-collection meaning that the real estate actor is studied in his or her natural context where not only the behaviours are included in the data but also interpretations and understanding of the participants. The raw data for the qualitative study is the 'naïve description' or first-person account of the participant in real estate investment. The semi-structured interviews posed open ended questions to offer the participant a wide range in which to describe their experience. Non-leading follow-up questions were asked when necessary to open-up discussion on themes prepared for the interview. The follow-up questions were informed by the guidelines in the questionnaire prepared in advance. The semi-structured interviews were audio recorded for transcription later.

A period of reflection, as propositioned by Oliver *et al.* (2005) between the interview and transcription, was observed. This research is interested in meanings and perceptions of the participants and not in the analysis of the language used by the interview participants. Thus a more denaturalized transcription style is appropriate (Denzin and Lincoln, 2000; Oliver *et al.*, 2005). Denaturalism is not concerned with idiosyncratic elements of speech, but rather looks for meaning and perceptions within speech that construct the reality of the interviewee or real estate actor (Oliver *et al.*, 2005). Therefore, although a verbatim transcription of the semi-structured interviews is done, stutters, pauses, nonverbal, involuntary vocalization, etc. is not recorded. The verbatim transcriptions are rather data collection with an interest in the meaning and perception of the real estate actors. The transcripts were made available to the participants to review and to remove information not wanted or to make corrections. One transcript is attached under Appendix C as an example.

3.5 *Measurement and Data Analysis*

Data are the observed values of a variable with four different levels of measurement, namely nominal, ordinal, interval and ratio (Keller, 2009). This research use nominal - and interval / ratio level of measurement. The nominal level of measurement, also known as qualitative or categorical, are words describing categories or themes (Keller, 2009) and therefore appropriate for the analysis of themes collected through the structured interviews in the second research stage of the research design. According to Keller (2009) there is no difference between interval - and ratio level of measurement in terms of statistical methods and procedures. Interval – and ratio level of measurement is used in the method of converting data to information with regards to the quantitative data collected during the first research stage or quantitative stage of the research design.

The first research stage of quantitative data analysis takes the form of descriptive statistics, which "… involves arranging, summarizing, and presenting a set of data in such a way that useful information is produced" (Keller, 2009: 12). Although inferential statistical methods, such as the nonparametric Kruskal-Wallis test, linear trend analysis and measures of linearity are used it is still used in the form of

descriptive statistics. The Kruskal-Wallis test, test if there is a difference between quantitative data variables before and after the sub-prime mortgage crisis, the linear trend analysis the direction and strength of the quantitative data variable's trend and measures of linearity the relationship between the three quantitative data sets. The inferential statistical methods are used to understand phenomena and extrapolate results to other situations and not to predict and generalise results as in the case with inferential statistics.

The second research stage of qualitative data analysis entails analysis of the semi-structured interviews transcripts. The practice or convention of qualitative data analysis is to "… (a) identify the range and salience of key items and concepts, (b) discover the relationships among these items and concepts, and (c) build and test models linking these concepts together" (Denzin and Lincoln, 2000: 790). This study is concerned with participant's reality or experience of phenomena, which Mallard (2016) name behavioural institutionalism. Behavioural institutionalism is the theory of understanding how people make economic decisions or specific to this study to describe the behavioural determinants of real estate investment decision-making. The scientific study of the behaviour and the mind of individuals are called psychology. There are two established methods within psychology to analyse qualitative data, namely interpretative phenomenological analysis (IPA) and Giorgi's descriptive phenomenology (Smith and Osborn, 2015). IPA place emphasis on the case and capturing particulars of participant's experience while the Giorgi's approach is more concern with the general structure of the experience for the group (Smith and Osborn, 2015). The latter methodology is congruent with the ethos of this study to explore agency relations of real estate actors by acknowledging the interrelation of the structuring dynamics and the constitution of interest and strategies as posited by Healey and Barrett (1990).

Giorgi's descriptive phenomenology follows 5 steps, which are "… (1) assume the phenomenological attitude. (2) read entire written account for a sense of the whole, (3) delineate meaning units, (4) transform the meaning units into psychological sensitive statement of their lived-meaning, and (5) synthesize a general

psychological structure or experience base on the constituents of the experience" (Broome, 2011: 3).

3.6 In Conclusion

A two-stage research project is executed, named a connected mixed method research design methodology. This means that the two data bases (quantitative – vacancy factor, capitalisation rate and change in office areas and qualitative – themes extracted from semi-structured interviews transcripts) are kept separate and the mixed method strategy employed is a quantitative to qualitative sequential explanatory design. Figure 13 provides a graphical illustration of this research design and the following paragraphs explains in more detail.

In the first, quantitative stage of the research, vacancy factors of office properties in seven office nodes in Cape Town are used as a proxy for real estate market performance, capitalisation rates are used as a proxy for investor behaviour and the change in office areas data serves as proxy for the behaviour of real estate developers. The first stage of data analysis takes the form of descriptive statistics, and although inferential statistical methods, such as Kruskal-Walis, linear trend analysis and measures of linearity are used it is still used in the form of descriptive statistics.

Qualitative data are collected through semi-structured interviews as this research method allows the exploration of the real estate actors' behaviour in the context of property market cyclicality. The building plan submission data for each of the office nodes assisted in identify participants for the semi-structured interviews. Giorgi's descriptive phenomenology approach is used to do the content analysis of the verbatim transcripts. The Giorgi's approach is more concern with the general structure of the experience for the group, which is considered congruent with the ethos of this study to explore agency relations of real estate actors by acknowledging the interrelation of the structuring dynamics and the constitution of interest and strategies as posited by Healey and Barrett (1990).

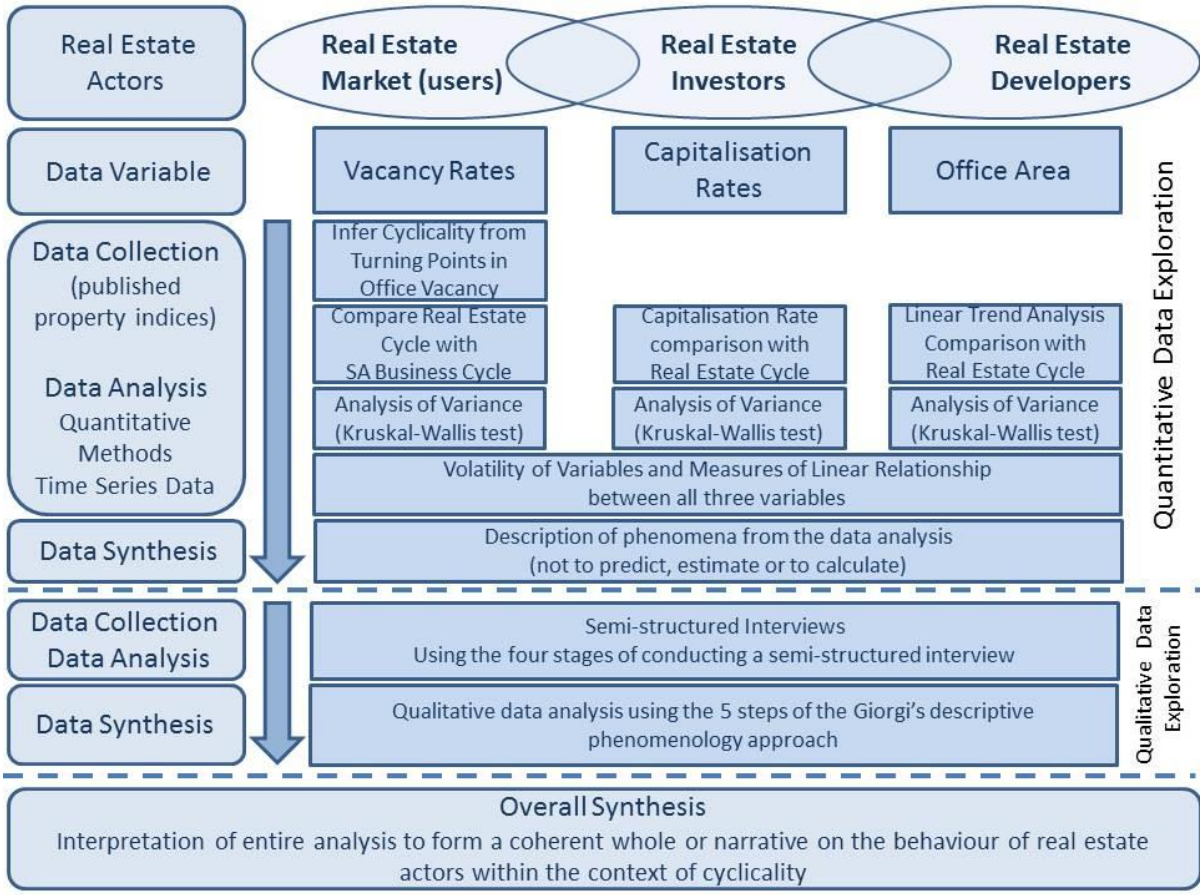


Figure 13: Quantitative to Qualitative Sequential Explanatory Research Design

The results of the research methodology and methods employed are presented in the next chapter.

Chapter 4: Results

4.1 *Introduction*

This chapter describes the analysis of the data collected as first step or stage towards combining the separate data components to form a coherent whole or narrative on the behaviour of real estate actors in the context of property market cyclicality of the office real estate market in Cape Town. A connected mixed method research design is executed meaning there are two data bases, which are kept separate. The mixed method strategy employed is a quantitative to qualitative sequential explanatory design. This chapter is thus organised in analysing the quantitative data (vacancy factors, change in office areas and capitalisation rates) first followed by an analysis of the qualitative data (identification and labelling of themes collected with semi-structured interviews). The next chapter, Chapter 5, 'Discussion and Findings' describes the coherent whole of the data analysis or synthesis of the data.

The quantitative – and qualitative data analysis is available through this internet link *https://drive.google.com/file/d/1CMIGMWM_2PSatuYbaXJ1Ndq_c44QWjOD/view?usp=sharing*. To be congruent with the phenomenological approach in the context of constructivist ontology of this study, the quantitative data analysis will be presented in the form of a narrative in this report. The data obtained from the semi-structured interviews is used to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the quantitative data. One semi-structured interview transcript is displayed in Appendix C as an illustration of how the transcripts are done, with Appendices A and B showing the information sheet and questionnaire.

4.2 *Data Diagram for the Study*

The data framework for this study is premised on the DiPasquale and Wheaton (1992) four quadrant analytic framework of the real estate market, see Figure 14 below. The equations express the interrelation between the different real estate actors. The mathematical equations provide limited illumination on the relation between the way actors behave in deploying resources to realise specific

investments and the broader process which drive the strategies and interests of the various actors involved. The literature review, section 2.5.3 explains the working and meaning of the mathematical equations. The triangle in the middle represents the interrelation between all the actors in the real estate market. This interrelation together with the interpretation of investment variables (expressed as mathematical equations in the diagram) may influence regular cycles of over- and under-building, which is the proposition of this research.

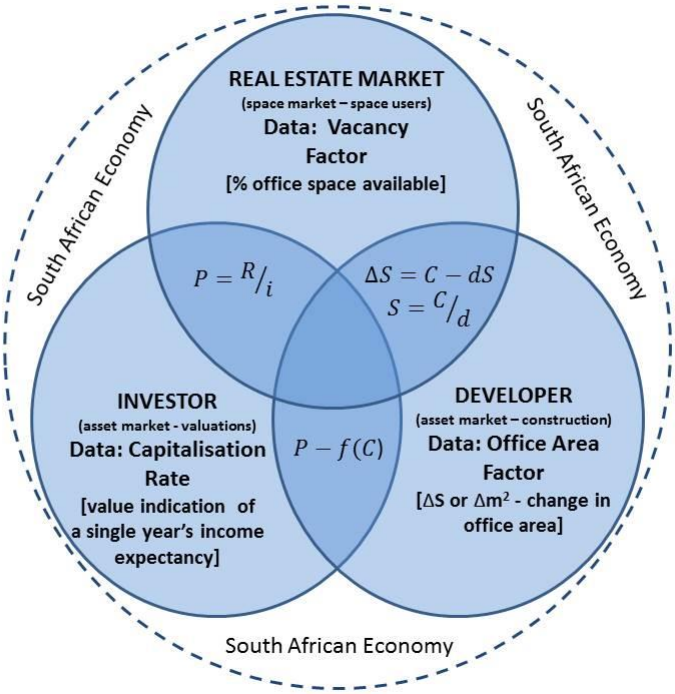


Figure 14: Data Framework

4.3 Data Clean-Up, Adjustments and Attributes

Data clean-up and adjustments is not discussed in the text body of this dissertation. All notes regarding data clean-up, adjustments and data notes or attributes are contained in the data analysis report available through this internet link *https://drive.google.com/file/d/1CMIGMWM_2PSatuYbaXJ1Ndq_c44QWjOD/view?usp=sharing*.

4.4 Factors with Potential to Influence the Results

This study is done with a phenomenologist perspective, meaning that the research is concerned with participant's reality or experience. According to Welman *et al.* (2009: 191), this approach "… question the possibility of studying such a reality with so-called objectivity", which is a requisite for a positivist study. The researcher is therefore not detached from the presuppositions of the real estate actors and may influence the results.

The second factor that may influence the results is the fact that the real estate actors are seen as dependent on their world and *vice versa*. The real estate actor cannot therefore be separated from his/her world (Welman *et al.*, 2009). Thus universal, context-free generalisation as with positivist studies is not possible but rather, the research is concerned with the real estate actor's experience of the phenomena. The perception of the real estate actor's experience may be unique and thus influence the results.

Finally the research design could not be completed before the quantitative data collection. An emergent research design is followed ((Welman *et al.*, 2009) where the quantitative data informed the qualitative, semi-structured interviews. Thus the researcher adapted the data-collecting procedure during the second step of the sequential explanatory design, which holds the potential to influence the results.

4.5 Data Analysis

4.5.1 Quantitative Data Analysis

The behavioural component of real estate actors in the office market of Cape Town is initially examined with the use of quantitative data. The distribution of the data is summarised in Table 5 below. The distribution of the variables are predominantly bimodal not equal in height (68% of the cases) which often indicates that two different distributions are present (Keller, 2009). The indication of two different distributions is congruent with the measurement of the variables over two phases of the real estate cycle.

Table 5: Distribution of the Variables Used in the Data Analysis

	Before the Sub-prime Mortgage Crisis			After the Sub-prime Mortgage Crisis		
	Multi-Modal	Bi-Modal	Positively Skewed	Multi-Modal	Bi-Modal	Positively Skewed
Distribution of the Vacancy Factor during Recovery and Expansion Phases of the Office Real Estate Cycle						
Bellville (incl. Tyger Valley)		✓			✓	
CBD Cape Town		✓		✓		
Century City		✓			✓	
Claremont		✓			✓	
Pinelands		✓				✓*1
Rondebosch / Newlands		✓				✓
V & A Waterfront		✓*2			✓	
Distribution of the Growth in Office Area during the Recovery and Expansion Phases of the Office Real Estate Cycle						
Bellville (incl. Tyger Valley)			✓	✓		
CBD Cape Town		✓				✓
Century City	No data					✓
Claremont		✓			✓	
Pinelands	No data				✓*1	
Rondebosch / Newlands		✓		✓		
V & A Waterfront	No data			No data		
Distribution of the Office Capitalisation Rate during the Recovery and Expansion Phases of the Office Real Estate Cycle						
Bellville Tyger Valley	✓				✓	
CBD Cape Town		✓		✓		
Century City	No data				✓	
Claremont		✓			✓	

Notes: *1 The real estate cycle for Pinelands after the sub-prime mortgage crisis display a recovery phase only and appear not to have entered expansion at end of study period yet.

*2 The real estate cycle for V & A Waterfront before the sub-prime mortgage crisis display an expansion phase only without recovery after the recession.

The discussed on the distribution of the quantitative data above is an initial exploration. The significance is that the data is not normally distributed, which therefore requires nonparametric statistical analysis (Keller, 2009). The next sections decompose the analysis into the different data sets per office node, except for the South African Business Cycle and real prime lending rate. These two variables are the same for all the office areas or nodes.

4.5.1.1 *The South African Economy*

The quantitative data analysis commence from the bigger picture, namely the South African economic perspective represented by the big circle encompassing all other in the data framework in Figure 14. The prime lending rate is superimposed on the business cycle to add another layer of information to the analysis. Interest rates affect decision-making of households and business on whether to invest in capital goods, such as building of new offices, or where to rent and therefore have important consequences for the health of the economy (Mishkin, 2010).

