The impact of Stellenbosch Square on retail buying patterns in Paradyskloof

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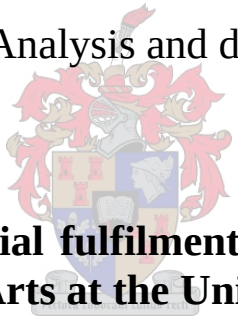

Thesis presented in partial fulfilment of the requirements for the degree of Master of Arts at the University of Stellenbosch

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Opsomming

Die kleinhandelsektor bied 'n wye area van analise aan geograwe waar hulle hulle kennis en vaardighede kan gebruik om werklikheidsprobleme te verklaar en op te los. Die plekke waar Suid-Afrikaners hul inkopies doen, het oor die afgelope aantal jare baie verander. Kleinhandelbesighede skuif weg van die besige Sentrale Sakekern (SSK) en gaan vestig in meer gerieflike, toeganklike en aantreklike liggings in inkopiesentrums op die stadsrand. Hierdie verskynsel is ook sigbaar in die kleinhandelstruktuur van Stellenbosch. *Stellenbosch Square* is relatief onlangs ontwikkel op die rand van Stellenbosch. Die inkopiepatrone van Paradyskloofwoonbuurt se inwoners is ontleed om die rol of invloed van die nuwe inkopiesentrum op hulle koopgewoontes te bepaal. Paradyskloof is geleë tussen Stellenbosch Square en Die Boordsentrum, wat nader aan Stellenbosch se SSK geleë is.

Die nulhipotese lui as volg: Die inkopiepatrone van die inwoners van Paradyskloof het nie noemenswaardig verander na die totstandkoming van Stellenbosch Square nie. Die oorhoofse doel is om die huidige inkopiepatrone van Paradyskloof te beskryf, te verklaar en te vergelyk met die voorspelde patrone volgens Flowmap 7.2 se oorsprong-beperkte gravitasie-model (*origin-constrained gravity model*).

Paradyskloof inkopiepatrone is bepaal deur gebruik te maak van ‘n steekproef van 250 ewekansig ruimtelik verspreide vraelyste. Verskeie tipes data (sekondêre en primêre) is versamel oor díe tyd. Die oorsprong-beperkte gravitasie-model is gekalibreer met die gemiddelde ritafstand. Die gemodelleerde resultate voorspel dat almal van Paradyskloof se inwoners by Stellenbosch Square hul inkopies doen. Die ondersoek het egter aangedui dat slegs 44% van die respondente by Stellenbosch Square hulle inkopies doen. Die redes wat aangevoer kan word waarom respondente steeds nader aan die SSK hulle inkopies doen, is oa: ‘n groot mate van mobiliteit, ‘n groot aantal skoliere wat daagliks dorp toe vervoer word, multi-funksionele ritte, bank en posdienste ens.

Die rol wat Stellenbosch Square speel in die Stellenbosch kleinhandelstruktuur word ook bespreek.

Sleutelwoorde: Kleinhandel, GIS, oorsprong-beperkte gravitasie model, kleinhandel inkopiepatrone, gemiddelde ritafstand, inkopiesentrum, markarea

Author's Declaration

I, the undersigned, hereby declare that the work contained in this report is my own original work and that I have not previously submitted it in its entirety or in part at any university for a degree.

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Date: _____

Summary

The retail sector provides geographers with a major area of analysis where they can apply their specialist knowledge to solve and explain real-world problems. Over the years there have been significant changes in the locations where South Africans shop. Retail shops are moving from city centres (CBDs) to more accessible and attractive locations on the city's edge. This phenomenon is also evident in the retail structure of Stellenbosch. Stellenbosch Square is a multi-million-rand shopping centre that has been erected on the edge of Stellenbosch. The retail buying patterns of the Paradyskloof neighbourhood (in Stellenbosch) was analysed and placed in context with Stellenbosch Square. Paradyskloof is situated between Stellenbosch Square and Die Boord shopping centre, which is situated more closely to the CBD.

The null hypothesis states that: "The buying patterns of the residents of Paradyskloof did not change significantly after the building of Stellenbosch Square, a shopping centre situated between Stellenbosch and the Somerset West shopping centre."

The overarching aim is to describe and explain the extent of the current retail buying patterns of the Paradyskloof population and compare them to the predicted results of the Flowmap 7.2 origin-constrained gravity model with regards to Stellenbosch Square shopping centre.

The Paradyskloof retail buying patterns was determined by a random distributed questionnare survey. The modelled results are compared to the actual buying patterns and the findings are placed in context. Various types of data (primary and secondary) were collected. The origin-constrained gravity model was calibrated with the mean trip lengths (MTL).

The modelled results predicted that all of the Paradyskloof residents shop at Stellenbosch Square. To determine the actual buying patterns, 250 questionnaires were spatially distributed with the aid of a random sampling of erven within the Paradyskloof neighbourhood. The survey indicated that only 44% of the respondents shop at Stellenbosch Square. Some of the reasons for why some of the residents still shop closer to the CBD are: high mobility, high number of scholars, multi-functional trips, banking and postal services etc. The rationale behind Stellenbosch Square and the role it plays within the Stellenbosch retail market has also been provided.

Keywords: Retail, GIS, origin-constrained gravity model, retail buying patterns, mean trip length, shopping centre, market area

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My special thanks go to my supervisor Mr PJ Eloff. He has helped me with all the problems that occurred along the way and directed me through the entire course of the project. I also want to thank Prof HL Zietsman and Prof T de Jong for guiding me through the technical aspects of the research. A big thank you goes out to all the respondents in Paradyskloof for assisting me in my research by taking the time to complete the questionnaire. Special thanks to Dr E Hees for proofreading and editing my manuscript. Thanks to my classmates for the moral support throughout. I appreciate it very much.

Praise the Lord for the strength and guidance that only He can give.

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1. SETTING THE SCENE

In section 1 the scene will be set by giving a short introduction to the dynamic nature of retailing. The research problem will also be discussed, followed by the aim and the objectives of the study. This section will be concluded by a spatial presentation and a short description of the study area.

1.1. Background

Retailing is one of South Africa's largest industries. It is so familiar to the public that they sometimes take it for granted. The location of retailing facilities, such as shopping centres, and their relationships with the local, regional, national and international environments are important issues for geographers. An analysis of retailing is particularly relevant as one moves deeper into the new millennium, given the importance of the industry in the South African economy.

O'Brien and Harris (1991) present four reasons that justify the study of retailing:

- It is a sector of the economy that is very visible to the general public, being located throughout urban areas in physical developments such as shopping centres;
- It is a highly dynamic sector which undergoes changes that can radically alter the character of towns and cities;
- It reflects social attitudes and aspirations more readily and topically than the faceless and less familiar industries of mines, factories, etc.;
- It is evident that retailers are some of the most active in redeveloping and restructuring urban spaces. They are among the most effective of modern property speculators and developers, yet they are also interested in developments in consumer psychology, buying behaviour, computer systems and information technology.

In reading economic, business and financial literature, one might begin to suspect that retailing is identical throughout South Africa and is subject to all the same pressures and processes. In reality there are some aspects that are generally applicable, but because of the highly dynamic nature of the retailing sector, it is very important to recognise and understand local and regional influences.

The researcher has come to recognise that retailing offers a means of studying many aspects of society, for example, individual and group behaviour, changing public attitudes and

preferences, land-use changes and the politics of the built environment. Retailing is a challenging field of investigation and, because of the importance and relevance of retailing to every member of society, studying it is worthwhile.

1.2. Research problem statement

According to Dawson (1980), the retail sector did not only provide the stimulus to considerable empirical, technical and conceptual advances in geography, but it also provided a major area of analysis where geographers have applied their specialist knowledge to solve and explain real-world problems. Over the years there has been a significant change in the locations where South Africans shop. The growth and expansion of retail organisations has always brought questions of geography to the fore (Birkin, Clarke & Clarke, 2002). Retail shops are moving from city centres (CBDs) to more accessible and attractive locations on the city's edge. This transformation results from the movement of people to the more liveable outer edges of the cities, where the population density and pollution levels are lower. These new locations mainly take the form of shopping centres that supply a wide range of products and services. One came to think that the in-town shopping centres may play a different role than the shopping centres on the edge of town as far as its market areas, consumer patterns, etc. are concerned.

People often use the expression 'shopping centre' to refer to the cluster of shops they visit either in town or on the town's edge. The term 'shopping centre' will be used in this research as follows to refer to 'a group of businesses, the majority of which are retailers, located in a unified architectural unit which may be a single structure or related group of buildings' (Dawson 1979: 298).

Most consumption decisions are made by household units. According to Fotheringham and O'Kelly (1989) Reilly's Law of Gravitation indicates that households will travel the shortest distance to satisfy their needs. The ultimate issue is how people trade off distance against a variety of products and services supplied by shopping malls. The spatial distribution of retail activity depends on the customer's preference for one shopping location over another.

The null hypothesis states that: "The buying patters of the residents of Paradyskloof' did not change significantly after the erection of Stellenbosch Square, a shopping centre situated between Stellenbosch and the Somerset West shopping centre."

Understanding this phenomenon will be the challenge confronting the researcher. A gravity model will be used in Flowmap 7.2 to predict buying pattern information of the Paradyskloof population. The basic relationship between customer and store is assumed to follow the Huff model: customers' trips from origin to destinations are related to the attractiveness of the destination (positively) and the distance from the store (negatively). In the case of Paradyskloof a very attractive shopping centre has been erected close by and will play a role in the shopping patterns of the Paradyskloof residents.

