

Property development: Feasibility and impact parameters in the Vaal Triangle

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ABSTRACT

One of the important operational and in some cases, also strategic business decisions, is in respect of the investment of funds. Although there are a number of assets to invest in, two particular popular investment asset classes are land and/or property. Land however, is becoming a very scarce resource. It can be argued that many companies investing in the property sectors' main income is generated from the sale of land. A new way of gaining a sustainable income stream is followed. This is done by investing in different kinds of property development projects.

One of the problems that companies face is to determine whether a property development project is a good investment, meaning that it will generate sustainable and acceptable profits in the long term.

Companies evaluate prospective investment opportunities by assessing whether the expected return, adjusted for project risk, exceeds the company's required return.

Different impact parameters exist and were identified in the study. Valuation methods used in determining the overall feasibility were discussed and evaluated to see the impact on the property development project.

Key words: Property development; Feasibility; Impact parameters; Valuation methods; Net Present Value; Discounted Cash Flow; Feasibility study; Vaal Triangle.

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LIST OF ABBREVEATIONS

BIAC	Business and Advisory Committee
BV	Book Value
DCF	Discounted Cash Flow
EVA	Economic Value Added
FCF	Free Cash Flow
FV	Future Value
GDP	Gross Domestic Product
GMOS	Gross Margin on Sales
IRR	Internal Rate of Return
LIFO	Last In First Out
MPR	Minimum Profit Requirement
NCA	National Credit Act
NDV	Net Development Value
NOPAT	Net Operating Profit after Tax
NPV	Net Present Value
PROC	Profit Return on Cost
PROS	Profit Return on Sales
PV	Present Value
RI	Residual Income
ROE	Return on Equity
ROI	Return on Investment
SASRIA	South African Special Risk Insurance Association
TDC	Total Development Cost
TV	Terminal Value
UIRR	Ungeared Internal Rate of Return
VAT	Value Added Tax
WACC	Weighted Average Cost of Capital

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CHAPTER 1

PROPERTY DEVELOPMENT: STUDY BACKGROUND

1.1 INTRODUCTION

One of the important operational and in some cases also strategic business decisions, is in respect of the investment of funds. Although there are a number of assets to invest in, two particular popular investment asset classes are land and or property. Land however, is becoming a very scarce resource. It can be argued that many companies investing in the property sectors' main income is generated from the sale of land. A new approach of gaining a sustainable income stream is followed by investing in different kinds of property development projects.

According to Cloete (2005:32), investment analysis is the systematic evaluation of capital outlays relative to the expected income stream for the purpose of making an investment decision. Real estate investment begins with the study of the proposed acquisition of the capital asset. The capital asset is an interest in a property, whether the interest is full ownership or a more limited type of interest.

Property is a long-term, and durable, asset. Property is illiquid, non-portable, and heterogeneous in nature. Property markets are imperfect, and it is possible to realise substantial returns, should the appropriate strategy be followed.

A primary objective of acquiring a capital asset, is the production of an income stream from the property. Return and risk are fundamental concepts when considering the financing of a property investment, through either equity investment or lending. The level of return correlates with the degree of risk (high risk, high reward). The developer strives to balance return and risk according to his own risk profile. A property developer will strive to achieve the maximum possible return for the minimum of risk. In order to achieve a

desired rate of return, it is necessary to identify risks that are faced, to manage the identified risks and to employ techniques to minimise such risk as far as possible.

The fact that companies receive financing from financial institutions, means that companies can follow the simple investment rule of accepting projects that maximize the value of the company.

Companies evaluate prospective investment opportunities by assessing whether the expected return, adjusted for project risk, exceeds the company's required return. The required return is the return the company itself must promise debt and equity investors; it is also referred to as the company's cost of capital, or opportunity cost.

1.2 PROBLEM STATEMENT

One of the problems that companies face is to determine whether a property development project is a good investment, meaning that it will generate sustainable and acceptable profits in the long term.

Another problem faced by companies are to determine which are the most important variables impacting on long-term success of property investments.

1.3 PRIMARY OBJECTIVES

The primary objective of the study, is to determine the feasibility and impact parameters on a property development project and whether to invest in a specific project given the associated risk and ability to create a sustainable return on investment.

1.4 SECONDARY OBJECTIVES

Certain secondary objectives need to be addressed in order to accomplish the primary objective discussed above. These secondary objectives include the following.

- ◆ The possible risks and impact parameters involved in determining a feasible property investment will be examined.
- ◆ Different financial evaluation models to determine the feasibility of a property development project will be evaluated.
- ◆ The forecasted and actual returns will be calculated to see whether the feasibility studies were successful for the Companies used in the research.

1.5 SCOPE OF THE STUDY

This study will be conducted in the field of Financial Management with regards to the feasibility and the impact when investing in a property development project.

The geographical demarcation will be restricted to the borders of the Vaal Triangle which is a triangular area of land bounded by the city of Vereeniging and the towns of Vanderbijlpark and Sasolburg. Together, these towns comprise a substantial urban complex in South Africa. Meyerton, situated just north of Vereeniging, is also generally included within this complex.

Residents of the greater Sebokeng, Sharpeville, Boipatong, Bophelong and Zamdela townships, together with the towns of Heidelberg and Potchefstroom also generally tend to consider themselves as part of the Vaal Triangle.

For the purpose of this study, only the following towns will be included: Sasolburg, Vanderbijlpark, Vereeniging and Meyerton.

Because property development is such a competitive environment, and because so many property developers compete for their business, it was decided to investigate the feasibility and impact parameters of successful property developments. The target population will therefore, include some of the most prominent property developments. For the purpose of this study, an investigation upon only two of the three different types of property developments will be conducted.

1.6 RESEARCH METHODOLOGY

In order to reach the objectives of the study, a research methodology comprising of the following needs to be conducted.

- Firstly a literature study will be done regarding property development in general.
- Thereafter a more specific study will be done on the financial feasibility and valuations methods used in determining the feasibility of a property development project.
- Thirdly an empirical study will be conducted where property developers will be questioned within the borders of the Vaal Triangle. The aim will be to gather their practical experience regarding the valuation methods used and to determine the possible impact parameters of property developments.
- Lastly, the practical information gathered, will be tested against the theory and conclusions and recommendations will be made.

1.6.1 Literature/theoretical study

The author of this mini-dissertation works in the property development industry and will therefore be able to gain a lot of information with regard to this specific topic.

The North-West University's library was also used as a source to gather information to conduct this study. The reason for this is that it consists of a large database of information which is crucial to this study, as not much research was recently done with regards to this topic.

Other sources of information which could be used, will include books on the topic at hand, magazines, articles, the internet and information gathered from some of the major firms in the study area.

1.7 EMPIRICAL STUDY

The study population will cover two of the three major property development areas, namely Retail Property development, and Residential Property development. Twelve property developers in the Vaal Triangle will be used.

A financial datasheet for the property developments will be compiled. This datasheet will consist of the following.

- Demographic information.
- Valuation method used.
- Forecasted and actual income.
- Forecasted and actual capital expenditure.
- Forecasted and actual cash flow analysis.
- Forecasted and actual Net Present Value, Internal Rate of Return and Weighted Average Cost of Capital.

The completed datasheet will be analysed by the Statistical Consultation Services of the North-West University (Potchefstroom campus). Descriptive statistics will be used to measure the demographical information of the developers.

Independent Phi Tests (ϕ) will be performed to determine if any statistical significant relationship between the demographical variables and the overall success of the development exists. Interpretations will be conducted on effect sizes (ϕ) which will give an indication if there are any practical significant differences between any of the demographical variables regarding the overall success of the development.

1.8 LIMITATIONS OF THE STUDY

The objective of the study is to determine the feasibility and impact parameters of a property development project and whether to invest in a specific project, given the associated risk and ability to create a sustainable return on investment. There are however, certain limitations to this study, namely:

The property development industry in South Africa entails residential, retail and industrial development. It was decided to limit the scope of this study to residential and retail property developers to prevent the study from becoming too general and too time-consuming.

The second limitation associated with the research, involves the fact that it will be limited to the boundaries of the Vaal Triangle only. It should result in a higher percentage of financial data to be retrieved as the area is geographically small and as a result, within easy reach to visit with these possible developers in an effort to motivate participation.

Another limitation was the fact that only data from twelve different developments could be used due to the fact that the financial data are not easily made available, and are considered sensitive.

1.9 LAYOUT OF THE STUDY

Table 1 below comprises a summary of the layout of the rest of the mini-dissertation.

Table 1: *Layout of the study*

Chapters	Main Headings	Goal
Chapter 1	Study Background	• Introduction to the study. • Problem statement. • Objectives of the study. • Scope of the study. • Research methodology. • Limitations of the study.
Chapter 2	Theory	• Theoretical study. • The property development process
Chapter 3	Literature review	• Theoretical study. • Financial Feasibility study
Chapter 4	Research Methodology and Results	• Discussion of statistical methodology. • Measures and data analysis. • Discussion of results.
Chapter 5	Conclusions and Recommendations.	• Conclusion. • Recommendations. • Evaluation of success of the study. • Suggestions for further research.

CHAPTER 2

PROPERTY DEVELOPMENT: THE THEORY

2.1 INTRODUCTION

According to Pyhrr, Cooper, Wofford, Kaplin & Lapides (1989:2) property development is the process directed at the increase in value of an existing property, developed or underdeveloped, by the application of resources such as, material, human and capital.

Pyhrr *et al.* (1989:2) also noted that development is not limited to erecting buildings but it also includes installing streets, water services, sewers, electrical lines and performing the necessary survey work to create building lots for single family residences. According to Ratcliffe (2000:127), property development is concerned with the creation of space: space in which to place, live, work, and build. Development also includes the redevelopment of existing buildings as well as the erection of new ones.

According to Fisher & Collins (1999:219), there are basically two types of developers: the Public sector and the Private sector. It is noted that Public sector development can be distinguished from Private sector development according to the nature of the expected yield. Public sector development will take place if the value (yield) for the community is higher than the development cost. For example, authorities may build a dam or road because the value of the dam or the road to the community is greater than the cost of building the dam or road. Private sector development is; mainly concerned with making profit which can be argued is the primary motivator of Private sector developers. Developers seek to make a profit producing a product by selling it for more than it costs to produce.

It is argued that economically, developers seek to create wealth. If the expected wealth added by the project is not great enough the developer will not undertake the project. In this regard, a developer attempts to produce the type, quality, and quantity of space on a particular site that maximizes profits. It is stated that a developer realizes that the cost of producing space increase with the size and the quality of the space. Furthermore, different types of space such as flats and office buildings simply do not cost the same to produce. Considering profitability, developers know that the value of the completed project is dependent on the rental income it will produce and that rental income is a function of the condition of property rental markets. The developer attempts to evaluate the costs and returns associated with different development alternatives in order to choose the most profitable project (Pisani & Pisani, 1989:5).

Not all developers plan on selling the developed project as soon as the developments are completed. Some developers may want to assume the role of equity investor and may also decide to operate the property. However, while the property was being transformed from idea to reality, the equity investor acted as developer.

2.2 THE PROPERTY DEVELOPMENT PROCESS

Pisani & Pisani (1989:7) noted, that property development requires a number of steps: a developer does not simply decide to develop and instantly produce a finished product. Each step requires the developer to make a decision about whether to continue the project. The developer does not have the luxury of performing each step in isolation and many activities/steps have to be managed at the same time.

According to Birrell & Shi Bin (1997:1), the start of the development process can be any idea, by anybody of a valid or invalid, perceived need for building user space. This puts the beginning of the property development process into the context of the creation of a new idea or thought or opportunity by one or

more developers. Put simply, the start of the property development process is the potential opportunity of profit for someone.

Birrell & Shi Bin (1997:1) noted, that it could be considered perfect that the developer moves the project through a set of phases/activities from whatever its start is, to the existence of the benefit producing asset which has a capital value. A property development process is considered finished or completed when an end product like a building exists and provides a recognisable stream of benefits, usually rental income, to the party owning it.

Ling & Archer (2005:32) state, that the timing of the finish of the property development for the developer could be the same point in calendar time of the duration expressed in the feasibility study, which matches the peak phase of demand for that type of user space in the current market place. It could also be the point in time when the building is rented up to the void level expressed in the feasibility study and the whole development is about to be bought by an investor and the price agreed approximately matches the sale appraisal in the feasibility study.

According to Birrell & Shi Bin (1997:2), the property development process comprise of fourteen phases or activities. Among these phases there are sequential relationships, different levels of importance among the phases for success or failure of the whole development and different permutations of work in each phase such as a) Quality thinking, b) Consuming duration and c) Spending capital. These phases should be considered as the ingredients of a generalised model of the property development process and for each project should be set in sequence or parallel as seen fit for the circumstances surrounding each property development process.

It is important to note that not all these phases are necessarily included in any one particular property development. Secondly, keep in mind that the fourteen phases do not necessarily follow a rigid time sequence and some phases may take place in parallel, depending on the nature of and managerial styles of individual developers. Also to consider, are the characteristics of the property

being developed as well as the market conditions. To be successful it is considered important not to omit essential work, a developer has to be very familiar with the required fundamentals in each of the phases. These phases as discussed in the next sections are the basic components, which can constitute different actual processes to suit individual property development projects.

2.2.1 Opportunity/ Site Identification

According to Fisher & Collins (1999:219), every property development starts with an idea. Many of the now accepted concepts, such as enclosed mall shopping centres and multiple use buildings, all started out as ideas. It seems that many of the more successful developers are quite good at visualizing what types of space are needed and where it should be located. Normally in the idea stage, the developer faces with one or two problems. Either the developer has an existing site and must decide what to do with it or the developer has an idea and must find a site for the property development.

Property development can begin with an idea. This idea may be initiated by the developer's motive for profit through producing property which meets the current or future needs in the property market. This idea may also be initiated from a potential client, suggesting to the developer that a space need could be satisfied by a new building. This idea may also be initiated by a third party such as a property agent, seeing an opportunity, which may initiate a bridge between these two parties to begin the process. The mentioned needs may arise either from property investors or property users but it is the developer that needs to find a site which can accommodate the proposed project. For successful execution it is essential that a written statement, or proposal, should be created by the developer, which states the essence of the objectives and requirements for this property development. In this regard it is common practice to make some adjustments and refinements and even draft successive iterations of the proposal before testing it against detailed information gathered on the market conditions, site conditions preparatory to feasibility study (Birrell & Shi Bin, 1997:3).

2.2.2 Market Analysis

Birrell & Shi Bin (1997:3) state, that market analysis is a prerequisite for matching of property to be developed with market needs. It comprises establishing the market place for the project and analysing the supply and demand scope of competition and opportunity to establish the potential and characteristics for the proposed project. When properly conducted, it can provide the developer with information on the demand strength and trend, and determine the validity of the requirements for a particular building in a particular location at a particular time, now and in the future. In practice, three levels are involved in market analysis a) Consideration of the present and future national and regional property market picture, b) Consideration of the site and its immediate locality as to economic potential, and c) Recommendations based on the conclusions of the market analysis.

2.2.3 Site Investigation

According to Birrell & Shi Bin (1997:4), investigation of the site is intended to examine the site conditions before the developer enters into a commitment to acquire a particular site. The developer should understand the planning status of the site. In addition, the physical and legal conditions of the site also need to be clarified, since any latent trouble therein may incur expense or delay or even become a deterrent to a property development. The physical conditions involve such matters as the site's load-bearing capacity, access and drainage, connection with appropriate utility services and infrastructure provision, likely underground problems and contaminations. Legal conditions involve the site's ownership and possession, easements and restrictive covenants.

2.2.4 Feasibility Study

Based on the results from preceding analyses and investigations, the feasibility study can be carried out to assess the viability of the property development by providing a realistic appraisal of all costs and benefits involved in the proposal and establishing the profit residual along with the required capital investment and appraisal of risks to be faced. The financial

core of the feasibility study is development appraisal, which produces a profit margin by calculating and evaluating the estimated amounts of revenue and costs. This result needs to be subject to sensitivity and risk analysis which provide further information on viability and may cause adjustments to the original descriptive proposal (Birrell & Shi Bin, 1997:4).

If alternative proposals exist for a property development, then each combination should have its own feasibility study which should be compared. Such a comparison may present a further optimum alternative which has been created from refinements from the initial array of alternatives. The output from this phase should include at least two components: a) A decision to develop or not, and b) If the decision is to develop, a clear description of what the development should be and how the development should be done and by when the development should be developed (Birrell & Shi Bin, 1997:4).

Fisher & Collins (1999:219) state, that the developer will make a “rough-cut” analysis of whether the project is feasible. Feasibility is generally measured in economic terms namely: Is the project worth a sufficient amount more than it costs to produce? At this point, the developer must settle for rough estimates of the cost of development, the rental income it can produce, and the resulting market value. A developer interested in selling a project when it is completed, may estimate the cost of construction, the rental income it will produce, and what investors will pay for mentioned rental income (the market value of the project).

If the developer feels that the expected profit (the difference between the project's value and its cost) is big enough, and provide enough cushions for possible cost overruns or lower than expected rents and market values, the project will continue. If not, the project will be rejected (Fisher & Collins, 1999:220).

If the developer does not yet control the site, it must be obtained at this stage. Control is necessary, because the same improvements at a different site may not be feasible and the feasibility would have to be redone because of the new economics of the different site. The word control is used because the developer will not necessarily purchase the site. If the developer needs more time either for analysis or to arrange financing, the developer may try to buy an option from the landowner. Frequently, purchase contracts are conditional upon, for example, obtaining the necessary financing, zoning, permission or some other factors.

According to Pisani & Pisani (1989:23), once control of the site has been obtained, a more detailed feasibility study can be undertaken. The level of the feasibility study, depends on the project and the developer. A complete feasibility study will analyse the legal, site, market, and financial aspects of the proposed development. Legal analysis will tell the developer how much and what kind of space can legally be developed. Site analysis will provide information about, among others, the ability of the soil to support structures and any special problems for construction. Market research will help answer questions about the size and type of space to be developed, what rental income can be expected, and what features tenants want. Architectural and design work provide alternative designs on the site, as well as cost estimates. Financial analysis is used to determine profitability of various alternatives. If these more detailed analyses indicate the project should not be undertaken, the project can be abandoned.

What constitutes an acceptable or unacceptable project, at this point, depends on the objectives of the developer and the ability of the project to satisfy them. The same result from a feasibility study may lead one developer to consider the project acceptable, while another would find it unacceptable. It cannot be said that a proposed project is acceptable without considering the specific developer. The developer provides the context within which a certain set of findings is judged to be feasible or not (Fisher & Collins, 1999:230).

2.2.4.1 *The Purpose of a Feasibility Study*

According to Carn, Rabianski, Racster & Seldin (1988:125), before a development is undertaken it is necessary to do an analysis to evaluate the chances of successfully executing the development. This analysis, called the feasibility study or viability analysis, involves the comparison of the cost benefit relationships of alternatives over specific time periods. In this study the analyst has to estimate the risk and/or variability of assumptions and the consequences of different alternatives.

According to Carn *et al.* (1988:125), the feasibility study is an analytical procedure which attempts to evaluate the potential success of a proposed development and it is an aid for decision-making, and is not a guaranteed recipe for success. The feasibility study has to answer the crucial question: “Will this project work?”

“Feasible” means practicable, possible, and capable of being accomplished. Anthony Downs, the best-known early author on the subject, defines a feasibility analysis as any study aimed at determining whether a proposed development on a particular site can be successfully executed (Downs, 1966:82).

Graaskamp (1970:4) defines feasibility as follows: “A real estate is feasible when the real estate analyst determines that there is a reasonable likelihood of satisfying explicit objectives when a selected course of action is tested for fit to a context of specific constraints and limited resources”. The following are important elements of this definition.

- “Likelihood” implies that feasibility is evaluated on a probabilistic basis. Risk and uncertainty have to be considered when projecting future events.
- “Selected course of action” refers to the proposed real estate development. Feasibility is specific to a particular project at a given location and time.

- “Objectives” set the aims to be achieved by the developer. Feasibility is a personal matter, unique to the individual developer and his specific objectives and resources.
- “Testing” in some form or another, is required for feasibility to be judged. Such testing may be intuitive or formalised, and based on economic and non-economic criteria. Decision criteria are determined by the developer, to reflect his requirements.
- “Context of constraints and limited resources” set the parameters within which the project has to function and be deemed feasible. Analysis of this context is central to feasibility analysis.

According to Downs (1966: 77), the purpose of a feasibility study is to provide an objective, independent analysis of a development opportunity and sufficient information for the developer to make a decision as to whether the developer should proceed, and if so, in what form. At the request of the developer, and given the units of measurement, for example, rates of return on project cost and on equity, the developer can reach a conclusion to the feasibility study.

According to Graaskamp (1970:6), a feasibility study gives support to a development proposal. A study can only conclude that a project is feasible if the measurement of feasibility is predetermined, which will vary according to who makes the decision. A definitive conclusion can therefore, be reached from one viewpoint, for example, the projected income streams are at an acceptable level according to specific criteria, while the project may not be considered feasible from another viewpoint.

The level of risk involved in the decision to proceed, varies according to the nature of the project, the reliability of the database, the team’s ability to control future events and conditions, and the expected level of financial gain and commitment (Graaskamp, 1970:7).

Carn *et al.* (1988:132) noted that the 'proceed' decision rests on a set of assumptions, analysis, and expectations. It requires an accurate assessment of current and future economic and market conditions, a development plan, and business strategy that insulate the project from conditions outside the developer's control, a management group committed to maintaining quality of the investment and a feasibility study that is pragmatic, timely, and responsive to all potential influences on the project's performance.

Graaskamp (1970:8) noted, that it is possible to categorizes, in general terms, the reasons why feasibility studies are commissioned into five primary groups: a) To support an application for finance, b) To support an application for planning permissions, c) To attract potential operators d) To define optimum land use and e) To define a concept.

Further to the primary categories, most feasibility studies will also have one or more secondary purposes, which could include: a) To provide marketing information, b) To identify market opportunities, c) To analyse specific operational aspects, for example local labour laws and d) To identify potential sources of development finance.

2.2.4.2 *Characteristics of the Feasibility Study*

According to Downs (1966:78), the following characteristics of the feasibility study should be noted: The objectives of the developer have to be determined before the success of the development can be evaluated. Feasibility studies are future-directed and based on the subjective evaluation of uncertain future events. No single optimal solution normally exists, as a variety of possibilities are possible, each with its own return, risk and uncertainties. A proposed development is limited by the resources available to the developer (financial resources, time, etc). The optimum solution is not always feasible within the limitations of the developer's resources. A feasibility study is unique to a specific project. In spite of certain mutual characteristics, a study is set in a specific time and context, and is applicable to a certain specific site. A proposed development has to conform to the developer's objectives, as well

as the external constraints. An attempt has to be made to fit the context in which the problem exists and a proposed solution.