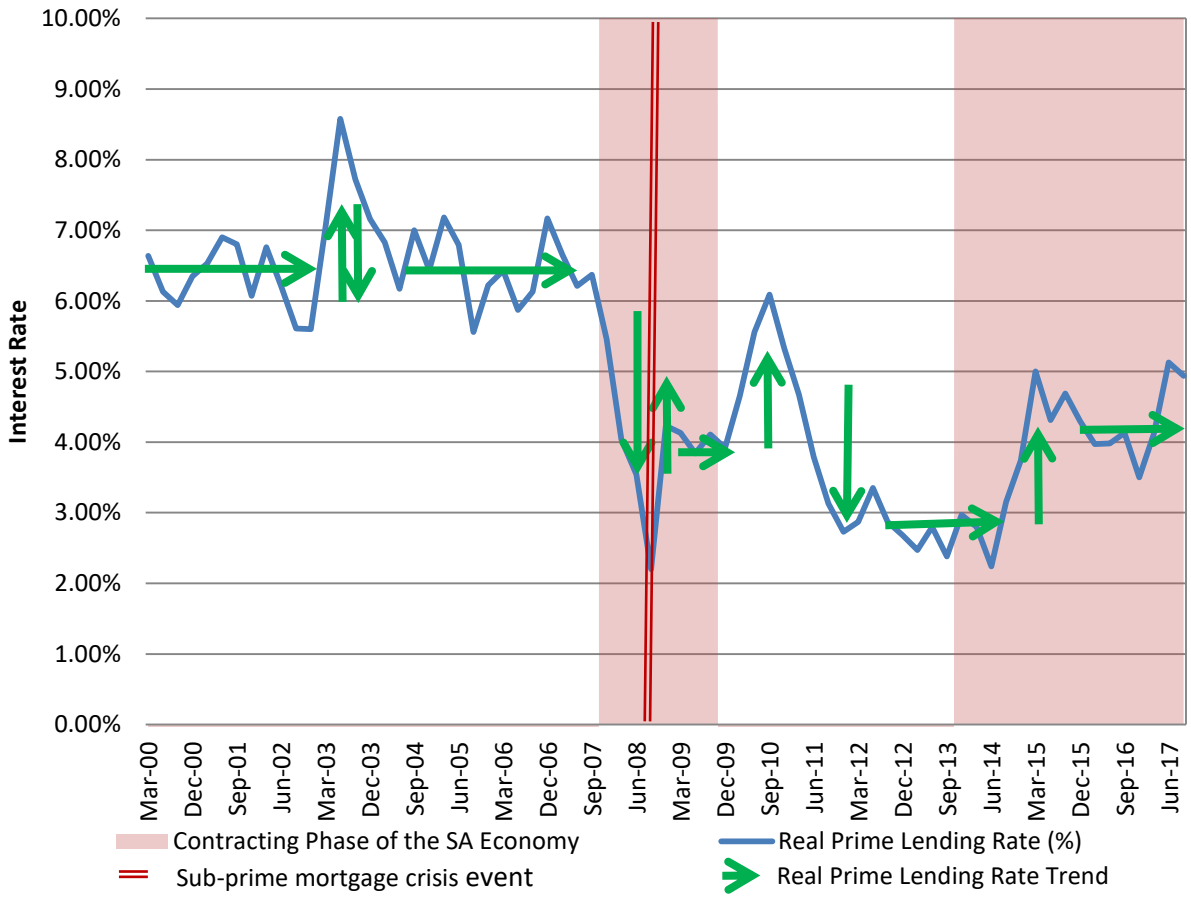


Figure 15: Data Analysis: The South African Economy and Banking Behaviour

The contraction of the South African economy and the sub-prime mortgage crisis show a remarkable correlation. The sub-prime mortgage crisis, although not an event at a specific point in time, is shown on the graph in Figure 15 as October 2008.

This is the date the USA stock market crash due to the fall in value of mortgage-backed securities on financial institutions' balance sheet (Mishkin, 2010). The green arrows show the trend of the real prime lending rate. The horizontal trend of the real prime lending rate is lower after the sub-prime mortgage crisis than before. An analysis of variance concludes that there is evidence to infer that the distribution of the real prime lending rate during the expansion phase before the sub-prime mortgage crisis and after the sub-prime mortgage crisis differ.

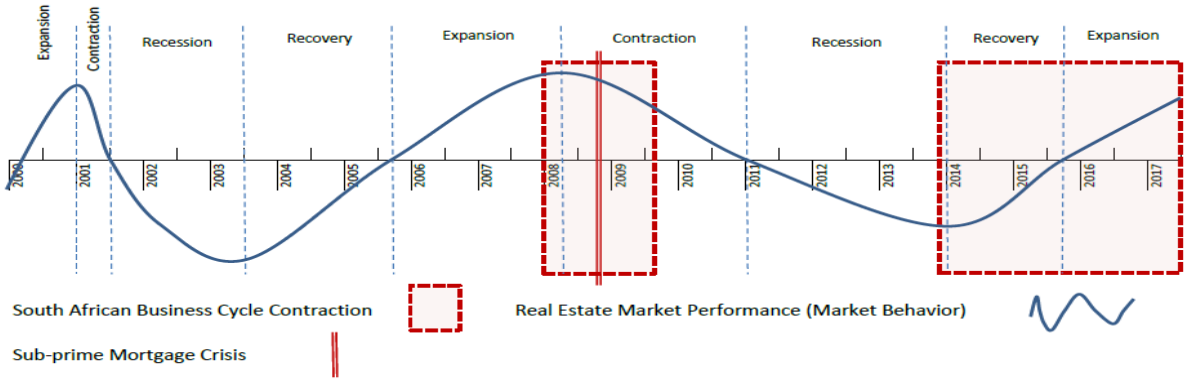
It appears therefore that banks' lending behaviour is different after the sub-prime mortgage crisis and that the price of a loan or the income received by banks / financiers from loans is less after the sub-prime mortgage crisis.

4.5.1.2 Real Estate Market Behaviour

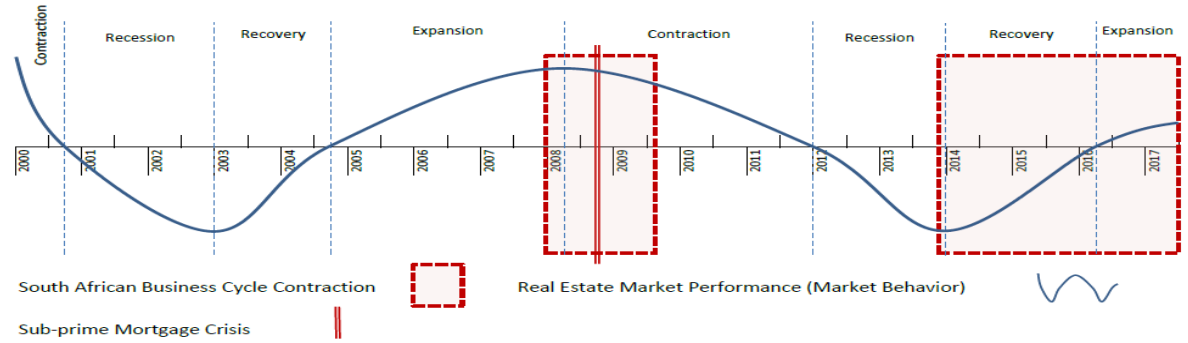
The Mueller and Laposa (1994) adaptation to infer a decision rule for turning points in the property market based on a comparison of *observed office vacancy rates* with *equilibrium office vacancy rate* (Pyhrr *et al.*, 1999) is used to explored the Cape Town office market. The real estate cycle phase nomenclature of Mueller & Laposa (1994) for each of the office nodes is superimposed on the contraction phases of the South African Economy and sub-prime mortgage crisis or the macroeconomic event. Figure 16 below illustrates this graphically. The behaviour of the real estate market is compared to South African business cycle and thereafter the behaviour of the real estate market during the recovery & expansion phase before the sub-prime crisis with the recovery & expansion phase after for each office node.

The first observation is that each office node's real estate cycle is unique to the other office nodes and the office real estate cycles are different to the South African business cycle, which is confirmed by research of Grissom and Delisle (1999), Barras (2009) and Hahn *et al.* (2016).

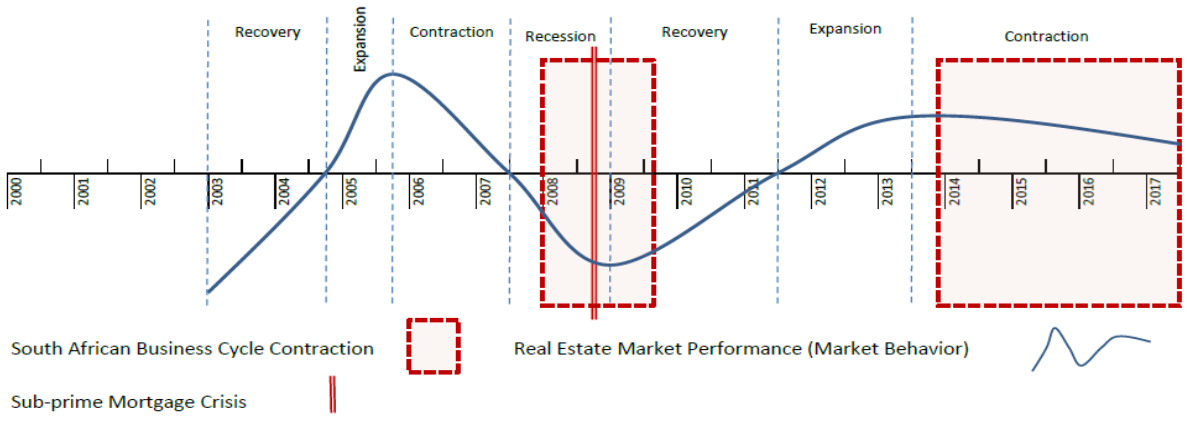
Bellville (incl. Tyger Valley) Office Node



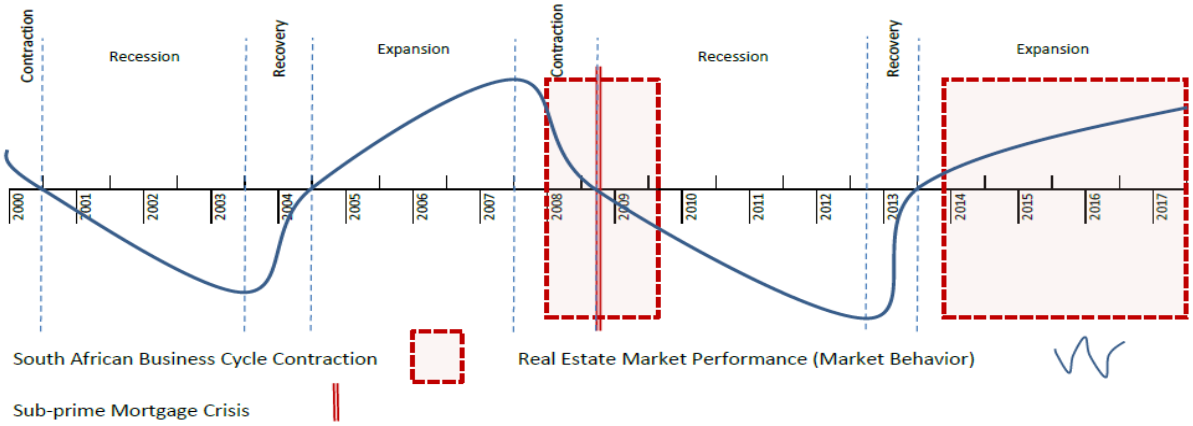
CBD Cape Town Office Node



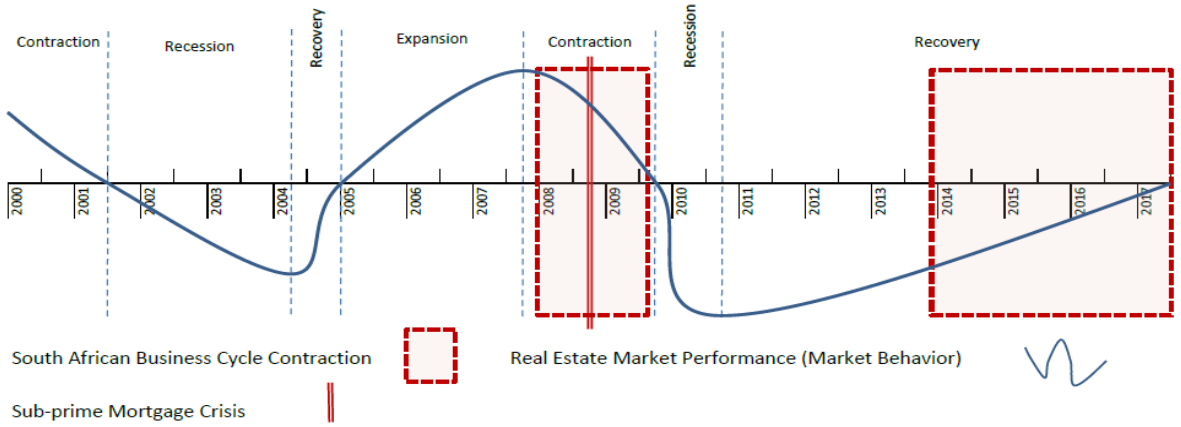
Century City Office Node



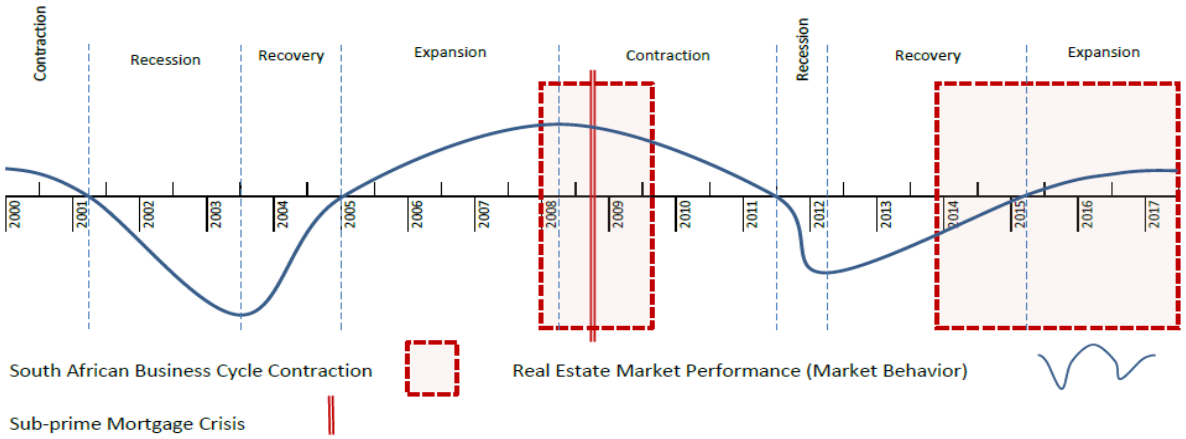
Claremont Office Node



Pinelands Office Node



Rondebosch / Newlands Office Node



V & A Waterfront Office Node

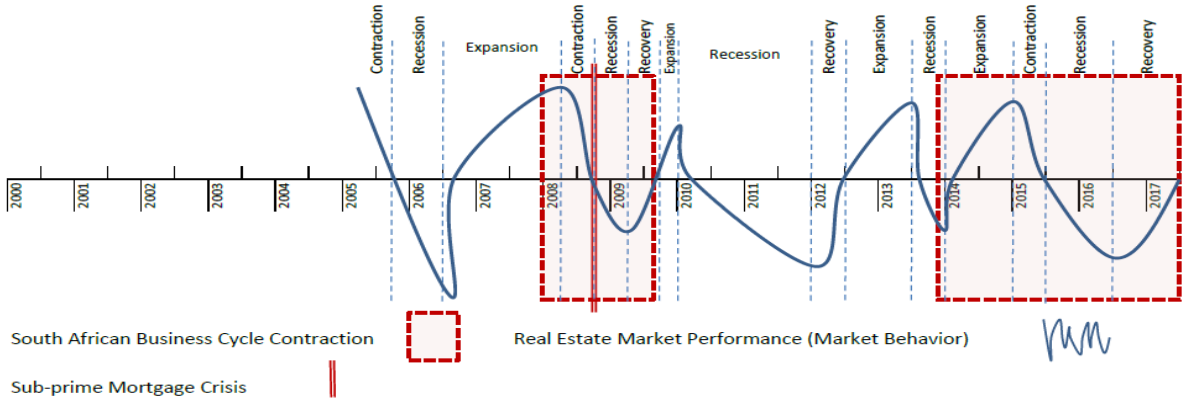


Figure 16: Data Analysis: Real Estate Market Behaviour

Start of the Property Boom

All the office nodes in Cape Town find themselves in a recession phase at the start of the property boom in 2002, except Century City and V & A Waterfront. The office nodes of Century City and V & A Waterfront did not exist at that time. Data for the Century City office node is available from December 2002 and for V & A Waterfront from March 2005.