The value of the model depends on its ability to incorporate different measures of store attractiveness, e.g. floor area. With a rapidly growing population worldwide, retail geography will still be an area of interest for geographers in the future (Van der Merwe 2005).

1.3. Research aim and methodology

1.3.1. Overarching aim

The overarching aim is to describe and explain the extent of the current retail buying patterns of the Paradyskloof population and compare them to the predicted results of the Flowmap 7.2 gravity model with regards to Stellenbosch Square shopping centre.

1.3.2. Research methodology

The following methodology will be used to accomplish the research aim:

- Current buying patterns of the Paradyskloof population will be determined with the use of a questionnaire survey;
- A gravity model and calibration process will be executed with information on the attractiveness of the seven shopping centres and the mean trip length (MTL) of consumers in Stellenbosch;
- The actual buying patterns (real-world) must then be compared to the predicted (modelled) buying patterns of the Paradyskloof neighbourhood;
- The role and interaction between Stellenbosch Square shopping centre and the residents of Paradyskloof within the retail environment of Stellenbosch can be analysed.

1.4. Research design

The research process consists of different phases, from the initial problem formulation right through to the final results and synthesis. A literature study was carried out to provide a theoretical background for the investigation. Relevant literature was obtained from books,

journals, articles, institutional reports and Internet sources. The literature survey forms a fundamental and integral part of the planning and implementation of the research project. By studying the literature, a research problem was formulated. By reading the literature with the research problem in mind and also taking the study area into consideration, a research aim and set of objectives have been constructed by the researcher.

Diverse types of primary and secondary data have been collected, including text, statistical and digital data. The collected data have been edited and prepared for the data-analysis phase. The aim of the analysis is to understand the different elements of the data by "breaking it up" into assorted themes.

The researcher will then conclude in a synthesis by explaining the patterns and trends evident from the results. The resulting patterns will be placed within the context of the theory and a conclusion with a set of recommendations will follow. The following research design (Figure 1.1) will be the 'blueprint' for conducting the research.

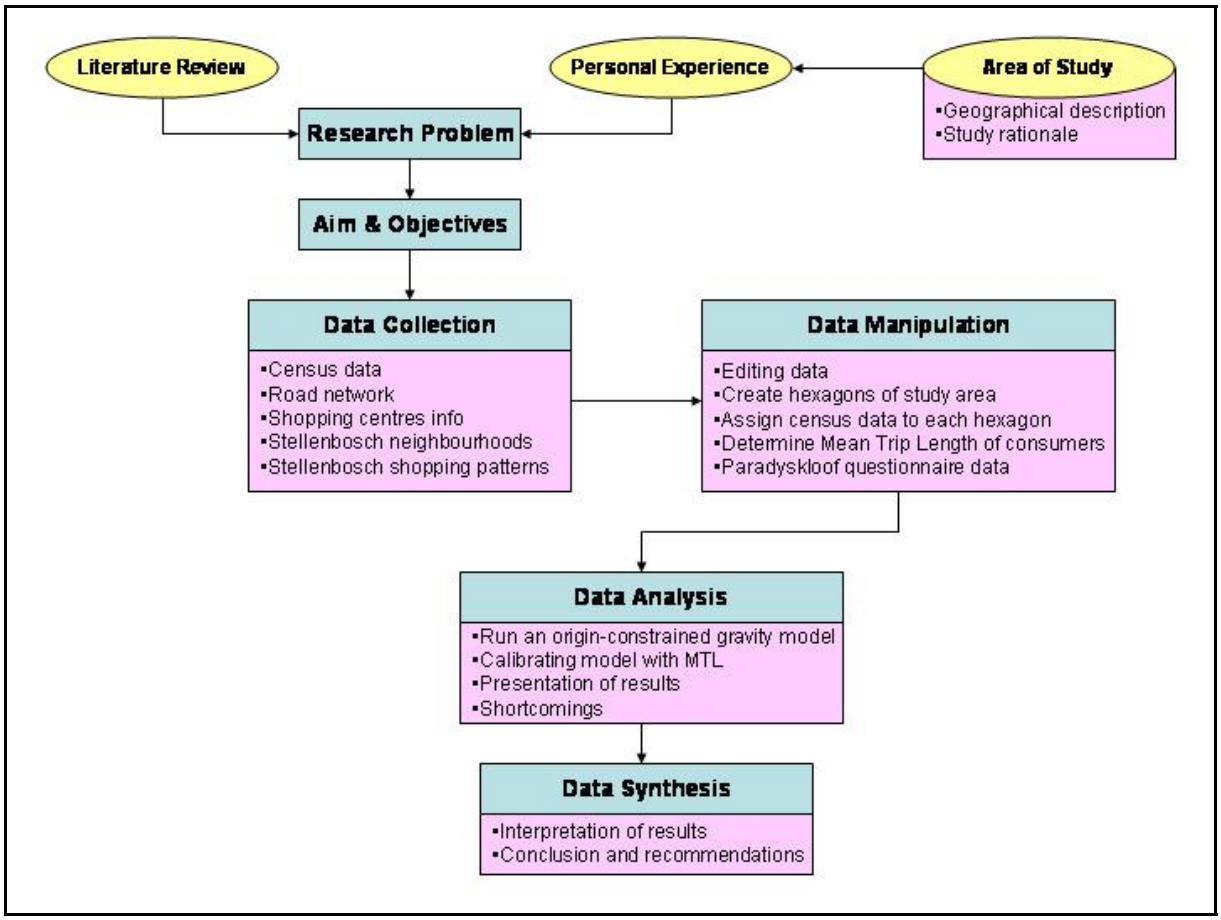

Figure 1.1: Research design

1.5. Study area

Paradyskloof is a residential neighbourhood situated in the southern part of Stellenbosch. Stellenbosch is located in the Boland region of the Western Cape (Figure1.2). Paradyskloof is one of the neighbourhoods that have expanded rapidly over the last decade due to the high influx of people into Stellenbosch.

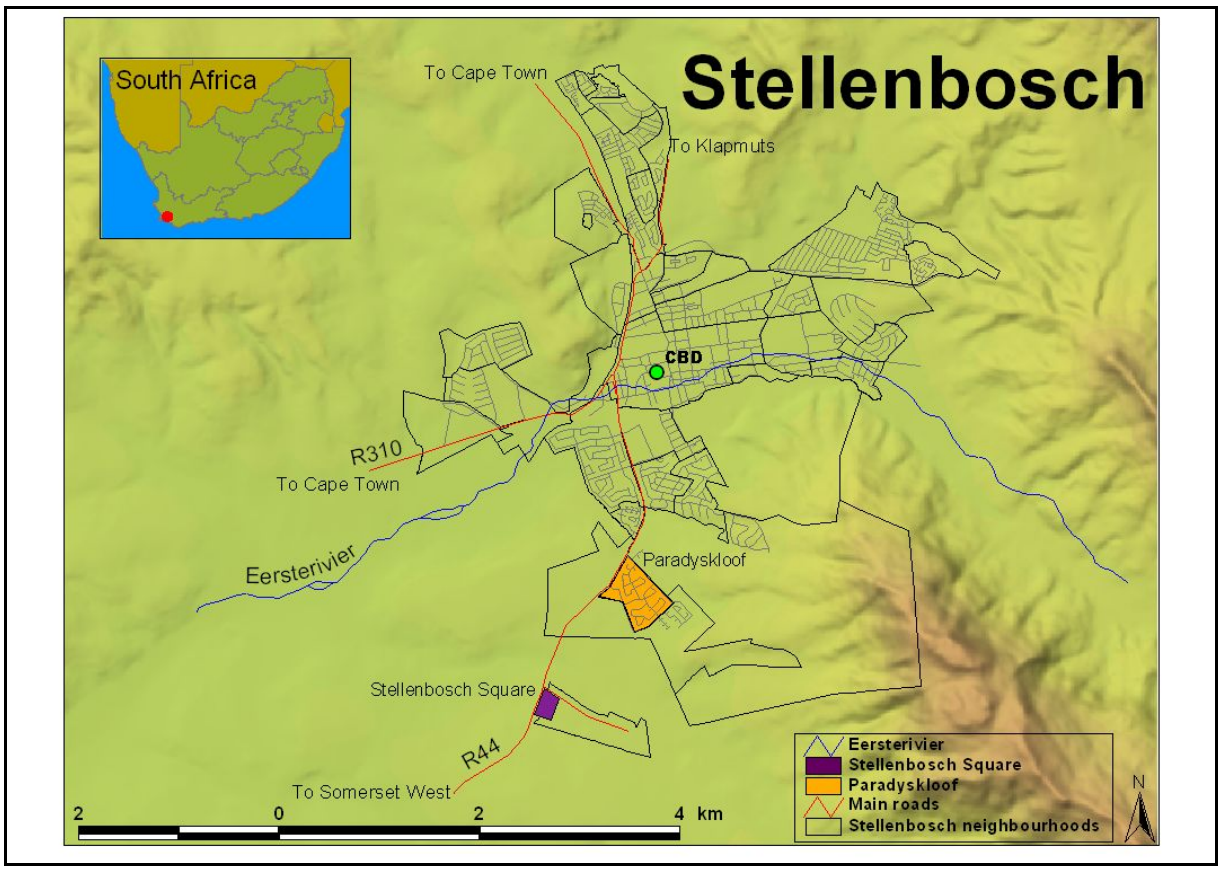

Figure1.2: Area of study

In summary, section 1 described the dynamics that surround retailing in general. Certain aims and objectives were stipulated. Retail geography and GIS will be placed in the foreground in the next section. Spatial analysis, retail site selection and spatial interaction models (gravity models) will be highlighted. Recent trends within retail geography will be noted.