According to Carn *et al.* (1988:140), any feasibility study is a perishable product. The future can never be predicted with guaranteed accuracy and although the developer will bring his experience into the equation when doing so and will conscientiously research all the factors which might impact on future projections, unforeseen events that can and will happen. Such unforeseen events might be the unexpected closure of a major employer , generator of space demand, or a natural disaster. The findings of a feasibility study should therefore, be subject to examination at regular intervals, to assess the impact of any changes in the bases and conditions of the recommendations and projections that have been built up on those factors. The following framework can be applied in most instances: a) Objectives of the developer; b) Socio-economic feasibility; c) Physical and legal feasibility; d) Marketing feasibility; and e) Financial feasibility.

2.2.4.3 *Types of Feasibility Analysis Reports*

Pyhrr *et al.* (1989:40) points out that a complete feasibility study might include seven types of studies, any one of which could be the analyst's total assignment in a particular situation.

Strategy study: Determination of investment and development objectives, policies, plans, and decision criteria.

Legal study: Analysis of the various legal and political constraints, and problems that may affect the project, including forms of organisation, title, zoning, building codes, etc.

Compatibility study: The compatibility of the project to surrounding land uses, public policies, and environmental standards.

Market analysis: Macro-economic studies, including regional analysis, economic base and neighbourhood or related aggregate data reviews.

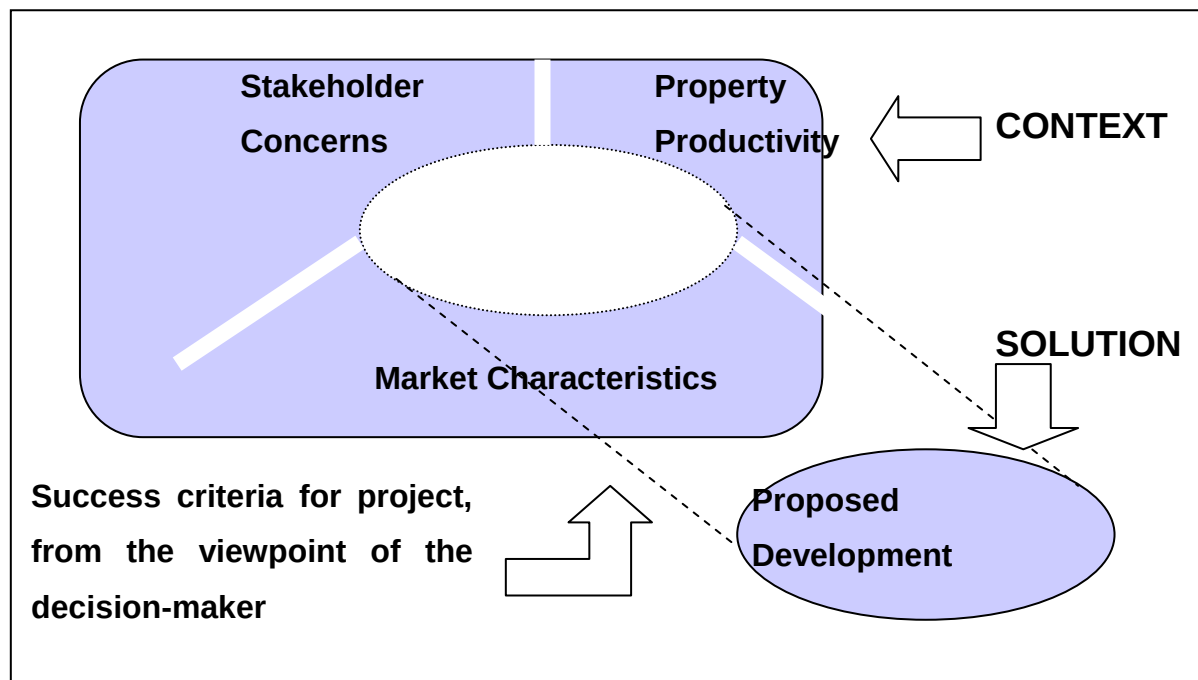
Merchandising study: Consumer surveys, analysis of competitive properties, sales and marketing evaluation, strategy, price, absorption rate studies and the like.

Architectural and engineering study. Determination of alternative land-use plans, structure, and design alternatives, soil analysis, utility availability, etc.

Financial-economic study: Cash flow forecasts, tax and tax shelter planning, rate of return analysis, analysis of financing alternatives, holding-period analysis, and so on.

It is noted that the nature and extent of the feasibility study is determined by the nature and extent of the problems that need to be solved. Secondly it is determined by the sophistication of the decision maker who perceives the problems, the size of the project and the budget available for such a study.

Figure 1: The concept of property feasibility



Source: Ghyoot (2003:2)

The feasibility concept for a new property development is illustrated in Figure 1. The figure depicts the following elements:

- Stakeholder concerns.
- Property productivity.
- Market characteristics.
- Proposed development.

The first three elements listed above define the constraints within which the proposed development must function and the opportunity it has to exploit. Jointly, these three elements determine the context of the feasibility problem. The fourth element, proposed development, is a potential solution to this problem. The degree, to which it is likely to succeed, is evaluated through feasibility analysis.

Ghyoot (2003:2) indicates that feasibility context requires additional comment.

Stakeholders concern

Stakeholders include the state, intended beneficiaries, broader public, developer, investor, financier, tenant, customer, local authority, political interests and environmental groups. Ideally, every stakeholders concern with the project should be addressed. Although feasibility is primarily measured in relation to the objectives of the company, the success criteria for the proposed development have to include the concerns of the other stakeholders.

Property productivity

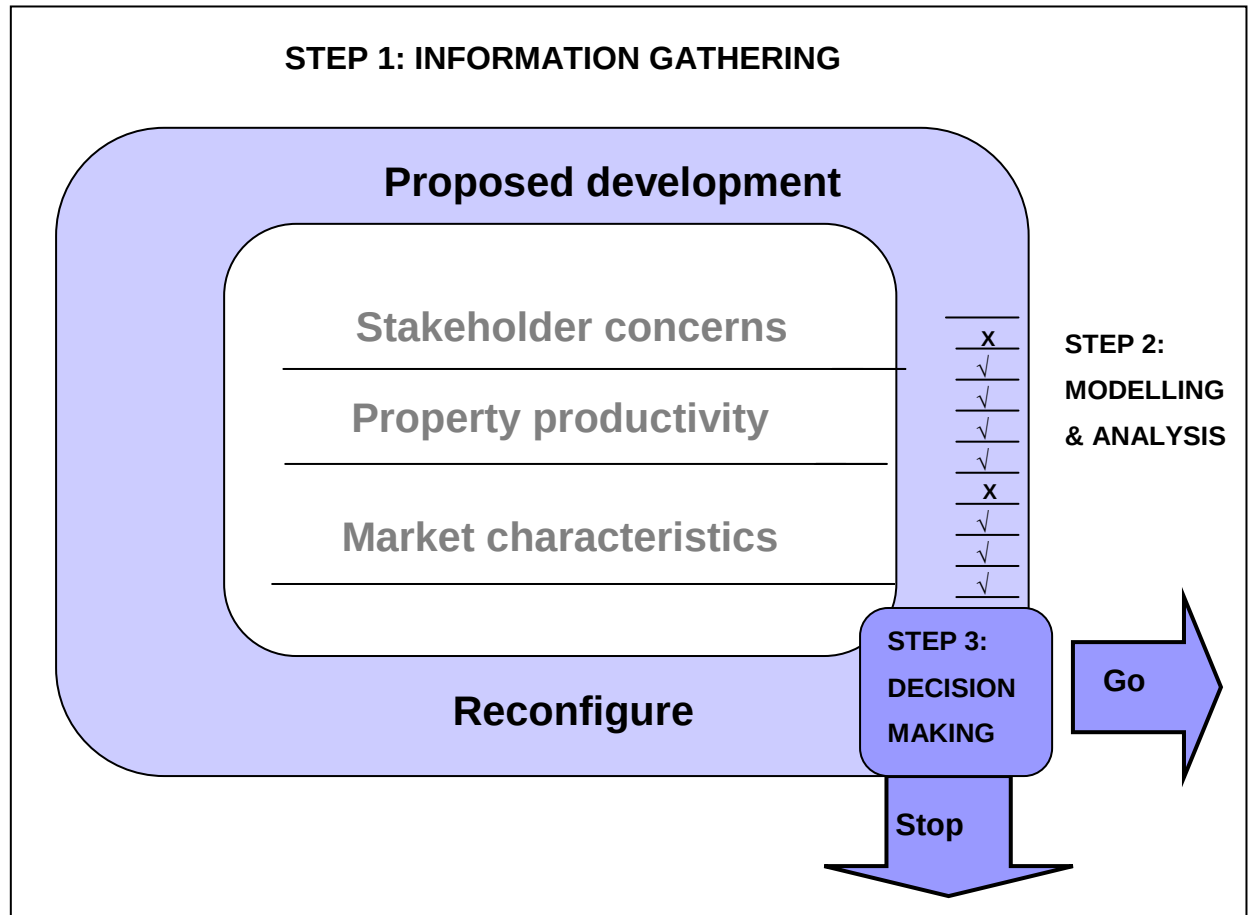
Property productivity analysis is the simplest part of the feasibility study and entails determining what services the property is capable of providing. This ends with an analysis of whether the proposal will allow the property to attain its highest and best use, or most likely use. For an industrial development zone, suitable land, with good access to international transport would be a key initial criterion. For example in the case of a disused airfield, investigating the existing facilities and location in relation to possible markets, are good starting points.

Market characteristics

Market analysis is the most difficult part of feasibility analysis and is usually the part that is executed poorly. Market analysis usually progresses from the general to the specific and includes broad economic and regional trends; supply and demand and potential opportunities; absorption rates; occupancy and vacancy rates; turnover and rental estimates; and projections into the

future. Market response is central to determining whether the objectives of stakeholders are likely to be achieved.

Figure 2: Feasibility analysis process for property development



Source: Ghyoot (2003: 3)

The feasibility analysis process is depicted in Figure 2. As shown, the process has three stages: information gathering; modelling and analysis; and decision-making. During the feasibility analysis process, a custom build decision model is used to evaluate the information gathered. The proposed development is systematically tested against each dimension of its feasibility context, using the success criteria of the company. These criteria reflect the company's requirements and its interpretation of the other stakeholders concerns. Such systematic testing helps to establish whether the project is likely to succeed. The process culminates in a recommendation to proceed with the project, to terminate the project, or to redesign the project to more closely fit its problem context.

A feasibility study that concludes that a project will “work” should convince the reader that the conclusion is appropriate to the data and analysis that have been presented. Specifically, there are two other matters that may easily be checked for a property development project.

The most common error in feasibility reports it seems is including data that are not interpreted and that do not contribute directly to the conclusion. It is easy to check for such “boiler plate” text, especially in appendices. Every item of data in the report should contribute to one or more of the conclusions. A better way to assess the feasibility report is to draw a diagram of the logic that leads to the conclusions. In the reports one reads, every item of data should be employed in the decision model and its effect on the eventual recommendation should be evident (Ghyoot, 2003:4).

Another check is whether the conclusions are conservative. For example, a simple way of making an infeasible project appear acceptable is to increase the projected growth rates or the expected absorption rate. Such unprofessionally executed studies are cynically referred to as “opportunity studies” that merely endorse the enthusiasm of the project sponsors. As long ago as 1958, Richard Nelson said that “... the good analyst will present a conservative report based, if there are unknown quantities, upon minimum assumptions.” Overoptimistic feasibility analyses, with inappropriate recommendations on project scale or orientation, are major causes of failure in real estate development projects. A property development feasibility study should rather get it wrong on the conservative side than avoid telling the company what they would like to hear.

After reading a report which recommends that a development should proceed, the company should be convinced it will succeed, not because it would be nice to have, but on the basis of hard facts, convincingly presented and cross-checked, using industry-standard approaches (Ghyoot ,2003:6).

2.2.4.4 *Objectives of the Developer*

According to Barret & Blair (1982:1), the objectives of the developer are of the utmost importance as the feasibility study of a project is evaluated by the extent to which these objectives are met.

According to Barret & Blair (1982:1), the objectives may consist of the following:

Economic objectives. Optimising the use of resources in maximising the return on funds invested. The maximising of the return and the skill in being able to employ the optimum amount of capital in the development will result in financially feasible development. The investment of capital in property provides a hedge against the erosion of the capital through inflation, but the primary objective is still the generation of an income stream.

Social or other objectives. The objective of governmental institutions is usually the improvement or optimization of services.

In evaluating the return on an investment, a specific attribute (for example that is internal rate of return) has to be decided upon and a scale, on which the effectiveness could be compared, has to be selected (for example that is an internal rate of return of 25% per annum). If the developer has financial objectives, the aim would be a certain return on his capital investment (Barret & Blair, 1982:3).

According to Carn *et al.* (1988:147), the developer often does not have a certain return as objective but rather an idea of a probable flow of income, set against the risk, as a criterion for the evaluation of the development.

SOCIO-ECONOMIC FEASIBILITY

Downs (1966:78) indicate that the active and effective implementation of the development is dependent on favourable socio-economic factors. This socio-economic feasibility must be characterised by: a) Selected determinants of economic activity, individual or combined movement which correlates with market movement, and b) Identification of socio-political factors which could have a positive or negative effect on the market.

It is noted, that the socio-economic study varies for the different types of property developments, both as far as the scope and the contents are concerned, as well as the relative importance of the various socio-economic factors. It is argued that general socio-economic factors of importance can be classified under the following headings.

a. Demographic factors

Population growth is a function of the existing population and growing rate and the national population growth is a function of births/mortalities, immigration/emigration. Local population growth is also a function of births/mortalities and immigration/emigration, as well as migration (regional migration, urbanisation, industrial growth). The population type is determined by: a) Age distribution, b) Household size, -type, - time span, and c) Divorce patterns/marriage patterns (Downs 1966:80).

White & Gray (1996:3) believe, that the demographic data that apply to each market area, have to be monitored regularly. Doing so, enables the landlord to adjust the tenant mix, merchandising and promotional efforts as necessary. Demographic factors cannot be controlled. It may change over time, for example the average age group and the income of the population in the trade area.

For example, if a new shopping centre is to be erected, surveys have to be conducted to determine the demographic status of the area and to anticipate future demographical changes. When an existing shopping centre is purchased, it is crucial to ensure that the center's profile matches the demographic requirements. White & Gray (1996:3) specifically believe that the

success of a shopping centre depends on the success of the center's tenants, the tenant's success depends on the ability to satisfy local consumers' needs.

Cloete (2003:112) believes, that the following factors have to be taken into account when the socio-economic and demographic characteristics of the local population are determined: Age profile (The needs of younger households are different from that of older households), Occupations, Education, Household size and Monthly household income (It could be argued that there is a close correlation between income and retail spending).

Commenting on a recently released property report by JHI Real Estate, Leis Weil, the executive chairman said that the fundamentals of most property sectors have improved. According to this report (2004:42), one of the most important trends that emerged strongly in 2003 was growth in the confidence level of high-income earners, reaching its highest level in eight years. Retailer confidence is also at a high level. Notwithstanding consumer confidence, there is still a vast area of untapped mass-market retail potential.

Property economist and University of the Witwatersrand School of Construction Economics and Management Professor Francois Viruly (2010:1) says that, while the property sector entered the economic downturn with relatively low vacancy rates and strong fundamentals, the economic slowdown has been intensely felt, with vacancy rising and optimism falling during 2009 and the first half of 2010. This had led to dramatic pullback in developments and continued caution, despite the fact that prospects for the domestic economy are improving.

b. Macro-economic factors

According to Downs (1966:80) investment in fixed property is coupled to a) The national economy, b) Fixed property sold in large economic unit's causes' use of borrowed capital and c) The importance of liquidity in national economy and financing institutions, like banks.

Understanding key real estate relationships has strategic implications on real estate decision making. In addition, having a good knowledge of the relationship between the main macroeconomic variables and real estate movements, can provide a useful tool set for decision making. This is important, particularly with companies increasingly seeking exposure to international markets.

Past research has consistently shown that commercial property performance is closely aligned to changes in the Gross Domestic Product (GDP), employment, interest rates and inflation. It is also evident, that due to property supply characteristics, the property cycle lags behind movements of macro-economic variables.

c. Local economic conditions

Downs (1966:81) is of the opinion, that the stability of local economic conditions can be evaluated by analysing retail/wholesale trading figures, service and manufacturing statistics and also the demand for property is a function of supply statistics.

According to Jacques du Toit, a property economist at Absa, South Africa remains in a low interest rate environment, whereas yields on commercial properties, shopping centers, offices, factories and warehouses around the world, have declined.

Cloete (2005:60) notes, that business cycles are fluctuations in the aggregate economic activity of nations (the economy moves in rhythmic cycles of growth and decline). Several types of business cycles have been identified, and these can be identified by their average duration (measured from peak to peak) or by the name of the person who first identified them. The more important cycles are:

- i. Kitchen cycle (less than 1 to 12 years): Short term
- ii. Kuznets cycle (15 to 25 years): Medium term
- iii. Kondratieff cycle (50 to 55 years): Long term.

The time period of the short-term cycle is typical of developed countries, but in South Africa and other developing countries a much shorter duration cycle is found from one to six years.

Structural changes may occur which can cause fundamental changes to the economic growth or decline, such as the scrapping of the gold standard, the Middle East Oil crisis or the current worldwide economic crisis.

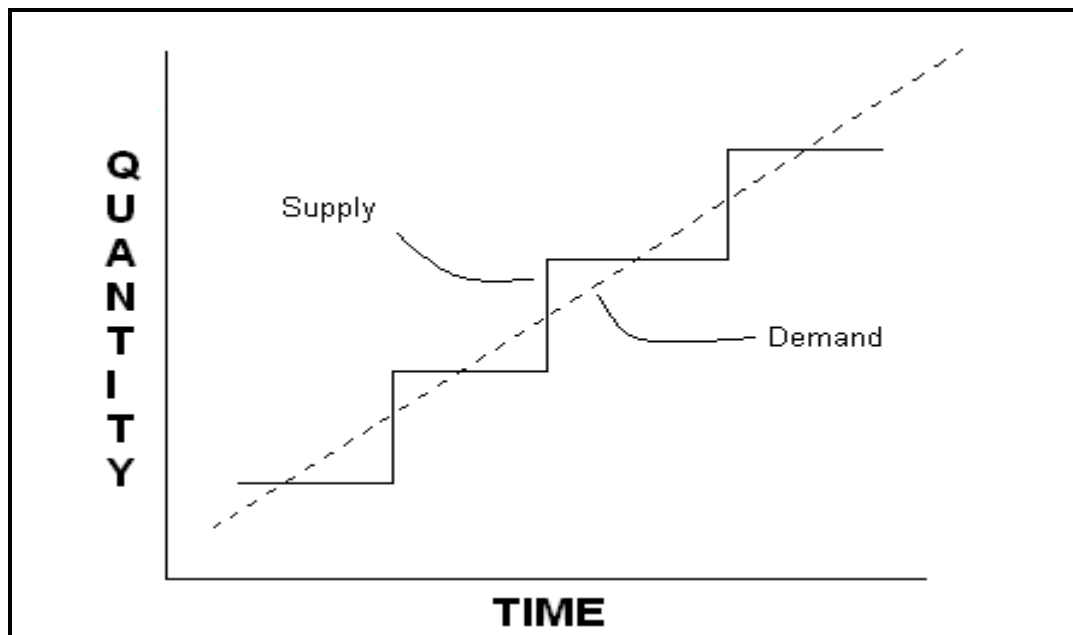
d. Trends in the construction market

Downs (1966:82) notes, that the following factors must be considered: a) Unique qualities of the construction market, b) Availability of professional expertise, c) Availability of skilled labour, d) Escalation in building costs and e) Shortage in building materials.

Cloete (2005:62) notes, that construction in South Africa is notoriously cyclical. Because of the long lead- and lag-times, phases of under-supply and oversupply alternate. This can be seen in Figure 3 and will be discussed shortly in the next paragraph.

A close correlation exists between the business cycle and the aggregate demand for construction in South Africa. The demand for construction begins to improve when the lower turning point of the cycle has been reached but it declines before the upper turning point. This would seem to indicate that construction demand is a leading indicator of the upper turning point, although more research is required before definite conclusions can be made.

Figure 3: Construction supply-demand relationship



Source: Cloete (2005:62)

e. Urban Growth

Downs (1966:81) also indicates that pattern and direction of growth in local market determines demand. The application of different theories on land use development patterns in specified area is therefore useful to determine demand for property development.

Cloete (2005:67) notes, that the character of local real estate cycles in metropolitan areas is determined by local business conditions in the local economy. The local business and real estate cycles may differ substantially from national business and real estate cycles. For example, in the early 1990s seaboard properties in Cape Town boomed while the bottom fell out of the property market in Port Elizabeth and Welkom.

f. Property trends

According to Downs (1966:83), property trends include: a) Type, age, state, occupancy and value of property, b) Supply of unoccupied space, c) Owner occupation versus tenant occupation, d) Changes in demand for different properties.

- Preference changes.
- Different purchase patterns.
- Demand for new types of housing.
- Demand for decentralized industrial areas.

Prof. Francois Viruly (2008:3) tracks the property cycle for office, industrial and retail property, through Boom Market, Recession and Recovery phases and the casual factors behind these. The three sub-sectors may not necessarily always be in the same phase of the cycle. For instance, while retail could be under pressure because of rising inflation and interest rates, industrial could be producing good returns due to a scarcity of zoned land with infrastructure and long lead times on new developments because of the time it now takes to have environmental impact assessments approved by local government. Even in the Vaal Triangle this is a problem because all residential property development was put on hold because of the current sewerage problem.

It is suggested by Pyhrr *et al.* (1989:52), that virtually every phenomenon in politics, economics, business and real estate is cyclical in nature, but that most investors and analysts incorrectly view these as trends and not as cycles. The consequences of this, is that many make poor choices, such as buying during the boom and selling during the down cycle, following the “herd instinct” and doing what everyone else is doing.

Various studies have shown that vacancy rates are a key variable linked to rent and building cycles. The latter consistently lags the vacancy rate cycle's peaks and troughs by about one year. Furthermore, the unique aspects of related to construction lag demand uncertainty and adjustment costs associated with property, offer some explanation into the mismatch between supply and demand which result in periods of abnormally high vacancy rates, followed by periods of abnormally low vacancy rates.

An alternative view on cyclical patterns is the psychological aspects of human behaviour. It is suggested that during extended periods of prosperity, people adopt the psychology of affluence and its by-product, economic optimism. People become economic risk-takers and rationalise that what has happened, will continue to happen in the future and thus see less risk than there actually is. Consequently, too many people become risk-takers, which in turn, create conditions for a major adjustment.

Pyhrr *et al.* (1989:89) makes three key observations on real estate cycles.