Recovery Phase of the Office Market Before the Sub-prime Mortgage Crisis

The Cape Town office market recovers at different dates for the different office nodes. The first to recover is CBD Cape Town and Century City from December 2002; Bellville, Claremont and Rondebosch / Newlands from June 2003 and Pinelands from March 2004. The V & A Waterfront office node show no recovery phase but moves from recession into expansion in June 2006, which is the earliest (last) date for expansion of the office market before the sub-prime mortgage crisis.

The recovery appears to start from the more central office nodes with the sub-urban office nodes following. The V & A Waterfront seems as an anomaly but the date of 'coming onto the market' explains the last date for expansion.

Expansion Phase of the Office Market Before the Sub-prime Mortgage Crisis

Almost all the office nodes started with expansion phases from June 2004 to December 2004, i.e. Claremont from June 2004; CBD Cape Town and Century City from September 2004 and Pinelands and Rondebosch / Newlands from December 2004. Bellville only started its expansion phase a year later in September 2005 and V & A Waterfront almost a year after Bellville in June 2006.

Contraction and Recession Phases of the Office Market with the Sub-prime Mortgage Crisis

The office nodes in Cape Town contract almost in unison with the sub-prime mortgage crisis. Bellville, CBD Cape Town, Rondebosch / Newlands and V & A Waterfront office nodes all started contracting from March 2008 onwards. Claremont and Pinelands started contraction earlier from June 2007 and September 2007 respectively. It is only the contraction of the office market in Century City that shows an anomaly with the sub-prime mortgage crisis. The contraction of the Century City office market starts in September 2005 onwards, which is significant earlier than the sub-prime mortgage crisis date.

The contraction and recession of the office real estate cycle in Cape Town that follows after the sub-prime mortgage crisis is deeper or lasted longer than the contraction of the South African economy. The South African economy started to contract from the beginning of December 2007 and reached a lower turning point at the end of August 2009. The South African Economy started to expand at the beginning of September 2009, see Figure 16. The office real estate recession lifted only from late in 2010 for all the office nodes in Cape Town except two.

The Century City office node's behaviour is the opposite from the other office nodes in Cape Town. This office node shows a recovery & expansion from December 2008 to June 2013 coinciding with the expansion phase of the South African economy. The office market at Century City goes into a contraction phase thereafter, again coinciding with the contraction of the South African economy. Although the V & A Waterfront office node started recovering just after the Century City office node in

March 2009, it was short in duration. The V & A Waterfront office market moved from expansion into recession from December 2009 onwards, skipping a contraction phase, thus behaving similar to the other office nodes in that the market experienced a recession during the expansion of the South African economy.

Recovery Phase of the Office Market After the Sub-prime Mortgage Crisis

The Cape Town office market's behaviour after the sub-prime mortgage crisis is the inverse of the South African business cycle in that the contraction & recession phases coincide with the expansion phase of the South African economy. The following recovery & expansion of the office market coincides with the contraction of the South African economy, with as noted above, with Century City the exception.

The first office node to recover after the sub-prime mortgage crisis is Pinelands from September 2010, followed almost a year and half later by Rondebosch / Newlands from March 2012, Claremont from September 2012. Bellville and CBD Cape Town recovered from December 2013 more than a year after Claremont.

Expansion Phase of the Office Market After the Sub-prime Mortgage Crisis

The Century City office market anomaly is mentioned above. The V & A Waterfront display another type of anomaly with the other office markets in Cape Town in the sense that it display numerous phases of recovery, expansion, contraction and recession phases after the sub–prime mortgage crisis. Pineland's office market on the other hand has not moved from recovery yet and at time of this study was still in a recovery phase of its idiosyncratic real estate cycle.

The Claremont office market started expanding first on June 2013 followed by Rondebosch / Newlands from March 2015, Bellville September 2015 and CBD Cape Town the last to expand from March 2016.

The sequence of recovery and expansion of the Cape Town Office market after the sub-prime mortgage crisis appears to be the opposite from the sequence of the recovery and expansion before. The sub-urban office nodes started to recover &

expand first with the more central office node of Cape Town the last to expand after the sub-prime mortgage crisis.

Analysis of Variance on Office Vacancy Factor Variable

The analysis of the office vacancy factor of the seven office nodes in Cape Town is concluded with an analysis of variance with the purpose to infer if the distribution of the office vacancy variable during recovery & expansion before the sub-prime mortgage crisis differ from the recovery & expansion after the sub-prime mortgage crisis.

The results of the Kruskal Wallis H test statistic (a nonparametric test statistic for the analysis of variance because the required condition of a normally distributed variable is violated) is displayed in Table 6 below. The reason for the analysis of variance is to learn if the behaviour of the real estate space market (vacancy factor) changed after this significant macroeconomic event. The Kruskal-Wallis test can only determine whether a difference exist (Keller, 2009: 787). The test thus does not tell if the real estate actors extrapolated the knowledge and experience gained before the sub-prime mortgage crisis to the growth period after.

Table 6: Summary of the Analysis of Variance on the Distribution of Vacancy Factors during Recovery & Expansion Phases of the Real Estate Cycle Before and After the Sub-prime Mortgage Crisis

H_0: Vacancy factors are distributed the same way before and after the sub-prime mortgage crisis.		
H_1: Vacancy factors are not distributed the same way before and after the sub-prime mortgage crisis.		
	H_0	H_1
Bellville (incl Tyger Valley) Office Node	✓	
CBD Cape Town Office Node		✓
Century City Office Node	✓	
Claremont Office Node	✓	
Pinelands Office Node		✓
Rondebosch / Newlands Office Node		✓
V & A Waterfront Office Node		✓

There is evidence to infer that the distribution of the vacancy factor during recovery & expansion of the real estate cycle before the sub-prime mortgage crisis differ from the recovery & expansion of the real estate cycle after the sub-prime mortgage crisis in the office nodes of CBD Cape Town, Pinelands, Rondebosch / Newlands and V & A Waterfront.

4.5.1.3 Behaviour of the Real Estate Developer and/or Construction Market

The data on the supply of office space is explored to gain an understanding of the real estate developer. Paragraph 2.6.1 above explains the reasoning for the premise to use physical office space (more specifically the change in office space) as proxy for the real estate developer and/or construction market. Figure 17 display the office areas, in square meter for each office node over the study period.

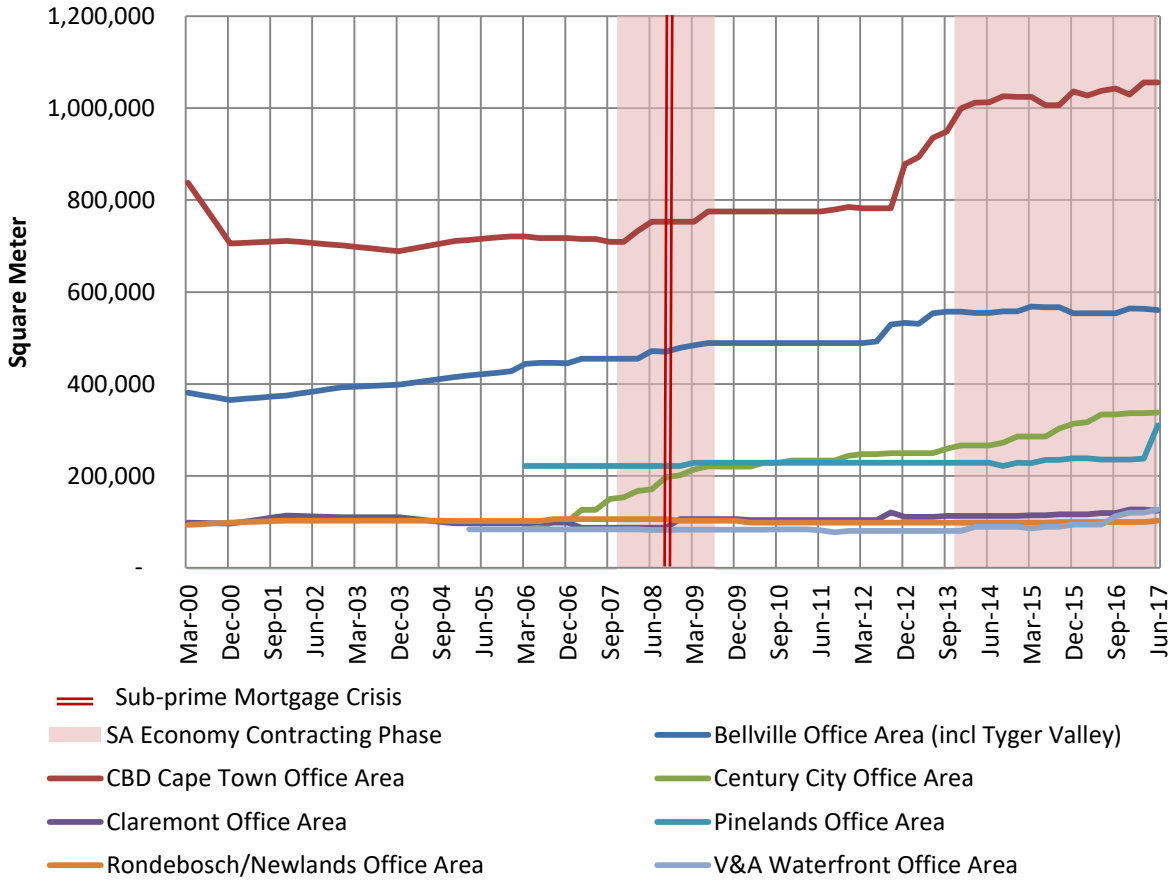


Figure 17: Office Areas Relative to Each Node

The physical character of the office market in Cape Town can be surmised from the graph in Figure 17. It is clear that the two biggest office nodes in the Cape Town office market are CBD Cape Town and Bellville (incl Tyger Valley). Century City office node display significant growth over the period. Claremont, Pinelands and Rondebosch / Newlands are relatively small in physical area, and located in sub-urban areas. V & A Waterfront is also relatively small in physical area but is centrally located next to CBD Cape Town. Figure 12 earlier in the report display the location of the office nodes geographically. A relative comparison of physical office areas between nodes is not unbiased. The Bellville (incl Tyger Valley) area is significant larger in geographical extent than the other office nodes. Of note, however is the prominence of CBD Cape Town in terms of physical office space despite a small geographical extent, which supports the observation of prominent high rise office development in the CBD compared to other office nodes.

This real estate developer act in the lower quadrant of the asset market of the DiPasquale and Wheaton (1992) model. The following data analysis seeks to understand the real estate developer and/or construction market's behaviour. The quantitative data analysis of the change in office area is employed to describe the behaviour of the real estate construction market by firstly comparing the supply of office space with the office real estate cycle and then comparing the rate at which office space is supplied before and after the sub-prime mortgage crisis. The presumption that real estate actors in the construction market may change their behaviour to accommodate the office real estate cycle and/or behave differently after the sub-prime mortgage crisis, is tested.

Two quantitative data analysis methods are executed, namely a trend analysis and an analysis of variance. The first is to describe the supply of office space with a trend line and to compare this tendency to the office real estate cycle derived from the vacancy factor and equilibrium vacancy factor for each node. Thereafter a test is executed to conclude if there is a difference in the rate of change in the supply of

office space during the growth periods before and after the sub-prime mortgage crisis.

Analysis of the Tendencies in Office Area Data

The linear trend line statistical technique aids the interpretation of the data through which the behaviour of the supply of physical office space and by extension the real estate developer is described. Trend analysis in this research is not employed to predict or to calculate a point estimate, but to justify statements about the tendencies in the data. The variable of interest in this analysis is the value of the gradient or slope of the linear equation. The value of the gradient or slope of the fitted linear line to the available square meter of office space provides thus a measure of the change in the supply of office space during a particular growing or decreasing phase of the office real estate cycle. Table 7 below provides a summary of the linear trend analysis.

The least square method, i.e. the method employed to fit a straight line through the available office space data, measures the strength and direction of the relationship of available office space over time (Keller, 2009). The direction of the relationship is shown by a positive or negative sign before the value. The phases of the office real estate cycle is for this analysis also shown as a positive sign for a growing market (decreasing office space vacancy) and negative sign for a decreasing market (increasing office space vacancy). An immediate observation is that the tendency in the supply of office space does not correlate with the real estate cycle in all instances.

The supply of office space that is anti-cyclical to the office real estate cycle alludes to overbuilt and underbuilt phenomena or cyclical behaviour. For the period before the sub-prime mortgage crisis the decrease and subsequent growth in office space coincide with the decrease and subsequent growth of the office market in the case of CBD Cape Town. All office nodes show increase in office space with a growing office market just before the sub-prime mortgage crisis with the exception of Claremont, which exhibits a decrease and Pinelands with no change of office space

area. Only Rondebosch / Newlands office node exhibit synchronisation in the supply of office space with its idiosyncratic office real estate cycle for the period after the sub-prime mortgage crisis. The V & A Waterfront exhibits weak supply of office space during real estate cycles. The change in supply of office spaces is prominent between its idiosyncratic real estate cycles of growing and decreasing after December 2013, which may indicate that the cycles may be induced by office space 'coming onto the market' or that the construction of office space is coordinated.

Table 7: Summary of the Trend Analysis of the Supply of Office Space and the Real Estate Cycle

Office Real Estate Cycle	Before			After							
Growing +	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Decreasing -	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**	**-**	**+**
	Value of the Slope in the Trend Equation										
Bellville (incl. Tyger Valley)	-57.6	38.3	40.6	34.5	2.1						
CBD Cape Town		-99.3	15.7	89.9	32.7						
Century City		122.97			24.6	66.7					
Claremont		14.3	-12.5	11.3	8.5						
Pinelands			0	9.4	10.5						
Rondebosch / Newlands		7.3	2.99	-5.6	1.4						
V & A Waterfront		0	0	2.9	0	-6.96	-0.002	0			
Before:	Means the growing and decreasing phases of the Office Real Estate Cycle preceding the sub-prime mortgage crisis.										
After:	Means the growing and decreasing phases of the Office Real Estate Cycle after the sub-prime mortgage crisis.										

The strong positive trend in change of office space for Pinelands, relative to the previous cycles for Pinelands is misleading. The Pinelands Office Node as depicted in Figure 12 includes the Black River Park precinct. The Black River Park precinct was added to the Pinelands Office node in the SAPOA 2017:Q2 report and the name of this office node changed to 'Central' in the SAPOA reports.

The data analysis above alludes to the potential of the real estate developer contributing to cyclicality in the office real estate market. The subsequent qualitative data analysis is used to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the analysis above.

Analysis of Variance on Supply of Office Space Variable

The analysis of the supply of office space of the seven office nodes in Cape Town is concluded with an analysis of variance with the purpose to infer if the distribution of the supply of office space variable during recovery & expansion before the sub-prime mortgage crisis differ from the recovery & expansion after the sub-prime mortgage crisis.

The results of the Kruskal Wallis H test statistic (a nonparametric test statistic for the analysis of variance because the required condition of a normally distributed variable is violated) is displayed in Table 8 below.

Table 8: Summary of the Analysis of Variance on the Distribution of the Change Rate of the Supply of Office Space during Recovery & Expansion Phases of the Real Estate Cycle Before and After the Sub-prime Mortgage Crisis

H_0: Vacancy factors are distributed the same way before and after the sub-prime mortgage crisis.

H_1: Vacancy factors are not distributed the same way before and after the sub-prime mortgage crisis.