2. RETAIL GEOGRAPHY AND GIS

2.1. Importance of geography in retail

The *Dictionary of Human Geography* (Johnson, Gregory & Smith, 1994 pp. 533-535) defines retail geography as follows: "The study of interrelations between the spatial patterns of retail location and organisation on the one hand, and the geography of retail consumer behaviour on the other".

The retail sector of an economy has been a key area of interest to human geographers for many decades. With a rapidly growing population worldwide, retail geography will still be an area of interest for geographers in the future. According to Dawson (1980), the retail sector did not only provide the stimulus for considerable empirical, technical and conceptual advances in geography, but it also provided a major area of analysis where geographers have applied their specialist knowledge to solve real-world problems.

Geographic Information Systems (GIS) is rapidly becoming a popular tool in the retail industry (Benoit & Clarke, 1997). Tesco, one of leading retailers in the United Kingdom, is also using GIS as an information system. The last decade has witnessed the widespread adoption of GIS by retail companies for decision-making purposes (Hernandez & Verrips, 2000). GIS has come to be seen as one means of demonstrating the relevance and applicability of geographical ideas and of enhancing the status of geography itself (Clarke & Longley, 1995). GIS is a tool for making maps, analysing data, and reporting your results. GIS can assist in solving real-world geographic and business problems such as determining site suitability, demarcating possible market areas and predicting customer flows, etc.

A GIS uses computers, software and data to evaluate and analyse a fundamental principle of retail geography - that location is important to business (Koloszyc, 1999). A GIS, like all other information systems, is only as good as the accuracy and correctness of its attribute data. Thus retail geography and the role of GIS have formed the central theme of the literature study.

Books such as *Retail location and retail planning* (Guy, 1980) and *Retail Geography* (Dawson, 1980) were some of the first publications in the study of spatial variations in demand and supply of retail activity. The growth and expansion of retail organisations have always brought questions of geography to the fore (Birkin, et al. 2002). Some of the questions

concerned retail location, social interaction between consumers and suppliers and spatial distribution. Before the dot.com collapse in 2000, many observers suggested that the arrival of the internet would relegate the importance of geography in retailing to a minor role, but just the opposite has happened (Birkin, et al. 2002). The location of a retailing outlet and its relationships with its local, regional, national and international environments are important issues for geographers, whose work can rarely, if ever, be scale free (O'Brien & Harris, 1991). As geographers we must emphasise factors with a spatial dimension that exist within the retail environment – factors such as demographics, place, networks and urban catchments. Real environments are the proper test bed of theory and the addition of space to economic, social and political theories help to clarify what they mean (O'Brien & Harris, 1991).

Geographers benefit from seeing spatial problems from the viewpoint of the various actors in the retail system, particularly the retail chains and shopping centre developers (Jones & Simmons, 1990). From these texts it becomes clear that geography has an important role to play within the retail environment. Thinking spatially will ensure that important issues will not be left out of consideration.

With the importance of geography within retailing research confirmed, a short overview of important practitioners of retail geography will be presented.

2.2. Trip down memory lane

Over the years much has been written about retail geography and thus the notion of retail location was firmly established in the literature. Through the 1980s and early 1990s explicit retail geographical texts were abundant (Davies, 1984; Davies & Rodgers, 1984; Jones & Simmons, 1990; Ghosh & MacLafferty, 1987). Since then, there has been very few texts published except for Guy (1994), Wrigley and Lowe (1996) and Birkin, et al. (1998). At present Birkin, et al. (2002) is the most informative text on retail geography.

GIS has a short but impressive history in the field of geography and many of the models, techniques and data-enhancement methods that have been pioneered in geography are now making the transition from potential applications to applied analysis (Masser and Blakemore, 1991). In the following three subsections the work that has been done with regard to spatial analysis, retail site selection and spatial interaction modelling will be emphasised.

2.2.1. Spatial analysis

Spatial analysis is one of those terms used so widely in so many different contexts that it is difficult to define successfully (Clarke & Longley, 1995). Goodchild (1988) offers a good general definition of spatial analysis as "that set of analytical methods which require access both to the attributes of the objects under study and their locational information". Openshaw (1991) suggests that what geographers refer to as 'spatial analyses', statisticians call 'spatial statistics'. Anselin (1989) and Goodchild (1988) prefer to use the term 'spatial data analysis', although there seems to be no substantial difference. Kubo (1991) suggests that the Japanese geographers were pioneering the use of spatial analysis in the 1930s. The late 1960s and early 1970s were a time of great interest and widespread use of spatial analytical methods by geographers and, to a lesser extent, other environmental and social scientists. During the 1980s spatial analysis was largely forgotten by geographers. From the low point of the mid-1980s, interest in spatial analysis increased remarkably in the 1990s, largely on the back of the great upsurge in interests in GIS (Clarke & Longley, 1995).

If the economic sector is considered, especially the retail sector, then it is found that GIS can be used as a tool in a variety of ways to enhance economic (retail) development efforts. A number of spatial analyses can be performed that will enhance economic (retail) development strategies. The following spatial analyses (methodologies) are discussed briefly:

- **Retail trade area analysis**: Secondary data such as the location of customers and businesses, as well as primary data from business and consumer surveys can be used in a GIS to identify retail trade areas. Trade areas demarcate the extent of the local market for a particular good or service. Potential demand for a good or service can be calculated within a trade area, taking into consideration the spatial distribution of income and other household demographic data. In the work of Jones and Simmons (1990) there is a comprehensive discussion on the nature of trade area analysis on a metropolitan scale. It appears that trade area analysis and site evaluation are complementary procedures. Trade area analysis focuses more on the demand side and thus a detailed knowledge of the customers is essential to demarcate trade areas. Various approaches to trade area analysis may be taken, but the most common one used is to analyse market penetration. Regression analysis and the Huff Model can be used as related procedures. The study of Chen, Tang, Shen and Hu (2004) conducted a market analysis in a multiple-store environment. This is a useful method for discovering purchasing patterns of customers.
- **Site suitability and selection**: Potential locations for an industrial facility or commercial business can be identified based on location criteria, such as proximity to

transportation routes, public services, suppliers and customers. In addition, a GIS can be used to predict how the location of a new business at a particular location might impact on the demand for goods and services provided by existing businesses. This issue will be discussed in much more detail later.

- **Land-use planning**: A GIS can be used to analyse the location of current and future residential areas relative to current and planned infrastructure (e.g. schools, roads and sewers) to evaluate current and potential demand for public services (Clarke & Longley, 1995). O'Brien and Harris (1991) highlighted three main areas that have to be considered when dealing with land-use planning: economic, environmental and social considerations. The issues and pressures of retail decentralisation have been studied in a Western context by O'Brien and Harris (1991), who also refer to the work of Davies (1976).
- **Land value assessment**: The location, use and assessed value of land parcels can be stored and analysed using a GIS. A GIS can be used to estimate the value of a land parcel in its current or alternative use based on its location, parcel characteristics and zoning. Two eighteenth-century theorists, David Ricardo and Johann Heinrich von Thunen, are credited for having created a vast and sometimes contradictory literature on land valuation (Thrall, 2002). Thrall introduced his general theory in regard to value of urban land for housing. This general theory can accommodate what-if scenarios as there are changes in the values of the various determinants of land value and land use. Thrall's (2002) general theory had a substantial edge over data analysis until recently, when the rise of technology, particular GIS, shifted the emphasis to data analysis. But Thrall's general theory still has a significant role to play. General theory can be used to identify the problem. This theory binds elements of land-value and land-use assessment together. David Ricardo, Heinrich von Thunen and Grant Thrall presented general land-use and land-value theories. Depending on the circumstances, each can be drawn on in order to explain and to anticipate how market forces will change because of some external influence.
- **Making maps for marketing**: The job of cartographers, producing high-quality maps can now be undertaken by anyone willing to learn GIS. Maps can be printed directly or imported into a document or computer presentation file. Marketing is primarily concerned with meeting consumer needs, both in terms of products and services, and in the ways they are delivered by companies. There are numerous definitions of marketing. Some of these definitions are cited in Dawson (1979), Enis and Cox (1988), and Levitt (1960). Maps can play a very important role in the marketing

process. They can be used in understanding the characteristics of customers and also their spatial distribution. Beaumont (1989) states that most marketing decisions are made in the face of uncertainty – uncertainty about future patterns of market growth, about consumer preferences, about the action of competitors and the nature of product innovations. The researcher will argue that in the 21st century data are much more accessible than in the past. The technological advance of facilities such as the World Wide Web was the main contributor towards the increase of information flow between sources. Maps often reveal trends, patterns and opportunities that may not have been detected in tabular form. Maps can play a vital role in the success of a retail organisation.

2.2.2. Retail site selection

In the retail world the difference between success and failure often comes down to one key element: picking the right location. But finding that perfect spot is not always easy. The availability of land within cities is just one of the many complications that face developers. Intelligent decision making is the sum of knowing who one's customers are and where they live, work and travel (Harder, 1997). Site selection isn't only a key issue in the retail environment, but also in service delivery, real estate, industrial, banking, etc. From the early days many writers were interested in site selection and its dynamics. Writers like Goldstucker (1978) and Robinson (1976) were some of the groundbreakers. More recent work has been done by Warden (1993), Clarke (1998), Gao (1998), De Witt (2000), Stone (2000) and Wambugu (2001).

In retail, every store has a unique story. It may be urban or rural, near the rich or the poor, in a mall or a shopping centre. There is no single feature that guarantees the success or failure of any single shopping centre. However, there are profiles of success and failures that emerge when the literature is studied closely. A GIS can help gather information about the retail marketplace and create a model of a proposed store before it is built. Spatial statistics can be used to predict customer behaviour and display sales forecasts on colour contour maps.