1. Many real estate professionals ignore cycles during the expansion phase because they are making extraordinary income commissions, fees, points and profits. They act as if the boom will never end because it is in their economic self-interest to do so.
2. On the recovery and expansion phase, the cycle usually increases faster than is anticipated and the market then generally produces over-priced real estate.
3. Timing is the key element to successful investing and investors must be willing to make significant adjustments in their portfolios to take advantage of constantly changing property market conditions.

g. Income-and expenditure patterns

According to Downs (1966:83), potential demand is converted to effective demand when the consumer can afford purchasing and the retail market is dependent on: a) Disposable income, b) Confidence in future economy and c) The life cycle of the consumer.

h. Political factors

According to Downs (1966:84) political factors include: local, provincial and national authority policies; land-use; building regulations; zoning; rent control; taxation legislation; labour legislation; and monetary and fiscal policy.

PHYSICAL AND LEGAL FEASIBILITY

Graaskamp (1970:9) states, that physical and legal feasibility is an analysis of the suitability of the site for the proposed development. The unique qualities of the site have to be fitted to the specific requirements of the proposed development. Information on the following aspects is collected during the feasibility process: a) the site characteristics; b) location, and c) environmental factors.

According to Graaskamp (1970:9), the site characteristics consist of the following:

Site description

This consists of the a) Real rights of the property like servitudes and title deed restrictions, b) Government control measures like development plans for the future, building regulations, property taxation, town planning schemes - use zone (that is residential, commercial), density zone (that is, 20 units/hectare), floor area ratio (the ratio between the total floor area on all levels and the area of the site), coverage (the ratio between the floor area on ground level and the area of the site), height restrictions (expressed in metres or in number of floors), building lines (street, side and back), parking and loading requirements, availability and sufficiency of necessary services like electricity and water reticulation, sewerage and storm water drainage, postage, police, fire department and refuse removal. Subsoil conditions: This will include a) The observation of vegetation, surrounding buildings, b) Geological investigations and soil structure and c) Water table. The topography will consist of a) Design and cost implications, b) Contours, c) View, d) Visual form and e) Slope. The vegetation which will typically be the conservation of natural vegetation and the landscaping of the new development.

Location

The importance of location, especially in retail feasibility studies, cannot be over-emphasized. According to Graaskamp (1970:10), the following aspects of location can be distinguished: a) Linkage, expressed in terms of time or money; method of transport; physical access (traffic flow, pedestrian

crossings); travelling stress and Travelling cost, b) Exposure of site and structure; the visual impressions of property and the neighbourhood and c) Supporting/complementary activities like public transport, shops, schools and traffic noise.

The location of a development is an important consideration when a new development is being planned. Developers all compete to gain access to the best available sites. Two factors contribute to effective location, namely convenient access and visibility. A good location allows easy access, attract large numbers of customers, and increase potential income from sales.

The selection of a site for a specific development is subject to the evaluation of the following factors (Cloete 2003:117): a) Accessibility to the site,; b) Passing pedestrians, c) Availability of parking, d) Distance from the parking area, e) “dead ends” in the shopping centre, f) Visibility and store frontage, g) Complementary stores and h) Economic factors.

Cloete (2003:106) believes that the following key factors apply in identifying a gap in the market: a) The size of the population in the area, b) The composition of the population in the area, c) Tthe labour market, d) The economic base in the area, e) Existing and future competition in the area, f) Future growth and development and g) Tthe availability of store sites.

The decision on the location of a development is influenced by the population, accessibility, competition and various costs.

Environmental factors

Environmental factors will typically consist of the following: a) Climate influences, orientation of the building, position and size of the windows, building materials and vegetation, b) Adjacent and neighbouring site uses: present and future uses important for success of planned development and c) Pollution, noise and dilapidated surroundings have a negative effect.

2.2.5 Professional Appointments

As soon as the developer intends to proceed with a property development, the developer will contact and appoint appropriate professionals to assist the necessary activities or deliver specialist advice and work for the developer. Usual professionals may include funding agents, planning consultants, valuers, architects, quantity surveyors, structural engineers, and mechanical/electrical engineers. These professionals constitute the so-called “professional team”. The members of the professional team advise the developer on the property development process and end-product property being developed. Professionals have both strategic and tactical influences on the success of a property development and the composition of a professional team and its communications and trust capability, as well as the timing of individual professionals entering and acting in the professional team will have considerable effect on the success potential of the project. Also, the team and the role players will vary from one property development to another and from one developer to another (Birrell & Shi Bin, 1997:5).

2.2.6 Financing stage

During the feasibility analysis and design phase, preliminary discussions are started with construction and permanent lenders. Once the plans are completed and the project has been determined to be feasible, negotiations on financing will be finalized. Initially according to Ling & Archer (2005:42) permanent financing will be arranged. When the permanent financing has been arranged, the construction financing is then sought. The construction lender will want to see a firm commitment from a reputable permanent lender before considering a request for construction financing. Any difference between the construction loan amount and the cost of the project represents the required equity investment in the development of the project, and will normally have to be provided upfront.

According to Birrell & Shi Bin (1997:6), short-term finance is required to pay for the costs during the property development process, comprising expenses on site, construction, professionals, letting/sale and marketing. As this money is spent it creates interest charges and loan repayments which accrue over the duration of the process. Obtaining the right sort of finance on the best terms is a complex and specialist activity and in most circumstances, is necessary for property development. The cost and availability of debt finance(working capital)has a considerable influence on the success of property development. The selection of a single or an optimum mix of financing methods will in most circumstances, directly affect the profit margin to the developer or even financial success or failure of the development.

If the developer wishes to hold the completed building for renting, long-term finance will be sought to repay the development short-term finance. Alternatively the trader developer would pay off the short-term finance from the sale price of the completed let building and realise the profit from the development process (Birrell & Shi Bin, 1997:6).

2.2.7 Planning Application

According to Birrell & Shi Bin (1997:7) this phase is to gain planning permission to build the desired building on the site usually from the local authority concerned but may be with central government implications. The proposal for a property development must be acceptable to the local authority with its planning control system and national guidelines. To quite an extent, the price of the site is dependent on its existing or forthcoming planning status.

The value of the end product will, to quite an extent, be dependent on a tolerance by the nature of the planning permission allowed to the basic profit maximization in the design and function of the end product. To gain agreement or changes in what is to be built on the site needs negotiations between the developer and the local authority. These negotiations may also include changing the nature, size and function of the building considered for

the site. In practice, consulting with the appropriate planning officer of the local authority before submitting the formal planning application, may help to obtain a positive result in this phase, as well as such information being fed into the feasibility study and minimizing the developer's expenditures and risks from same.

2.2.8 Site Assembly/ Purchase

Usually site purchase is the first, major financial commitment of the developer. Once it is settled, almost no future efforts can be made to improve any existing disadvantageous characteristics of the location of the purchased site. In case of a large property development encompassing a number of existing lots, site assembly may take quite a long time. Normally all existing legal interests must be acquired. In the short term, some owners and occupiers may be unwilling to sell, even at prices well above existing use value, especially if they know a large site assembly is taking place. Site acquisition is simplified if the site is held in a single ownership. Even then careful preparatory investigations should be made, often while trying to maintain anonymity for the investigator (Birrell & Shi Bin, 1997:8).

2.2.9 Design

According to Birrell & Shi Bin (1997:8), the design phase falls into four sub steps, it is a) Conceptual design which is establishing the general layout and external physical expression and the bulking of the building in relation to its surroundings so that its aesthetics and image are appropriate to the needs of the building, b) Design development which is taking the conceptual design and reducing it to the specificity of drawings from which the construction drawings can be produced, c) Construction drawings which comprise transforming the developed design to a level of detail that can be costed, priced scheduled and built by building contractors, and d) Building specifications which are clear statements of the quality of all materials and machinery required in the building. Apart from numerous specialists in the design team, other professionals' advice, such as from quantity surveyors and

especially letting/sales agents, in the early or pre-design phases are very worthwhile inputs to the building design.

2.2.10 Tendering/ Contracting

Birrell & Shi Bin (1997:8) notes, that three groups of activities should be conducted in this phase, a) Writing the construction contract package of documents, b) Inviting tendering from building contractors, and c) The contracting process establishing which parties will carry out the whole and parts of the construction work.

The first is to prepare contract documents, such as general conditions of building contract, design drawings, specifications, and bill of quantities, by the developer or the professionals. The second is to establish the construction work costs and market probabilities and prices by building contractors tendering to the developer. The third is for the developer to choose the prospective building contractors as a result of tendering and/or negotiating with an array of prospective building contractors. Preceding the above, a careful selection of the most appropriate building procurement process from the marketplace alternatives available should be made in relation to the nature and requirements of this property development.

2.2.11 Construction stage

While the activities described earlier are going on, the developer also considers the construction of the improvements. Construction costs are critical to the success of the entire project. If actual costs exceed the estimates used in the feasibility study, the project may turn from a winner to a loser. If the project is not completed on schedule, extra interest costs and lost rental income could hurt profitability. If any of the parties involved in construction run into financial difficulties, the project could be held up by legal proceedings and financing issues may arise. The developer must decide who is to implement the architectural plans and under which conditions.

This phase involves constructing the whole building, including site preparation work and other associated work, as well as the handling of the flows of all construction resources. The developer's aim under the contract with the building contractors, is to produce the designed building on time, within budget and at the written quality standard specified. Any time duration difference in completion from the plan/schedule or variation in cost, will affect the profitability of the property development. Therefore, it is essential that the developer controls progress and cost of the construction work as planned throughout this phase. Construction is the phase in which the developer is spending the maximum negative cash flow in the whole property development process, therefore it can have the greatest effect on variance of the work compared to the planned schedule can considerably affect the project cash flow timings which in turn impact positively or negatively on the financing costs of the development process (Birrell & Shi Bin, 1997:9).

2.2.12 Marketing stage

The ultimate success of a development project depends on its marketability. Downs (1966:84) identifies two types of marketing that may accompany a development project. First, the space in the development must be leased. Second, if the project is to be sold, a buyer must be found. These two areas of marketing activity are closely related to one another since the ability to lease the space being produced is a prime determinant of the ability to find a buyer and the price that the buyer is willing to pay. A project that has been leased to good tenants at competitive rental rates is attractive to potential equity investors and can command a premium price.

Developers play a risky game in which many of the factors affecting the ultimate profitability of a project are beyond their control. However, just because these factors are out of the developer's control, doesn't mean the developer should simply ignore them. It is imperative that the developer closely monitor them and incorporate this information into the many decisions that must be made throughout the life of a project. According to Ratcliffe (2000:129), a good feasibility study will identify the critical variables and

provide some initial information about how sensitive the returns from the project are to changes in the variables.

According to Birrell & Shi Bin (1997:9), in many circumstances, letting/sales promotion should begin much earlier, than indicated in this sequenced presentation. It may begin as soon as the time of the developer's commitment to carry out a property development project. Feedback from such early promotion may induce changes in the end product or development process which affect the results of the development process. The various means of promoting a property being developed, include: a) Advertising, b) Mail shots, c) Particulars and brochures, d) Site boards and site hoardings, e) Launching ceremonies and f) Show suites. Each has different expense requirements and marketing effects on potential tenants. The extent, to which each of these is adopted, depends upon the supply competition in that segment the property market at that time.

2.2.12.1 *Marketing Feasibility*

According to Carn *et al.* (1988:168) the marketing feasibility study comprises of a study of the demand and supply and analysing thereof to determine if the property is marketable.

The objectives of the market study is to inform the developer of the effective demand for a product at a certain price level by analysing the existing economic health of a specified market area (region, city, community, neighbourhood) its future and the potential for new spatial units within that area. The price level dictates the amount the developer can spend on the different cost components of the development.

Barret & Blair (1982:4) aver that the market analysis is carried out to identify the potential market for a specific product and is thus mainly future-directed. It is further relatively easy to collect a vast amount of data with relation to the property market because of the fact that each property is more or less unique.

One should therefore, thoughtfully decide which market parameters are the most applicable for the specific analysis.

According to Barret & Blair (1982:4) the market analysis gives a description of the competitive marketing environment and conditions and is thus a description of factors which are normally not controllable by the developer. A market analysis must be supplemented by a merchandising analysis, which identifies those unique elements which will increase the potential marketing success.

Allison (2005:3) believes, that the purpose of every marketing endeavour is to create a sustainable competitive advantage. An intelligent marketer should be working on the marketing mix – not only to meet but to exceed his customers' expectations.

According to Cloete (2003:520), marketing is both a strategy and a method of bringing a product or service to the attention of prospective consumers.

Demand analysis

According to Carn *et al.* (1988:172), the purpose of the demand analysis, is to analyse the current and future need for a certain type of property. The demand analysis consists of three parts: a) Analysis of national economic situation; b) summary of socio-economic factors and application on relevant type of property; and c) the definition of the trading area.

The trading area or primary market is the geographic area to be served by the development. Results from socio-economic factors analysis are applied on the relevant trading area to determine potential demand. Demand factors should be grouped with regard to applicability and importance on the development. Current demand can be determined through market building method, while future demand can be determined through systematic surveys of potential clients, opinion of experts or use of statistical methods (Carn *et al.*, 1988:172).

Supply analysis

According to Carn *et al.* (1988:172), supply can be defined as the amount of space of a given type which would be available for the current and future market at given price levels.

The following supply factors can be distinguished, according to Carn *et al.* (1988:176):

Construction: Volume, type, location and tendency.

Rent: Rental levels according to type, trends and services included.

Rent periods: Owner's occupation against tenant, trends.

Empty space: Ratios according to building type, location, trends.

Competition: Number, location, rent, prices and trends.

Geography: Climate, topography, soil.

Community: Facilities, type, location, services supplied.

Services: Type, extent, location, taxes, tendency.

Merchandising analysis

The purpose of a merchandising analysis is to identify the elements necessary for survival, as well as the factors giving a competitive advantage. In order to describe the unique product a profile of the future space user's characteristics must be compiled. The merchandising analysis supplies the information needed to provide a competitive product.

2.2.13 Letting

According to Birrell & Shi Bin (1997:10), the success of a property development is very much dependent on whether, or the degree to which, the completed building will be accepted for use by tenants in the property market. The letting agent, with a detailed market knowledge, tries to persuade and negotiate with prospective tenants, already known or found by promotion, in order to let the building with favourable lease terms for the developer, although some incentives may be offered to tenants depending on marketplace condition at that time or expected in the near future. In fact, pre-letting of whole or part of the building enables the developer to reduce the

chance of incurring development profit failure but may reduce the size of his profit at time of completion of the development.

In this phase, the developer should also pay attention to leasing to as high quality tenants as possible and the constituents of clauses in the leasing covenants. These features constitute the investment quality of a let property and thus will affect the amount and security of the rental income flows, as well as affect the value and sale price of the project when being put up for sale (Birrell & Shi Bin,1997:10).

2.2.14 Sale

When the building has been let fully or to the planned occupancy level, the trader-developer has completed the property development process, except for closure, by selling it on to a future landlord/investor and paying off the short-term finance used for the development process. Upon sale, the developer realises his profit, positive or negative, and moves on to the next property development. Alternatively, for the permanent or temporary future the developer may choose other avenues of profitability but these are out with the property development process. The point in time of sale can be any time the developer believes it propitious to do so, either as above or the property development process (Birrell & Shi Bin, 1997:10).

2.3 SUMMARY

The main objective of this chapter was to give the reader a background regarding property development.

Property development is the process directed at the increase in value of an existing property, developed or underdeveloped, by the application of resources such as material, human and capital.

According to Birrell & Shi Bin (1997:1) the property development process comprises of fourteen phases or activities. Among these phases there are sequential relationships, different levels of importance among the phases for success or failure of the whole development and different permutations of work in each phase such as a) quality thinking, b) consuming duration and c) spending capital.

The property development process consists of the following fourteen phases:

Phase 1: Opportunity/Site Identification

Phase 2: Market Analysis

Phase 3: Site Investigation

Phase 4: Feasibility Study

Phase 5: Professional Appointments

Phase 6: Financing Stage

Phase 7: Planning Application

Phase 8: Site Assembly/Purchase

Phase 9: Design

Phase 10: Tendering/Contracting

Phase 11: Construction

Phase 12: Marketing

Phase 13: Letting

Phase 14: Sale

These phases were discussed to give the reader an understanding of what each of these phases consists of.

According to Carn, Rabianski, Racster & Seldin (1988:125) before a development is undertaken, it is necessary to do an analysis to evaluate the chances of successfully executing the development. This analysis, called the feasibility study or viability analysis, involves the comparison of the cost benefit relationships of alternatives over specific time periods. In this study the analyst has to attempt to determine the risk and/or variability of assumptions and the consequences of different alternatives.

The level of risk involved in the decision to proceed, varies according to the nature of the project, the reliability of the database, the team's ability to control future events and conditions, and the expected level of financial gain and commitment (Graaskamp, 1970:7).

The objectives of the developer are of the utmost importance as the feasibility study of a project is evaluated by the extent to which these objectives are met. These objectives may consist of economic objectives or social objectives.

It was also noted that it is possible to categorize, in general terms, the reasons why feasibility studies are commissioned into five primary groups: a) to support an application for finance; b) to support an application for planning permissions; c) to attract potential operators; d) to define optimum land use; and e) to define a concept.

According to Graaskamp (1970:11), further to the primary categories, most feasibility studies will also have one or more secondary purposes, which could include: a) To provide marketing information, b) To identify market opportunities, c) To analyse specific operational aspects, for example local labour laws and d) To identify potential sources of development finance.

Different feasibility studies were discussed, namely: a) Socio-Economic feasibility, b) Physical and Legal feasibility and c) Marketing feasibility. The financial feasibility was discussed in detail in the next chapter.

CHAPTER 3

FINANCIAL FEASIBILITY

3.1 INTRODUCTION

The last phase of the feasibility study is to determine whether the project satisfies the financial requirements of the developer. The purpose of the financial feasibility study is to determine whether the proposed project will “pay”, in other words, whether it will satisfy the financial criteria of the parties involved. The financial objectives of the developer may be quick profit and construction turnover, the professional consultants want to earn fees, the leasing or selling agent will want a commission and the investor requires an acceptable yield on the investment. Similarly, the local and other authorities, the potential tenants and political and environmental pressure groups, all have concerns which need to be addressed. These various requirements must all be reconciled in the proposed project. Quantification of these objectives is incorporated in the feasibility study.

From the viewpoint of the investor, the decision on whether to invest in a specific property development or, if faced with alternative developments, which development to invest in, is based simply on the ability of that development to generate an acceptable income stream in relation to the capital employed. This is measured in a number of ways, but common to all is the calculation of firstly the capital employed and secondly the income stream.

A thorough marketing analysis should precede the financial feasibility study to prevent an optimistic assessment being made of the rental levels which may result in an unsuccessful development and very unhappy financiers. At this stage one should take care not to be tempted to manipulate the figures of the financial feasibility study to a desired result (Cloete, 2005:77). The purpose of this financial feasibility study is for the very reason of determining the profitability of the success of a planned development – not to manipulate the figures until a desired result is reached. If the figures of the financial feasibility study do not comply with reality, it could prove disastrous for the developer.

The financial feasibility is a powerful and necessary tool to be used when establishing the economic desirability of investing in a development. It should not however be treated as a mechanical tool where decisions are automatically taken on the result of the study. The personal “gut feel” and experience of the developer is still of inestimable importance and common sense should always be exercised in all decision-making (Cloete, 2005:77).

3.2 DIFFERENT TYPES OF FINANCIAL FEASIBILITY REPORTS

According to Jaffe & Sirmans (1989:121), different types of financial feasibility reports can be distinguished: a) An estimate of current building cost only (usually based on either the square metre or the elemental method of estimating), b) An estimation of current building cost, but escalated to tender date (estimating building cost at tender date) or to the date of practical completion (estimated final building cost), c) An estimate of escalated final building cost with only the estimated cost of professional fees added, d) An estimate of the total capital outlay, e) A replacement valuation for insurance purposes and f) An economic viability analysis incorporating the estimate of the total capital outlay, for:

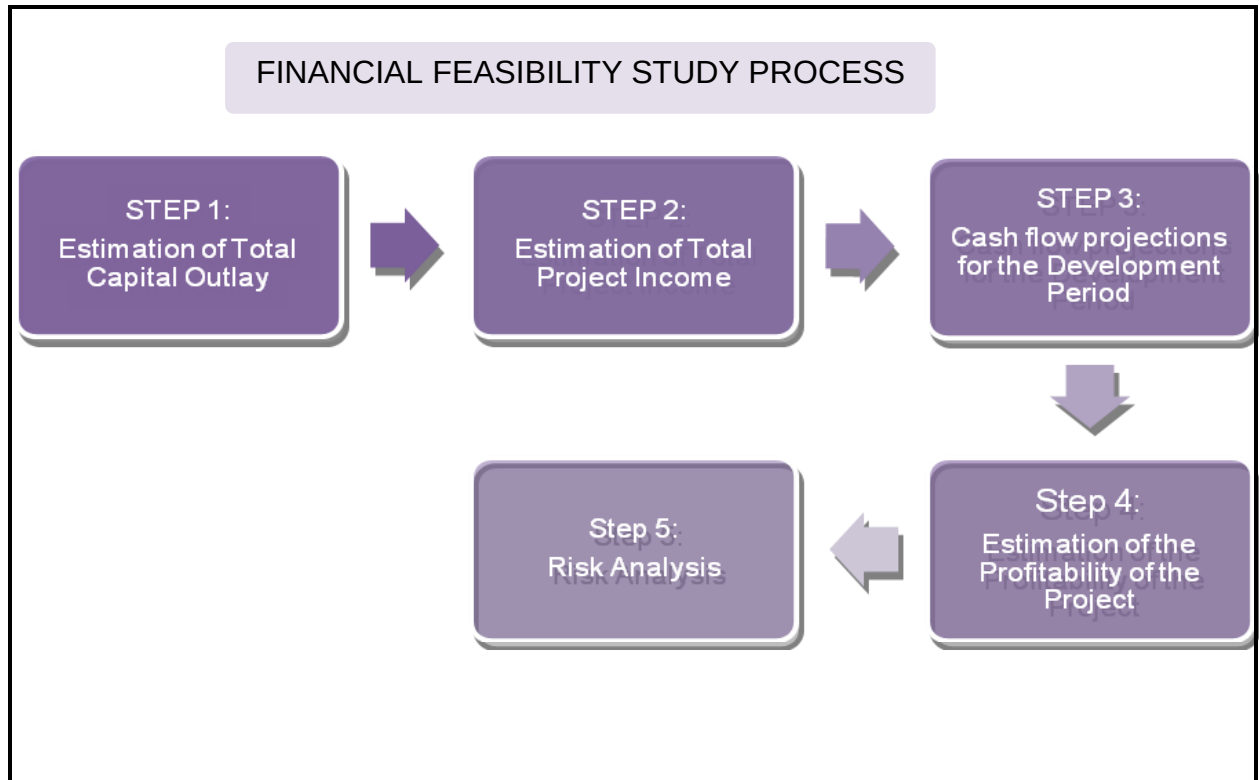
- A letting scheme
- A marginal return letting scheme
- A sectional title/share block selling scheme
- A leasehold scheme
- A timeshare scheme.