	H_0	H_1
Bellville (incl Tyger Valley) Office Node		✓
CBD Cape Town Office Node	✓	
Century City Office Node	No data for period before	
Claremont Office Node	✓	
Pinelands Office Node	✓	
Rondebosch / Newlands Office Node	✓	
V & A Waterfront Office Node	✓	

The reason for the analysis of variance is to learn if the behaviour of the real estate construction market or supply of office space changed after this significant macroeconomic event. As with the real estate space market, the Kruskal-Wallis test

can only determine whether a difference exist (Keller, 2009). The test thus does not tell if the real estate actors extrapolated the knowledge and experience gained before the sub-prime mortgage crisis to the growth period after. There appears to be no evidence to infer that the distribution of the change rate of the supply of office space during recovery & expansion of the real estate cycle before the sub-prime mortgage crisis differ from the recovery & expansion of the real estate cycle after the sub-prime mortgage crisis, except for the Bellville (incl Tyger Valley) office node.

4.5.1.4 Behaviour of the Real Estate Investor

The data on the office capitalisation rate is explored to gain an understanding of the real estate investor. Paragraph 2.6.2 above explains the reasoning for the premise to use the office capitalisation rate as proxy for the real estate investor. Figure 18 display the office capitalisation rate for each office locale over the study period.

The Rode report lists capitalisation rates for offices in 'best locations', which for Cape Town are the areas of Cape Town CBD, Cape Town Decentralised, Bellville CBD, Bellville Tyger Valley, Century City, Westlake and Claremont. The 'best location' office areas or locales coincide with the office nodes for the vacancy factor and office areas, the other proxy variables in this study, in the following instances, namely Cape Town CBD, Bellville CBD & Bellville Tyger Valley, Century City and Claremont.

The purpose of the study is to explore the behaviour of the real estate investor and not to compare office nodes or geographic office areas. As such the office nodes or areas of the different variables do not necessarily need to be similar. However to be consistent and to acknowledge the finding by Coiacetto (2000), that real estate actors show similar behaviour within a locale but behaviour differ from locale to locale, the office locales (capitalisation rates) coinciding with office nodes for vacancies and office areas are used in the analysis of capitalisation rates for this study.

The capitalisation rate for Bellville CBD is excluded from the study and Bellville Tyger Valley is used in the analysis to represent Bellville office node. The reason being the data received from Rode for Bellville CBD contained missing values for periods

March 2006 to December 2010, September 2011 to December 2011, June 2012 to December 2012, September 2013 to March 2014 and September 2014 to June 2016. The missing data points render the analysis unreliable.

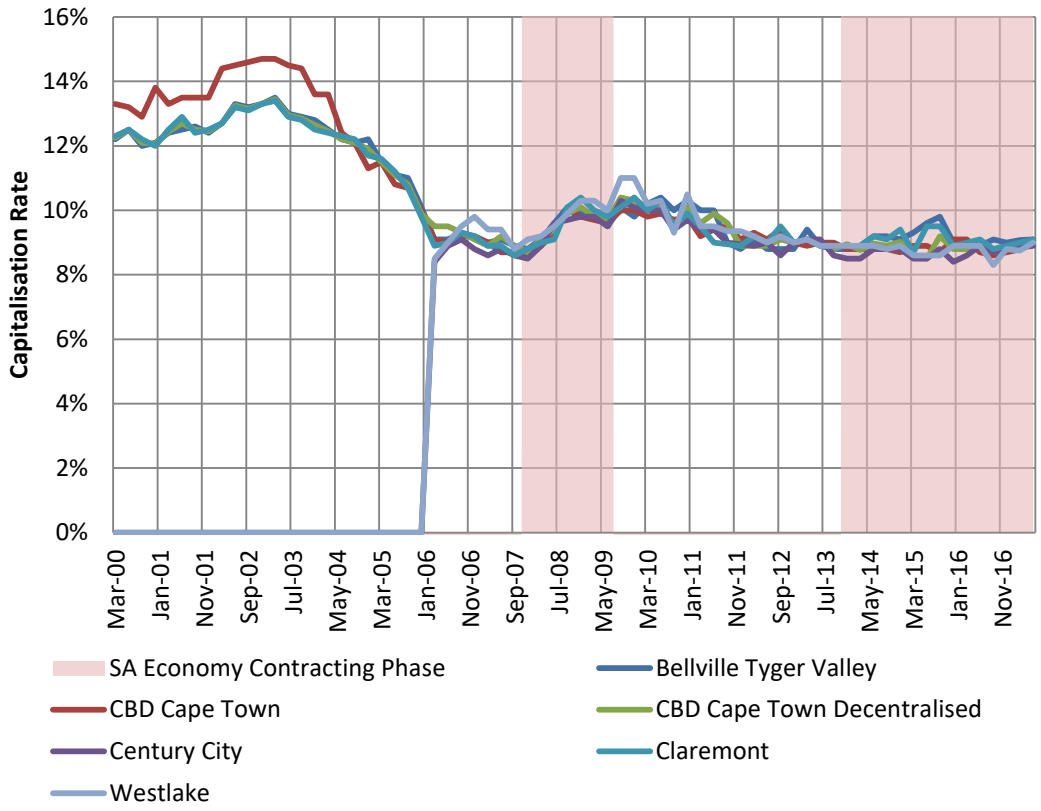
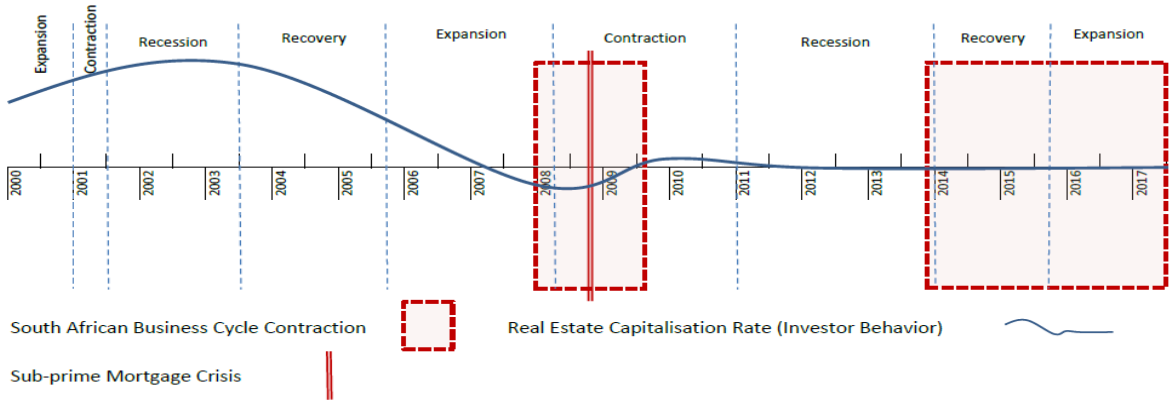


Figure 18: Office Capitalisation Rates for 'Best Locations' in Cape Town
Source: (Rode, 2000-2017)

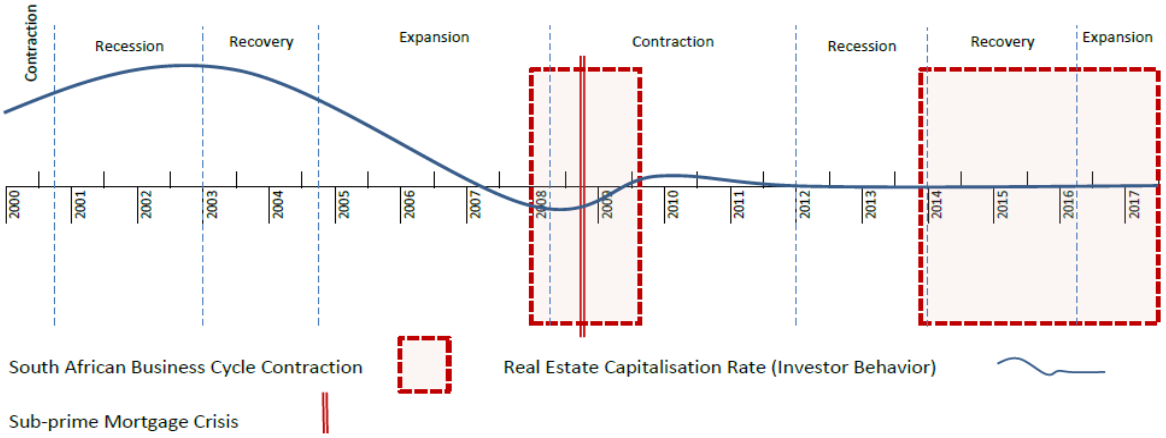
The capitalisation rates for the different locales over the study period show remarkable consistency. Only Bellville CBD and CBD Cape Town display higher value capitalisation rates for the period before the sub-prime mortgage crisis. Meaning the value (or purchase price) of offices was lower in Bellville CBD and CBD Cape Town compared to the other office locales. Because the capitalisation rates for the different locales are so similar a general capitalization rate curve is deduced. This generalized capitalization rate curve is then plotted onto the real estate market cycle of each office node, see Figure 19 below. The purpose, as with previous analysis is to describe the behaviour of the real estate investor. The analysis is not employed to predict or to calculate a point estimate, but to justify statements about the tendencies in the data and therefor the direction of movement of the

capitalisation rate is considered against the cyclicality of the economy and real estate market.

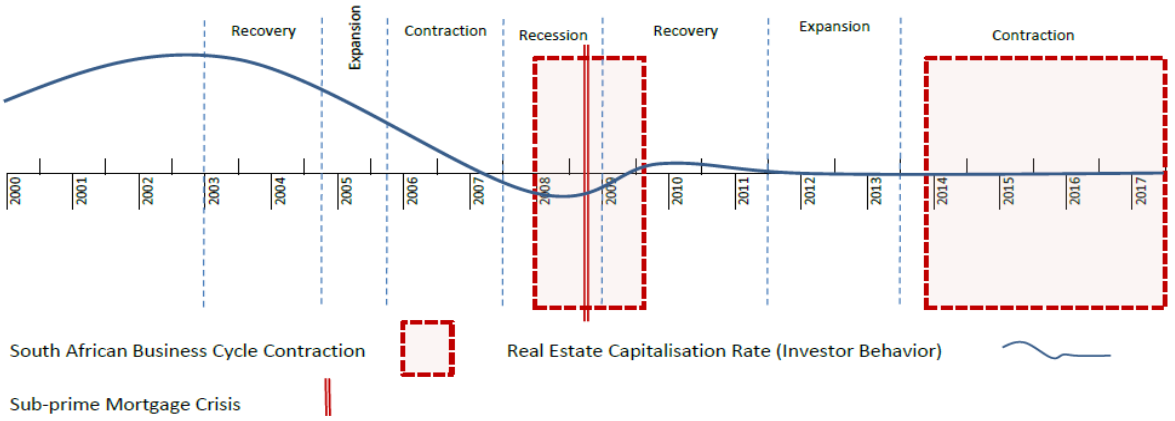
Bellville (incl. Tyger Valley) Office Node



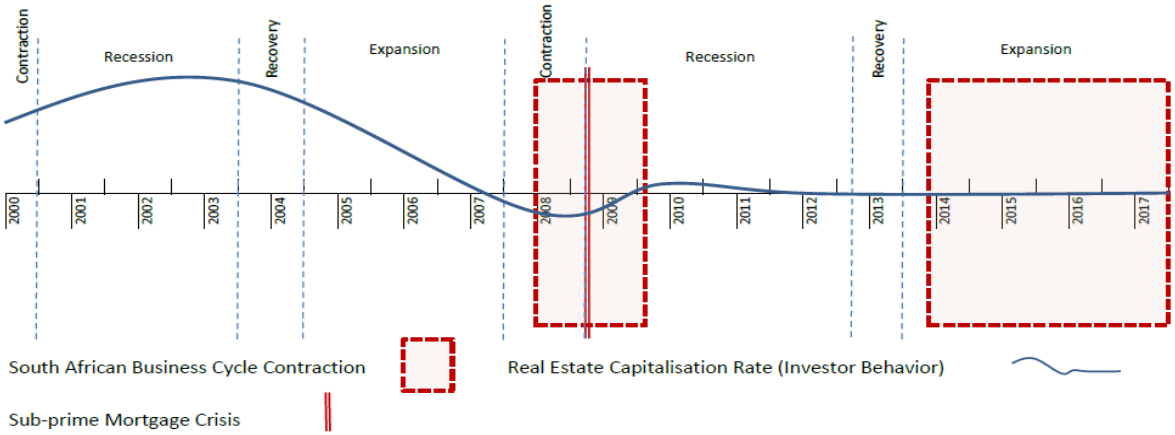
CBD Cape Town Office Node



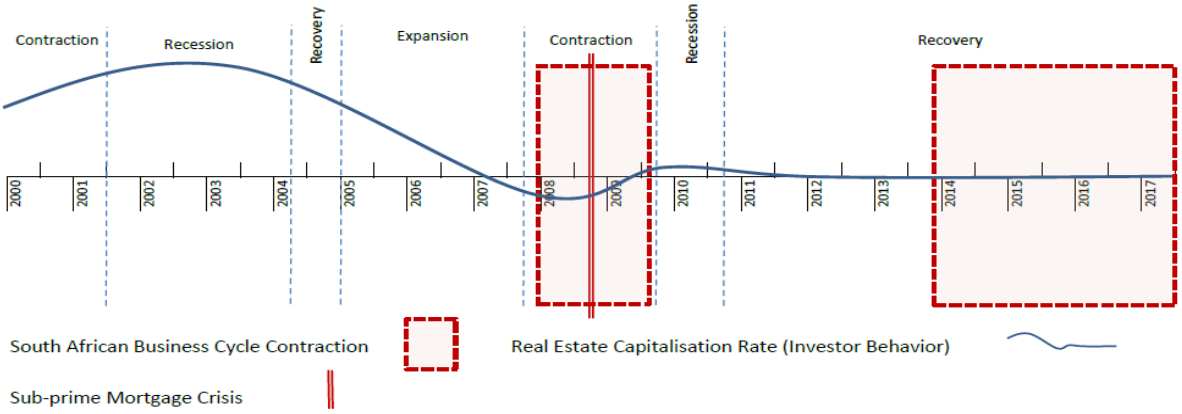
Century City Office Node



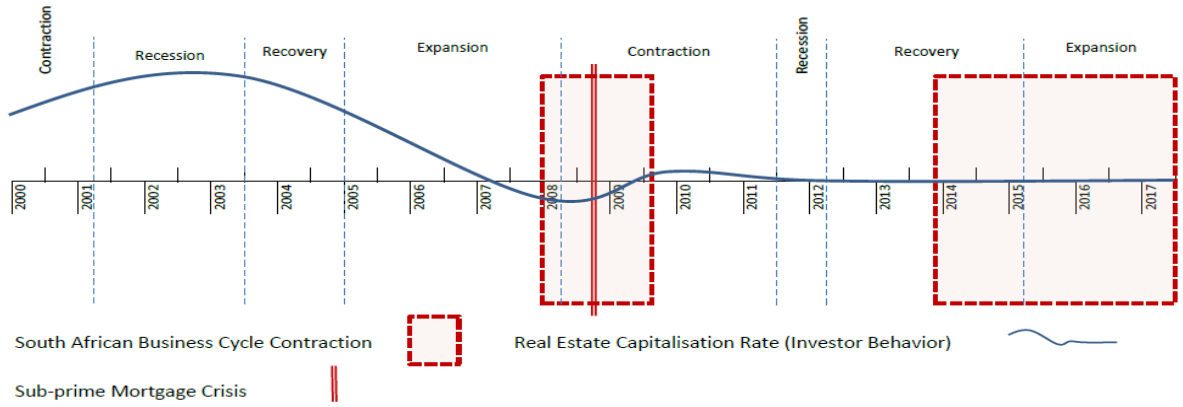
Claremont Office Node



Pinelands Office Node



Rondebosch / Newlands Office Node



V & A Waterfront Office Node

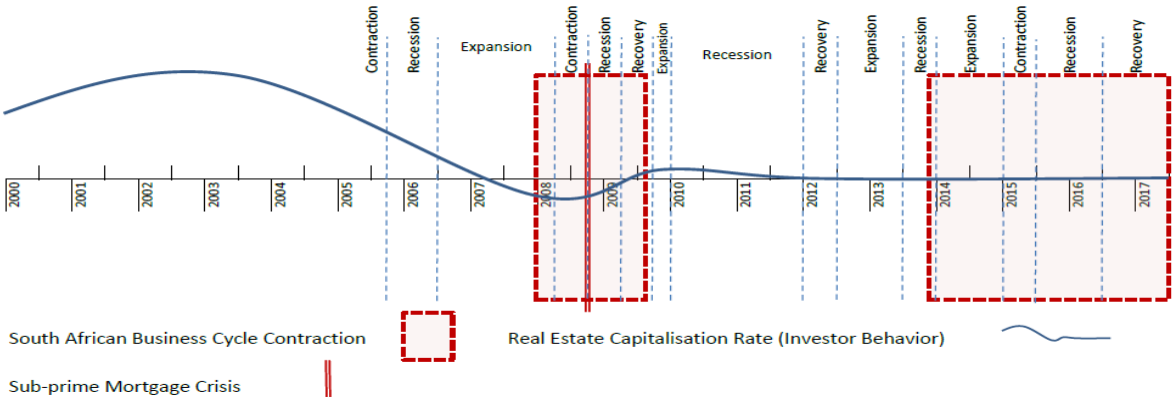


Figure 19: Data Analysis: Real Estate Investor Behaviour

The capitalisation rate reacts to the South African Business cycle before the sub-prime mortgage crisis. The price demanded by investors to invest in offices increased with the expanding economy and shows subsequently a decrease in asking price during the contraction of the South African economy. The capitalisation rate does not show a reaction to the idiosyncratic real estate cycle of the different office nodes. Of note is the office real estate investment sentiment remaining unchanged during the expansion and contraction of the South African economy after the sub-prime mortgage crisis. The semi-structured interviews are used to supplement, validate, explain, illuminate, or reinterpret the findings.