Collins (1989) studied the role of location strategy within the context of a multiple retailer's overall marketing strategy. He also looks at some of the techniques now being applied by retailers to provide the information needed to make better location decisions. Various techniques exist for site selection and, according to Clarke (1998), a definite change in methods used has occurred over time, from 'gut feel' and 'checklist' approaches to some of

the more sophisticated applications of multiple regression and gravity models. Neither Clarke nor Collins recognises the fact that the intuition of a person can also play a role in determining a retail location. Each person is unique and so it is very difficult to predict consumer behaviour accurately.

Recent advances in GIS provide decision-makers with efficient tools with which to organise and structure the spatial decision process (Longley & Batty, 1997). Potential locations for an industry facility or a retail store can be identified based on location criteria, such as proximity to transportation routes, public services, suppliers and customers. A GIS can be used to predict how the location of a new business at a particular location might impact on the demand for goods and services provided by existing businesses.

At the 4th AGILE Conference on Geographic Information Science, Morojele, Krygsman and de Jong (2001) illustrated a methodology for identifying (and comparing) suitable locations for major retail facilities in currently poorly serviced areas was discussed. The analysis is based on the number of people not within an acceptable reach of major retail locations from place of residence and place of work, using distance as measure of acceptable reach. Distance is measured along a detailed transport network; a gravity model is used to link residential and work locations. The above methodology is incorporated into a simplified spatial decision-support system and applied in the Cape Town Metropolitan area. Potential new sites are defined by means of a hexagonal tessellation of all suitable space in the Metropolitan area. Although the paper concentrates on retail sites, it is possible to apply the methodology and the decision-support system to other public and private facilities.

If one considers the implications for companies without a location policy, the future does not look promising. According to Davies and Rodgers (1984), when a company’s future is at stake, retail location research is so important and the price so small relative to the total investment that such research must be done. If a company has a sound location policy and a well-designed procedure for its implementation and its competitor has no location policy, then the latter will be operating at a competitive disadvantage.

2.2.3. Spatial interaction models

Also known as gravity models, spatial interaction models play a very important role in retail management today. Reilly's Law of Gravitation was a pioneering application of Newtonian physics to the modelling of the shopper movements based on the countervailing influences of (a) the attractiveness of the shopping centre or store, and (b) the distance between the shopper's home and the location of the centre (Davies and Rodgers, 1984). The gravity model has also been widely used, to identify the optimum locations of new stores or shopping centres and to simulate the impact of new developments on an existing retail system. This area of work owes much to Huff's adaptation of Reilly's principles in the early 1960s. In essence the gravity model expects shoppers to gravitate to a store with increasing frequency the nearer it is to their homes and the more attractive the store is, relative to competitors (in both cases).

Many empirical studies support the usefulness of the gravity model in predicting with reasonable accuracy the market share of shopping centres. These studies include Huff (1963), Huff and Blue (1966), Forbes (1968), Haines, Simon and Alexis (1972) and Van Zyl (2003).

Most of the models under this heading are based on the gravity concept of human interaction, which is not so much a body of theory as a set of mathematical developments of the basic notion that an attracting force of interaction between two areas of human activity is created by the population masses of the two areas, and a friction against interaction is caused by the intervening space over which the interaction must take place (Carrothers, 1956). Retail analysts would like to be able to incorporate the various characteristics of each particular shopping centre into their models of market penetration. If they can evaluate the customer's response to factors such as an in-store bakery, a snack bar or a better parking lot, they can make better decisions about investments in store improvements (Jones & Simmons, 1990). One means of exploring these relationships is to use a spatial interaction model.

The well-known 'gravity model of retail' links three factors: expenditure, supply and accessibility. The gravity model is one of the oldest retail models, popularized by Huff (1963). The gravity model derives its name from Newton's law of gravitation, which states that the force between two bodies is proportional to the product of the mass of the two bodies and inversely proportional to the distance between them. This model can be traced back to the work of Reilly (1931). These models use detailed demographics and market research data to evaluate market size, competitor characteristics, and store performance on the supply side.

Information on demand-supply relationships, such as point-to-point drive times and customer activity patterns, can be used to derive the accessibility component (Birkin, et al. 2002). Through the work of Okabe and Okunuki (2001) one can study the use of the "Huff model" in a real-world application.

Four types of gravity models exist for analysing spatial interactions. According to Fotheringham and O'Kelly (1989) the first is an *unconstrained model* where the number of trips between origins and destinations are determined by their production and attraction value respectively. The *origin constrained model* places a constraint on the number of people originating from each origin. The sum of the estimated number of trips from every origin must be equal to a preset number per origin. The *destination constrained model* is just the opposite. The sum of the estimated number of trips to every destination must be equal to a preset number per destination. Lastly the *origin-destination constrained model* states that the sum of the estimated number of trips to every destination must be equal to a preset number per destination. It also states that the sum of the estimated number of trips from every origin must be equal to a preset number per origin.

It was decided to use an origin constrained model because each origin has a preset number of people. The 2001 census for Stellenbosch was used to populate each origin. Each shopping centre in Stellenbosch can handle an unlimited number of people, thus no constraint was placed on the destinations. The attractiveness of each destination (shopping centre) was determined by the floor space (trading area) of each.

According to Fisher and Getis (1999), spatial interaction models have been fundamental to the regional sciences. The development of spatial interaction models over time can be followed from an earlier text by Wilson (1974) and studies by Fotheringham and O'Kelly (1989) right through to more recent work done by Sen and Smith (1995), and Fisher and Getis (1999).

Through the combination of academic theory and practical business research, the gravity model has emerged as a powerful evaluative tool for retail managements facing strategic decisions concerning store development. Thus the importance of using GIS in the retail sector cannot be stressed enough. The following subsection will examine the advantages of a GIS for a retail company. Through the evolution of technology over the last couple of years and an emphasis on the economic wellbeing of society, a "new" retail geography has emerged and will be commented on.

2.3. Retail and Geographic Information Systems (GIS)

As early as the 1970s some academics utilised the concepts of what would become GIS and applied those concepts to the human-built environment. For example, Thrall (1979) evaluated the quality of local property tax assessment and was the first to map the assessed value-to-market value ratio.

The retrieval of spatial information is one thing, but using it to predict or forecast is quite another. GIS is built to turn raw data into marketing information by allowing analyses at a variety of spatial scales. Most successful retailers make it their business to know who their customers are and where they come from. Long before the arrival of computers, retailers depended on old-fashioned research like phone, mail- and in-store surveys to gather information about their clientele. They still do so, but what has changed with the advent of computers is the way that information is interpreted, presented and used to make better decisions.

Retailers use GIS to map and analyse research data for management, field staff, etc. Top management relies on GIS to identify underserved regions and to compare various markets from a national perspective. Corporate departments responsible for conventions, merchandising, advertising and human resources use maps and GIS analysis to solve a variety of problems, from deciding on whether or not to except a new branch or to target certain stores for relocation. According to market strategists Talbot Consultants (no date), the reason why GIS is one of the hottest information tools on the business landscape is that the ‘geographic’ aspects of GIS provides an effective and efficient way to manage, analyse and view data that other information systems do not offer. If a retailer implements a GIS properly, it will increase his analytical ability and reduce analysis time and cost.

As the move away from the old-fashioned ‘gut feel’ approaches of the past to more recent spatial modelling techniques progressed, it became clear that the predicted flows of customers became ever more accurate. But an environment in which individual consumer tastes and behaviours vary widely can make modelling very difficult.

One method for modelling the retail environment is by using the gravity models available in some geographic information systems (GIS) such as Flowmap 7.2. Once these gravity models have been established, they can typically be used in a Spatial Decision Support System (SDSS) that provides easy access to the model data and the functionality of the model. They

are easy to use and no in-depth knowledge of the programming and mathematical environments to run a gravity model within a GIS interface is required. The new generation of computer maps has taken capabilities from the representation of spatial patterns to new levels. GIS and spatial modelling represent complementary technologies and thus have a bright future in the retail environment, if used accurately and sensibly. Because of the rapid changes in information technology and the retail environment over the last couple of years, some authors such as Birkin, et al. (2002), Wrigley and Lowe (1996) and Crewe (2000) state that a 'new' retail geography has emerged.

It is important to mention the new trend that is taking shape within retail literature. According to Birkin, et al. (2002), a so-called *new retail geography* has become popular in the last five years or so. Within this geography there seems little space for traditional concerns with retail location, especially when it is addressed through GIS and spatial modelling. This kind of geography tries to emphasise the fact that both economic and cultural geographies have to be taken seriously when studying retailling.

The 'new' retail geography is a term first applied by Wrigley and Lowe (2002). In a review of recent trends in retail geography, Crewe (2000) describes this as 'reconstructed' retail geography, giving an account of the transformation from the old 'boring' geography, which 'misrepresented both the wider structure of the commodity channel and the status of consumption in shaping retail change'. The new retail geography is theoretically very well informed and is thus an important development.

Wrigley and Lowe (1996) state that a 'new' retail geography which emerged during the 1990s is characterised – above all else – by theoretical engagement and by a shared perspective among its adherents that 'retail capital' and its transformation is a vital and relevant topic for research and demands urgent attention. The early 1990s was a period when retail geography began to take its economic geographies seriously and began to explore such issues as the geography of retail restructuring. According to Ducatel and Blomley (1990), for retail geography to be worthy of its name, it must take both economic and cultural geographies seriously. A reconstructed retail geography insists that the economic and the cultural are intertwined and mutually constituted. The form of the interconnections between economic and cultural geographies remains one of the central problems.