All of the above types of feasibilities may be based on varying stages of completion of the architect’s drawings with, at the one end of the scale, no drawings with only the local authority bye-laws to go on, and at the other end of the scale full working drawings.

The financial feasibility study consists of five steps: a) Estimate the total capital outlay of the project, b) Estimate the total project income, c) Do a cash flow projection for the development period, d) Estimate the profitability of the project and compare with the investors’ objectives and e) Do a risk analysis

on the proposed project. The financial feasibility flow process is illustrated in Figure 4 and will be explained in the next sections.

Figure 4: The financial feasibility flow process



Source: Jaffe *et al.* (1989:126)

3.3 STEP 1: ESTIMATION OF THE TOTAL CAPITAL OUTLAY

Step one in the financial feasibility process is to estimate the total cost of the capital outlay. Capital in this context refers to the funds used to finance the acquisition of assets in the form of property. According to Cloete (2005:198), the cost of capital is vitally important. Maximising the value of a property requires that the cost of all inputs, including the cost of capital, be kept as low as possible. The goal is to estimate the overall cost of capital, or the weighted average cost of capital (WACC). The most common form of funds used to finance long-term assets, is either equity or long-term debt. WACC is primarily determined in order to assist the developer to make capital budgeting decisions. The cost of new funds is therefore, the only relevant form of debt, to be considered in WACC calculations. To determine WACC, the after-tax cost of debt, the cost of preference shares, and the cost of ordinary shares

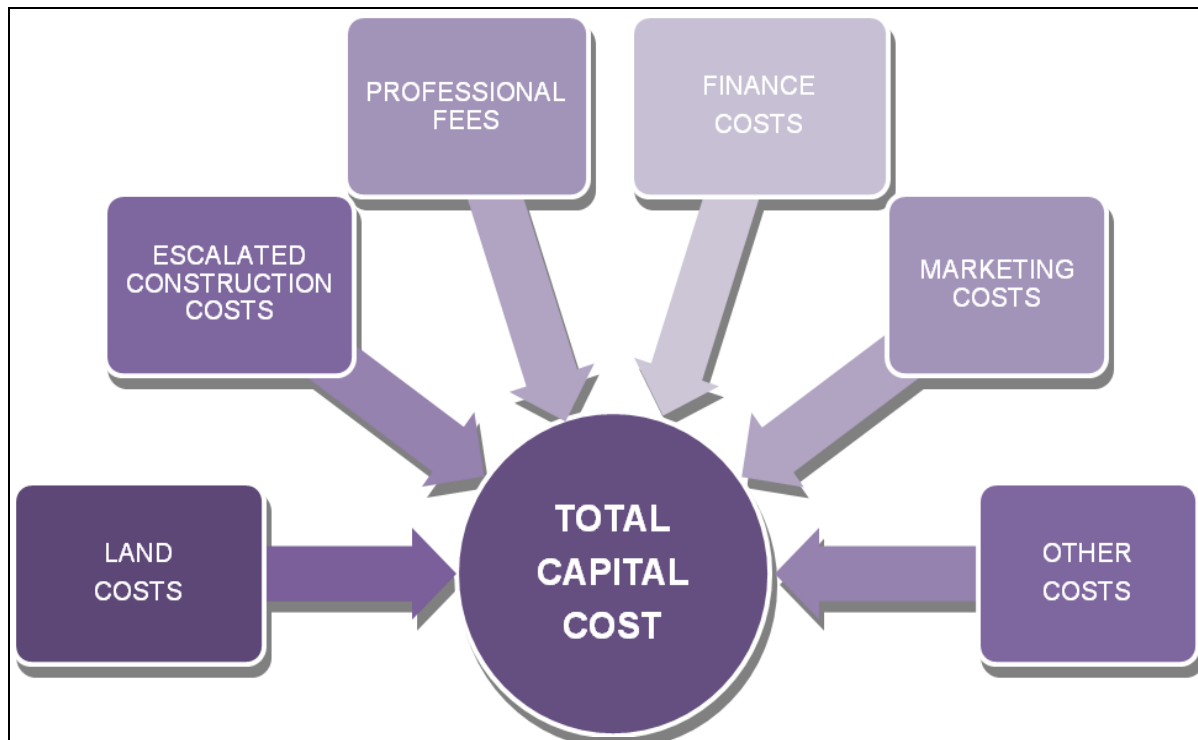
are determined. The latter can be divided into two aspects, namely the cost of retained earnings and the cost of new share issues. The cost of the ordinary shares is composed of the risk-free rate (k_{rf}), the market risk premium (RP_m) and its beta (b_i).

WACC is determined as follows:

$$\text{WACC } (k_a) = w_d k_d (1-T) + w_p k_p + w_s k_s + w_e k_e$$

Where: k_a = *Weighted Average Cost of Capital*,
 w_d = *weight used for debt*,
 k_d = *cost of debt*,
 T = *Marginal Tax rate*,
 w_p = *weight used for preference shares*,
 k_p = *cost of preference shares*,
 w_s = *weight used for ordinary shares*,
 k_s = *cost of ordinary shares*,
 w_e = *weight used for newly-issued ordinary shares*,
 k_e = *cost of newly-issued ordinary shares*,

Figure 5: Components of Total Capital Costs



Source: Jaffe *et al.* (1989:147)

3.3.1 Capital cost

According to Jaffe *et al.* (1989:147) capital costs consist of the following components: a) Land costs, b) Escalated construction cost, c) Professional fees, d) Finance costs, e) Marketing costs and f) Other costs. All of these components are seen as part of the capital cost, since the definition of capital cost is: “One time setup cost of a project, after which there will only be recurring operational costs”, or “... the total cost needed to bring a project to a commercially operable status”. These components can be seen in Figure 5 and will be discussed briefly for information purposes, in the next sections.

3.3.1.1 Land costs

The cost of the land consists of the following elements.

Market value – of the land. The market value of the land should be reflected in the feasibility. State the source of the market value if it has not been appraised professionally.

Transfer costs – calculate the transfer cost and duty if the land is not already owned by the developer. Bear in mind that no transfer duty will be payable if value added tax (VAT) is payable.

Soil tests – may be required to ascertain the sustainability of the ground structure to support the improvements.

Bulk service charges – are charged by the municipalities to compensate the municipality from providing new or extended services. If applicable this could be a major item of expenditure, especially in the case of bulk electricity service charge.

Interim tax on land or improvements – is calculated according to the local authority's requirements. Allow for interim tax on the land from the date of the economic feasibility report to the opening date of the development, utilising the local authority valuation of the land and the applicable tax rate.

3.3.1.2 *Building cost and escalation*

The estimate of the current building cost consists mainly of: basic items - influenced by design and aesthetic specifications, special items – that is partitioning, air conditioning, ventilation, equipment and furniture for admin offices, site works – that is paving, road work, electrical and water-reticulation, preliminaries and contingencies – consisting of contingencies and plan and detail development. The estimate is usually based on an estimate of R/m² or an elemental analysis.

Jaffe *et al.* (1989:198) noted, that if the elemental method of estimating building cost is employed, the following should be taken into consideration. The basic items of the different functional entities are usually kept separate, that is parking, shops, and offices. As it is usually difficult to split the special items into the different functional entities, these are usually grouped together. Alterations, external works, preliminaries and contingencies, are dealt with separately. In the improvement square metre estimating method, the basic items are dealt with on a square metre basis but the rest are separately dealt with, in exactly the same way as would be the case in an elemental method. The estimate is measured at component or sub-component level. For

presentation purposes, however, the costs are grouped together by element. As the same elements are consistently used, a comparison of costs is possible. In shopping centre developments it is sometimes useful to make available to the developer the component or sub-component detail of the internal fitting out of the majors and nationals. The element cost is expressed as a rate per unit, a building rate per m² and a percentage of building cost. This facilitates comparison with other building developments and highlights possible over-expenditure and/or measuring and pricing errors.

In all cases it is important that the specifications, upon which the estimate of building cost is based, be clearly identified.

Escalation in building cost

According to Jaffe *et al.* (1989:199) escalation in building cost comprises both pre-tender escalation and post-tender escalation. Pre-tender escalation comprises the allowance in tender price from date of the feasibility report to the anticipated tender date. Apply the tender price index predictions or a percentage per month compounded, obtained from a reliable authority. It is suggested that the “base month” principle be used when determining the month for the index that is that up to the 15th of the month the index for the previous month shall apply and for the rest of the month the index for that month.

Post-tender escalation is the escalation during the building period and is usually calculated by applying the BIAC Contract Price Adjustment Provisions. This formula utilizes the work group indices (P0151) published by the Statistical Services. To calculate the post-tender escalation the following procedure is followed: 1) Apply the predicted indices multiplied by a factor of 0.85 (which is the average of the group indices from the Statistical Services) over the period from the date of tender to the date of handing over of the site to the contractor, 2) Continue for the period from handing over of the site to the date of practical completion, but multiply with a further factor (usually 0.6) in order to allow for that portion of the contract sum which has not already been

certified and paid to the contractor and also for the nature of the payment curve.

3.3.1.3 Professional fees and disbursements

Under this heading the detail of the professional fee calculations based on the recommended fee scales of the various professional consultants may be provided. Bear in mind that there are consultants (such as landscape architects, surveyors and, town planners) other than architects, quantity surveyors, structural engineers, mechanical engineers and electrical engineers that may be involved.

According to Jaffe *et al.* (1989:200), the developer need to see to it that no overlapping of fees occur other than the traditional overlapping such as the architect charging fees on the wet services when the design was in fact prepared by a wet services engineer. The architect normally uses the services of the wet services engineer and incorporates it into the architect plans.

Refer to that section in the report where the detail may be obtained unless only a percentage of the estimated escalated building cost is used for calculating the professional fees.

Project management fee

According to Jaffe *et al.* (1989:201), in large developments a project manager/coordinator is sometimes employed to control the overall researching and expenditure of the project. In these cases a partially compensating saving is generally effected in the fees paid to other consultants as certain of their responsibilities are now assumed by the project manager.

Disbursements

Allow for disbursements such as the cost of typing and duplicating, printing of plans and travelling and subsistence. According to Jaffe *et al.* (1989:201), it is normal to allow 0.5% of the escalated building cost for this, excluding travelling and subsistence.

3.3.1.4 Finance costs

Mortgage registration cost is calculated if a mortgage is applicable. The allowance for cost of capital and/or interim interest on mortgage – this allowance is to cover the finance fee and the interim cost of capital during the construction period calculated according to a cash flow prepared for the project. According to Jaffe *et al.* (1989:203), there are basically two ways of calculating the cost of capital and/or interim interest on the mortgage, namely:

Short method.

Split the expenditure into costs which occur at a given point in time, separating those occurring at specific times and those that are spread over a period of time. The land cost may, for instance, be taken as being incurred at the date of the economic feasibility analysis report, for example 65% of the professional fees one month after the date of tender and the building cost plus the rest of the professional fees may be taken as spread over the building period. Apply the applicable full interest rate, compounded over the time spans involved up to the opening date of the development, but multiply the interest calculated for the spread costs by a factor in an endeavour to make provision for the spread.

Longer method.

Prepare an income and expenditure cash flow to date of opening of the development (normally there is no interim income, except in the case of a phased development). Apply the applicable interest rate, compounded, to this cash flow. The rate of interest to be used is the interest rate which the developer is required to pay for short-term bridging finance.

3.3.1.5 Marketing costs

Marketing and promotion cost: An allowance for all marketing and promotion costs such as brochures, public launches and press releases, should be incorporated, if applicable. Leasing commissions: Substantial leasing commissions may be required to be paid for negotiations with and securing of

tenants. The Competition Commission has advised that they do not allow commission tariffs as they believe it creates an anti-competitive situation.

3.3.1.6 *Sundry costs*

According to Jaffe *et al.* (1989:205), the following sundry costs can occur:

Sundry legal fees: This allowance is for legal fees paid in respect of agreements. This could be a substantial sum if complex agreements are involved.

Plan scrutiny fee: A fee paid to and calculated in accordance with the requirements of the relevant local authority for approval of building plans.

Tenant co-ordination fee: A separate fee is sometimes paid to consultants for liaising with tenants with regard to their fitting out requirements and the co-ordination and expediting thereof.

Stamp duty on lease agreements: Usually the stamp duty is paid by the tenant but in many cases, especially where a major anchor tenant is involved, the cost is shared equally by the tenant and the landlord.

Development and promotion fee: If applicable this could range between 1% and 5% of the escalated building cost.

Non-recoverable tenant requirements: Requirements not allowed for in the basic building specifications. Fairly often a developer, in an attempt to attract a blue chip tenant, may agree to pay for certain tenant requirements not allowed for in the basic building specification.

Interim income: The net income, if any, which is generated before the opening date of the entire complex, is to be deducted in order to obtain the net total capital outlay. It is usual to be very conservative when estimating such income, using low rentals and a high vacancy factor.

3.4 STEP 2: INCOME PROJECTIONS AND ESTIMATES

According to Jaffe *et al.* (1989:210), the net income, if any, which is generated before the opening date of the entire complex, is to be deducted in order to obtain the net total capital outlay.

3.4.1 Estimated gross income

According to Jaffe *et al.* (1989:218), the accurate calculation of the anticipated income is the most important part of the feasibility study and in many instances is treated much too lightly. In the case of a development undertaken for leasing purposes, the income must be based on a rental plan with each lettable component allocated a rental according to its tenant/use. The averaging of rental income over all lettable components is not recommended, as problems are sure to arise when the actual letting is done. This is especially true in the case of shopping centers. Rentals must relate to the rentals obtainable in the market. Jaffe *et al.* expressed caution over doing a calculation in reverse where the rental structure is merely adapted to suit the required return.

- List the different letting components of the building with their respective rentable areas and multiply these with the rental rate per month applicable during the first year of operation.
- Indicate for comparison purposes what the current rental rate would be if the first-year rental rate is de-escalated at a reasonable escalation rate per annum. From the above the estimated gross monthly income and the estimated gross annual income may be determined.
- Where it is considered that turnover clauses will enhance the basic rental, then the additional rental is to be determined and added into the calculation. This is usually the case only when dealing with cash flow returns as it is seldom that turnover clauses come into operation in the first year or two after opening.

- Deduct from the gross annual income the estimated escalated annual operating expenses to obtain the estimated net annual income before vacancies. Deduct a percentage for vacancies to obtain the estimated net annual income after vacancies. Ignore the probable higher than usual vacancy during the first year of operation but apply the realistic average vacancy factor which may be applicable over the lifespan of the development.

The income from a property investment is received monthly in advance but the return is expressed as a percentage per annum. According to Jaffe *et al.* (1989:224) in order to be in a position to calculate the simulated effective return per annum, the cumulative interest on the monthly income should be added at an interest rate equal to the average which may be obtainable on short term investments. However, most investors express the return without making such an adjustment as they are either not conscious of the fact that an adjustment should be made or they wish to ignore such fact deliberately.

3.4.2 Operating costs

Operating costs can be defined as the recurring expenses which are related to the operation of a business.

According to Jaffe *et al.* (1989:226), the relative contributions by the landlord and the tenant to operating costs, are determined by the nature of the lease signed by the tenant, which can range from net leases, whereby a tenant undertakes to pay for certain operating costs, to triple net leases where all operating costs are borne by the tenant. Until fairly recently all operating costs have been borne by the landlord. However in the “boom” times of the early eighties the net lease was introduced whereby a tenant undertook to pay for certain of the operating costs of the building over and above the agreed rental.

According to White & Gray (1996:25), the major tenants in shopping centers, generally do not contribute to operating costs. In addition, certain of these costs are not always readily ascertainable and able to be passed on to the tenant. Therefore, a prudent allowance should be made for these costs classified as “non-recoverable”. This could amount to 8% to 12% of the gross income.

The estimated operating expenses should include the following, if applicable:

a) Local authority charges like tax on land, tax on improvements, water, electricity consumption – general, lifts, escalators, air conditioning and recovery from tenants, sanitary fees and refuse removal; b) Management and rent collection for example security personnel, management fees, administrative personnel, rent collection, auditors fees and legal fees; c) Cleaning and maintenance like cleaning service, garden maintenance, building maintenance, lift and escalator maintenance and air conditioning maintenance; d) Sinking funds/depreciation provision for equipment – lifts, escalators and air conditioners and other – carpets and paint; e) Insurances for fire and storm, Political Riot (SASRIA), Public liability and Income loss (White & Gray,1996:25).

The following process is the followed:

- 1) Calculate the annual operating expenses in current money terms and then escalate it at an annual rate roughly equal to the expected rate of inflation up to the middle of the first year of operation. This does not apply to items which are already escalated such as the insurances which are from the outset based on the escalated building cost.
- 2) Express the escalated operating expenses as a rate per square meter of rentable area per month and as a percentage of gross annual income in order that comparison with other building developments may be made.

In order to obtain the replacement allowance, merely take the current cost of the article to be replaced and divide it by the expected lifespan. According to White & Gray (1996), this ensures that the first-year allowance is not unduly

high on the basis that future allowances will make provision for inflation of replacement costs. However, some developers advocate that no allowances be made for replacement.

3.5 STEP 3: CASH FLOW ANALYSIS

According to White & Gray (1996:40), financial considerations begin with a timeline determining outlays and receipts and thus the span of time for which specified amounts of money are utilized. A bar chart indicating the timing and duration of all major activities is very useful. While the project may have an ultimate value in excess of its cost, it is not feasible for a developer if the cumulative outlay of cash exceeds the financial resources available.

A study of the magnitude of resources required under several sets of assumptions of construction cost and other expenditure, has to be made and these requirements matched to credit and equity resources available over time.

The investment period of a project is taken as the period during which the property shows a net income at a competitive yield.

3.5.1 Construction cash flow

Under this heading the detail of the construction cash flow may be provided. The basic construction cash flow should include the escalation in building cost. Such escalation should be shown separately.

3.5.2 Income and expenditure cash flow

Under this heading the detail of the income and expenditure cash flow may be provided. It is essential to state the assumptions on which the cash flow is based, such as assumed escalation in rental and operating expenses.

In the income and expenditure cash flow a realistic vacancy factor may be introduced during the first year of operation. To allow for the normally high vacancy factor in the first year, Van Rensburg (1994:2) has proposed that the “development period” should in fact be extended to include the first year of

operation. The result of this proposal would be that any long-term investment decisions are then taken on more realistic data.

It is usual to show the income and expenditure cash flow over a twenty-year period. According to White & Gray (1996:55), it is essential to make provision in the cash flow for a terminal value of the development. Some developers merely take the original total capital outlay as the terminal value, while some take no terminal value into consideration at all. The terminal value could also be calculated by capitalizing at that point in time the net income using capitalization rate relevant to the age of the development that is higher than would be the case for a new building. The shorter the lifespan of the investment, the more the impact of the terminal value on the internal rate of return.

In a discounted cash flow valuation (DCF), the cash flow is projected for each year into the future for a certain number of years, after which unique annual cash flows cannot be forecasted with reasonable accuracy. At that point, rather than attempting to forecast the varying cash flow for each individual year, a single value could be used represent the discounted value of all subsequent cash flows. This single value is referred to as the terminal value. The terminal value can represent a large portion of the valuation. For this reason, the terminal value calculation often is critical in performing a valuation. (Correia, Langfield-Smith, Thorne & Hilton, 2008:1042)

The terminal value is a number intended to reflect the value of a project at a given future point in time, and there are a number of ways to estimate this value. Megginson *et al* (2007:304) notes, that perhaps the most common approach to calculate terminal value is to take the final year cash flow projections and make an assumption that all future cash flows from the project will grow at a constant rate.

3.6 STEP 4: MEASURES OF RETURN

According to White & Gray (1996:69), the success of a development is measured by the extent to which the investor's objectives are met. These objectives may be in terms of maximizing yield, beating inflation, and the service of a public need. The decision-making process is based on the results of comparing the results of the information analysis with the success criteria of the developer.

According to White & Gray (1996:69), decision-making by the developer, leads to one of three courses of action: a) Proceed with the development; b) Terminate the process; and c) Revert to pre-feasibility investigations and redefine the parameters of the proposal – the concerns of the parties at interest, the property, the market, or the development proposal. This constitutes the classic “what if” analysis.

The financial yield can be measured in a number of ways. Some of the more common methods are summarized below:

3.6.1 Initial return

According to Megginson *et al.* (2007:257), many companies decide whether to invest in a given project based on the rate of return the investment will earn on an accounting basis. Companies have many different ways of defining a hurdle rate for the investment in terms of accounting rates of return. Almost all these metrics involve two steps: 1) to identify the net income associated with the project in each year of its life, and 2) to measure the amount of invested capital devoted to the project in each year. Given these two figures, a company may calculate an accounting rate of return by dividing net income by the book value of assets, either on a year-by-year basis or by taking an average over the project's life. Note that this measure is comparable to return on investment (ROI), for measuring a company's overall effectiveness in generating returns with its available assets. Companies will usually establish some minimum accounting rate of return that projects must earn before they can be funded or invested in. When more than one project exceeds the

minimum standard, companies prioritize projects based on their accounting rate of return, and invest in projects with higher returns first.

Because of convenience, ease of calculation, and ease of interpretation, accounting based measures are used by many companies to evaluate capital investments. However, these techniques have serious flaws. First, the decision about what depreciation method to use has a large effect on both the numerator and the denominator of the accounting rate of return formula. Second, this method makes no adjustment for the time value of money or project risk. Third, investors should be more concerned with the market value than the book value of the assets that a firm holds. Fourth, finance theory teaches that investors should focus on a company's ability to generate cash rather on its net income. Fifth, the choice of a percentage accounting rate of return hurdle rate is essentially arbitrary. This rate is not based on rates available on similar investments in the market, but reflects a purely subjective judgment on the part of management. (Megginson *et al.* 2007:258)

According to White & Gray (1996:78), the problems with this measurement are that a property might not reach full maturity in its first year of operation and that the total income received over the economic life of the project and the time value of money are not taken into account. This true capitalization rate however, is different in that it is calculated on a standardized income that is as if the property is fully let at market rentals.

3.6.2 Payback method

According to Megginson *et al.* (2007:258), the payback method is the simplest of all capital budgeting decision-making tools. It enjoys widespread use, particularly in small companies. The payback period is the amount of time it takes for a given project's cumulative net cash inflows to recoup the initial investment. Firms using the payback approach, define a maximum acceptable payback period and accept only those projects that have payback periods less than the maximum, all other projects are rejected.

Cloete (2005:83) states, that the payback period approach measures the period which it takes for a project to generate sufficient cash to recover its original cost. The formula for the payback period is as follows.

$$\text{Payback period} = \frac{\text{Investment Cost}}{\text{Cash flow per period}}$$

All investments for which the payback period is less or equal to the period set by the developer, are regarded as acceptable. The payback period is merely the time it takes for the cost of the property to be recouped.

The payback is a type of break-even calculation, and provides an indication of how long capital will be tied up before being recouped. The payback period is useful as an elementary measure to indicate the liquidity risk of a project.