Analysis of Variance on the Capitalisation Rate Variable

The analysis of the office capitalisation rate in four of the seven office nodes in Cape Town is concluded with an analysis of variance with the purpose to infer if the distribution of the office capitalisation rate variable during recovery & expansion before the sub-prime mortgage crisis differ from the recovery & expansion after the sub-prime mortgage crisis.

The results of the Kruskal Wallis H test statistic (a nonparametric test statistic for the analysis of variance because the required condition of a normally distributed variable is violated) is displayed in Table 9 below.

Table 9: Summary of the Analysis of Variance on the Distribution of the Office Capitalisation Rate during Recovery & Expansion Phases of the Real Estate Cycle Before and After the Sub-prime Mortgage Crisis

H_0: Vacancy factors are distributed the same way before and after the sub-prime mortgage crisis.		
H_1: Vacancy factors are not distributed the same way before and after the sub-prime mortgage crisis.		
	H_0	H_1
Bellville Tyger Valley Office Locale		✓
CBD Cape Town Office Locale		✓
Century City Office Locale	No data for period before	
Claremont Office Locale		✓

The reason for the analysis of variance is to learn if the behaviour of the real estate investor changes after this significant macroeconomic event. As with the real estate space market and real estate developer, the Kruskal-Wallis test can only determine whether a difference exist (Keller, 2009). The test does not tell if the real estate actors extrapolated the knowledge and experience gained before the sub-prime mortgage crisis to the growth period after. There appears to be evidence to infer that the distribution of the office capitalisation rate during recovery & expansion of the real estate cycle after the sub-prime mortgage crisis differ from the recovery & expansion of the real estate cycle before the sub-prime mortgage crisis. The analysis of variance could not be done for Century City due to the unavailability of capitalisation rates for this office locale before the sub-prime mortgage crisis.

The inference on the office capitalisation rate distribution concurs with the inference that the distribution of the real prime lending rate during the expansion phase before and after the sub-prime mortgage crisis differ. The conclusion on the bank's lending behaviour is that the price of a loan or the income received by banks / financiers from loans is less after the sub-prime mortgage crisis. A similar conclusion may be possible for the real estate investor, i.e. that the real estate investment conditions after the macroeconomic event is less favourable than before. The lower capitalisation rate after the sub-prime mortgage translates into higher prices or a higher asking price by office real estate investors to transact in office real estate investment. The congruence between the capitalisation rate and prime lending rate is not surprising giving the explanation by Mishkin (2010) of the effect of interest rates on investment decision-making behaviour. The data obtained from the semi-structured interviews is used to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the Kruskal-Wallis H statistic on the office capitalisation rate.

4.5.1.5 Volatility of the Variables

This section borrows from the standard measure of risk in modern portfolio theory to further describe the behavior of office real estate in Cape Town. The argument of Müller *et al.* (2014) that volatility as measure of risk used together with other measures yields a more comprehensive picture is accepted. Volatility, as measured by the standard deviation is considered as complementary to the quantitative data analysis above, not as a quantitative risk measure but to describe the behavior of the subject real estate market. Table 10 below provides a summary of the standard deviation of the variables used above in the quantitative analysis above.

Claremont office space market appears to be the most volatile, with Pinelands and V & A Waterfront displaying the least variance in terms of office vacancy factor. The office node showing the most growth, namely Century City is, as expected also the most volatile in terms of growth in office area. Pinelands office node shows high volatility in terms of growth in office area after the sub-prime mortgage crisis. The high volatility in terms of growth in office area for Pinelands is misleading. The Black

River Park precinct was added to the Pinelands Office node in the SAPOA 2017:Q2 report and the name of this office node changed to 'Central' in the SAPOA reports. This volatility is thus not a result of new office development but rather as a result of change on nodal definition.

Table 10: Volatility of the Variables Used in the Data Analysis

	Vacancy Factor			Growth in Office Area			Capitalisation Rate		
	Full Period	Before	After	Full Period	Before	After	Full Period	Before	After
Bellville (incl. Tyger Valley)	2,6%	3,5%	1,8%	1,4%	2,0%	1,0%	1,6%	1,6%	0,3%
CBD Cape Town	3,4%	3,1%	1,6%	2,3%	0,9%	1,3%	2,1%	2,2%	0,2%
Century City	4,2%	6,1%	2,7%	5,6%	No data	2,0%	0,5%	No data	0,5%
Claremont	7,6%	9,0%	6,1%	4,0%	4,6%	2,7%	1,6%	1,5%	0,2%
Pinelands	1,5%	1,4%	1,0%	4,6%	0%	5,9%	No data	No data	No data
Rondebosch / Newlands	4,3%	4,8%	2,6%	1,0%	1,1%	0,6%	No data	No data	No data
V & A Waterfront	2,1%	0,6%	1,5%	3,7%	0%	0%	No data	No data	No data

Full Period:	Means the period from March 2000 to June 2017.
Before:	Means the recovery and expansion period of the Office Real Estate Cycle preceding the sub-prime mortgage crisis.
After:	Means the recovery and expansion period of the Office Real Estate Cycle after the sub-prime mortgage crisis.

A general observation on the volatility of the variables is that the office market appears less volatile after the sub-prime mortgage crisis than before. This phenomenon may be a sign of a delay in office investment as a result of uncertainty as meant by Bulan *et al.* (2009). The data obtained from the semi-structured interviews is used to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the volatility and linear trend of the supply of office area.

4.5.1.6 Relationship Between the Quantitative Variables

This section of the data analysis explore the relationship between the quantitative variables, namely the office vacancy factor serving as a proxy for the real estate

market, the growth in office area serving as a proxy for the real estate developer or construction market and the office capitalisation rate serving as proxy for the real estate investor.

Table 11: Measures of Linear Relationship

	Covariance Nature of Relationship			Coefficient of Correlation Linearity of the Relationship			Coefficient of Determination Strength of Relationship		
	Vacancy Factor & Growth in Office Space	Growth in Office Space & Capitalisation Rate	Capitalisation Rate & Vacancy Factor	Vacancy Factor & Growth in Office Space	Growth in Office Space & Capitalisation Rate	Capitalisation Rate & Vacancy Factor	Vacancy Factor & Growth in Office Space	Growth in Office Space & Capitalisation Rate	Capitalisation Rate & Vacancy Factor
Bellville (incl. Tyger Valley)	+	-	+	Weak	Weak	Medium	Weak	Weak	Weak
CBD Cape Town	+	-	+	Weak	Medium	Medium	Weak	Weak	Weak
Century City	+	-	+	Weak	Weak	Weak	Weak	Weak	Weak
Claremont	+	+	+	Weak	Weak	Medium	Weak	Weak	Weak
Pinelands	-	NA	NA	Weak	NA	NA	Weak	NA	NA
Rondebosch / Newlands	-	NA	NA	Weak	NA	NA	Weak	NA	NA
V & A Waterfront	+	NA	NA	Weak	NA	NA	Weak	NA	NA

Weak	Values < 0.33 for Coefficient of Correlation and < 35% for Coefficient of Determination
Medium	Values between 0.33 and 0.70 for Coefficient of Correlation and between 33% and 70% for Coefficient of Determination
Strong	Values > 0.70 for Coefficient of Correlation and > 70% for Coefficient of Determination
NA	Not available

Three numerical measures of linear relationship are calculated to provide information on the direction and strength of the linear relationship. The numerical measures are covariance, coefficient of correlation and coefficient of determination.

The purpose of measuring the relationship between the variables is to understand phenomena and extrapolate results to other situations and not to predict and generalise results as in the case with pure quantitative research. The expected outcome is thus only a description of a positive - or a negative linear relationship and a measurement of the strength of that linear relationship, see Table 11.

The strength of the linear relationship between the variables is weak. Linearity of the relationship as measured by the coefficient of correlation shows a medium linear strength for the relationship between capitalisation rate and vacancy factor. The nature of the relationship between capitalisation rate and vacancy factor appears to be mostly positive. Conclusions on the movement of one variable in relation to the other are unreliable as a result of weak measures for the strength - and linearity of the relationships.

4.5.1.7 Conclusion on the Quantitative Analysis

The quantitative data methods are executed to examine the behavioural component of the real estate actors in Cape Town, and although some understanding is gained, it fails to explain the processes and meaning of the behaviour of these real estate actors. Semi-structured interviews are conducted to do a qualitative data analysis to supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the quantitative data above (Amaratunga *et al.*, 2002). Table 12 summarise the trends discovered in the quantitative data analysis.

Table 12: Summary of the Trends Discovered in the Quantitative Data Analysis

Unit of Analysis	Variables	Trends in the Quantitative Data
The South African Economy	• Real Prime Lending Rate • SA Business Cycle	Bank's lending behaviour is different after the sub-prime mortgage crisis, real prime lending rate is lower meaning income from loans are less
Real Estate Market Behaviour	• Real Estate Market Performance (vacancy factors) • SA Business	Before sub-prime mortgage crisis: Sequence of recovery of office nodes starts from central nodes with sub-urban office nodes following
		The performance of all office nodes contract in unison with the sub-prime mortgage crisis

	Cycle	After the sub-prime mortgage crisis: The contraction and recession of the office real estate cycle is deeper and lasted longer that the contraction of the South African economy
		After the sub-prime mortgage crisis: The Cape Town office market's behaviour is the inverse of the South African business cycle
		After the sub-prime mortgage crisis: Sequence of recovery and expansion starts from sub-urban office nodes with central office nodes following
		Anomaly: The Century City office node's behaviour is the opposite from the other office nodes more or less coinciding with the South African Business Cycle
		Anomaly: The V & A Waterfront office node's behaviour display numerous periods of the real estate cycle in contrast to one period for the other nodes after the sub-prime mortgage crisis
		The distribution of the vacancy factor before and after the sub-prime mortgage crisis differ in four of the seven office nodes
Behaviour of the Real Estate Developer	• Physical Office Space in m^2 • SA Business Cycle	The supply of office space does not correlate with the real estate cycle in all instances
		The supply of office space that is anti-cyclical to the office real estate cycle alludes to overbuilt and underbuilt phenomena
		There is no evidence to infer that the distribution of the change rate of the supply of office space before and after the sub-prime mortgage crisis differ
Behaviour of the Real Estate Investor	Capitalization Rate SA Business Cycle	The real estate investor's behaviour more or less coincide with the South African economy but does not react to the real estate cycle
		After the sub-prime mortgage crisis: The investment sentiment did not react to the South African Business Cycle but the investor is asking a higher purchase price than before the sub-prime mortgage crisis
		The distribution of the office capitalisation rate before and after the sub-prime mortgage crisis differ
Volatility of Variables	All variables	The volatility of the variables appears less after the sub-prime mortgage crisis alluding to a 'hold-and-wait' strategy by real estate actors
Measuring the Linear Relationship between Variables	All variables	The strength of the linear relationship between the variables is weak
		A positive linear relationship between capitalisation rate and vacancy factor is the only notable one

4.5.2 Qualitative Data Analysis

This study is concerned with participant's reality or experience of phenomena, which Mallard (2016) name behavioural institutionalism. Behavioural institutionalism is the theory of understanding how people make economic decisions or specific to this

study to describe the behavioural determinants of real estate investment decision-making. The scientific study of the behaviour and the mind of individuals are called psychology. There are two established methods within psychology to analyse qualitative data, namely interpretative phenomenological analysis (IPA) and Giorgi's descriptive phenomenology (Smith and Osborn, 2015). IPA place emphasis on the case and capturing particulars of participant's experience while the Giorgi's approach is more concern with the general structure of the experience for the group (Smith and Osborn, 2015). The latter methodology is congruent with the ethos of this study to explore agency relations of real estate actors by acknowledging the interrelation of the structuring dynamics and the constitution of interest and strategies as posited by Healey and Barrett (1990).

Giorgi's descriptive phenomenology follows 5 steps, which are "… (1) assume the phenomenological attitude. (2) read entire written account for a sense of the whole, (3) delineate meaning units, (4) transform the meaning units into psychological sensitive statement of their lived-meaning, and (5) synthesize a general psychological structure or experience base on the constituents of the experience" (Broome, 2011: 3).

4.5.2.1 The Participant's Reality or Experience

Semi-structured interviews are used as a data-collecting method on the behaviour of real estate actors in real estate investment decision-making. The method and analysis is discusses in section 3.4 above and is not repeated here except to remind that the study is executed within an emergent research design. The results of the quantitative data analysis were used to inform the qualitative data-collecting procedure during the second step of the sequential explanatory design with presenting the results of the quantitative data analysis to the semi-structured interview participants. Table 13 summarise the themes and guidelines used in collating the data from experienced and expert interviewers.

Table 13: Themes and Guidelines of the Questionnaire

Research Question	Does the behavioural determinants of real estate actors in real estate investment decision-making influence regular periods of over- and under-building?
Themes	Guidelines

Quantitative data trends	• Quantitative data analysis:
	  ○ Behaviour of South African Economy - South African Business Cycle and real prime interest rate
	  ○ Behaviour of Offices or Users – Vacancy rates
	  ○ Behaviour of the Real Estate Developer – Office areas in square meters
	  ○ Behaviour of the Real Estate Investor – Capitalisation Rate for Offices per office Node

Investment variables / indices / rates	• Hunch or gutfeel • Traditional valuation methods • Advance valuation methods • Combination of methods
Investment models of judgement / procedural methods	• Simplistic mathematical model • Advance valuation methods - descriptive • Advance valuation modelling – prescriptive • Requisite modelling
Institutional environment	• Process for real estate investment decision • Consideration of cyclicality, other actors and the future
Project ecology	• Core team • Firms / consultants • Stakeholders / advisors

The availability of experienced and expert interviewee's for the interviews supported the semi-structured interview data-collection method (Welman *et al.*, 2009). The intent of the semi-structured interviews is to understand the essence of the experience of the real estate actors. Morse (1994) as cited by Denzin and Lincoln (2000) suggest that six participants in the semi-structured interviews will suffice to achieve this. Table 14 below provides a synopsis of the participants in the interviews and show a collective experience in real estate of 142 years.

The interviews were conducted with an interest in the meaning and perception of the real estate actors of their lived world in real estate investment. The verbatim transcripts were demarcated into meaning units, which are transformed subsequently into psychological sensitive statements of the participants lived-meaning. The sections below analyse the meaning units to infer a general psychological structure

or experience based on the constituents of the participants' experience. The analysis is presented in a narrative form, broken up into the themes of this study, which are listed in Table 13 above. The perspective used to distil this general psychological structure is the real estate investment behavioural determinants that may influence over- or under-built situation in the real estate market.

Table 14: Participant's Experience

Participant	Role	Experience		
		Years in this position	Years in the organisation	Years working in real estate
1	CEO of real estate development company (small personnel component)	9	9	22
2	Development feasibility analyst at a real estate development company	2,5	2,5	4
3	Property broker at a real estate development company (large personnel component)	3,5	3,5	15
4	Real estate investment economist	10	19	19
5	CEO of a real estate investment solution intermediary	4	4	48
6	Regional / Provincial Manager at a financial intermediary	7	7	34
	Real Estate Experience in Years		142	

The Participant's Experience or Reality of the South African Economy

The actors directly involved in real estate investment provided limited lived experience on the South African economy, while the actor with a financial intermediary in contrast provided significant more meaning units on this topic. The gist of the participant's reality of the South African economy is the acknowledgement of a relationship between lending rates and the market for money or supply of money.