The versions of the new retail geography of Birkin, et al. (2002) and of Wrigley and Lowe (1996) are in harmony. Both identify that a shift of emphasis has occurred within retail geography since the study by Dawson (1980). Birkin, et al. (2002) recognises that GIS and spatial modelling are starting to play a huge role in retail organisations. However, spatial modelling and GIS have to be brought closer to each other in order to have a much greater influence in the retail market. Models are commonly used to address strategic issues such as the impact of new store openings, store closure, relocations, etc.

In conclusion, one can say that a 'new' retail geography definitely exists. However, one has to ask whether retail geography has undergone such a radical shift as to be called a 'new' retail geography? A study of the literature makes it clear that there has been a certain amount of change (transformation) over the years, but if one digs deep enough one will still find that some core basics of retail geography – for example, central place theory and retail location – are still embedded in the discipline.

Birkin, et al. (2002) explain the technical side of the new retail geography, whereas Wrigley and Lowe (1996) place the emphasis on the theoretical side in that economic and cultural geographies start to play a role in retail geography. The large number of case studies used in Birkin, et al. (2002) is an indication that the transformation of retail geography is in full swing and that the actual change took place back in the 1990s with the work of Wrigley and Lowe (1996). One can identify the new shape of retail geography in the 1990s, but six years later in the work of Birkin, et al. (2002) it is possible to describe and explain the shape of this change. The fact that geography and GIS plays an important role in the retail environment has been emphasised in this chapter. With this background of retail theory, the data collection and analysis stages can now be addressed with greater knowledge and efficiency.

3. DATA COLLECTION AND ANALYSIS

This section will start off with a description of the research procedures that were used throughout this study. Both data types, secondary and primary data, that were used in the study are described.

3.1. Research methodology

The research methodology (Figure 3.1) is a detailed description of the various phases of the research. There were three main stages that can be distinguished.

In the data-collection phase a plurality of primary and secondary sources was collected. Primary data were gathered through a questionnaire survey. The data-manipulation phase was characterised by the creation of a database of survey results. The survey data were edited and condensed in a format that was structured for analysis.

In the data-analysis phase the gravity model was set up. The data were interpreted by combining the survey and modelled results. By thoroughly analysing and interpreting the results, it was possible to derive certain conclusions and make recommendations regarding future research.

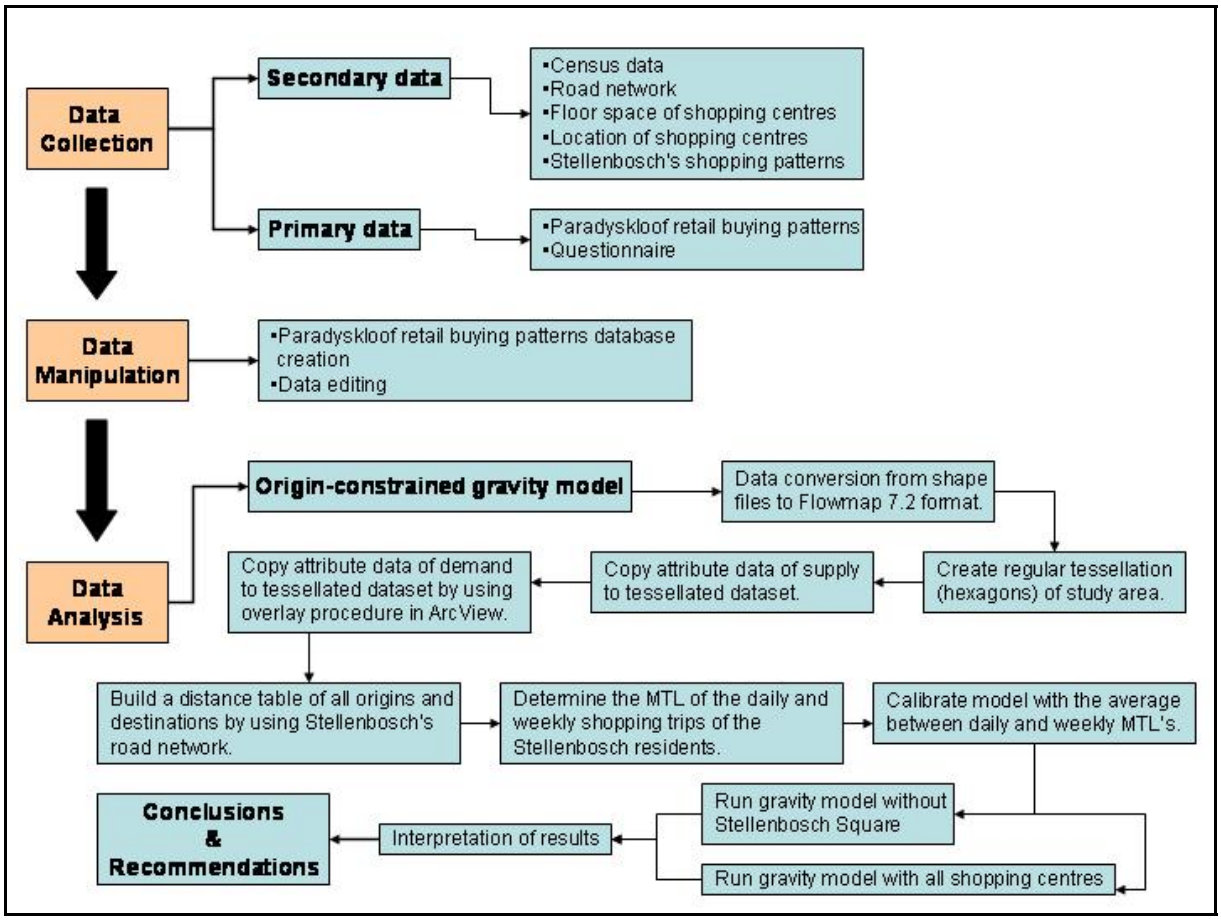

Figure 3.1: Research methodology

3.1.1. Secondary data

Secondary data are sources of information that already exist and are then used by a researcher. The secondary data included population census data, information on the shopping centres of Stellenbosch and a previous study done on the shopping patterns of Stellenbosch residents.

3.1.1.1. Census data

The 2001 population census data were used to determine the population numbers of each neighbourhood in Stellenbosch. Stellenbosch was divided into 32 neighbourhoods. The extent of each neighbourhood and population distribution is clearly visible in Figure 3.2. Table 3.1 provides the names and population numbers of each neighbourhood.