Let us assume that a payback period of 4 years has been set as the investment criterion, and that three projects (A, B and C) are being considered, each of the cash flows as set out below.

Capital (R)	Year					
	1	2	3	4	5	6
A 30 000	25 000	2 000	2 000	2 000	2 000	2 000
B 30 000	2 000	2 000	2 000	25 000	2 000	2 000
C 30 000	25 000	2 000	2 000	2 000	20 000	20 000

Each of the projects would be regarded as equally desirable under a four-year payback, since each recovers its capital cost as well as a surplus of R 1 000 during the first four years. It is obvious, however, that project A is better than project B, as A has much higher cash flow during the first year. It is equally obvious that project C is superior to either A or B, as it has a much higher level of cash flows outside the payback period.

Simplicity is the main virtue of the payback approach. Once a company estimates a project's cash flows, it is a simple matter of addition to determine when the cumulative net cash inflows equal the initial outlay. The intuitive appeal of the payback method is strong. It sounds reasonable to expect a good investment to pay for itself in a fairly short period of time. Indeed, time value of money principles suggest that, other things being equal, a project that brings in cash flow faster ought to be more valuable than one with more distant cash flows. The payback period is a very popular decision-making technique in highly uncertain situations. (Megginson *et al.* 2007:259).

Megginson *et al.* (2007:260) notes, that despite these apparent virtues, the payback method suffers from several serious problems. First, the payback cutoff period is simply a judgmental choice with little or no connection to shareholder value maximization. Second, the way that the payback method accounts for the time value of money is crude in the extreme. The payback method assigns a 0 percent discount rate to cash flows that occur before the cutoff point. Third, using the payback period as a way to control for project risk, is equally crude. Finance teaches that riskier investments should offer higher returns. If it is true, that riskier projects have longer payback periods, then the payback rule simply rejects all such investments even if they offer higher returns in the long run.

This is merely the capital outlay divided by the average net income to determine how long it will take to get the investor's capital back. The time value of money is not taken into account.

Cloete (2005:83) states, that the payback period is subject to two serious deficiencies: it ignores any cash flow beyond the payback period and it ignores the time value of money (although this limitation may be overcome by the discounted payback period, where the cash flows are discounted to present values).

3.6.3 Net present value (NPV)

A project's net present value (NPV) equals the sum of its cash inflows and outflows, discounted at a rate consistent with the project's risk. Calculating an investment's NPV is relatively straightforward. First, write down the net cash flows that the investment will generate over its life. Second, discount these cash flows at an interest rate that reflects the risk inherent in the project. Third, add up the discounted cash flows to obtain the NPV, and invest in the project only when its NPV exceeds zero. The cash flows in each year may be positive or negative, though one usually expects projects to generate cash outflows initially and cash inflows later on (Megginson *et al.* 2007:262).

According to the present-value (PV) model, also called the net present value (NPV) and the discounted cash flow (DCF) method works as follows: determine the sum of all cash flows – both in-and outflows, and initial outlay- and discount to present values at the project's cost of capital. With a positive NPV the project can be accepted and the project should be rejected if the NPV is negative. The NPV can be expressed as follows.

$$NPV = CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{CF_N}{(1+r)^N}$$

Where: CF_t = cash flow in period t ,

N = number of periods,

and r = discount rate (cost of capital)

Consider two possible property developments, property X and property Y. Each property costs R 100 000 and the cost of capital is equal to 20% and the future net cash inflows are as shown in Table 1.

Table 2: Cash flows of Property X and Property Y

Years	Property X	Property Y
0	(R 100 000)	(R 100 000)
1	R 65 000	R 40 000
2	R 30 000	R 40 000
3	R 30 000	R 40 000
4	R 20 000	R 40 000

Source: Cloete (2005:89)

In the case of Property X, the NPV is calculated as follows.

$$\begin{aligned} & \frac{(R100\ 000)}{(1+20\%)^0} + \frac{R65\ 000}{(1+20\%)^1} + \frac{R30\ 000}{(1+20\%)^2} + \frac{R30\ 000}{(1+20\%)^3} + \frac{R20\ 000}{(1+20\%)^4} \\ &= (R100\ 000) + R54\ 167 + R20\ 833 + R17\ 361 + R9\ 645 \\ &= R\ 2\ 006. \end{aligned}$$

Similarly, the NPV of project Y is equal to R 3 549.38.

In terms of NPV both projects are acceptable. When making a choice between the two properties, property Y is preferable due to its higher NPV.

According to White & Gray (1996:81), net present value (NPV) is simply the difference between the present value of cash inflows and the present value of cash outflows. With a positive NPV the project can be accepted and it should be rejected if the NPV is negative.

According to Megginson *et al.* (2007:265), the net present value method solves all the problems identified with the payback rules, as well as the problems associated with decision rules based on the accounting rate of return. First, the NPV rule focuses on cash flow, not accounting earnings. Second, when properly applied, the net present value method makes

appropriate adjustments for the time value of money. Third, the decision rule to invest when NPVs are positive and to refrain from investing when NPVs are negative, reflects the company's need to compete for funds in the marketplace rather than an arbitrary judgment or management. Fourth, the NPV approach offers a relatively straightforward way to control for differences in risk among alternative investments. Cash flows on riskier investments should be discounted at higher rates. Fifth, the NPV method incorporates all the cash flows that a project generates over its life, not just those that occur in the project's early years. Sixth, the NPV gives a direct estimate of the change in shareholder wealth resulting from a given investment.

However, the NPV rule suffers from a few weaknesses. Relative to alternative capital budgeting tools, the NPV rule seems less intuitive to many users. There is one other subtle drawback to the NPV rule, a drawback that results from the inability to incorporate the value of managerial flexibility when calculating a project's NPV. What is meant by using the term managerial flexibility are options that managers can exploit after an investment has been made to increase its value. (Megginson *et al.* 2007:267)

NPV is the net income discounted back at the required rate of return. If the NPV exceeds the actual capital outlay a profit is made. This method takes into account the time value of money, but the discounting rate is kept constant, which is not always the case in practice.

3.6.4 Internal rate of return (IRR)

According to White & Gray (1996:95), the Internal Rate of Return (IRR) is defined as that rate of return which will make the present value of future cash inflows equal to the present value of the initial investment cost and other cash outflows. The NPV would therefore, be exactly zero if the IRR is used as the discount rate. The IRR indicates where the break-even point is for an acceptable rate of return. An IRR which exceeds the cost of capital, means that a positive NPV or profit for the investor has been achieved. Where an

IRR is lower than the cost of capital, it will indicate that the investor could make a loss on the project.

Cloete (2005:91) defines the IRR as that rate of return which will make the present value of future cash inflows equal to the present value of the initial investment cost and other cash outflows. The NPV would therefore, be exactly zero if the IRR is used as the discount rate. The IRR can be expressed as follows.

$$NPV = CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{CF_N}{(1+r)^N} = 0$$

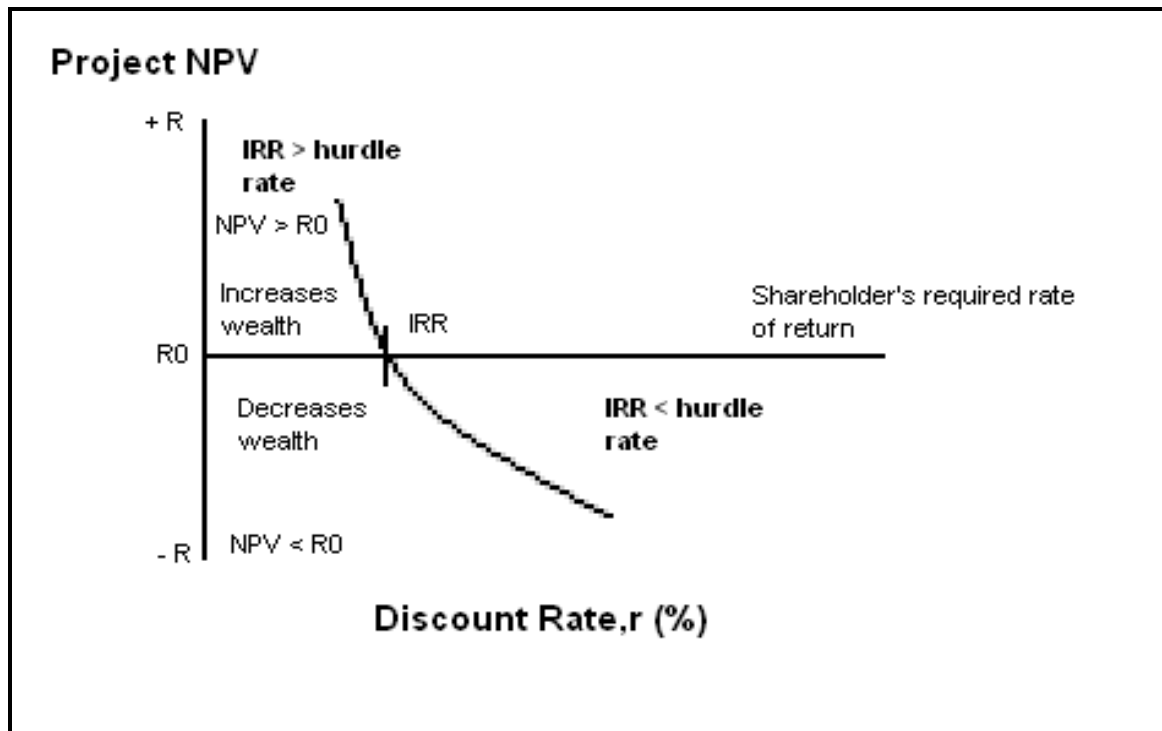
Where: CF_t = cash flow in period t ,

N = number of periods,

and r = discount rate (cost of capital)

According to Megginson *et al.* (2007:267), the most popular and most intuitive of the above alternatives, is known as IRR method. The IRR of an investment project is the compound annual rate of return on the project, given its up-front costs and subsequent cash flows. A project's IRR is the discount rate that causes the net present value of all project cash flows to equal zero. Once the IRR is calculated, it should be compared with a prespecified hurdle rate established by the company. The hurdle rate represents the company's minimum acceptable return for a given project, so the IRR decision rule is to invest only if the project's IRR exceeds the hurdle rate, otherwise reject the project.

Figure 6: NPV Profile and Shareholder Wealth



Source: Megginson *et al.* (2007:268)

But where does the hurdle rate come from? How do companies decide whether to require projects to exceed a 10% hurdle or a 20% hurdle? The answer to this question provides insight into another advantage of IRR over capital budgeting methods that focus on a project's accounting rate of return or payback period. A company should set the hurdle rate at a level that reflects market returns on investment that are just as risky as the project under consideration. Therefore, the IRR method, like the NPV method, establishes a hurdle rate or a decision criterion that is market based, unlike the accounting based and payback approaches that establish arbitrary thresholds for investment approval. In fact, for a given project, the hurdle rate used in IRR analysis should be the discount rate used in NPV analysis. (Megginson *et al.* 2007:268)

According to White & Gray (1996:99) a number of advantages make the IRR one of the most widely used methods for evaluating capital investments. First, the IRR makes an appropriate adjustment for the time value of money. The value of a rand received in the first year is greater than the value of a rand received in the second year. Even cash flows that arrive several years in the future receive some weight in the analysis. Second, the hurdle rate itself can be based on market returns obtainable on similar investments. Because market rates vary, based on the risks of different instruments, companies can similarly choose different hurdle rates for projects with different risks. Third, because the “answer” that comes out of an IRR analysis, is a rate of return; its meaning is easy for both financial and non financial managers to grasp intuitively. Fourth, the IRR technique focuses on cash flow rather than on accounting measures of income.

According to Megginson *et al.* (2007:271), though it represents a substantial improvement over the accounting rate of return or payback analysis, the IRR technique has some quirks and problems that in certain situations should concern analysts. Some of these problems arise from the mathematics of the IRR calculation, but other difficulties come into play when companies must discriminate between mutually exclusive projects. If two projects offer IRRs in excess of the hurdle rate, but the company can only invest in one, which project should it pursue? It turns out that the intuitive answer, to select the project with the highest IRR, sometimes leads to bad decisions.

Two classes of problems can be identified which analysts encounter when evaluating investments using the IRR technique. The first class can be described as “mathematical problems”, which are difficulties in interpreting the numbers that is obtained from solving an IRR equation. A second difficulty with the IRR method can occur when a project’s cash flows alternate between negative and positive values. In that case, there may be more than one solution to the IRR equation (Megginson *et al.* 2007:271).

According to White & Gray (1996:102), the acceptable level of IRR will vary from investor's depending on their investment criteria but should be in excess of the rate of interest for long-term Government stock – the rationale being that Government stock is blue-chip whereas the property development is exposed to risk which should be discounted by 1% to 2% (or more, depending on the perceived risk of the development). The IRR method is particularly useful in ranking alternative investment opportunities with different economic life spans. It is not possible to calculate the IRR if the land value is not known and a residual land value calculation are usually called for.

Interest (finance cost) and depreciation, is specifically excluded because of the determination of the cost of capital and for any project using debt cost of capital should be WACC. If the IRR exceeds the required rate of return, the investment qualifies. In determining the cash flow for both the NPV and IRR calculation, a view of the end-value must be taken. Normally, a 20 year cash flow and a 100% end-value are used.

When existing buildings are to be enlarged or improved or when the developer wishes to evaluate a certain portion of a proposed development, the marginal return technique is employed. In this technique the additional (marginal) net income is expressed as a percentage of the additional (marginal) total capital outlay. If the marginal initial return is higher than the existing return, then it is clear that the additional building work will enhance the overall initial return.

According to White & Gray (1996:103), the development for which a marginal return is to be calculated, is usually secondary to the primary development. Thus the land value is usually not taken into account as the land value is usually already taken into account in the primary development.

It is wrong to mix historical cost with current cost when a return is to be calculated. Theory of finance dictates that all comparisons should be at the same point in time.

3.6.5 Valuation methods

This section reviews valuation methodology and risk analysis in the private sector. The inputs to the development process are numerous. Some will be relatively certain prior to the commencement of the development, while others will be uncertain and are like to vary over the development period.

It is the uncertainty of these variables which gives property development its unique characteristics. Quantifying risk involves determining all the possible values a risky variable could take and determine the relative likelihood of each outcome.

According to Rodney & Venmore-Rowland (1996:1), there are different kinds of valuation methods that can be used when analysing these risks and they will be discussed now.

3.6.5.1 *Residual valuation*

Historically, property development has been analysed principally through the use of a residual valuation. According to Rodney & Venmore-Rowland (1996:2) this technique can be used to value either the amount available to purchase the site, cover acquisition charges and costs of finance in respect of the land/property about to be purchased, or it can be used to appraise the amount of developers' profit in situations where the land costs are already known.

Although this valuation method is used widely in practice, it seems to have many underlying problems. According to Rodney & Venmore-Rowland (1996:2), one of the biggest problems is the fact that a small adjustment to the figures can have a huge effect on the results of the residual valuation. It can be said that the variables used to calculate the end value are very sensitive and will change the end value when only a small increase or decrease was made to the values.

According to Rodney & Venmore-Rowland (1996:3), another problem is the inflexibility of this method with regards to the timing of its cash flows to produce a single figure outcome. This method presupposes that the constructions costs will be charged on a straight line basis. That will be wrong because in effect the construction costs will be following an S-curve and the result of this will be that the interest charges will be calculated wrongly.

The residual value method is the sum remaining from value of the completed property, measured in terms of Net Development Value (NDV), after deduction of the costs of creating the development, the Total Development Costs (TDC), and the developer's Minimum Profit Requirement (MPR). Calculation can be very complex, typically requiring the use of computer spreadsheets or one of the many proprietary valuation software programmes to carry out the necessary computational analysis.

To populate the calculation, estimates are required for each of the many component factors. These will be specific to each developer, and will reflect each developer's individual views about the vision for the project (in terms of uses, density mix, quality), each developer's views on delivery timings and costs, each developer's required rate of return, and each developer's own circumstances (in terms of risk attitude, investor relations, financing ability, resourcing capability).

The main factors will include: a) Net Development Value for properties to be let – the expected rental value and the investment yield on sale, net of the purchaser's acquisition costs and remaining rent free; and for properties to be sold outright – the expected sale price, net of sales incentives which will reduce the realisable price. B) Development Costs which includes Land acquisition costs including, for example, finders fees, legal fees, agents fees, options costs, and stamp duty land tax;

- Site preparation costs to convert the site from its state at the time of purchase to the state required to enable the commencement of the new build including, for example demolition, decontamination, remediation and site works such as roads and service diversions;

- Off-site infrastructure costs necessary to access the development such as immediate roads, road junctions, and roundabouts, and also those cost obligations imposed by statutory authorities as a requirement of the planning consent to accommodate the new development such as motorway junctions, and contributions to public transport schemes;
- Construction costs for the new build including foundations and buildings, landscaping and public territory;
- Fees for professional advisors including for example, architects, quantity surveyors, engineers, and project managers, as appropriate to the development; marketing and sales costs including, show units, promotion events, commission to agents and legal costs; and
- Finance costs being the interest and arrangement fees on funds used for purchasing the site, obtaining the planning consent, carrying out the construction and paying other costs; c) Other factors: when a developer conceives of a development, the developer will be faced with a range of alternatives some of which the developer will determine, some of which can be influenced and some of which are external.

The developer will need to decide on the outcomes he chooses and expects in order to arrive at the cost and value estimates required to populate the residual value calculation. In particular he may consider; The planning application stance, being consideration of what he believes is achievable in terms of design, mix and density, and how hard he is prepared to push and how long he may have to wait and what other trade-offs may be involved, and whether or not an inquiry or an appeal may be involved; The development plan, comprising both issues of where to pitch the development in terms of the expected market, quality and sustainability which will affect both likely GDV and cost, and what is possible on the site given its constraints; The delivery methodology. Developers have a range of choices on procurement, materials, project management and these affect timing and cost; The marketing strategy, as more spending on marketing, up to a point, may generate increased sales prices and numbers, and every developer will have a different view on the strategy and the cost; The development profit - the criteria applied and the

required level of return will depend on the financial circumstances of each developer, their cost of capital, their perception of risk, their tax position, their investors expectations; and the timing of the dates of payment for the site. If these are in the future then they are discounted back to the valuation date.

Since residual value is a derivative of many estimated factors, residual value is highly sensitive to inputs and may vary widely between different developers, depending on the assumptions used. Notwithstanding variability in results between valuers, for an individual developer the method provides a consistent way of deriving a valuation for land that is appropriate for that developer.

Minimum profit requirement (MPR)

Developers typically adopt a MPR criterion that seems appropriate to the developer's business. Developers then tend to stick to it as a measurement method, varying only the level in establishing the hurdle appropriate to each particular project, say in response to project specific risks. The main MPR methods are: a) Profit return on Cost (PROC): Project Profit divided by Total Development Costs; b) Ungeared Internal Rate of Return (UIRR): the IRR of the project cash flows before interest; c) Profit Return on Sales (PROS): Project Profit divided by Net Development Value; and d) Gross Margin on Sales (GMOS): Project Profit before interest divided by Net Development Value.

When used to value stocks, the residual income model separates value as sum of two components: a) The current book value of equity (BV) and b) The present value of expected future residual income [sum from $t=1$ to infinity $(R1/(1+r)^t)$].

Unlike models that discount dividends or free cash flow, in which a significant portion of the estimated value is the terminal value, a residual income model tends to be front-end loaded by the reliance on book value. This can be an advantage since forecasting errors tend to magnify over time. Using only residual income is likely to result in smaller errors and even if the error is not reduced, the future income is less significant to the overall evaluation.

Like any model, residual income models are more appropriate at some times than others. Residual income models are appropriate when: The subject company is non-dividend paying; free cash flow is unstable or negative over a reasonable forecast possibility and other approaches result in greater sensitivity to terminal value than the investor finds comfortable.

Residual income models are less appropriate when: the company's accounting practices result in significant dirty surplus and the components of residual income (book value, ROE) are not predictable.

According to White & Gray (1996:136), the value of any asset must equal the present value of its future cash flows, discounted at a rate that reflects its inherent risk. Since neither the future cash flows nor the appropriate discount rate can be known with certainty, valuation is basically an estimate. However, when project discount rates are developed, then the estimate becomes a justified estimate.

Using earnings as cash flow ignores the cost of the equity invested in the firm. This is corrected in Residual Income (RI) models, of which the best known is Economic Value Added (EVA). These models deduct a cost of equity capital (the discount rate times beginning shareholder equity) from reported earnings. What remains is residual income (RI) – the amount the company earns in excess of the required return.

According to White & Gray (1996:136), strengths of the RI model include: less sensitivity to estimated terminal value than other models; rely on readily available accounting data; can be used to evaluate stocks that do not have stable dividends or cash flow and focus on economic, rather than accounting, profitability.

According to White & Gray (1996:141), weaknesses include: relying on accounting data which can be manipulated and may require adjustments based on accounting methods, particularly in cases of a dirty surplus.

Economic value added is a proprietary residual income model developed by Stern Stewart & Company. Like other residual income models, it charges a capital cost to accounting income measures. However, there are several adjustments made to the accounting figures to have them conform more closely to economic cash flows. Some of the major adjustments include: a) Capitalising and amortizing research and development rather than expensing it immediately; b) Deferring capital charges on strategic investments not expected to have an immediate accounting payoff; c) Ignoring deferred taxes until paid; d) Adjusting capital and earnings for LIFO inventory accounting; e) Operating leases are treated as capital leases; and f) Adjustments are made to non-recurring items.

In its basic formulation, EVA equals net operating profits after tax (NOPAT) less the weighted average cost of capital (WACC) multiplied with total operating capital. The EVA formula is shown as follows.

$$\text{EVA} = \text{NOPAT} - (\text{WACC} \times \text{Operating capital})$$

Where: *NOPAT = net operating profit after tax;*

WACC = weighted average cost of capital.

Given this formulation, the ways a management team could increase the firm's EVA would be to: Increase revenue; Minimize operating expenses needed to generate a given amount of revenue; Produce the same goods and services using less capital; Invest additional capital in opportunities that will earn more than the associated capital charge; and Reduce the cost of capital.

According to White & Gray (1996) where the land value is not provided, it is not possible to calculate the returns mentioned and a residual land value calculation is usually called for. The initial return method is usually employed. The procedure is as follows: a) Determine the escalated net income for the first year of operation and capitalise it at a capitalisation rate equal to the required initial return; b) Deduct the estimated escalated total capital outlay,

which in this case would exclude the land value, transfer cost and cost of capital related to the land value and transfer costs; c) Deduct from the above the cost of capital that would have been applicable by calculating the present value (PV) of the above result at the required capitalisation rate, the difference being the cost of capital; and d) Deduct the transfer cost, if applicable.