The financial intermediaries display sensitivity towards risk and the supply of money in considering loans for real estate, meaning a bank reduce the supply of money in times of uncertainty. There is an internal tension within financial intermediaries between avoiding risks and earning an income as banks have to lend money to earn income.

External events such as macroeconomic events and/or politics result in behavioural change of real estate actors. In times of uncertainty investors lent less which reduces income to financial intermediaries. In turn the financial intermediary uses mainly interest rates and loan-to-value to influence the lending behaviour of the real estate investor and – developer based on perceived risk and sentiment in the market.

The Participant's Experience or Reality of the Real Estate Market Behaviour

The office real estate cycle derived from vacancy rates served as a proxy for real estate behaviour in the quantitative analysis. A significant meaning unit collected from the qualitative data analysis is that local area knowledge is more important than the real estate cycle in investment decision-making. One of the explanations offered is that each office node is at a different point in the cycle making it difficult to extract meaning from the analysis. Another is that real estate investment decision-making is centred around one individual or couple of individuals. Real estate investment thus seems less about a study of variables but more about expert knowledge, skills and experience in real estate specific to a geographical area and/or real estate sector or specific type of real estate investment.

The real estate supply characteristics of office nodes are perceived as a cause of cyclicality and the idiosyncratic nature of each node's cycle. An overbuilt situation may be caused by simply release new or additional office space onto the market, which explains the multiple real estate cycle periods of the V & A Waterfront office node behaviour for the period after the sub-prime mortgage crisis versus only one real estate cycle period for the other nodes. It is further not always possible to harmonise the supply of real estate with the economy because of real estate development lag factors, which validates the tendency in the supply of office space

not to correlate with the real estate cycle shown in section 4.5.1.3 above. The experience of the participants provides a richer meaning to this statement in that there is potential to harmonise the supply of real estate with the economy where there is land and/or real estate buildings available. Century City and V & A Waterfront are examples where there is land and/or buildings available for take-up in an economic growth phase in control of a single real estate developer. The Century City office node's real estate cycle behave similar to the South African economy, confirming this lived experience from the participants. In contrast other nodes such as Bellville, Claremont, Newlands and CBD Cape Town is already built-up with multiple real estate actors meaning that there is less coordination over the timing of when real estate comes onto the market for re-development or real estate investment.

The Participant's Experience or Reality of the Real Estate Developer's Behaviour

The supply of office space in relation to the office real estate cycle serves as proxy for the real estate developer's behaviour in the quantitative analysis. The lived experience of the participants is that the real estate developer tries to coordinate real estate development with the real estate cycle. Previous research of Wheaton (1999) that real estate agents that forecast leads to a less cyclicality in the market, while myopic behaviour by agents promotes oscillations is confirmed by the participants. Foresight versus myopia is however not an either-or-choice in the world of a real estate developer. Participants shared situations of developer's trying to beat the competition, which confirms the research of Grenadier (1996) that real estate developers, fearing pre-emption by a competitor, proceed into a 'panic' equilibrium in which the supply of real estate occurs during a market downturn.

The participants offered further meaning to the behaviour of the real estate developer with the explanation that the real estate developer is driven by demand and avoids an overbuilt situation by matching a user with an opportunity. The matching of a user with an opportunity is done by employing agency and the use of the real estate actor's network.

The Participant's Experience or Reality of the Real Estate Investor's Behaviour

The capitalisation rate (cap rate) plotted over time in relation to the real estate cycle serves as proxy for the behaviour of the real estate investor. Interesting observations by the participants found in the qualitative data are that the cap rate is not always understood and banks prescribing the cap rate value by insisting on certain value for the cap rate in an application for financing real estate investment. Participants understood the cap rate to be a function of return on investment and /or market expectation. The lower cap rate after the sub-prime mortgage crisis means that investors are asking a higher price for real estate investment. The uncertain political situation in South Africa after the sub-prime is offered as explanation by the participants for this behaviour. This also illuminates the observation of less volatility in the quantitative variables for the period after the sub-prime mortgage crisis, and thus providing an explanation for the quantitative data analysis supposition of a hold-and-wait strategy by real estate actors. The relevance of this on real estate market cyclicality is that a hold-and-wait strategy may lead to an underbuilt situation considering the lag factor or lead time characteristic of real estate development.

The Use of Investment Variables by Real Estate Actors

The investment variables or methods of valuation used by real estate actors are predominantly traditional such as income, building costs, comparables and capitalisation rates. Advance valuation methods such as hedonic pricing or fuzzy logic to determine the value of an investment could not be found in the qualitative data analysis.

A graduation from a reliance more on agency with specialist skills, knowledge and experience from the real estate developer to the use of a larger number of variables by the real estate investor and financial intermediaries is found. The world of the real estate developer is focussed more on income versus cost, which upon deciding on a viable project is structured into a feasibility study to engage the more formalised system of the financial intermediary for a real estate investment loan. The financial intermediary is structured and employs resources to do comprehensive traditional

valuation methods to ascertain the risk and value of a real estate investment but no evidence is found of using advance valuation methods.

The Use of Investment Models of Judgement by Real Estate Actors

A similar pattern of graduation to investment variables is found in models of judgement. From normal spreadsheets by the real estate developer to purpose built quantitative models with some qualitative inputs by the real estate economist on the other side of the spectrum. The experience of the participants is a focus by the real estate developer on agency and strategy in the form of negotiation and reliance on specialist skills, experience and knowledge to understand the viability of a real estate project, and management thereafter mostly through costs and income factors. The real estate investor and financial intermediary on the other hand have a focus beyond the real estate project, a more long term outlook, thus considering the quality of the user / tenant and affordability of the lender and investments other than real estate. The qualitative data analysis is ambiguous on the use of descriptive- and/or prescriptive modelling, as meant by French (2001). It is clear though that for the real estate investor and financial intermediary the procedural methods to ascertain the feasibility of a real estate investment is formalised within an institutionalised analytical environment.

The real estate investment economist, providing a specialist service to the real estate investment fraternity approach advance models of judgement in the sense that the models goes through continuous improvements from lessons learnt in past applications, thus a form of evaluation heuristic as meant by French (2001). An insight shared by this participant is that real estate developers sometimes employ them to convince shareholders or financial intermediaries with their more advance models of judgement of the viability of a real estate project which they as real estate developers already believe in.

Description of the Institutional Environment of Real Estate Actors

A similar pattern of graduation to models of judgement is found in the institutional process of real estate actors. The participant's experience on a real estate

investment decision by a real estate developer is from an impromptu informal discussion by an individual with co-workers or network members to regular meetings by a couple of individuals. The real estate developer's lived world is not committee meetings or statutory processes as in the case of a REIT and/or financial intermediary, but agency and strategy in the form of negotiation and reliance on specialist skills, experience and knowledge to understand the viability of a real estate project.

Description of the Real Estate Actors Involved in Real Estate Investment Projects

The qualitative data analysis on the working of networks within real estate investment provides some insight on the interrelation of real estate actors and cyclicality in the market, more so than the qualitative data analysis of variables, models of judgement and institutional environment. The real estate investment process is a team effort and networks are important for successful execution of a real estate investment project.

More than one participant alluded to the characteristic of a specific identity or specialisation, i.e. a real estate actor must be clear on 'who he or she is'. Banks for instance trade in money not property and are thus structured to contract real estate with no perceived possibility of default on repayment of interest. Banks do not develop or trade directly as a norm in real estate. There is more variety or choices in the real estate developer's identity, but similarly the real estate developer must be clear on whom he/she is and on the role he/she plays in the real estate development process. One participant indicated specialisation in projects where land use rights are already in place together with development potential (land use rights, which is more than the actual physical development on site) within a specific and narrow real estate sector. The qualitative data reveals that even the intermediaries or service providers to the real estate development process specialise and as such each actor performs a specific role in the real estate development process.

The real estate actors and specifically the real estate developer use his networks to bring a real estate development to the market on time, this being the second

characteristic on networks. This is done in two ways. The first is to gain a competitive edge through working with a network and the second is using the network to deliver a real estate project efficiently.

The lived world or reality of the real estate actor is real time knowledge of the market to gain a competitive edge. This is achieved through interaction or contact with other real estate actors, learning about real estate prices, movement in vacancies etc. before it is published in industry reports or made known in general. To gain the competitive edge in real estate investment the real estate actor has to learn about an opportunity meeting a demand before it is made publicly known and then act efficiently.

To execute a real estate investment project efficiently requires an appropriate network. The experience of the participants confirms the project ecology framework as presented by Henneberry and Parris (2013) in that real estate actors utilise latent networks in real estate investment projects, participant's made specific mention of an equity partner in the one instance and a REIT in another in executing real estate investments. The use of professional service providers to mobilise swift trust (Henneberry and Parris, 2013) is part of their experience with reputation being important. The participants confirm the preference for forming a project team with real estate actors known or on referral bases supporting the importance of reputation among real estate actors. Approaching the same financial intermediary for funding is used to great effect in bringing the real estate investment onto market on time as the financial intermediary's rigid institutionalised process is negotiated in a shorter time with an established relationship between the bank and the client.

The final characteristic of networking discovered through the lived meaning of participants is signalling. This occurs when a real estate actor indicates a preference or opportunity in the market place through some understood form of behaviour (Ball, 1998: 1505) This may be informal by way of communication through the network of real estate actors or structural. A participant shared his experience of the importance of making the capital he/she has available and the requirements thereof known to match supply and demand. Mishkin (2010) and Ball (1998) explain how high

transaction costs (typical in real estate investment) and risk influence the structure of real estate institutions. The structure of financial intermediaries is mentioned above but also real estate developers structure their business model around networks. A participant explains that, being a real estate developer he/she is in a better position to accept development risk while the REIT, he/she partnered with has a larger trade footprint and more formalised structure putting the REIT in a better position to manage the long term tenanting of the property, thus forming an efficient and robust partnership in real estate investment projects.

4.5.2.2 Conclusion to the Qualitative Analysis

The foremost finding from the general psychological structure based on the constituents of the participants' experience is that real estate actors do not deliberately consider cyclicality in their investment decision making. Knowledge about the real estate cycle is implicit in their behaviour with local area knowledge and agency more cognisant in real estate investment decisions making.

The Giorgi analytical techniques were used to arrive at the findings above. The way it was done in this study is as follows: The phenomenological attitude was assumed meaning the researcher intentionally will an awareness state of simply being present and see the data as it appear in its own context without presuppositions and/or judgements (Broome, 2011). Reading of the entire transcript is done in this attitude to conduct a critical reflection on the participant's experience of the phenomena described (Broome, 2011). The next step in the data analysis is the demarcation of the transcripts into 'meaning units'. This makes the data manageable (Broome, 2011). The transition from one concept or idea to the next in the narrative of the participant signals a fault line between meaning units. Each meaning unit is enclosed in square brackets ([ ]) with a numerical label in superscript at the beginning of the meaning unit, see copy of a transcript add under Appendix C. The numerical label is transferred to a table (see Appendix XIV of the data book) where the meaning unit is transformed into a psychologically sensitive descriptive expression or statement of lived-meaning. Each psychologically sensitive descriptive expression is categorised into a 'clue word', which is a descriptive word of the notion

or character of the statement of lived-meaning. These clue words were analysed to assist in the synthesis of a general psychological structure or experience base on the lived world of the real estate actors. The analysis of the clue words are summarised in Figure 20.

From the analysis of the clue words it appears that agency is rather used to successful negotiate the complex milieu of real estate investment. The analysis of the meaning units derived from the qualitative data shows that only 12% of the meaning units or lived experience of the participants is about investment variables and feasibility studies (models of judgement) while 47% is about agency, strategy and networking, collectively called 'to hustle', which is "to have the courage, confidence, self-belief, and self-determination to go out there and work it out until you find the opportunity you want…" (Louis, 2017). A summary of the Analysis of the Qualitative Data on the Behavioural Determinants of Real Estate Actors in Real Estate Investment Decision-making is shown graphically in Figure 20.

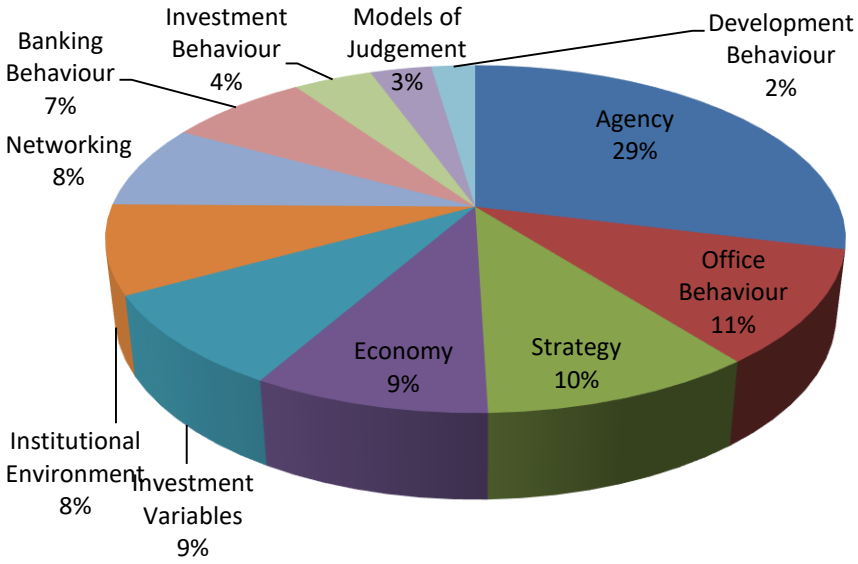


Figure 20: Summary of the Analysis of the Qualitative Data on the Behavioural Determinants of Real Estate Actors in Real Estate Investment Decision-making

Source: Qualitative Data

4.6 In Conclusion

The lived experience of the participants shared through the semi-structured interviews did supplement, validate, explain, illuminate and reinterpret some of the quantitative data analysis phenomena and suppositions.

The discussion of the findings in the next chapter takes the quantitative - and qualitative data analysis and synthesise it into a coherent whole or narrative on the behaviour of real estate actors. The data analysis above is presented in the data collection structure or sequence of quantitative to qualitative, and reference to the research question is thus implicit. The next chapter will lose the data collection structure with synthesis addressing the research question and objectives explicitly.

Chapter 5: Discussion of the Findings

5.1 *Introduction*

This chapter presents a coherent whole or narrative of the quantitative to qualitative sequential exploratory data analysis in the previous chapter. The judgements, beliefs and preferences of real estate actors were explored through the qualitative data analysis. The quantitative data analysis revealed trends in the office real estate market of Cape Town that were used as input into the exploration of the behaviour of the real estate actors. The exploration of the behaviour of real estate actors is used to gain a better understanding of how, and the degree to which, the behaviour of the actors involved exacerbate real estate cycles, that is the endogenous causes of real estate cycles.

5.2 *The Behavioural Determinants of the Real Estate Actor*

This coherent whole or synthesis is focused on the behaviour of real estate actors in the context of Cape Town's office real estate market cyclicality, i.e. to answer the research question:

> Does differences in the interpretation of investment variables of real estate actors in real estate investment decision-making influence regular periods of over- and under-building?

The study found that the real estate actor behaviour are driven by the bounded nature of information, because the future is unknown and the bounded rationality of the real estate actor, referring to the inability of the real estate actors to adapt optimally, or even satisfactorily, to the complex real estate investment environment. It can therefore be said that the behaviour of real estate actors do have an influence on market cyclicality based on the tenets of information – and bounded rationality theories.

The participants in the semi-structured interviews explain, for instance that local area knowledge is more important than real estate cycle information in investment decision-making, which corroborate the theory of tension between the need of

information for real estate investment against the bounded nature of information as the future is unknown (Ball, 1998). The real estate actor in other words confines information to alleviate the bounded nature of information. The notion of 'know who you are' or specialisation, also picked up in the semi-structured interviews, is related to local area knowledge but points to the limits upon the ability of real estate actors to adapt optimally, or even satisfactorily to complex environments (Simon, 1999). Significantly the participants revealed a behavioural trait of negotiation, and the use of unique knowledge and skills, which points to the use of agency to liberate the bounded rationality of the real estate actor.

The proposition of this research is:

> Endogenous causes of real estate market cyclicality are a result of the subjectivity of real estate actors in the use of investment information in the development system.

The proposition developed at the beginning of the study is supported by the results of the data analysis to some extent. The qualitative data analysis did reveal subjectivity of the different real estate actors in the interpretation of investment variables. The real estate developer is more parsimonious in the interpretation of investment variables, relying more on experience to using a lot of detail in the interpretation of investment variables by investors / banks / real estate investment economist, relying on vast amounts of data and/or studies.