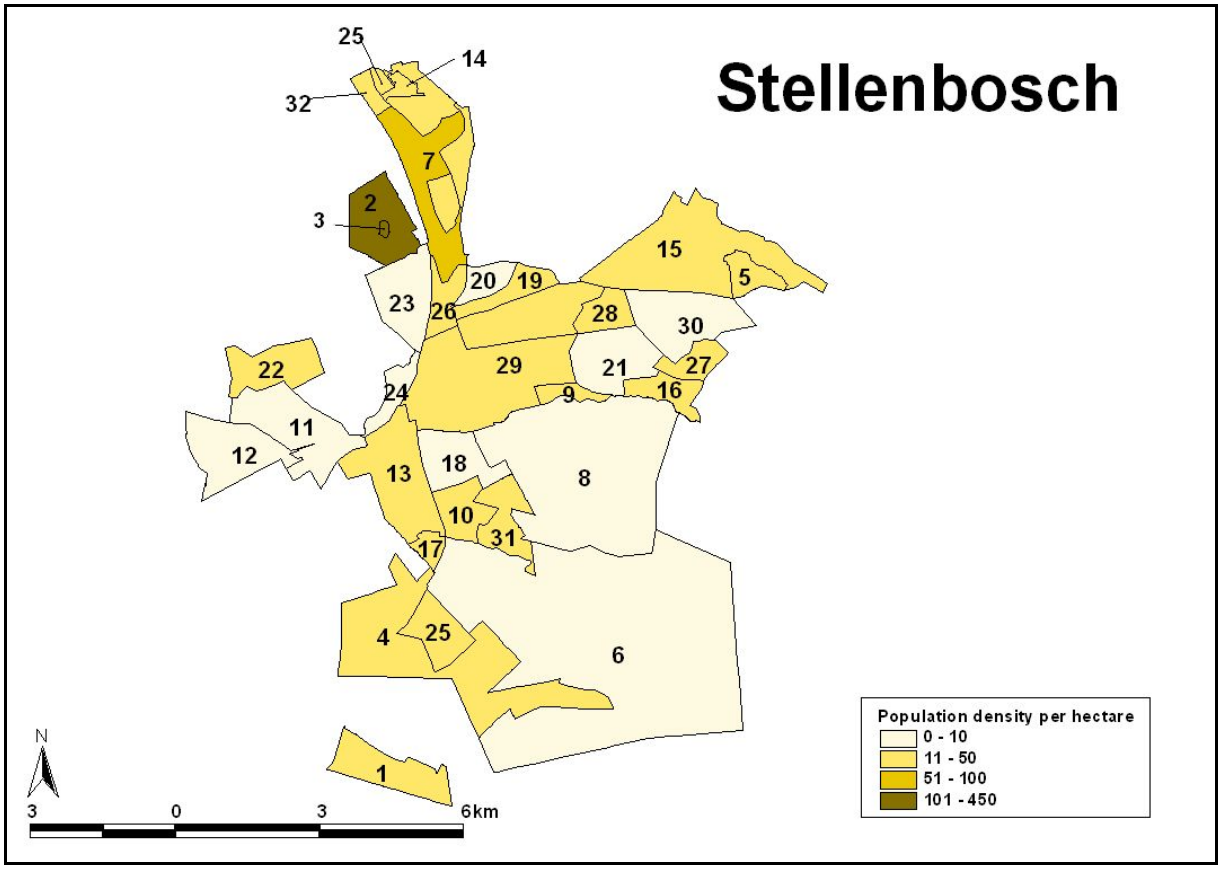

Figure 3.2: Stellenbosch population distribution

Table 3.1: Stellenbosch's neighbourhood population totals

Number	**Neighbourhoods**	**Population**
1	Webersvallei	1249
2	Kayamandi SP (sub-place)	12203
3	Kayamandi	930
4	Stellenbosch Part 1 SP	6215
5	Arbeidslus	915
6	Brandwacht	766
7	Cloetesville	5249
8	Coetzenburg	355
9	Coetzenburg Stadium	610
10	Dalsig	577
11	Devon Park	638
12	Devonvallei	165
13	Die Boord	2127
14	Green Oaks	348
15	Idas Valley	8464
16	Karindal	460
17	Kleingeluk	416
18	Krigeville	533
19	Kromrivier	1030
20	La Colline	95
21	Mostertsdrift	514
22	Onder Papegaaiberg	917
23	Papegaaiberg	0
24	Papegaaiberg Industrial Park	33
25	Paradyskloof	1507
26	Plankenburg	366
27	Rozendal	576
28	Simonswyk	450
29	Stellenbosch Central	6340
30	Uniepark	531
31	Welgelegen	769
32	Weltevrede	609
Total population of Stellenbosch:		**55 957**

The northern sections of Stellenbosch have higher population densities than the southern. Stellenbosch Central (29), Idas Valley (15), Cloetesville (7) and Kayamandi (2) are the neighbourhoods with the most inhabitants. By using the selected neighbourhoods of Stellenbosch a total population of 55 957 was arrived at.

3.1.1.2. Stellenbosch shopping patterns

In 1999 Louw did a study to determine the impact of regional and neighbourhood shopping centres on the CBD of Stellenbosch (Louw 1999). Stellenbosch was divided into ten regions. Ten questionnaires were randomly distributed in each region. According to Louw (1999), the target population was middle- to high-income residents of Stellenbosch because the different shopping centre's buying power lies with them. A distinction was made by Louw of daily and weekly shopping trips of Stellenbosch residents. This data was used to calculate the mean trip length of the daily and weekly shopping trips. By ascertaining the mean trip length of the Stellenbosch residents, calibration of the gravity model is possible.

3.1.1.3. Stellenbosch shopping centres

Six shopping centres within Stellenbosch and one in close proximity to the edge of town has been identified (see Figure 3.3).

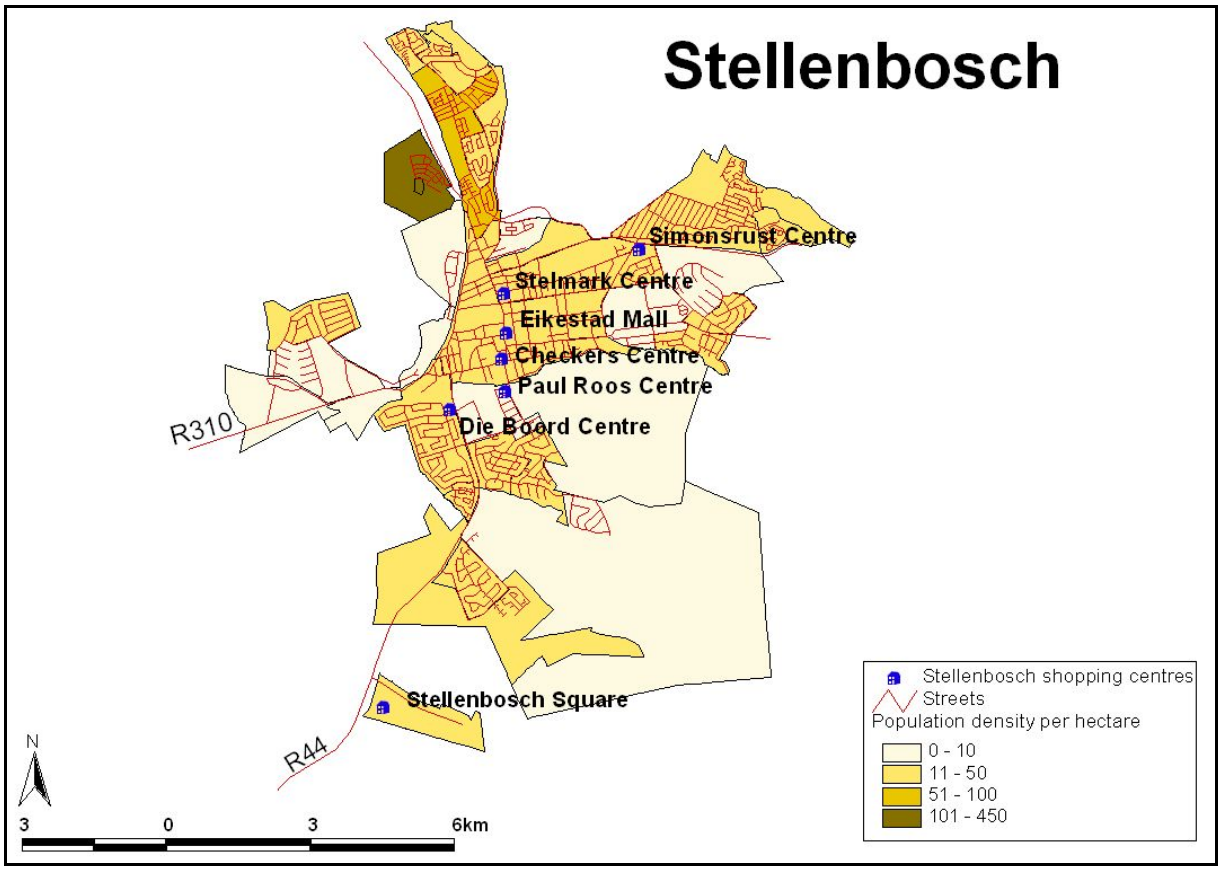

Figure 3.3: Stellenbosch shopping centres

With a much higher population density in the northern section of Stellenbosch, it can be observed that there are also more shopping centres situated in the north. This could indicate a greater demand for retail facilities in the north than in the southern parts of Stellenbosch.

Each shopping centre will differ in the degree of attractiveness. In this study the size of each shopping centre was taken as the factor determining the attractiveness of the shopping centre. Table 3.2 lists the various shopping centres (from the most attractive shopping centre to the least attractive) with their size in square meters.

Table 3.2: Size of Stellenbosch shopping centres

Shopping centre	**Area (m^2)**
Stellenbosch Square	12 940
Eikestad Mall	7 365
Checkers shopping centre	5 006
Stelmark shopping centre	4 740
Simonsrust shopping centre	4 716
Die Boord shopping centre	4 240
Paul Roos centre	1 122

It must be noted that the selected shopping centres do not only vary in size, but also vary in the variety of shops, goods/or services provided by each centre. The common denominator, however, is the fact that all of them have daily household goods for purchase. The questionnaire survey was directed towards establishing the purchasing patterns with regards to household goods in particular.

3.1.2. Primary data

Primary data are data that are collected by a researcher. Quantitative research has been done by means of a questionnaire survey.

3.1.2.1. Questionnaire survey

The Paradyskloof neighbourhood in Stellenbosch was chosen as focus area for a shopping patterns questionnaire survey. The Paradyskloof neighbourhood lies between the newly developed, edge-of-town shopping centre, Stellenbosch Square, and the central business district (CBD) of Stellenbosch. By selecting this specific neighbourhood, one could clearly

determine the effect that the multi-million Stellenbosch Square shopping centre had on the retail buying patterns of Paradyskloof inhabitants.

The questionnaire consists of one A4 page of fifteen questions and took roughly three minutes to complete. The intention was to keep the questions as precise and compact as possible to try and ensure a good response rate (see Appendix 1.A and 1.B). A cover letter was also included in the questionnaire (see Appendix 2.A and 2.B).

According to the 2001 census, the target area (Paradyskloof) had a population of 1507, of whom 811 were female and 696 male. The Paradyskloof neighbourhood has a very young population, with 37% of all residents still 18 years or younger. The age distribution is illustrated in Table 3.4.

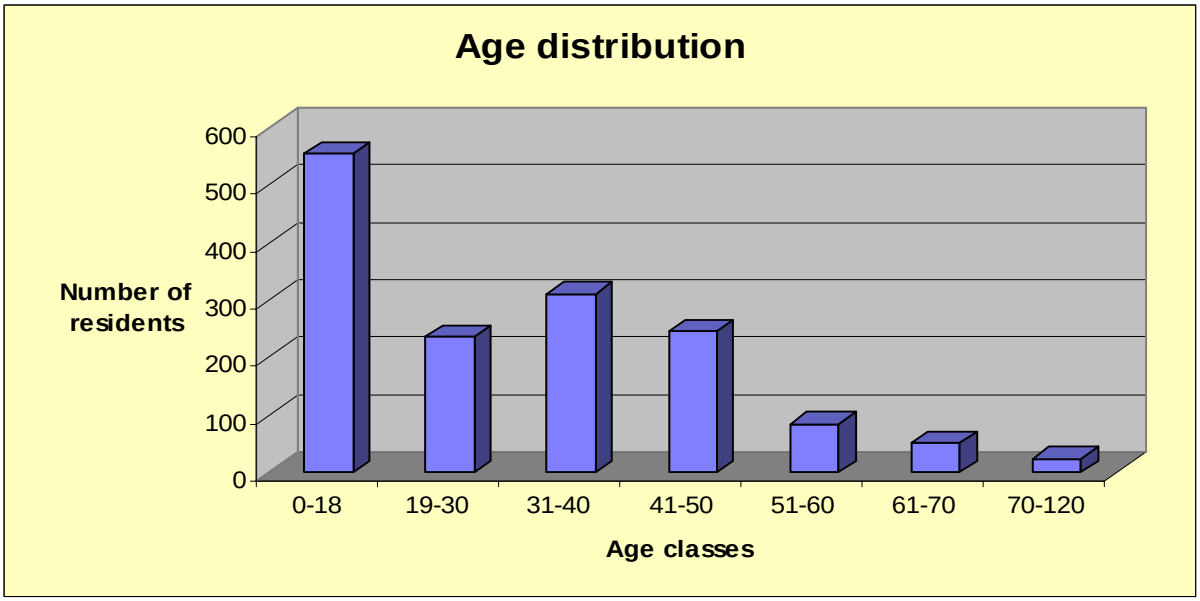

Figure 3.4: Age distribution of Paradyskloof residents.