Example:

R

<i>Escalated net income for first year of operation</i>	<i>1 000 000</i>
<i>Capitalised at 10.5% per annum ($1\,000\,000 \div 0.105$)</i>	<i>9 523 810</i>
<i><u>Less:</u> Total capital outlay excluding land value, transfer costs and cost of capital related thereto</i>	<i><u>8 450 000</u></i>
	<i>1 073 810</i>
<i><u>Less:</u> Cost of capital at 16% per annum compounded Monthly, over a fifteen- month period</i>	
<i>FV = 1 073 810 (see above calculation)</i>	
<i>PV = 880 324</i>	<i><u>193 486</u></i>
	<i>880 324</i>
<i><u>Less:</u> Transfer costs</i>	<i><u>45 324</u></i>
<i>Residual Land Value</i>	<i><u>835 000</u></i>

It is usual to provide a table showing what the residual land value would be if three or more different capitalisation rates are employed.

From the literature review regarding the residual valuation, it could be noted that the residual land value calculation is extremely sensitive to changes in the total capital outlay or the net income and such calculations should therefore, be used with caution. This is definitely a questionable method and should rather be used very cautiously.

3.6.5.2 *Discounted cash flow (DCF)*

Discounted cash flow is a vital concept for any developer and according to Cloete (2005:157), has many applications and can be regarded as one of the most important techniques used in finance.

According to Rodney & Venmore-Rowland (1996:5), discounted cash flow methods are more flexible than the traditional residual method and can be easily constructed with the aid of spreadsheets or commercial software programs.

A number of advantages of this technique were identified by Rodney & Venmore-Rowland. They found, that all the assumptions may be stated explicitly, allowing more accurate calculations.

According to Kishore (1996:63), the most commonly used valuation method is the multi-period discounted cash flow (DCF) valuation. Kishore adds that a study conducted in Australia among property investors, indicated that 75% used DCF consistently for valuations and 25% used it occasionally. For acquisitions, 100% of investors used it.

Why is the DCF method so important? Geltner *et al.* (2007:237), has these points to make about the DCF method: a) The DCF method recognises that the valuation fundamentally depends on the future net cash flow generation potential of the asset; b) It takes a long-term perspective, appropriate in decision making in an illiquid market – typically ten (10) years for real estate; c) It takes a total return perspective, appropriate for successful investment decision making; and d) If done properly, the DCF method can keep the developer from being swept up by sentiment, especially when asset values do not reflect income stream potential.

Ward & Price (2006:133), give a summary of the steps in the DCF valuation approach, as follows: a) Estimate the free net cash flows (FCF's) into the future (10 years for real estate); b) Estimate the weighted average cost of

capital (WACC), using target market values for debt and equity; c) Calculate the terminal value using $TV = FCF / (WACC - \text{growth rate})$; and d) Discount the free cash flows and the terminal value to the present.

The discount rate serves to convert the future rand-value of the cash flows into a present Rand-value equivalent, using a value that is appropriate to the risk. This must allow for the time value of money and for the risk in the cash flows from the investment. Total risk comprises a risk-free component and a risk premium related to the investment.

Kishore's (1996:63), comments that forecasting of the future direction of investment is essential, particularly if the asset under consideration is a long-term investment, which property is. The way in which discount rates are selected, however, appears to be an issue among valuers, with two main schools of thought. One school proposes that the discount rate be based on long-term bond or gilt rates, and the other, that the rate be based on the cost of capital. Kishore favours the latter, since Kishore puts forward evidence that property yields and bond yields in Australia had an inverse relationship and that it would be more appropriate to use the internal rate of return (IRR) of the investment.

3.6.5.3 *Risk analysis*

Risk analysis is what the investor needs to concentrate on once the mechanical aspects of investment analysis are understood. Computers are for calculating, investors are for thinking and analysing. Real estate investment analysis is actually risk analysis (Jaffe & Sirmans, 1989:310).

Measures to determine the risk of individual projects include conservatism, risk-adjusted discount rates, the certainty equivalent approach, the risk-absorption ratio, decision trees, sensitivity analysis, and probabilistic risk simulation. Of these, the sensitivity analysis probably provides the best trade-off between sophistication and practicality.

According to White & Gray (1996:167), due to the risks and uncertainties associated with development projects, different techniques have been developed to highlight and identify possible variables where uncertainty exists. The purpose of any analysis is to obtain reliable projections or estimates, or to reduce the level of inaccuracy.

Cloete (2005:101) states, that some improvements on “gut-feel” are offered by three common methods of analysing risk: a) payback period (the shorter the period in which the initial investment is recouped, the less the risk); b) the risk-adjusted discount rate (some premium is added to the required rate of return); and c) conservative forecasts.

Additional risk information is obtained by using ratio analysis (like the debt coverage ratio and the breakeven point) and by sensitivity analysis (where the relative effect of changes in the input assumptions on the rate of return or other output variables are determined).

When determining the IRR and the NPV, a specific value of each input variable is entered into the model to calculate the return. The values many of the input variables are uncertain and should rather be defined as ranges with associated probability distributions. Ideally the return should be expressed as a probability of receiving various rates of return, in stead of a single return (Cloete, 2005:101).

The most sophisticated approach to risk is the Monte Carlo risk simulation model. In this approach, probability distributions are estimated for the range of variations in each input variable to determine a range of possible outcomes and the probability distribution of each.

Sensitivity analysis

According to White & Gray (1996:170), this technique provides the developer with information about uncertainty – which uncertain costs or values have the greatest effect on an expected outcome? Sensitivity analysis identifies significant inputs and provides a useful insight into the interaction of variables,

by posing “what if” questions. It thereby helps in determining the strength of the optimal decision. This however, does not measure the risk but it enables the identification of the critical variables underlying projections or forecasts of the costs and the possible returns. All probable variables should be tested to avoid biased or selective testing.

Cloete (2005:287) notes, that a sensitivity analysis is performed by varying the values of input variables (interest rates, rental levels) to determine the effect on relevant output variables (project value, NPV, IRR). This technique is characterised by the question “What if.....?” For example: “What would be the effect on the IRR if the gross rental income fell by ten percent?”, or “What would the NPV be if interest rates increased to 25 percent?”

If it is discovered that the output variables are very sensitive to a certain input variable, time and effort should be directed to trying to decrease the uncertainty in that variable. Sensitivity analysis therefore, enables the developer to concentrate on the essential variables and helps prevent waste of time on trying to reduce uncertainty in variables which are not important.

Typically, the effect on output variables is calculated by making an optimistic, a most likely and a pessimistic assumption of the value of each of the input variables. The value of the sensitivity analysis is obviously crucially dependent upon the validity of the assumptions. The assumptions should be as realistic as possible and should be based upon the best possible information (Cloete, 2005:287).

The problem with sensitivity analysis, is that no consideration is given to correlations which may occur between several variables. This means that the resulting outputs can be misleading, as it tends to exaggerate the expected outcomes because correlations are not taken into consideration.

According to White & Gray (1996:172), a sensitivity study is conducted to determine the extent to which change in each of the different components of a feasibility study, will influence the yield of the proposed project.

For investment schemes some of the components include: total capital outlay, initial rental structure, operating expenses, vacancy factors, and escalation in rental.

For selling schemes some of the components include: total capital outlay, selling price structure and take-up rate and operating expenses.

White & Gray (1996:172) notes, that the most critical parameters of the total capital outlay in both cases are obviously the escalated building cost, the cost of capital, land cost and professional fees.

To determine the sensitivity of a component the following analysis may inter alias be provided: Initial return and IRR if total capital outlay increases by 5%; and Initial return and IRR with each of the following: escalated building cost, initial rental structure, operating expenses, vacancy factors and escalation in rental, on three levels, namely: Optimistic/Realist (most likely)/Pessimistic.

Marginal returns for the different functional components of a complex are in itself a form of sensitivity analysis. In this technique, used when existing buildings are to be enlarged or improved or when the developer wishes to evaluate a certain portion of a proposed development, the additional cost (marginal) net income is expressed as a percentage of the additional (marginal) total capital outlay. If the marginal initial return is higher than the existing return, then it is clear that the additional building work will enhance the overall initial return (White & Gray, 1996:173).

According to Megginson *et al.* (2007:357), most capital budgeting problems require companies to make many different assumptions before arriving at a final NPV. For instance, forecasting project cash flows may require assumptions about the selling price of output, costs of raw materials, market share, and many other unknown quantities. In sensitivity analysis, developers have a tool that allows them to explore the importance of each individual assumption, holding all other assumptions fixed, on the project's NPV. To

conduct a sensitivity analysis, companies establish a “base case” set of assumptions for a particular project and calculate the NPV based on those assumptions. After that, companies allow one variable to change while holding all others fixed, and they recalculate the NPV based on that change. By repeating this process for all the uncertain variables in a NPV calculation, companies can see how sensitive the NPV is to changes in baseline assumptions.

Analysts often begin a sensitivity analysis by developing both pessimistic and optimistic forecasts for each of the model’s important assumptions. These forecasts may be based on subjective judgments about the range of possible outcomes, or on historical data drawn from the developer’s past investments. (Megginson *et al.*, 2007:357).

Scenario analysis

According to Megginson *et al.* (2007:258), scenario analysis is just a more complex variation on sensitivity analysis. Using scenario analysis the NPV of the project is calculated based on the probability that specific scenarios may occur rather than adjusting one variable up or down as in the case of sensitivity analysis.

Developing realistic scenarios requires a great deal of thinking about how a NPV model’s assumptions are related to each other. As with sensitivity analysis, developers often construct a base-case scenario along with more optimistic and pessimistic ones. If everything goes wrong, the developer should expect an extremely negative NPV, and it should expect just the opposite if the project does better than predicted in every possible way. These scenarios are still useful in that they illustrate the range of possible NPVs (Megginson *et al.* 2007:358).

According to White & Gray (1996:178), this technique provides the developer with information about uncertainty – which uncertain costs or values have the greatest effect on an expected outcome?

Simulation

An even more sophisticated variation on the scenario analysis, is Monte Carlo simulation. In a Monte Carlo simulation, analysts specify a range or a distribution of potential outcomes for the variations in each of the model's assumptions. It is even possible to specify the degree of correlation between key variables (Megginson *et al.*, 2007:259).

This technique informs the developer to the degree of risk or variability involved with a particular project.

According to Megginson *et al.* (2007:259), analysts enter all the assumptions about distributions of possible outcomes into a spreadsheet. Next, a simulation software package begins to take random "draws" from these distributions, calculating the project's cash flows (and perhaps its NPV) over and over again, perhaps thousands or tens of times. After completing these calculations, the software package produces a large amount of statistical output, including the distribution of project cash flows (and NPV's) as well as sensitivity figures for each of the model's assumptions.

The use of the Monte Carlo simulation has grown dramatically in the last decade because of steep declines in the costs of computer power and simulation software. Unfortunately, misuse of simulation analysis has grown as well (Megginson *et al.*, 2007:359).

According to Megginson *et al.* (2007:259), perhaps the most common misuse, involves the calculation and misinterpretation of a distribution of project NPV's using the cost of capital. If developers use a computer to generate a distribution of NPVs, they should discount cash flows using the risk-free rate. Why not use the cost of capital? The purpose of discounting cash flows at the cost of capital is to take into account the uncertainty of expected project cash flows. When a simulation package calculates a NPV, the cash flows in the numerator represent just one outcome drawn from a large distribution of possible outcomes, not the expected value. Therefore, plotting an entire distribution of NPVs and looking at the mean and variance of that distribution

is, in a sense, double counting risk. A better approach is to calculate NPVs using the risk-free rate. A distribution of NPVs generated by discounting at the risk-free rate is free of any prior risk adjustment, so the volatility of that distribution to some degree measures the risk of the project.

However, interpreting a distribution of NPVs calculated and using the risk-free rate has its own problems. For example, if analysts look at the variance of such a distribution to draw inferences about risk, they ignore the opportunities of shareholders to eliminate some of the risk through diversification. Moreover, the simulated distribution of one project's NPVs can be artificially reduced by joining one project with another and rerunning the simulation. If an examination of NPV distributions is part of a company's project approval process, then employees will soon learn to propose joint projects that have less volatility than stand-alone investments (Megginson *et al.*, 2007:359).

The bottom line is that Monte Carlo simulation is a powerful, effective tool when used properly. Using simulation to explore the distribution of a project's cash flows, and the major sources of uncertainty driving that distribution, is very sensible, but be wary of distributions of NPVs produced by a simulation program (Megginson *et al.*, 2007:359).

3.7 STEP 5: RISK ANALYSIS

According to Pyhrr *et al.* (1989:154), return and risk are fundamental concepts when considering a proposed project. The level of return normally correlates with the degree of risk :the higher the return, the higher the risk and the lower the risk, the lower the return.

A decision-maker will strive to achieve the maximum possible return for the minimum of risk. In order to achieve a desired rate of return, it is necessary to identify risks that are faced, to manage it and to employ techniques to minimise such risk as far as possible.

Investment decisions are often made without considering risk explicitly. According to Pyhrr *et al.* (1989:205), the mathematics of risk are often left largely to the four horsemen of the implicit decision-making apparatus: judgement, hunch, instinct, and intuition.

Some improvement on “gut-feel” is offered by three common methods of analysing risk: a) the payback period (the shorter the period in which the initial investment is recouped, the less the risk); b) the risk adjusted discount rate (some premium is added to the required rate of return); and c) conservative forecasts. All these were discussed in detail in the previous sections.

According to Pyhrr *et al.* (1989:205), additional risk information is obtained by using ratio analysis and by sensitivity analysis. Many real-world investors and financial managers believe that the ability to test the sensitivity of results to changes in parameters, is the real advantage of the discounted cash flow models.

When determining the IRR and NPV, a specific value of each input variable is entered into the model to calculate the return. In fact, the values many of the input variables are uncertain and should rather be defined as ranges with associated probability distributions. Ideally the return should be expressed as a probability of receiving various rates of return, instead of a single return.

Cost overruns created by high interest rates, poor estimates, labour problems, or bad weather can destroy a project’s profitability even if it satisfies the demand for space. Likewise, if the market demand for the type of space being developed is satisfied before the project is completed, the developer may not be able to sell it for as much as anticipated. A combination of cost overruns and changes in markets can be particularly devastating to the developer. Three types of risks can be distinguished: legal, market risk and cost risk.

Because of the expense involved, estimating the legal risk for a project is an important aspect of the developer’s feasibility analysis. Public opinion, especially the sentiment of those near the project, should be carefully

evaluated to determine what objections may be raised by the project. Research should be conducted into recent decisions on similar projects to see whether precedents exist. Finally, the availability of utilities should be explored to determine whether they represent a potential problem for the development.

According to White & Gray (1996:181), one option available to minimize legal risk, is to purchase land already zoned for the intended use.

Even if a developer correctly assesses demand, and the market value of the space produced, making a profit is dependent on the cost of producing the space. Estimating this cost is no small matter. In times of inflation, costs frequently change during the course of development.

Rather than measure potential variance, most lenders attempt to absorb foreseeable shifts of income, occupancy and expectations. The two typical measures of cushion for variance in creditor realizations, are the default ratio and the debt coverage ratio.

According to Barret & Blair (1982:5), the default ratio is the ratio of all foreseeable expenses plus real estate taxes, plus interest and principal payments, to the gross cash rent schedule. A default ratio of 80% in effect means that vacancies may increase 20% or rental prices can be cut by the same amount to achieve 100% occupancy or the 20% cushion may be split between increased vacancies and expenses.

The debt coverage ratio is the ratio of net income available for debt service to required debt service payment. If net income is 1.3 times debt service, there may be fewer cushions than if net income is twice that of debt service.

3.8 SUMMARY

The purpose of the financial feasibility study is to determine whether the proposed project will “pay”; in other words, whether it will satisfy the financial criteria of the parties involved.

A financial feasibility study is a powerful and necessary tool to be used when establishing the economic desirability of investing in a development. It should not however be treated as a mechanical tool where decisions are automatically taken on the result of the study. The personal “gut feel” and experience of the developer is still of inestimable importance and common sense should always be exercised in all decision making (Cloete, 2005:77).

The financial feasibility study consists of five steps: a) Estimate the total capital outlay of the project; b) Estimate the total project income; c) Do a cash flow projection for the development period; d) Estimate the profitability of the project and compare with the investors’ objectives; and e) Do a risk analysis on the proposed project.

According to Jaffe *et al.* (1989:147) capital costs consist of the following components: a) Land costs, b) escalated construction cost, c) professional fees, d) finance costs, e) marketing costs and f) other costs. Each of these components was discussed in detail in the above chapter.

The first step in the financial feasibility study, is the projection of the possible income. These income projections include the estimation of the gross income and the estimation of the operating costs.

According to Jaffe *et al.* (1989:218), the accurate calculation of the anticipated income is the most important part of the feasibility study and in many instances is treated much too lightly. Operating costs can be defined as the recurring expenses which are related to the operation of a business.

According to White & Gray (1996:69), decision-making by the developer leads to one of three courses of action: a) Proceed with the development; b) Terminate the process; and c) Revert to pre-feasibility investigations and

redefine the parameters of the proposal – the concerns of the parties at interest, the property, the market, or the development proposal. This constitutes the classic “what if” analysis.

The different measures of return were discussed, which include: a) Initial return; b) Payback Method; c) Net present Value (NPV); and d) Internal Rate of Return (IRR).

According to Megginson *et al.* (2007:257), many companies decide whether to invest in a given project based on the rate of return the investment will earn on an accounting basis.

The payback method is the simplest of all capital budgeting decision-making tools. The payback period is the amount of time it takes for a given project's cumulative net cash inflows to recoup the initial investment.

A project's net present value (NPV) equals the sum of its cash inflows and outflows, discounted at a rate consistent with the project's risk. Calculating an investment's NPV, is relatively straightforward.

The internal rate of return (IRR) is defined as that rate of return which will make the present value of future cash inflows equal to the present value of the initial investment cost and other cash outflows.

The inputs to the development process are numerous. Some will be relatively certain prior to the commencement of the development, while others will be uncertain and are likely to vary over the development period. It is the uncertainty of these variables which gives property development its unique characteristics. Quantifying risk involves determining all the possible values a risky variable could take and determine the relative likelihood of each outcome.

There are different kinds of valuation methods that can be used when analysing these risks and they are: a) Residual valuation; b) Discounted Cash Flow (DCF); and c) Risk Analysis.

Residual Valuation is the technique which can be used to value either the amount available to purchase the site, cover acquisition charges and costs of finance in respect of the land/property about to be purchased, or it can be used to appraise the amount of developers profit in situations where the land costs are already known.

Discounted cash flow is a vital concept for any developer and according to Cloete (2005:157), has many applications and can be regarded as one of the most important techniques used in finance. Ward & Price (2006:133) give a summary of the steps in the DCF valuation approach, as follows: a) Estimate the free net cash flows (FCFs) into the future (10 years for real estate); b) Estimate the weighted average cost of capital (WACC), using target market values for debt and equity; c) Calculate the terminal value using $TV = FCF / (WACC - \text{growth rate})$; and d) Discount the free cash flows and the terminal value to the present.

Risk analysis is what the investor needs to concentrate on once the mechanical aspects of investment analysis are understood. Measures to determine the risk of individual projects include conservatism, risk-adjusted discount rates, the certainty equivalent approach, the risk-absorption ratio, decision trees, sensitivity analysis, and probabilistic risk simulation.

According to Pyhrr *et al.* (1989:154), return and risk is fundamental concepts when considering a proposed project. The level of return normally correlates with the degree of risk – the higher the return, the higher the risk and the lower the risk, the lower the return.

CHAPTER 4

RESEARCH METHODOLOGY AND RESULTS

4.1 INTRODUCTION

This chapter contains the empirical research part of the study investigating the feasibility and impact parameters of property development. This research is a non- experimental design that is observational and quantitative.

From the literature study in the previous chapters the impact parameters on property development were identified as: Demographic factors: Location, Tenant Mix; Capital costs; Cash flow; Initial return; Rent Income; NPV; and Payback period.

This chapter includes the following.

- The research design.
- The research methodology which includes the research instruments used, a discussion of the data, the population, the sample and data analysis techniques, limitations to the successful completion of the research.
- The results from the gathered data.
- The conclusion to the chapter.

4.2 RESEARCH DESIGN

A research design is a designed method specifying the methods and procedures for collecting and analysing the information needed for the study. It is a framework that plans the action for the research section of the study. The objectives of the study determine during the early stages of the study are included in the design so as to ensure that the information collected is appropriate for solving the problem. The research should specify the source of information, the research method used, sampling methodology and the schedule and cost of the research (Zikmund, 2003.65).

The research for the current study is done by using a systematic process of gathering and analysing the data in order to determine the impact parameters of property development. The research is carried out using the following standard research design: correlation-based research (Hofstee, 2006:120-131). The research design is briefly discussed to indicate its suitability for the current study.

4.2.1 Correlation-based research

Correlation-based research is done to compare two or more variables in order to determine whether a relationship exists (Hofstee, 2006:123). Statistics are used to determine if a relationship exists and if the relationship is fundamental and important.

When a correlation exists between variables, it does however not necessarily imply that it is fundamental (Hofstee, 2006:123). For this reason the statistics have to be applied carefully and everything considered before a fundamental relationship can be established.

Although correlation-based research is applicable in this study, there are factors that limit its success and have to be considered. External independent variables not considered and measured by the empirical study may have a significant effect on the dependent variables. The technique is data-driven and the quality of the results a function of the reliability and the accuracy of the input data. However, over-simplification of complex relationships could result.

4.2.2 Secondary data analysis

Secondary data analysis is done by analysing data collected by sources other than from the researcher. Primary data analysis is done when the researcher collects the data for a specific purpose and analyses the data. The same set of data can be secondary data when the researcher analyses the data for another purpose (Boslaugh, 2007:1). The current study relies on secondary data from twelve random selected property developers.

The use of secondary data in research has advantages and disadvantages. The first advantage of using secondary data is economy; the researcher does not have to devote resources to the collection of the data. Because the data is already collected and usually cleaned and formatted in a user-friendly form, the researcher has more time to devote to the analysis (Boslaugh, 2007:3). Secondly, the width of data available is an advantage. Large databases exist that can be used for research purposes. The third advantage of using secondary data is, that frequently the data collection process is informed by expertise and professionalism not available to small research facilities (Boslaugh, 2007:4).

When secondary data is used, it is important that the data is relevant to the research being done (Struwig & Stead, 2001:80). The reliability and the limitations of the data should be verified and understood, as it could have a significant effect on the validity of the research for which it is being used (Hofstee, 2006:128). Additionally, care should be taken that the secondary data are representative of the population for which it was gathered. A major disadvantage of secondary data, is that the researcher was not involved in the planning, execution and cleaning of the data. These processes may influence the results obtained from the data analysis. The secondary data may also exclude important information related to the data, for example geographical, demographical or social parameters that have an influence on the data. (Boslaugh, 2007:5).

4.3 RESEARCH METHODOLOGY

In order to realise the primary objective of the study, the secondary objectives have to be accomplished. This section deals with the research design of the study, the population and the sample from the population are described, the data analysis methods illustrated and the limitations noted.