The interpretation of investment variables is an expression in the research question underpinned by the four objectives of this study, namely:

> Verify the variables used by real estate actors to determine the value of an envisaged real estate investment.

> Explore the use of models of judgement / procedural methods employed by real estate actors to ascertain the feasibility of a real estate investment.

Explore the institutional environment imposed on real estate actors in real estate investment process and decision-making.

Describe the interrelationship between different real estate actors to infer if there is an influence on cyclicality in the real estate market.

The following paragraphs discuss the findings of the data analysis on the proposition according to each of these research objectives:

Investment Variables and Models of Judgement: The analysis of the data on the use of variables and/or models of judgement by real estate actors did not reveal unambiguous reasons for cyclicality in the market. A graduation to the use of investment variables and models of judgement is found, from the more simplistic use of variables and models by the real estate developer to larger number of variables used in more sophisticated models by the real estate investors, intermediaries and service providers. Similar variables and models of judgement are used by the different real estate actors. The use of advance valuation methods and use of heuristics as mentioned in the literature is not found. The finding in the use of variables and models of judgement fit the hypothesis of information theory and bounded rationality, meaning that because information and the ability of real estate actors are bound, the actors' behaviour leans more to the employment of agency and use of networks in decision-making in real estate investment.

Institutional Investment Environment: A similar pattern of graduation to the use of variables and/or models of judgement by real estate actors are found in the real estate investment institutional environment, i.e. from an informal institutional environment of the real estate developer to complex and sophisticated institutional environments of real estate investors / financiers. The analysis of the data on the institutional environment of real estate actors did not reveal unambiguous reasons for cyclicality in the market other than the lag time for approval of a real estate investment loan, which the real estate actors solve though agency, strategy and engagement with networks.

Interrelationship between different real estate actors: The data analysis on the interrelationship between different real estate actors reveals that real estate actors actively try to avoid investment losses as a result of market cyclicality. This is done through specialization, which ties in with the explanation on 'know who you are' above, working the network to be up to date with the latest information, engaging the network to execute a real estate investment project efficiently and signaling through the structure of his or her organization / company and or feedback to the network.

Therefore, although the data analysis does reveal an influence on market cyclicality because of differences in the interpretation of investment variables based on the tenets of information – and bounded rationality theories, it is also found that real estate actors actively avoid investment losses through agency.

5.3 *An Agency Based Model on the Behaviour of Real Estate Actors*

It is possible with the use of the Giorgi analytical techniques together with the theories of information theory, bounded rationality theory and project ecology to derive an agency based model of the behaviour of the real estate actor in the context of cyclicality in the real estate market.

Agency is used by the real estate actor to circumvent asymmetric information. Asymmetric information is present in real estate investment because of the bounded nature of information and bounded ability of real estate actor, meaning there is insufficient information and knowledge to make an accurate decision. What Ball (1998) calls 'information theory' is according to Mishkin (2010: 174) 'agency theory'; "The analysis of how asymmetric information problems affect economic behaviour…". Asymmetric information interferes with the efficient functioning of the real estate market through adverse selection (problem before the real estate transaction) and moral hazard (problem after the real estate transaction).

The real estate actors circumvent the inefficiencies in the real estate development market through a practice of agency and strategy by means of specialisation, working the network, engaging the network and signalling.

Specialisation by the real estate actor means focussing on a narrow geographical area and/or real estate sector or specific type of real estate investment. Specialisation makes it possible to narrow-down information thus confining the bounded nature of information and liberating the bounded ability of the real estate actor with the application of abundant skills, knowledge and experience in a narrow field of real estate investment.

This specialisation is reinforced by *working the network*, meaning the real estate actor is not only familiar but also up to date with the current real estate investment milieu. To mitigate adverse selection the real estate actor needs to be aware what is the latest price or market trend as an example, which Henneberry and Parris (2013: 231) describes as "…(c)olocation enables networks of potential project partners to filter 'noise' – gossip, informal information and misinformation, trade stories and personal opinions – into market signals". Working the network allows the real estate actor to stay ahead of the curve or sinewave of the real estate cycle, also known as having the competitive edge.

Gaining the competitive edge is not enough. The execution of the real estate investment opportunity must be done efficiently, or the wasteful execution will erode the competitive advantage after the real estate transaction, i.e. moral hazard. Latent networks carries the potential to mould the real estate opportunity or supply within the local development milieu through the use of 'swift trust' (Henneberry and Parris, 2013). Swift trust is when real estate actors engage with each other on professional basis rather than individuals which provide the basis for coordinating complex tasks, thus *engaging the network*.

The final concept in the agency based model on the behaviour of the real estate actor, namely *signalling* is more passive compared to the more pro-active characteristic of agency in the concepts above. Signalling is how a real estate actor makes idiosyncratic judgment, beliefs and preferences known through some understood form of behaviour (Ball, 1998). This is done on two levels, i.e. the first is a flow of information from the real estate actor back to his/her network, thus the opposite from working the network explained above. The second is structuring.

Mishkin (2010) explains how the structure of organisations is influenced by high transaction – and information costs, which is typically high in real estate investment. Ball (1998) explains how different attitudes to risk influence the structure of an industry or organisation. Therefore the way in which the real estate actor structures his/her business signals to the market in general and to collaborating real estate actors in particular the specialisation of the real estate actor, thus reinforcing the pro-active characteristics of agency and strategy of the real estate actor.

5.4 Triangulation of the Findings

The use of a mixed method research approach makes triangulation possible, which overcome the weakness of qualitative data analysis, namely the validity and reliability of a study (Golafshani, 2003). Trends on the behaviour of real estate actors in the office market of Cape Town were found in the quantitative data analysis. The knowledge gained however fails to explain the processes and meaning of the behaviour traits behind these trends. The qualitative data analysis supplement, validate, explain, illuminate, or reinterpret the knowledge gained from the quantitative data (Amaratunga *et al.*, 2002), or makes triangulation of the data possible.

The lived-experience of the participants as shared through the semi-structured interviews reveals information that may explains the process and meaning behind the quantitative data findings:

Qualitative data finding through the lived-experience of the participants:	Explaining the following quantitative data findings or trends:
• The supply of real estate is a cause of cyclicality and each office node exhibits unique supply characteristics.	• The sequence of recovery of office nodes before and after the sub-prime mortgage crisis is different. • Difference in the distribution of the vacancy factor before and after the sub-prime mortgage crisis in four of the seven office nodes. • Multiple real estate cycle periods of the V & A Waterfront for the period after the sub-

	prime mortgage crises versus only one real estate cycle period for the other nodes.
• The harmonisation of the performance of real estate and the economy is possible where there is land and/or real estate buildings available in control of a single real estate developer.	• Century City office node's behaviour is the opposite of the other nodes, more or less coinciding with the South African Business Cycle.
• Investment sentiment and/or market expectation plays a significant role in the performance of the real estate market. The uncertain political situation in South Africa after the sub-prime mortgage crises is seen as explaining several quantitative data findings.	• The simultaneous contraction in the performance of all office nodes with the sub-prime mortgage crisis. • The deeper and longer contraction and recession phase of the real estate cycle after the sub-prime mortgage crisis compared to the South African Business Cycle. • Different behaviour of banks and higher price asked to invest in real estate after the sub-prime mortgage crisis. • Less volatility in the quantitative variables after the sub-prime mortgage crisis. • There is a positive relationship between the cap rate and vacancy factor.
• The real estate investors consider alternative investments to real estate and pursue the highest yield.	• The Cape Town office market's behaviour is the inverse of the South African Business Cycle after the sub-prime mortgage crisis. • The real estate investor's behaviour is more or less the same as the South African economy but does not react to the real estate cycle.
• There is lag factors in real estate development.	• The supply of office space does not correlate with the real estate cycle in all instances.

The conclusions in the next chapter provide a summary of the discussion on the findings of this study.

Chapter 6: Conclusions and Suggestions for Further Research

This study was undertaken to explore the proposition that the endogenous causes of real estate market cyclicality are a result of the subjectivity of real estate actors in the use of investment information in the development system.

6.1 *Conclusions*

The conclusion of this research is that regular periods of over- and underbuilding in the real estate market may be influenced by the real estate actors because of the bounded nature of information and bounded capability of the real estate actor. This finding correspond to the previous research of Wheaton (1999) that myopic behaviour by agents promotes oscillations and of Grenadier (1996: 1654) that real estate developers, fearing pre-emption by a competitor, proceed into a 'panic' equilibrium in which the supply of real estate occurs during a market downturn. The study reveals a difference in the interpretation of investment variables by real estate actors from simplistic use of variables and models by the real estate developer to larger number of variables used in more sophisticated models by the real estate investors, intermediaries and service providers.

A further conclusion is that the bounded nature of information and bounded capability of the real estate actor has an influence on the behavioural determinants of real estate actors. Specialisation by real estate actors makes it possible to narrow-down information thus confining the unknown nature of information and liberating the bounded ability of the real estate actor with the application of abundant skills, knowledge and experience in a narrow field of real estate investment.

A final and more general observation from this study is that real estate actors display behaviour actively avoiding the potential negative impact market cyclicality may have on the financial returns of a real estate investment through the use of agency. This requires an individual equipped with knowledge of real estate principles, experience of the real estate market in general but importantly experience in a specific real estate sector with skills in negotiation and interaction with other real estate actors, collectively described as 'to hustle'.

An agency based model of the behaviour of the real estate actor in response to cyclicality in the real estate market is developed from this study with the use of the Giorgi analytical techniques together with the theories of information theory, bounded rationality theory and project ecology. The four concepts of the agency based model are *specialisation*, *working the network*, *engaging the network* and *signalling*.

6.2 Suggestions for Further Research

Weber (2016: 599) argued that there are material incentives for the real estate actors to actively perform real estate cycles. The sociology of crowds or heard behaviour is the fundamental concept in Weber's finding. This research did not consider the sociology of crowds but focussed on the real estate actor. Further research exploring the influence of crowd behaviour on the agency and strategy of real estate actors may contribute more insight on the influence of real estate actors on the cyclicality of the market.

The outcome of this study, namely that behaviour of real estate actors may influence cyclicality in the real estate market because the future is unknown and limited capability of humans to adapt to a complex environment points to the research discipline of 'future studies', which is a branch of the social sciences. The explicit use of 'foresight methodologies' as explained by Conway (2018) is not expressed by the participants to this study. It appears to the researcher that due to the high capital requirement for real estate investment and specific personality traits displayed by real estate developers that real estate actors may potentially fail to think different and new about the future. It would be interesting to see if the application of future studies to real estate investment could yield more optimal decisions about future real estate investment strategies.

6.3 Final Word

This was a long journey, which I found incapable of doing quickly or to accelerate the pace. My mind and the research process dictate a certain tempo, which were frustrating at times.

The goal I set for myself was nevertheless met. I wanted to get an insight into the mysterious world of real estate investment. I did get to have a peek and I am forever grateful to the participants in the qualitative study for making their time available and share their experiences and knowledge with me.

I am, however disappointed to acknowledge that this does not make me a real estate developer, or should I rather say “not yet”. Doing further research using foresight methodologies? Maybe.

Appendix A – Semi-Structured Interview Information Sheet and Consent Form

Participation in Semi-Structured Interview

INFORMATION SHEET & CONSENT FORM

Study Title: The Behaviour of Real Estate Actors and Cyclicality in the Real Estate Market

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Introduction

I am conducting research towards a master's degree at the University of Cape Town. I am researching cyclicality in the office real estate market and would like to invite you to participate in the project.

What the study is about

The aim of the research is to study the behaviour of real estate actors in the context of property market cyclicality. The proposition is that differences in the interpretation of investment variables and decision-making behaviour (idiosyncratic judgments, beliefs and preferences) of real estate actors may influence regular cycles of over- and underbuilding. The purpose of the study is to gain an insight into the interrelation between real estate actors in the Cape Town office property market and

to learn if their behaviour contributes to the expansion and contraction of the Cape Town office market.

The study explores the investment variables/indices/rates used to determine the value of a real estate investment, models of judgement / procedural methods employed to ascertain the feasibility of the investment and the institutional environment imposed on the actors. A semi-structured interview is used as research tool to supplement, validate, explain, illuminate, or interpret the knowledge gained from a quantitative analysis. Vacancy factors of offices in seven office nodes in Cape Town are used in the quantitative analysis to infer a real estate cycle. The vacancy factor is also used as a proxy for real estate market performance, capitalisation rates are used as a proxy for investor behaviour and the change in office areas data serves as proxy for the behaviour of real estate developers. The quantitative data analysis takes the form of descriptive statistics. The qualitative analysis will be presented in the form of a narrative, describing the behaviour of real estate actors inferred from the data collected from the interviews.

How the study is done

You are being asked to participate in an individual interview in which you will be asked to share your knowledge and opinion on real estate investment practices. The interview will last between 30 and 60 minutes. Please understand that your participation is voluntary. There will be no negative consequences should you choose not to participate. You are also free to withdraw from the interview at any stage. However, I would be grateful if you would assist me in my study.

The interview will be audio recorded if you provide your explicit permission. You may opt out of the audio recording before the interview or at any time during the interview, in which case I will take detailed notes.

Confidentiality and anonymity

Your responses will be kept confidential and identifying information will be removed from the data collected. Your explicit permission will be sought in case your real

name is used in reports and papers emerging from this research. Information collected from this interview will be kept in locked storage and/or on a password-protected computer.

Risk and Benefits

I believe the potential risk and discomfort from participating in this study is minimal. You will have the opportunity to review your interview transcript to confirm the information you provided, provide clarification and/or to remove any information you do not what to include in the study. The information you provide may assist my understanding of cyclicality in the office real estate market in Cape Town.

Compensation

There is no direct benefit from participating in this interview. Participation in the interviews is voluntary with the right to withdraw consent or discontinue at any time.

Liability statement

By signing this form you gives consent to participate in this study. It informs me that you understand what the study is about and how it is done. You do not give up your legal rights in signing this information and confidentiality form, and note that the researchers involved still have their legal and professional responsibilities.

By providing your signature on this form you are confirming:

- You have read the information about the research;
- You have been able to ask questions about the study;
- You are satisfied with the answers to all of your questions;
- You understand what the study is about and what is asked of you;
- You understand you are free to withdraw from the study at any time without any negative effect; and
- That you will have the opportunity to review the interview transcripts to remove information you do not want to be included in the study.

Consent Form

Project Title: The Behaviour of Real Estate Actors and Cyclicality in the Real Estate Market

Student: Pierre Cronje

I have read the information sheet, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Interviewee's Name (please print): _____

Interviewee's Signature: _____

Date: _____

Interviewer's Name (please print): _____

Interviewer's Signature: _____

Date: _____

Please check one of the following boxes:

☐ Yes, I consent to the interview be audio recorded

☐ No, I do not give my consent for the interview be audio recorded

Appendix B – Semi-Structured Interview Questionnaire and Guidelines

SEMI-STRUCTURED INTERVIEW QUESTIONNAIRE

Study Title: The Behaviour of Real Estate Actors and Cyclicality in the Real Estate Market

Interview Check List:

	Introductions and discussed & explained information sheet & consent form
	Answered all questions from interviewee to his/her satisfaction
	Written consent provided by interviewee
	Consent to audio recording from interviewee

Name of Interviewee: _____

Position / Job Title: _____

Organisation: _____

Years working in this position: _____

Years working in the organization: _____

Years working in real estate: _____

Contact No. Work Telephone: _____

Contact No. Cellphone: _____

Email: _____

Transition Question 1: Describe the investment variables / indices / rates that you consider in preparation for a real estate investment decision? That is the elemental input variables to ascertain the value of the proposed real estate investment.	
Aspects / issues / categories to provide prompts for further exploration or encouragement for interviewee to share:	Answers / Remarks / Notes
What type of input variables are used to ascertain a real estate investment's value? • A hunch or gutfeel? • Is it **traditional valuation methods** such as: comparable -, income -, profit -, residual -, cost -, multiple - or stepwise regression methods? • Is it **advance valuation methods**, such as: artificial neural networks -, hedonic pricing -, spatial analysis, fuzzy logic - , ARIMA methods? • Is it a combination of various methods?	