Paradyskloof consists of roughly 600 populated erven. For the purpose of this study the assumption was made that each single erven consists of one household. Questionnaires (250) were spatially distributed with the aid of a random sampling of erven.

The questionnaires were delivered at the sampled households with a self-addressed return envelope. Respondants were given three weeks to return the completed questionnaires. After three weeks 103 questionnaires were returned (figure 3.5). This was a 43% response rate on the original sample. As is clear from Figure 3.5, the respondents represent a good spatial distribution of the Paradyskloof neighbourhood.

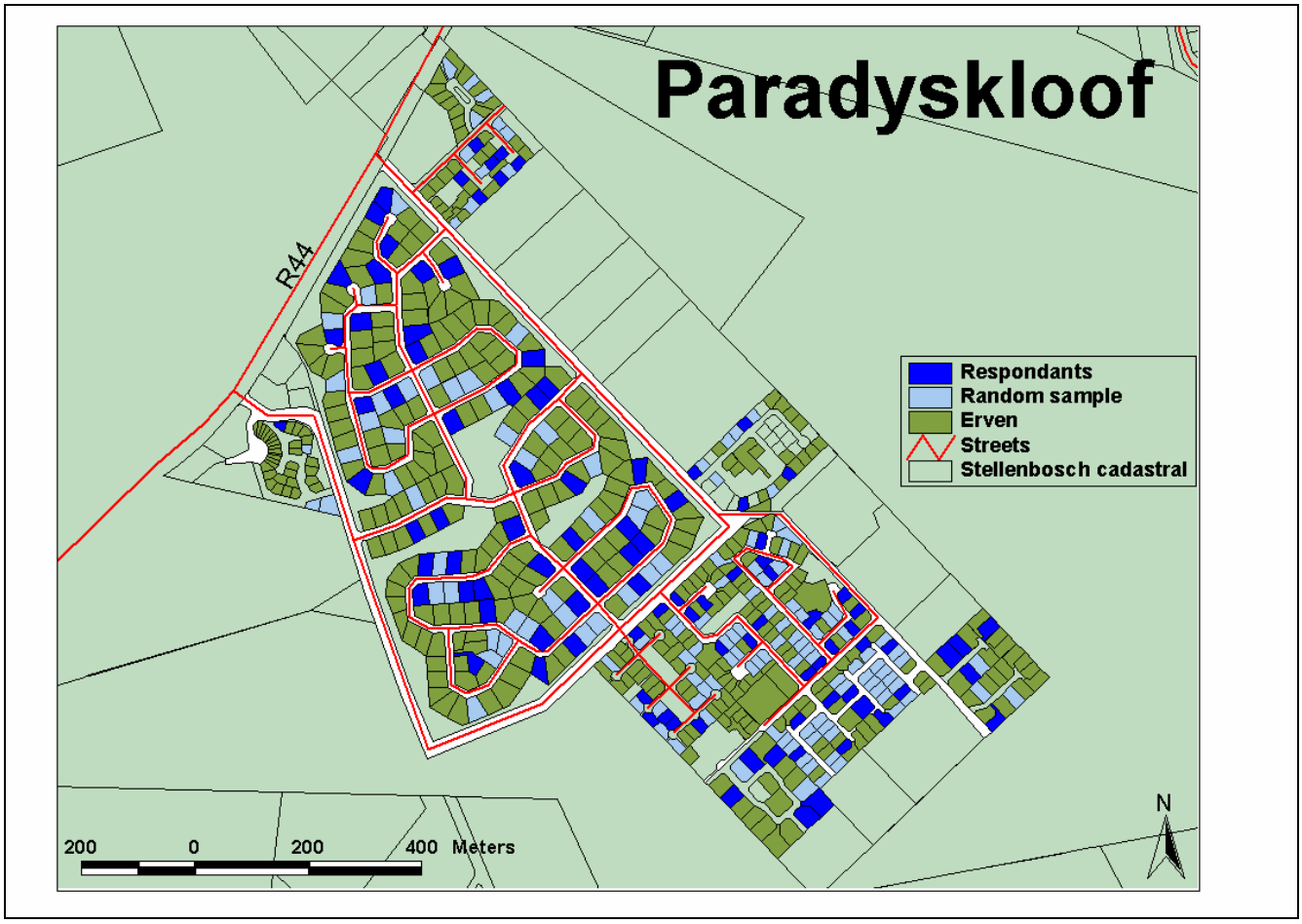

Figure 3.5: Random sampling of Paradyskloof residents

3.2. Mean trip length of Stellenbosch shoppers

Determining the mean trip length (MTL) of the shoppers of Stellenbosch is very important. It is imperative to know what distance the Stellenbosch population is prepared to travel when going to do shopping. The mean trip length will be used to determine the distance decay coefficient, beta. Beta (ß) is used in the distance decay function to calibrate the distance to destinations in a gravity model. A smaller ß-value indicates that people are prepared to travel further to shop (e.g. furniture shopping) and a larger ß-value indicates that people are prepared to travel short distances to do shopping (e.g. grocery shopping).
By calibrating the origin-constrained gravity model with the acquired data, the actual buying patterns of Stellenbosch can be modelled as closely as possible to the real world.

Data, pertaining to the MTL, gathered by a previous study containing the shopping patterns of Stellenbosch residents, was used in the present model (Louw 1999). The study by Louw (1999) consisted of a questionnaire survey that was spatially distributed to randomly selected

households in Stellenbosch. Stellenbosch was divided into ten regions, namely Brandwacht, Die Boord, Dalsig, La Colline, Middedorp, Mostertsdrift, Onder Pagegaaiberg, Paradyskloof, Rozendal and Uniepark.

At the time of that study Stellenbosch Square and Simonsrust shopping centres had not been built. The daily as well as weekly total and average shopping trip distances of the residents of the different residential areas are important. The weekly trip distance is slightly further than the daily distance. This means that the residents of Stellenbosch will travel a longer distance to do weekly shopping than daily shopping. The average of the daily and weekly shopping trip distances was 1,86km for the Stellenbosch population. This figure will serve as the mean trip length (MTL) in the modelling process.

3.3. Modelling Stellenbosch's retail environment

In order to model the Stellenbosch retail environment, certain data preparation is imperative. Data have mainly been prepared in Flowmap and ArcView; with this complete, the gravity model can be computed and calibrated by using the MTL that was calculated in the previous sub-section. The modelled results will then be placed in context.

3.3.1. Data preparation

Various digital data sets were used as inputs for the origin-constrained gravity model. The various steps in preparing the data sets are summarised below.

Spatial data are often irregularly spaced and thus unsuitable for a more or less continuous image. The complete Stellenbosch urban area was tessellated with regular polygons in the form of hexagons. The purpose of constructing tessellations is to divide up large sub-areas (32 neighbourhoods) into smaller ones (317) in the form of equally sized hexagons.

The sizes of the various neighbourhoods in Stellenbosch vary widely. By making a hexagon map, an equal distribution of size will be established. This will be convenient for running the gravity model.

In order to generate a tessellated surface within the study area a setting in Flowmap can be set to determine the extent to which the hexagons could overlap the border of the map area and still be applicable for incorporation in the modelling process. It was decided that there has to be a minimum of 2 vertices of a hexagon completely inside of the map area for inclusion. The higher the number chosen, the more tiles on the border of the map area will be left out of the

resulting map and vice versa. A hexagon 'edge length' of 200m was chosen. The length of the edges of the hexagons determines the size and therefore the number of hexagons within the study area.

If too few large hexagons are constructed, the whole purpose of using tessellations is defeated. Each of the original 32 neighbourhoods would be represented by only a few or not even one hexagon, which is pointless. Setting up too many hexagons also has its disadvantages. Such a map will slow Flowmap down and take up too much computer memory. The ideal setting resulted in 317 hexagons that cover the complete urban map area (see Figure 3.6).