The property development industry in South Africa entails residential, retail and industrial development. It was decided to limit the scope of this study to residential and retail property developers in order to prevent the study from becoming too general and too time-consuming.

4.3.1 Population and sample size

The population is an integral part of the research process. A population normally consists of all the items or individuals from which a conclusion wants to be derived. The target population for this research was retail and residential property developers in the Vaal Triangle.

A sample is the portion of the population selected for the analysis. Rather than selecting every item in the population, statistical sampling procedures focus on collecting a small representative group of the larger population. The results of the sample are then used to estimate characteristics of the entire population. An attempt was made to get a arbitrary sample from the developers that are evenly spread between age, type of development and the years in property development. A sample, using the simple random sampling technique, of twelve different developers was used.

4.3.2 Data collection

The data used in this research paper, were collected from twelve randomly selected property developers in the Vaal Triangle. The researcher made use of secondary data obtained from the twelve arbitrary selected property developers. The data used, consisted of the financial feasibility studies done before the property development was conducted, as well as the after-implementation studies done for the first five years.

4.4 DATA ANALYSIS

The data analysis techniques applied in this study, include descriptive statistics of the demographical data and statistical analysis of the data. While the results of the research rely heavily on statistical analysis, it is not the objective to explain the theory behind the techniques used. For this reason, only essential information will be discussed relating to the theory of the statistics used.

4.5 LIMITATIONS

The first limitation associated with the research, involves the fact that only two of the three property development sectors were used, namely retail and residential developments.

The second limitation associated with the research involves the fact that the data analysis was done using only property developers in the Vaal Triangle area

Another limitation was the fact that only data from twelve different developments could be used due to the fact that the financial data is not easily made available, since this is very sensitive information.

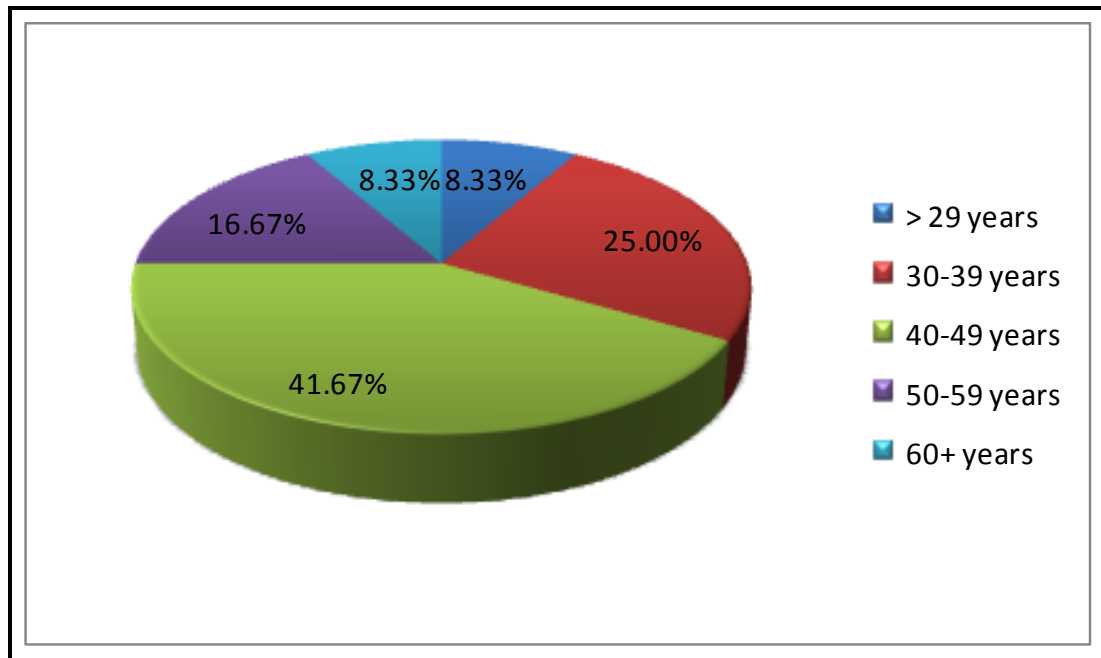
4.6 RESULTS

Demographical information regarding the age of the developers, type of development, type of valuation method used, and the years in property development, measured in the first part of the interview, are discussed below.

4.6.1 Age of the developers

The purpose of this question was to determine the age group classification of the developers interviewed. The age group is included in the interview, because different age groups could have different views. The distributions of the age group classification of the developers in this research are tabulated in Graph 1.

Graph1: Age group of developers

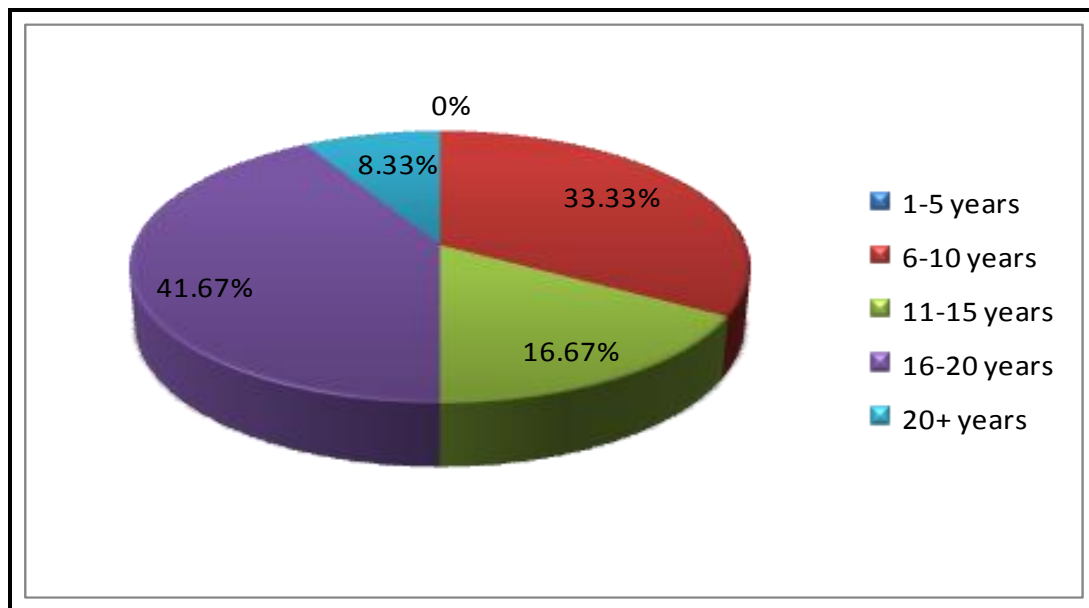


Most of the developers that were interviewed in this research, were between 40 and 49 (41.67%) years old, while the second largest interval is between 30 and 39 (25%) years old. Although most of the interviewed developers fall between the age group of 40 to 49 years old, 33.33% were younger than 39 years of age and 66.67% were between the ages 30 and 49 years. Only one interviewed developer was older than 60 years.

4.6.2 Years in development

The purpose of this question was to determine the years in development classification of the developers interviewed. The years in development are included in the interview, because the experience in developments from the developers could have different views. The distributions of the years in development classification of the developers in this research are tabulated in Graph 2.

Graph 2: Years in development

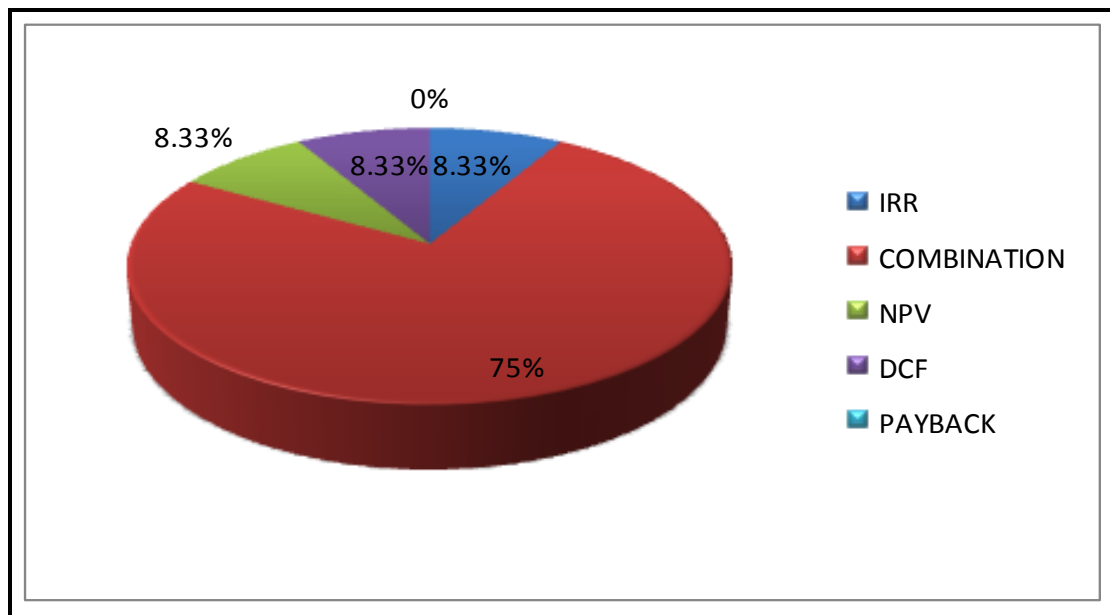


Most of the developers that were interviewed in this research, have between 16 to 20 years (41.67%) experience in developments, while the second largest interval is between 6 and 10 (33.33%) years. Although most of the interviewed developers have between 16 to 20 years experience in property development, 33.33% have between 6 and 10 years experience and 16.67% have between 11 and 15 years experience in development. Only one interviewed developer had more than 20 years experience in property development.

4.6.3 Type of valuation method used

The purpose of this question, was to determine the type of valuation method used by the developers interviewed. The type of valuation method used is included in the interview, because different methods used could have different results. The distributions of the valuation methods used classification of the developers in this research are tabulated in Graph 3.

Graph 3: *Type of Valuation method*

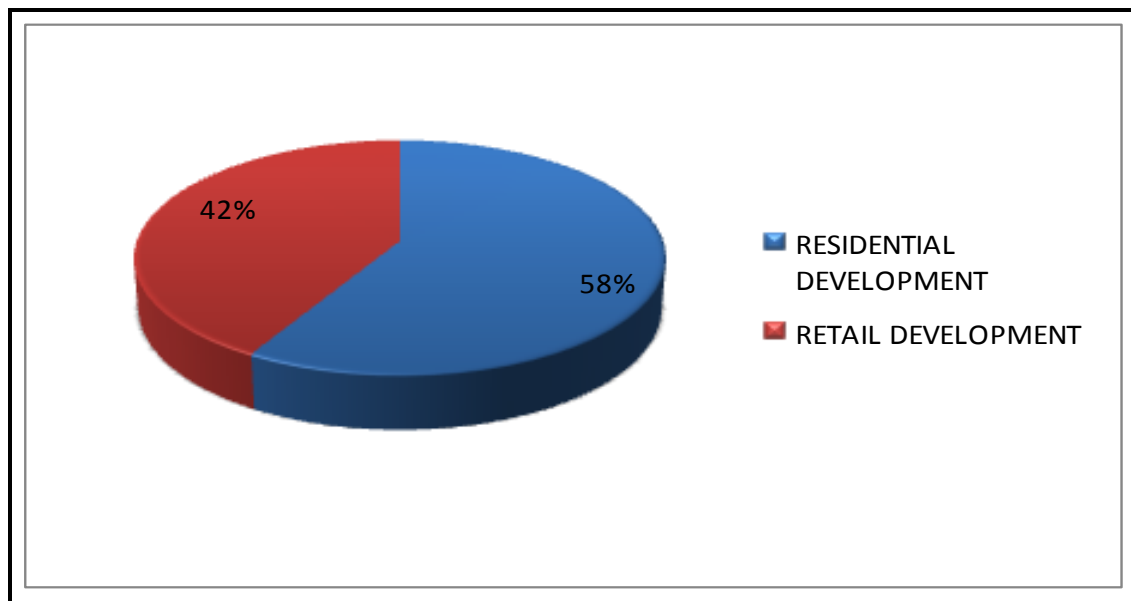


Most of the developers that were interviewed in this research, made use of a combination of the valuation methods (75%), while there was one (8.33%) developer that made use of the IRR method only, one (8.33%) developer that made use of the NPV method only, and one (8.33%) developer that made use of the DCF method only.

4.6.4 Type of development

The purpose of this question was to determine the type of development classification of the developers interviewed. The type of development is included in the interview, because different types of developments could have different results. The distributions of the type of development classification of the developers in this research are tabulated in Graph 4.

Graph 4: *Type of development*



Most of the developments that were analysed in this research, were residential developments, 58%. There were also five retail developments (42%).

4.6.5 Relationship between forecasted and actual figures

The purpose of this question was to determine the forecasted figures for each of the developments. The purpose was also to determine whether the forecasted figures used to determine the feasibility of the project, were realized after 5 years. A comparison between the forecasted and the actual figures, was done.

Each of the different developments used in the research will be discussed from Table 3 to Table 14.

Table 3: Development 1 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	81 159	111 744	-	13.7	11	713 215	9
Actual	85 410	101 427	-	11.2	11	750 763	10
Deviation	5.24%	9.23%	0	(18.25%)	0	5.26%	(11.12%)

As can be seen from Table 3, there was an increase in the rent income of 5.24%, a decrease of 9.23% in the actual capital costs, a decrease in the forecasted IRR of 18.25%; the NPV increased by 5.26% and the payback period increased from 9 years to 10 years. Since the deviations were not very high, the developer considered this development to be an overall success. The deviation of 5.24% in rent income was mainly because of better cost control by reducing the operating costs. The 9.23% decrease in the capital costs were due to the cheaper supply of electrical and water installations.

Table 4: Development 2 (Retail development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	16 445	2 852	+	32.5	15.5	1 272	3.82
Actual	13 156	4 386	-	14.2	15.5	-131	6
Deviation	(20%)	(53.79%)	-	(56.31%)	0	(89.7%)	(57.07%)

As can be seen from Table 4, there was a decrease in the rent income of 20%, an increase of 53.79% in the actual capital costs, a forecasted positive cash flow did not materialise, a decrease in the forecasted IRR of 56.31%, the NPV decreased by 89.7% and the payback period increased from 3.82 years

to almost double at 6 years. This development was considered to be a failure, since none of the forecasted figures materialised. The 20% deviation in the rent income could be ascribed to the fact that the rental of the Gross Lettable Area (GLA) of 8 000 m² was not fully achieved. There was a huge increase in the steel prices due to the strong rand/dollar exchange rate: Therefore, the 53.79% increase in capital costs occurred.

Table 5: Development 3 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	500 951	373 032	+	28	14	53 943	2.48
Actual	442 302	372 832	+	18.2	14	18 143	3.68
Deviation	(11.71%)	0.05%	0	(35%)	0	(66.37%)	(48.39%)

As can be seen from Table 5, there was a decrease in the rent income of 11.71%, an increase of 0.05% in the actual capital costs, a decrease in the forecasted IRR of 35%, the NPV decreased by 66.37% and the payback period increased from 2.48 years to 3.68 years. Although there were some of the figures that showed a decrease, the development was considered to be a success.

Table 6: Development 4 (Retail development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	5 955	3 343	-	18	14	800	6.19
Actual	5 899	3 222	-	18.7	14	862	6.09
Deviation	0.94%	3.62%	0	3.89%	0	7.75%	1.6%

As can be seen from Table 6, there was a slight decrease in the rent income of 0.94%, a decrease of 3.62% in the actual capital costs, an increase in the forecasted IRR of 3.89%, the NPV increased by 7.75% and the payback period decreased from 6.19 years to 6.09 years. This retail development was considered to be a success.

Table 7: Development 5 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	55 832	40 674	+	8.3	8	34 298	5.01
Actual	30 784	48 179	-	-27	8	-16 376	5.19
Deviation	(44.86%)	(18.45%)	-	(225%)	0	(52.25%)	(3.59%)

As can be seen from Table 7, there was a decrease in the rent income of 44.86%, an increase of 18.45% in the actual capital costs, a forecasted positive cash flow did not materialise, a decrease in the forecasted IRR of 225%, the NPV decreased by 52.25% and the payback period increased marginally from 5.01 years to 5.19 years.

Part of the five-year after-implementation study fell in the 2008 global crisis. During this period the sales declined and then the new National Credit Act (NCA) was also introduced. All of the above made it very difficult for possible home owners to obtain the necessary finance to buy homes. This could be seen in the 44.86% decrease in the actual rent income.

The 18.45% increase in the capital costs was the effect of waiting for the local authorities to approve the zoning of the residential stands, and only after two years, the zoning was done and all the capital costs were higher than forecasted. All of the above factors, as well as the fact that the NPV decreased by 52.25%, contributed to the fact that the development was not successful.

Table 8: Development 6 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	56 268	28 856	+	-	25	13 170	-
Actual	56 268	27 256	+	-	25	14 156	-
Deviation	0%	5.54%	0	0	0	7.48%	0

As can be seen from Table 8, there was no change in the rent income, a decrease of 5.54% in the actual capital costs, and the NPV increased by 7.48%. Since there were no big deviations, this development forecast exercise was a success.

Table 9: Development 7 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	66 831	26 481	+	-	19	22 401	-
Actual	46 468	28 641	+	-	19	16 747	-
Deviation	(30.47%)	(8.16%)	0	0	0	(25.24%)	0

As can be seen from Table 9, there was a decrease in the rent income of 30.47%, an increase of 8.16% in the actual capital costs, and the NPV decreased by 25.24%. This development was considered to be unsuccessful.

Table 10: Development 8 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	103 962	77 647	+	28.2	20	2 932	2.01
Actual	77 643	89 647	-	13.9	20	-10 664	5.67
Deviation	(25.32%)	(15.45%)	-	(50.71%)	0	(263%)	(182%)

As can be seen from Table 10, there was a decrease in the rent income of 25.32%, an increase of 15.45% in the actual capital costs, a decrease in the forecasted IRR of 50.71%, the NPV decreased by 263% and the payback period increased from 2.01 years to 5.67 years. Since there were huge deviations, this development was unsuccessful. This could also be the result from poor planning and forecasting from the developer's side.

Table 11: Development 9 (Retail development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	180 368	70 125	+	45.6	25	418 043	2.85
Actual	259 479	70 125	+	39	25	317 683	3.65
Deviation	43.86%	0%	0	(14.47%)	0	(24%)	(28.07%)

As can be seen from Table 11, there was an increase in the rent income of 43.86%, a change in the actual capital costs, a decrease in the forecasted IRR of 14.47%, the NPV decreased by 24% and the payback period increased from 2.85 years to 3.65 years. This development was considered to be a success, since the rent income increased by 43.86% and the capital costs did not change.

Table 12: Development 10 (Residential development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	149 400	117 235	+	25.1	5	45 192	3.25
Actual	169 727	115 215	+	26.5	5	47 115	2.58
Deviation	13.6%	1.72%	0	5.58%	0	4.26%	20.61%

As can be seen from Table 12, there was an increase in the rent income of 13.6%, a decrease of 1.72% in the actual capital costs, an increase in the forecasted IRR of 5.58%, the NPV increased by 4.26% and the payback period decreased from 3.25 years to 2.58 years. Since there are no big deviations, this development was a success.

Table 13: Development 11(Retail development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	46 886	33 088	-	24.9	22	3 145	5.78
Actual	31 360	53 568	-	20.9	22	-1 232	9.91
Deviation	(33.11%)	(61.89%)	0	(16.06%)	0	(60.8%)	(71.45%)

As can be seen from Table 13, there was an increase of 33.11% in the rent income, a huge increase of 61.89% in the actual capital costs, a decrease of 16.06% in the forecasted IRR, the NPV decreased by 60.8% and the payback period increased from 5.78 years to 9.91 years.

Table 14: Development 12 (Retail development)

	Rent Income (Rm)	Capital Cost (Rm)	Cash Flow (+/-)	IRR (%)	WACC (%)	NPV (Rm)	Payback Period
Forecast	43 728	33 568	-	16.9	15	2 279	27.96
Actual	52 352	36 968	-	18.4	15	8 395	12.24
Deviation	19.72%	(10.13%)	0	8.87%	0	268%	56.22%

As can be seen from Table 14, there was an increase in the rent income of 19.72%, an increase of 10.13% in the actual capital costs, an increase in the forecasted IRR of 8.87%, the NPV increased by 268% and the payback period decreased from 27.96 years to 12.24 years.

4.6.6 Success of the development

The purpose of this question was to determine the success of the development after a period of 5 years. The success of the development is included in the interview, because different success rates for the developments can be achieved than was anticipated. The success of the development was measured against the exceeding of the targets set when forecasted. The distribution of the success of the developments in this research, are tabulated in Table 15.

Table 15: Distribution of the success of the development

	Rent Income		Capital Cost		IRR		NPV		Payback Period		Overall Success	
	S	U	S	U	S	U	S	U	S	U	S	U
D1	X		X		X			X	X		X	
D2		X		X		X		X		X		X
D3	X		X		X		X		X		X	
D4	X		X			X	X		X		X	
D5		X	X		X		X		X			X
D6	X		X		-		X		-		X	
D7		X	X		-			X	-			X
D8		X		X		X		X		X		X
D9		X	X		X			X	X		X	
D10		X	X			X	X		X		X	
D11		X		X	X			X		X		X
D12	X		X		X			X		X	X	
TOTAL	5	7	9	3	6	4	5	7	6	4	7	5
%	42%	58%	75%	25%	50%	33%	42%	58%	50%	33%	58%	42%

Where:

S = Successful

U = Unsuccessful

D = Development

Table 15 above shows that the rent income was 58% forecasted unsuccessfully. As the capital cost is a much more predictable and stable component, 75% of all the developments forecasted the capital cost successfully. Only 50% of the developers forecasted the IRR successfully. The forecasted NPV of the developments, were 58% forecasted unsuccessfully. With the payback periods the developments were forecasted 50% successfully.

From Table 15 above, it can be seen that 58% of all the developments, were successfully forecasted and 42% of the developments were unsuccessful.

4.7 THE RELATIONSHIP BETWEEN THE DEMOGRAPHIC VARIABLES AND OVERALL SUCCESS OF THE DEVELOPMENT

By drawing a random sample, it enables one to study the properties of a population. In such cases the t-test, (to determine statistical significance) is used to illustrate that the result, for example the difference between two means, is significant. The p -value (indicating statistical significance) is a decisive factor of this, giving the probability that the acquired value could be obtained under the assumption that the null hypothesis (e.g. no difference between the population means) is true. A small p -value, which is a value smaller than 0.05, is considered to be sufficient evidence that the result obtained is statistically significant. This doesn't necessarily imply that the result obtained is important in practice as these tests have a tendency to yield small p -values as the data sets' sizes increase.