Transition Question 2: Describe the investment models of judgement / procedural methods employed to ascertain the feasibility of a real estate investment decision?	
Aspects / issues / categories to provide prompts for further exploration or encouragement for interviewee to share:	Answers / Remarks / Notes
What are the models of judgement involved in real estate investment decision that leads to a deliberate and rational choice and / or decision? • Simplistic mathematical model to produce a single value / cost or point estimate, also called normative modelling? • Advance valuation methods (simplifying around an iterative processes and studying patterns) incorporating judgements, beliefs and preferences by simulating thought processes of real estate actors, also called descriptive modelling? • Using advance valuation methods that extends beyond description to prescription (heuristic advantages)? • Employing a requisite model – it works while not necessarily perfect?	

Transition Question 3: Describe the institutional environment / process of approving and executing a real estate investment decision?	
Aspects / issues / categories to provide prompts for further exploration or encouragement for interviewee to share:	Answers / Remarks / Notes
• How is an investment idea being identified / tabled? • What is the processes / decision gates / time frames etc. for obtaining approval? • To what extend is cyclicality of the market incorporated into the decision-making process? • To what extend is the decisions or actions of other actors considered in the decision-making process or an influence in the decision-making process? • What determines a 'hold and wait' strategy in executing a real estate investment versus 'execution as priority / as soon as possible'? • How do you consider / incorporate the future, which is unknown into your process of approval?	

Transition Question 4: Describe the real estate actors involved in your real estate investment projects?	
Aspects / issues / categories to provide prompts for further exploration or encouragement for interviewee to share:	Answers / Remarks / Notes

• Who is in the core team for the latest / typical project?
• What firms / consultants are involved in the latest or typical project?
• What other stakeholders / advisors are involved in the latest or typical project?
• Classify the actors listed into:
  ○ *Networks of communality* – relations are personalized and experienced-based, built over long periods with mutual experiences or a common history;
  ○ *Networks of sociality* – Relations forged with other practitioners, which rely on reputation derived from judgement of other network members;
  ○ *Networks of connectivity* – Relations that are utilized to aid learning and to find solutions to specific issues – weakest form of connection.	

Appendix C – Data: Semi-Structured Interview Transcripts

The intent of the semi-structured interviews is to understand the essence of the experience of the real estate actors. Morse (1994) as cited by Denzin and Lincoln (2000: 780) suggest that six participants in the semi-structured interviews will suffice to achieve this.

The participants to this study were selected through an exploratory process of the non-residential building plan data intersected with a marked change in physical office areas as explained in Chapter 3.4. Nine participant properties were selected. Through an internet search and enquires to property brokers the real estate actor responsible for the development could be identified. All the identified real estate actors were invited to participate in the study. In the end only three agreed. A total of six semi-structured interviews were conducted by using a non-probability sampling technique called snowballing. In this sampling technique the individuals willing to participate in the semi-structured interviews act as informants for other individuals to participate in the study (Welman *et al.*, 2009: 69). Care was taken through the selection of other individuals to ensure that qualitative data were collected on all categories of real estate actors, namely the real estate user, - investor, and – developer.

Two transcription versions were made. The first a verbatim transcription with names and places as articulated by the participant kept in locked storage and a second where all references that could identify the participant removed. One transcript without references is included in this report below as an example. The transcripts are the raw data used for the qualitative analysis.

Participant:	*No. 1 – CEO of Real Estate Development Company (small personnel component)*
Date:	*20 July 2018*
Time:	*12:00 – 13:00*
Format:	*Face-to-face semi-structured interview*

Trends in the Quantitative Analysis

Pierre Cronje: As part of the first stage quantitative analysis I looked at the South African Business cycle and real prime interest rates, vacancy factors for offices, office space in square meters and capitalisation rates. What are your observations and opinions on the trends in the quantitative analysis?

Participant:

South African Business Cycle and Real Prime Lending Rate Patterns: [[1]The real prime interest rate shows a cycle, which is quite close to the economy and is a factor of the price of money. The higher the interest rate the more the Reserve Bank tries to tap down the demand for money. Assets are finite and the more the supply of money the higher the price of money or inflation. To dampen the supply of money or achieve less lending the Reserve Bank increase the interest rate. To stimulate the economy the Reserve Bank will lower interest rates. The real prime interest rate over the study period is therefore an indication of the stimulation in the market for money.]

Office Real Estate Cycle: [[2]The office market is different from industrial and retail, industrial being a subset of retail, because it is part of the supply chain for retail. Offices behave more like a bond and its behaviour is linked to the demand for office space. Supply chain industrial linked to the retail market is driven by the consumer. Obviously the interest rate does impact on the consumer and this market but there are many other factors. Offices behave quite different and are driven by corporate South Africa's need for space or the growth and contraction of the demand for office space. Corporate South Africa's cycle is a lot flatter than retail, which is more buoyant and emotive as it is linked to people.] [[3]What is fascinating about offices is that it can be analysed by location and compared to other nodes or cities and each office node is at a different point in the cycle, making it difficult to extract meaning from the analysis.] [[4]As an entrepreneur working in real estate the office cycle is interesting but I would rather be looking at a node and the different corporates in that

node. In contrast a Growthpoint with office investments across various office nodes will find more value from analysing office cycles of different nodes.]

Supply in Office Space (square meters): [[5]I do understand that from a research point of view you take a step back and look at all the different office cycles. There is definitely a correlation between the South African Business Cycle, interest rates and sub-prime mortgage crisis.] [[6]There is a lag factor in office development and business confidence is a lead factor in demanding or not demanding office space.] [[7]Century City and V & A Waterfront are behaving different from the other office nodes because they provide massive supply opportunities with big corporates moving there and serving as a replacement of the CBD. I have noticed that the supply disrupts the office cycle. CBD Cape Town has a finite supply. Portside was the last complete city block office development in the CBD. V & A Waterfront and Century City is preferred nodes as CBD Cape Town is the biggest cul-de-sac in the world, e.g. Sandton can expand north, south or east with approach roads from all four directions, with Cape Town having only two approach roads, making it unattractive.] [[8]The other notable distinction between Century City and CBD Cape Town is that the office buildings at Century City are single tenanted with company brand on the outside, while office buildings in CBD Cape Town are predominantly multi-tenant.]

[[9]As entrepreneurs in the market we are driven by corporate's demand and supply.] [[10]Corporates tend to plan one year to three years ahead, and it is said that corporates always build their own offices at the end of a very good period. This is a mini-signal that some trouble is coming as the corporates are overspending and spending on themselves while they should put money aside to counter the next down cycle.]

Capitalisation Rate: [[11]You are going to find that the cap rate is more correlated to the bond interest rate cycle. Especially if you got a big corporate, their payment of rent is like a bond, it is just going to drift with the interest rate cycle.] [[12]The lower the cap rate (after the sub-prime mortgage crisis) means the higher the price the investor is demanding, therefore there is a positive outlook and there is a positive interest rate

outlook as well.] [[13]It could also mean an upgrade to office buildings. This also drives expectations, turning a building from B-grade to A-grade, better quality tenant, single tenant vs multi-tenants, the latter carrying a higher cap rate.] [[14]It depends what change on the supply side. If that is all equal, then it is driven by positive outlook.]

My opinion on endogenous causes of real estate cycles due to the interrelation of real estate actors: [[15]An investor and a developer are driven by demand factors. The supply factors are of lesser concern.] [[16]As an entrepreneur I am selfish about where I find the solution for the demand as I am in competition with other developers. As a Growthpoint I would want to fill space in my portfolio when faced by a demand for office space. As a Rabie, when faced with demand they just build, they got enough land and enough rights. Then it is just the time lag, how quick can you build.] [[17]The user is often driven by contract. Portside was driven by FNB wanting to move out of 18 different branches into one. They were all over the city paying too much rent.] [[18]All those 18 leases that get cancelled, created supply in these outer-lying nodes and created inefficiencies in the market. Users choose nodes and then they go from there. You choose Century City and go and build a whole new campus for yourself and walk away from a Claremont – and other nodes. FNB moved out of Westerford here in Claremont. Now Westerford is multi-tenant, the use of Westerford has changed.]

Question 1: Investment Variables / Indices / Rates Used for Investment Decision

[[19]To answer this question you need to be in office development. I do not consider myself as an office developer. Having said that, we just bought a property in Paarl, a big campus, industrial and there is an office component, so now I am in office development. The reason that I did Portside is that it was an Old Mutual piece of land, I've been head of Old Mutual Property Investments, so I knew the land was available and I knew the actuaries needed money, and I knew they are not going to develop it because they did not have the money. So I found a solution for it knowing FNB. So I matched a user to an opportunity and used an architect to come up with a

presentation to convince FNB, which we did.] [[20]So if you say what are the variables, the variables are, you need a user, you need to have access to users, you need to be in touch with users. You need to have very good relation with brokers in a sector. I call it the honey-pot syndrome – you must tell that you have honey because then the bees will come. When a broker is aware of a law firm that wants to change and build their own building the broker will then approach a list of investors or people who they think have the money or the properties. If you are not on that list you will not even be aware of the opportunity. It is very important to keep that network alive, keep people aware of what you are doing.] [[21]You do come across these things by yourself at times as well.] [[22]There's got to be a need or opportunity that you match with supply. You may not be the owner of the land or the building but if I am aware of this strong user I am going to buy a building for them.] [[23]I am not going to take the user to an existing owner and say here is a tenant, because I am not a broker. You need to be clear on who you are.] [[24]The process is very demand driven, it is demand, demand, demand, and that demand wants location, location, location. You are feeding the opportunity to the market and you structure the supply, the building to whatever the tenant wants.] [[25]I work with the banks and debt so they got an evaluation team already.] [[26]It is important to get the rent roll, take the expenses off that to determine the nett worth. I use traditional valuation methods to give me a sense of the value] [[27] and then we go and do the best possible deal we can based on the seller, so it is over to negotiation skills.] [[28]If I own the building and want to fill it, the quality of the user is very important, because that determines my cap rate. If they are a national tenant I will cut them a deal.]

Question 2: Investment models of Judgement / Procedural methods employed to ascertain the Feasibility

[[29]You can be theoretical about this but at the end of the day there is a seller on the other side and they've got expectations. So it doesn't matter what you think the property is worth, if the seller wants to sell for X than that is it, you need to negotiate.]

[[30]You have to have legal skills to make sure when you do your due diligence you pick up certain things, you can have price adjustments, techniques in the legal

agreement to delay the transfer that makes it cheaper because it is todays price but you only paying in the future.] [31We've got a principle that we do not do any work until we got rights.]

[32We will push the seller to the lowest point he will accept, through negotiating skills. For example we settled on a price for a specific property and we stuck in a rental underpin, because the seller is presenting numbers. If it is real he should be able to back it up. He doesn't want to provide that so the price comes down. The lower price is thus a due diligence price adjustment. Step 1 is therefore pure negotiating, agree a price as low as possible, speak to a broker etc. I haven't even assess the market, I have done nothing accept negotiate. It is a 10% yield, no rental underpin. Now I do the research, i.e. assess the market, geographical area and other retail offerings, etc. I know the 10% yield is not a bad number. I know it is acceptable to my capital partners. What I need to do is to make sure it is real and deliverable and solid. There must not be funny expenses.] [33But this is different from office because I am assessing other users of a retail centre. Offices are different as offices are very driven by the user. For example a REIT recently put out to tender a portfolio of properties, with 75% offices in there. All I looked at is the quality of the lease, who is the tenant, how long is the lease, what are the break points of the lease. The REIT wanted 9% all in. If you buy a portfolio you can charge a lower cap rate than if you buy one property, because the risk is spread. The value of the office property is driven by the tenant, now I go and look at the length of the lease. All the leases in this example were less than three years.

Question 3: Institutional Environment / Process of approving and Executing

So we put an offer in (to the REIT) subject to due diligence, subject to Board, subject to finance.] [34If it is a great deal we go 20 days for due diligence, 20 days for Board approval and 20 days for finance.] [35In this particular case we went 40 days for due diligence, 20 days for Board Approval and 10 days for finance. The reason for that is that I needed time to negotiate with the tenant to extend the lease. I am not going to get Board approval until I have extended this lease to six years at least. If you are paying someone 9% cap rate you are giving him 11 years' worth of money.]

[36To execute a real estate investment decision: Number one; I have to have rights, I do not do anything without rights, you need a formal agreement. Number two; you look at things like trends in the area and interest outlook, you look at SAPOA, you look at all these qualitative factors, but at the end of the day you got to look at the deal factors, is it a quality deal yes or no.]

[37How is an investment idea tabled? We got access to brokers so these opportunities come our way. We have parameters on our capital. We know what our capital needs. We got our own capital and we got a real estate fund that we work with. We know their requirements. So we hunt for the right type of product or property – convenience retail anything from 5000 square to 25 000 squares. Retail brokers bring us properties in that space and we can very quickly assess which ones are in the sweet spot. We always want extra bulk, we are developers and we like to improve things, expand them. We know who we are.] [38If you are big REIT you are driven very much on the demand and corporates and being active. That's why they advertise. What they try to do is to show corporate South Africa that they are serious real estate players with serious supply and they can build a Discovery building. So their decision processes is a lot more formalised.] [39It all comes down to the user of the office. What are their covenant, what are they offering, what's their deal relative to the market. Quite frankly if you get a 10 year lease from a national tenant, you will do whatever it takes.]

Question 4: Real Estate Actors Involved

[40We are busy managing the Coastal Shoprite development, we got a 20% stake and the listed fund got 80%. We are the development guys.] [41So who are the players in this whole project: We got an investors forum, you look at this thing purely from an investment, which mean where is the capital coming from is the assets matching the original proposal. Then you deal with the banks. The banks got their own QS's. They release money on a very formal process. Then you got your professional team, the principal agent that we outsource, you get a project manager for that, you got the architect, QS and various engineers. The principal agent leads the team.] [42On another project we played the role of principal agent, which was

particular onerous, I don't like playing it. I rather outsource it and play the role of client and keep your objectivity.] [43Then you obviously got your contractor, the guy that is actually doing the work and then there are the tenants. To source tenants both brokers and partnership with a REIT is used. The REIT is an investor and we got an internal team with great relationship with all the retailers.]

[44The Redefine's and the Liberty Life's, the Growthpoint's have a much better opportunity to have relationship with big corporates because they operate in different cities. So if a big corporate suddenly has a need to change to have a new office is a particular area then Growthpoint Redefine can respond.] [45For me, I am a local entrepreneur so for me it very opportunistic in office space. But in retail, all the retailers are in Cape Town so I can springboard off that so I have relationship with them. They may ask me to assess a new retail opportunity. In such a case we will work with a town planner to get the rights in place. But typically we don't deal with property that is not zoned correctly.] [46This is one way to circumvent a lull in the performance of the real estate I am involved in by letting someone else get the property rights.]

[47Do banks cause a lull in property performance? Banks back the jockey, if you are an existing client they are all ears because they know and they can trust you, you delivered and paying back the bonds. This relationship assists in getting to market on time.] [48Same goes with professional team.] [49What is a worry is that you get access to capital and you know what that capital wants. Then you are able to engage with the broker market and the general market, bring opportunities that match your capital. Once that's in place you structure the deal with the seller or buyer and then you approach the banks and the formal process kicks in.]

[50If you are a Growthpoint you have an investment committee, which is a formal process that will take more time.] [51They are yield sensitive, in order to do a development they have to capitalise the yield. In other words if I do a development for a property fund, a certain amount of money is allocated as a yield which the project has to absorb.] [52There is thus a structural relationship between me and the property fund. The property fund has a put in call after three years on our stake.

They will eventually own the whole asset. The relationship, of us taking on the development risk and the property fund taking on the longer term management risk, works.]

Appendix D – Ethics Clearance

Application for Approval of Ethics in Research (EIR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form before collecting or analysing data. The objective of submitting this application prior to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the EBE Ethics in Research Handbook (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/ebe/researchvethics1

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		Pierre Ernest Cronje
Department		Construction Economics and Management
Preferred email address of applicant:		Cronje.pierre@gmail.com
If Student	Your Degree: e.g., MSc, PhD, etc:	MSc in Property Studies
	Credit Value of Research: e.g., 60/120/180/360 etc:	60
	Name of Supervisor (if supervised):	Prof. François Viruly
If this is a research contract, indicate the source of funding/sponsorship		Not applicable
Project Title		The Behaviour of Real Estate Actors and Cyclicality in the Real Estate Market

I hereby undertake to carry out my research in such a way that:

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	Pierre Ernest Cronje		30 May 2018

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	Prof. François Viruly		4-6-2018
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduate research (including Honours).	Not Applicable	Not Applicable	
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	NIEN-TSU TUAN		22 June 2018

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