For completeness sake, p -values are reported as if random sampling was done. According to Ellis and Steyn (2003:51), this is considered as standard practice where data obtained from convenience sampling are erroneously analysed as if it were obtained through random sampling. These data should therefore, be considered as small populations for which statistical inference and p -values are not relevant. By making use of the descriptive measures that have been calculated, statistical inference draws conclusions about the

population from which the random sample was drawn. In such cases, instead of only reporting descriptive statistics, effect sizes can also be determined. Practical significance (d -values) can therefore, be understood as a large enough difference to have an effect in practice.

The normal way to comment on practical significance, is to use the standardised difference between the means of two populations, i.e. the difference between the two means divided by the estimate for standard deviation. According to Steyn (2000:1-3), this measure is called the effect size, and not only makes the difference independent of units and sample size, but also relates it to the data spread.

When two variables are presented, for example in a contingency table, it is important to know whether or not a relationship between the two variables is practically significant. In the case of random sampling, the statistical significance of such relationships is determined with the Chi-square tests. What needs to be determined is if a relationship is large enough to be of any importance. In the case of a contingency table as presented below, the effect size (ϕ) is given by the phi (ϕ) coefficient and is independent of the sample size (Ellis & Steyn, 2003:54).

Cohen (1998:224-225), gives the following guidelines for the interpretation of the phi (ϕ) coefficient.

- $\phi = 0.1$ small effect;
- $\phi \geq 0.3$ medium effect (noticeable with the naked eye); and
- $\phi \geq 0.5$ large effect and also practically significant.

According to Cohen (1998:80), a medium effect is already noticeable from inspection.

In this study the demographical variables were also compared with the overall success of the development. It must be noted that the population was only

twelve property developers in the Vaal Triangle. This was a very small population and was discussed in the limitations of the study.

4.7.1 The relationship between the demographical variable age group and success of the development

The statistical analysis for the relationship between the age group of the developers and the overall success of the development, yielded a phi (ϕ) coefficient of 0.717, which is an indication of practical significance. It also yielded an effect size of 0.046, which is an indication of a small effect. The p-value (0.046) indicates statistical significance, since it is smaller than 0.05.

Table 16: Relationship between the age group of the developers and the success of the development

Age Group				
	N	Unsuccessful	Successful	Total
<39	4	75% (3)	25% (1)	100%
40-49	5	0% (0)	100% (5)	100%
>50	3	66.7% (2)	33.3% (1)	100%
Total	12	41.7%	58.3%	100%
p-value				0.046
Phi (ϕ)				0.717

From Table 16 above it can be seen that 75% of developers younger than 39 years were unsuccessful with the development. According to Table 16, 100% of developers between the ages 40 and 49 were successful with the development.

4.7.3 The relationship between the demographical variable years in development and success of the development

The statistical analysis for the relationship between the years in development and the overall success of the development, yielded a phi (ϕ) coefficient of 0.535, which is an indication of practical significance and the effect size was 0.180, which indicates a small effect. It also yielded a p-value of 0.180, which indicates no statistical significance.

Table 17: Relationship between the years in development and the success of the development

Years in Development				
	N	Unsuccessful	Successful	Total
1-10	4	75% (3)	25% (1)	100%
11-15	2	0% (0)	100% (2)	100%
>16	6	33.3% (2)	66.7% (4)	100%
Total	12	41.7%	58.3%	100%
p-value				0.180
Phi (ϕ)				0.535

From Table 17 above, it can be seen that 100% of developers with eleven to fifteen years experience in development, was successful, where developers with more than sixteen years' experience was 66.7% successful. Developers with less than ten years experience will have a success rate of only 25%.

4.7.3 The relationship between the demographical variable type of property development and success of the development

The statistical analysis for the relationship between the type of development and the overall success of the development, yielded a phi (ϕ) coefficient of 0.029, which is an indication of no practical significance. It also yielded an

effect size of 0.921, which is an indication of a large effect. It also yielded a p-value of 0.921, which is an indication of no statistical significance.

Table 18: *Relationship between the type of development and the success of the development*

Type of Development				
	N	Unsuccessful	Successful	Total
Residential	7	42.9% (3)	57.1% (4)	100%
Retail	5	40% (2)	60% (3)	100%
Total	12	41.7%	58.3%	100%
p-value				0.921
Phi (ϕ)				0.029

From Table 18 above, it can be seen that 57.1% of residential developments was successful, where only 60% of retail developments was successful in doing a financial feasibility study.

4.7.4 The relationship between the demographical variable type of valuation method used and success of the development

The statistical analysis for the relationship between the valuation methods used and the overall success of the developments, is shown in Table 19 to Table 22 below.

Table 19: Relationship between the type of valuation method used: IRR and the success of the development

Valuation method used: IRR				
		OVERALL		
	N	Unsuccessful	Successful	Total
Unsuccessful	8	37.5% (3)	62.5% (2)	100%
Successful	4	50% (2)	50% (2)	100%
Total	12	41.7%	58.3%	100%
p-value				0.679
Phi (ϕ)				0.120

From Table 19 above it can be seen that 62.5% of developers use the IRR method of valuation alone and thus was successful, and 50% of developers that use the IRR method of valuation in a combination with other valuation methods, were successful. A phi (ϕ) coefficient of 0.120 indicates a small effect on the practical significance. The p-value of 0.679 indicates no statistical significance.

Table 20: Relationship between the type of valuation method used: Payback and the success of the development

Valuation method used: Payback				
		OVERALL		
	N	Unsuccessful	Successful	Total
Unsuccessful	5	60% (3)	40% (2)	100%
Successful	7	28.6% (2)	71.4% (5)	100%
Total	12	41.7%	58.3%	100%
p-value				0.276
Phi (ϕ)				0.314

From Table 20 above it can be seen, that 60% of developers use only the Payback method of valuation and would be unsuccessful, and 71.4% of developers that use the payback method of valuation in a combination with the other valuation methods, would be successful. A phi (ϕ) coefficient of 0.314 indicates a medium effect on the practical significance. The p-value of 0.276 indicates no statistical significance.

Table 21: Relationship between the type of valuation method used: NPV and the success of the development

Valuation method used: NPV				
		OVERALL		
	N	Unsuccessful	Successful	Total
Unsuccessful	5	60% (3)	40% (2)	100%
Successful	7	28.6% (2)	71.4% (5)	100%
Total	12	41.7%	58.3%	100%
p-value				0.276
Phi (ϕ)				0.314

From Table 21 above it can be seen that 60% of developers that use only the NPV method of valuation would be unsuccessful and 71.4% of developers that use the NPV method of valuation in a combination with the other valuation methods, would be successful. A phi (ϕ) coefficient of 0.314 indicates a medium effect with regard to the practical significance. The p-value of 0.276 indicates no statistical significance.

Table 22: Relationship between the type of valuation method used: DCF and the success of the development

Valuation method used: DCF				
		OVERALL		
	N	Unsuccessful	Successful	Total
Unsuccessful	3	100% (3)	0% (0)	100%
Successful	9	22.2% (2)	77.8% (7)	100%
Total	12	41.7%	58.3%	100%
p-value				0.018
Phi (ϕ)				0.683

From Table 22 above it can be seen that 100% of developers that doesn't use the DCF method of valuation in a combination with the other valuation methods, would be unsuccessful and 77.8% of developers that use the DCF method of valuation in a combination with the other valuation methods, would be successful. A phi (ϕ) coefficient of 0.683 indicates a high effect and therefore, shows a high practical significance. The p-value of 0.018 indicates statistical significance.

Table 23: Relationship between the type of valuation method used: Combined methods and the success of the development

Valuation method used: Combination of Methods				
		OVERALL		
	N	Unsuccessful	Successful	Total
Unsuccessful	3	100% (3)	0% (0)	100%
Successful	9	22.2% (2)	77.8% (7)	100%
Total	12	41.7%	58.3%	100%
p-value				0.018
Phi (ϕ)				0.683

From Table 23 above it can be seen that 100% of developers that do not use the combination of the methods of valuation would be unsuccessful, and 77.8% of developers that use a combination of the methods of valuation, would be successful. A phi (ϕ) coefficient of 0.683 indicates a high effect and therefore practical significance. The p-value of 0.018 indicates statistical significance.

4.8 SUMMARY

The chapter describes the research methodology. The research design, data and data analysis are presented to the reader. The applicability of the chosen methods towards the realisation of the research objectives is motivated. Factors limiting the research are identified and clarified and the results of the data analysis are discussed. In the final chapter, conclusions will be drawn from the results obtained in this chapter.

Statistical significance exists between the relationship age group and overall success (0.046); DCF and overall success (0.018) and between the relationships combination and overall success (0.018).

High practical significance exists between the relationship age group and overall success (0.717); years in development and overall success (0.535); DCF and overall success (0.683) and between the combinations and overall success (0.683). A medium effect exists between the relationships payback and overall success (0.314) and between the relationships NPV and overall success (0.314). This was measured by using the phi (ϕ) coefficient.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter, the results of the empirical study identifying the feasibility and impact parameters within the Vaal Triangle demographical area, will be discussed.

The chapter begins with conclusions drawn from the results obtained from the datasheet compiled by the author of this mini-dissertation. Firstly the demographical information will be discussed, whereafter conclusions regarding the success of the feasibility study and finally, the relationship between the demographic variables and the feasibility studies will be addressed.

After conclusions are drawn, recommendations will be made regarding the feasibility and impact parameters of property development studied in this mini-dissertation. The success of this study will be evaluated in terms of the primary and secondary objectives put forward in Chapter 1. The chapter concludes with suggestions for further research in this field of study.

5.2 CONCLUSIONS

Conclusions will follow the basic structure of Chapter 4 and will firstly address the demographical information of the respondents. Thereafter conclusions regarding the relationship between the demographic variables and the success of the development will be addressed.

5.2.1 Demographical information of respondents

Demographical information of the respondents regarding their age, years in development, type of development, and type of valuation method used, were obtained.

The following general conclusions can be drawn regarding the demographical information of the respondents.

The distribution of the developers interviewed with respect to their age mainly fell in two groups namely 29 to 39 years and 40 to 49 years, accounting for 66.67% of the total number of developers interviewed. This is an indication that property developers in the Vaal Triangle are middle-aged and are well-balanced below and above 40 years of age.

The distribution of the developers that were interviewed in this research have between 16 to 20 years (41.67%) experience in developments, while the second largest interval is between 6 and 10 (33.33%) years. Although most of the interviewed developers have between 16 to 20 years experience in property development, 33.33% have between 6 and 10 years experience and 16.67% have between 11 and 15 years experience in development. Only one interviewed developer had more than 20 years experience in property development. This is an indication that property developers in the Vaal Triangle are well experienced.

Most of the developers that were interviewed in this research made use of a combination of the valuation methods (75%), while there was one (8.33%) developer that made use of the IRR method only, one (8.33%) developer that made use of the NPV method only, and one (8.33%) developer that made use of the DCF method only. This is an indication that property developers in the Vaal Triangle are making use of a combination of the different valuation methods.

Most of the developments that were analysed in this research were residential developments, 58%. This is an indication that property developments in the Vaal Triangle are well balanced between retail and residential developments.

Detailed conclusions on the relationship between the demographic variables and the overall success of the development tested within the study, will be presented in section 5.2.3.

5.2.2. Assessment of the relationship between the forecasted and actual figures tested

The following general conclusions can be drawn regarding the deviations between the forecasted and actual figures tested.

Table 24: Deviation between the forecasted and the actual figures of the 12 developments

	Rent Income	Capital Cost	IRR	NPV	Payback Period
D 1	5.24%	9.23%	(18.25%)	5.26%	(11.12%)
D 2	(20%)	(53.79%)	(56.31%)	(89.7%)	(57.07%)
D 3	(11.71%)	0.05%	(35%)	(66.37%)	(48.39%)
D 4	0.94%	3.62%	3.89%	7.75%	1.6%
D 5	(44.86%)	(18.45%)	(225%)	(52.25%)	(3.59%)
D 6	0%	5.54%	N/A	7.48%	N/A
D 7	(30.47%)	(8.16%)	N/A	(25.24%)	N/A
D 8	(25.32%)	(15.45%)	(50.71%)	(263%)	(182%)
D 9	43.86%	0%	(14.47%)	(24%)	(28.07%)
D 10	13.6%	1.72%	5.58%	4.26%	20.61%
D 11	(33.11%)	(61.89%)	(16.06%)	(60.8%)	(71.45%)
D 12	19.72%	(10.13%)	8.87%	268%	56.22%

Where: D = Development

When the rent income is shown in brackets, it indicates that the rent income was less than the forecasted figure. When the capital cost is shown in brackets, it indicates that the capital cost was actually more than the forecasted figure. When the IRR have a negative deviation, it indicates that the IRR percentage was less than the forecasted percentage. The negative NPV indicates that the NPV after 5 years was less than the forecasted NPV.

The negative deviation with the payback period indicates that the payback period increased after the 5 years.

It can be concluded that rent income was impacted by factors, such as the gross lettable area (GLA) where either more of the GLA was rented out, or where the forecasted GLA could not be achieved (Development 2 and Development 11). It was also influenced by other factors such as the location of the property, global economic turndown, and new legislation (NCA) (Development 5, Development 7 and Development 8). Many of the forecasts were done in the development peak season before the global economic crisis or some of the years used in the after-implementation study was during the global economic crisis.

The capital cost was influenced by factors such as the global economic crisis (Development 5 and Development 8), the high rand/dollar exchange rate which influenced the imports of building materials (Development 2 and Development 11), and an underestimation of the capital costs.

It could be concluded, that all of the above factors have an impact on the IRR, NPV and Payback period. If the capital costs were more than anticipated, the interest paid for the finance of the project, will automatically increase the payback period.

5.2.3 The relationship between the demographic variables and the overall success of the development

The following section will discuss conclusions made regarding the relationship between the demographical variables and the overall success of the development tested in the study which had a phi (ϕ) coefficient, being considered as practical significant.

Conclusions will also be discussed where the relationship between the demographical variables and the overall success of the development were

presented in contingency tables. In this case a large effect size which is being considered as practically significant, is represented when $\phi \geq 0.5$.

Table 25: Summary of the *p*-value and the phi (ϕ) coefficient of all the relationships between the type of valuation method and the overall success of the development

	N	p-value	Phi (ϕ)
IRR vs. Success	12	0.679	0.120
Payback vs. Success	12	0.276	0.314
NPV vs. Success	12	0.276	0.314
DCF vs. Success	12	0.018	0.683
Combination vs. Success	12	0.018	0.683

Statistical significance exists between the relationship age group and overall success (0.046); DCF and overall success (0.018) and between the relationships combination and overall success (0.018).

High practical significance exists between the relationship age group and overall success (0.717); years in development and overall success (0.535); DCF and overall success (0.683) and between the combinations and overall success (0.683). A medium effect exists between the relationships payback and overall success (0.314) and between the relationships NPV and overall success (0.314). This was measured by using the phi (ϕ) coefficient.

5.3 RECOMMENDATIONS

Based on the conclusions drawn, the following recommendations regarding the feasibility and impact parameters studied, can be made.

It would be recommended that a combination of the different valuation methods should be used to obtain the maximum success with a new property development. Different scenarios, possibilities and alternatives should be evaluated in order to obtain the most realistic financial feasibility. By using the more experienced property developers, a better and more accurate financial feasibility will be obtained. If property developers made use of the Simulation of different scenarios, best-case, worst-case and realistic case, the developer would be more accurate in determining the financial feasibility of the project.

5.4 ACHIEVEMENT OF OBJECTIVES

The success of this study is based on the evaluation of the achievement of the primary and secondary objectives as indicated in section 1.4.

5.4.1 Primary objectives

The primary objective of this study was to determine the significance of factors that influence the feasibility of a property development project. The achievement of the primary objectives was dependent on the realising of the secondary objectives.

5.4.2 Secondary objectives

The secondary objectives were determined in section 1.4.2 of this study. These objectives were set out to help with the achievement of the primary objective. The secondary objectives were the following.

- ◆ The possible risks and impact parameters involved in determining a feasible property investment will be examined.

- ◆ Different financial evaluation models to determine the feasibility of a property development project, will be evaluated.
- ◆ The forecasted and actual returns will be calculated to see whether the feasibility studies were successful for the Company.

In terms of the abovementioned objectives, the following can be contributed.

- ◆ The possible risks and impact parameters involved in determining a feasible property development were examined and rent income was impacted by factors, such as the gross lettable area (GLA). It was also influenced by other factors such as the location of the property, global economic crisis, and new legislation (NCA). Many of the forecasts were done in the development peak season before the global economic crisis or some of the years used in the after-implementation study were during the global economic crisis.
- ◆ Different financial evaluation models for property development were evaluated and it was seen that the success of the development was more accurate by using a combination of the valuation models namely NPV, DCF, Payback method and IRR.
- ◆ The forecasted and actual figures were calculated to see whether the feasibility studies were successfully determined. It was seen that the Rent income was 58% forecasted unsuccessfully. As the capital cost is a much more predictable and stable component, 75% of all the developments forecasted the capital cost successfully. Only 50% of the developers forecasted the IRR successfully. The forecasted NPV of the developments, were 58% forecasted unsuccessfully. With the payback periods the developments were forecasted 50% successfully.

From the above secondary objectives, it can be concluded that the secondary objectives of this study were successfully achieved.

5.5 SUGGESTIONS FOR FURTHER STUDIES

The following suggestions can be made for further research regarding this topic.

Since all of the current research regarding this topic is very outdated and old, it would be recommended that research in this study field should be done. The research in this study also focussed more on the financial feasibility and the valuation methods. The demographical impact parameters should be researched in more detail.

The results of this research were obtained from only a few property developers in the Vaal Triangle and it would be recommended that a proper research regarding property developers in South Africa should be done. It will be interesting to see whether the same results will be obtained as in the Vaal Triangle.

5.6 SUMMARY

The aim of this chapter was to conclude on the results obtained from the study and to give practical recommendations regarding compliance to the commercial restriction studied in this mini dissertation.

The chapter started off by concluding on the demographic information of the respondents. The relationship between the demographic variables and the overall success of the development tested, was addressed. After conclusions were drawn, recommendations were made regarding the feasibility and impact parameters in the Vaal Triangle.

The chapter concluded by evaluating the success of the study based on the achievement of the primary and secondary objectives. It was found to be successful after it was established that all the objectives were reached. Suggestions for further research in this field of study were made.

REFERENCE LIST

ALLISON, L. (2005). Measuring Success. Prepared for the South African Council of Shopping Centers and the University of Pretoria.

BARRET, G.V. & BLAIR, J.P. (1982). How to conduct and analyze real estate market and feasibility studies. New York: Van Nostrand.

BIRREL, G. & SHI BIN, G. (1997). The UK development process: Its phases and their degree of importance to profitability. Cutting Edge: Tsinghua University.

CARN, N., RABIANSKI, J., RACSTER, R. & SELDIN, M. (1998). Real Estate Market Analysis: Techniques and Applications. Englewood Cliffs. New Jersey: Prentice Hall CCIM. 544p.

CLOETE, C.E. (2001). Principles of property management. Pretoria: SA Property Education Trust. 248p.

CLOETE, C.E. (2003) Shopping centre management in South Africa. South African Council of Shopping Centers.

CLOETE, C.E. (2005a). Property Investment in South Africa. Pretoria: SA Property Education Trust. 378p.

CLOETE, C.E. (2005b). Property Finance in South Africa. Pretoria: SA Property Education Trust. 294p.

CLOETE, C.E. (2006). Feasibility Studies: Principles and Practice. Sandton: SA Property Education Trust.

CUSACK, M.M. (1987). The significance of the time parameter on the analysis and use of costs for cash flow requirements. London: E & F N Spon. Pp. 493-502.

DOWNS, A. (1966). Characteristics of various economic studies. *The Appraisal Journal* (July). Reproduced as Chapter 8 in American Institute of Real Estate Appraisers, Readings in *Real Estate Investment Analysis*, Volume 1. Chicago: Ballinger. Pp. 77-86.

ELLIS, S.M. & STEYN, H.S. 2003. Practical significance (effect sizes) versus, or in combination with statistical significance (p-value). *Management dynamics*, 12(4): Pp. 51-53.

FIELD, A. 2009. Discovering statistics using SPSS. 3rd Ed. London: Sage Publications. 821p.

FISHER, P. & COLLINS, T. (1999). The commercial property development process. *Property Management* 17(3). Pp219-230.

GELTNER, D., MILLER, N., CLAYTON, J. & EICHHOLTZ, P. (2007) Commercial Real Estate Analysis and Investments. Mason, Ohio: Thomson South Western. 880p.

GRAASKAMP, J.H. (1970). A guide to feasibility analysis. Chicago: Society of Real Estate Appraisers.

GHYOOT, V. (2003). *How to evaluate a Property Development Feasibility Study*. School of Business Management: UNISA.

JAFFE, A.J. & SIRMANS, C.F. (1989). Fundamentals in Real Estate Investment. 2nd Edition. Englewood Cliffs, New Jersey: Regents/Prentice Hall. 452p.

KISHORE, R. (1996) Discounted cash flow analysis in property investment valuations. *Journal of Property Valuation & Investment*. 14 (3), 1996, Pp 63-70.

LING, D.C. & ARCHER, W.R. (2005). Real Estate Principles: A Value Approach. Boston, Massachusetts: Irwin McGraw-Hill. 688p.

MEGGINSON, W.L. , SMART, S.B. & GITMAN, L.J. *Corporate Finance*. 2007. 2nd Edition. Mason: Ohio.USA. 650p.

PISANI, R.R. & PISANI, R.L. (1989). Investing in land. How to be a successful developer. New York: Wiley. 256p.

PRINSLOO, D.A. & PRINSLOO, L.J. (2004). Property economics in South Africa. Pretoria: Jetline. 320p.

PYHRR, S.A., COOPER, J.R., WOFFORD, L.E., KAPLIN, S.D. & LAPIDES, P.D. (1989). Real Estate Investment. Strategy, Analysis, Decisions. New York: Wiley. 381p

RATCLIFFEE, J. (2000). "Scenario building: a suitable method for strategic property planning" *Property Management* 18(2). Pp 127-144.

STEYN, H.S. (Jr.). 2000. Practical significance of the difference in means. *Journal of industrial psychology*, 26(3). Pp1-3.

VAN RENSBURG, P.J. (1993). "n Kritiese bespreking van onrealistiese eerstejaar vakantaannames by nuwe multihuurder eiendomsprojekte en 'n voorstel vir die oplossing van die problem". Unpublished MSc (Building Management: Real Estate Assignment, University of Pretoria.

VIRULY, F. (2008). The state of the South African Property Industry. SAPOA Annual Conference 2008. Cape Town. Johannesburg: University of the Witwatersrand.

VIRULY, F. (2010). The state of the South African Property Industry. SAPOA Annual Conference 2010. Cape Town. Johannesburg: University of the Witwatersrand.

WARD, M. & PRICE, A. (2006). Turning vision into value. Paarl: Paarl Press.

WHITE, J.K. & GRAY, K.D. (1996). Shopping Centres and other retail properties. Canada: Wiley.