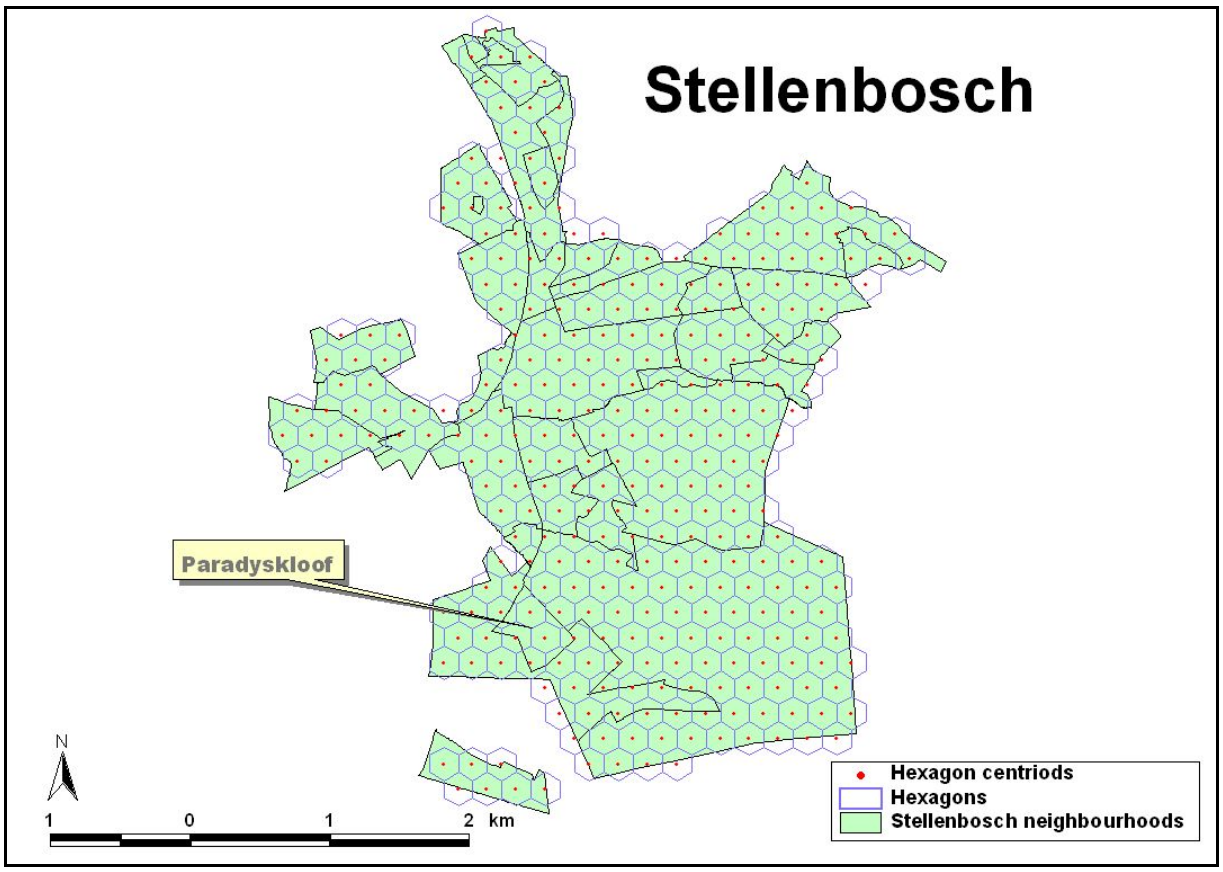

Figure 3.6: Regular tessellation of study area

The next step was to copy information about supply (destinations) as attribute values to the new hexagon dataset. Point data can simply be copied to the hexagon dataset with the nearest centroid.

When dealing with the seven different shopping centres as the destinations for the Stellenbosch population, it is not sufficient to just mark their location and their lack thereof. Thus for the gravity model in Flowmap it is also necessary to set an unlimited capacity for each destination centre. In practice this means that individual shopping centres were assigned

a capacity value that exceeds the total demand (total population) of the map area. Thus a capacity of 100 000 was assigned to the various shopping centres as this value exceeds the Stellenbosch population total of 55 957.

To specify the various parameters of the gravity model, it is not only the capacity that is important, but also the attraction value of the different shopping centres. A new field was added to the hexagon attribute table with the attraction values of the different shopping centres. Each shopping centre's floor size (trade space) was used as the attraction value. The seven different shopping centres all differ in size, as indicated in Table 3.2. The assumption is made that shoppers will rather go to a bigger shopping centre, if distance is excluded from the equation. The share of shoppers that a shopping centre attracts is inversely proportional to distance and directly related to the attraction (size) of the different shopping centres.

To copy data from one polygon layer (neighbourhoods) to another polygon layer (hexagons) is quite complicated. Data on the study area's demand are copied to the various hexagons by overlaying the census and hexagon datasets. Flowmap has no overlay capabilities, thus this procedure has to be done in ArcView.

The hexagon dataset has to be converted to a polygon shape file and exported from Flowmap to conduct an intersect overlay procedure in ArcView. First the areas of the various neighbourhoods are determined in hectares from the neighbourhood's dataset. Then the population density per hectare is calculated. An intersect process integrates the two spatial data sets (hexagons and neighbourhood dataset), while preserving only those features falling within the spatial extent common to both themes.

After completing an intersect procedure, the size of each polygon in the new layer is recalculated to hectares and then multiplied by the population density per hectare of the neighbourhood's dataset. The population is then summarised by the HEX_ID field. This means that population totals are calculated for each of the 317 hexagons. This new field is copied back to the hexagon attribute table in Flowmap.

At this stage of the model building process a distance table has to be built. A distance table contains the various possible distance combinations between the origins and destinations of the dataset. Distances based on the actual road network of Stellenbosch were decided upon. Straight-line distances do not take obstacles such as the Eersterivier, railway and the various

topographical configurations in and around Stellenbosch into account. Network distances are based on the shortest path calculation via a road network. Impedance to travel was expressed in road lengths (m).

The centroids of each hexagon represent the origins and destinations in the distance matrix. However, it would be quite a coincidence if a centroid was located exactly on the spot where a road is present. But if the centroids were not connected to the road network, this would mean that the origins and destinations are inaccessible for calculating a distance matrix. Therefore, Flowmap has the functionality to join the origins and destinations to the nearest road segments. It is also very important to take note of the distance travelled within each hexagon. This intra-zonal distance for each hexagon can be estimated as two thirds of the hexagon radius. This means that 2/3 * 200m = 133m. This value has to be expressed in the impedance units (m).

After the distance matrix is calculated by Flowmap, the following summary results were generated by the software (see Figure 3.7)

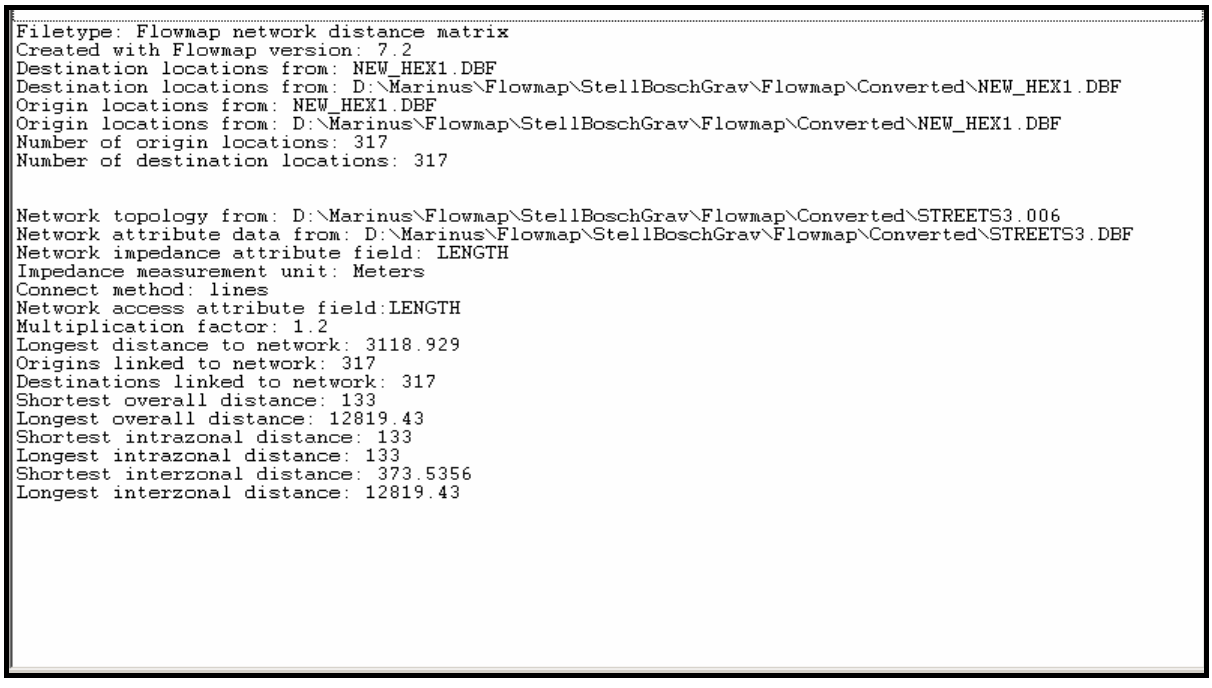

Figure 3.7: Distance matrix summary

From the summary data it can be seen that all 317 hexagons were linked to the Stellenbosch road network. The longest distance between two hexagons is 12 819.43m and the shortest distance was 373.5356m. All the parameters were specified and ready for running and calibrating the model.

3.3.2. Origin-constrained gravity model

3.3.2.1. Model calibration

The origin-constrained gravity model in Flowmap is used to predict the future interactions between the origins (population) and the destinations (shopping centres) of Stellenbosch. In the Stellenbosch context an origin-constrained model means that the number of people originating from the various origins (hexagons) is fixed. The model then predicts at which shopping centre the population of Stellenbosch will shop (via the road nework). The origin-constrained gravity model estimates the most probable distribution of movements in a matrix with the population (origins) and the shopping centres (destinations).

The gravity model was set up with an origin constrained value of the total number of people per hexagon. Figure 3.8 gives an indication of the population densities in context with the shopping centres, after the Stellenbosch residents were allocated to each of the 317 hexagons.

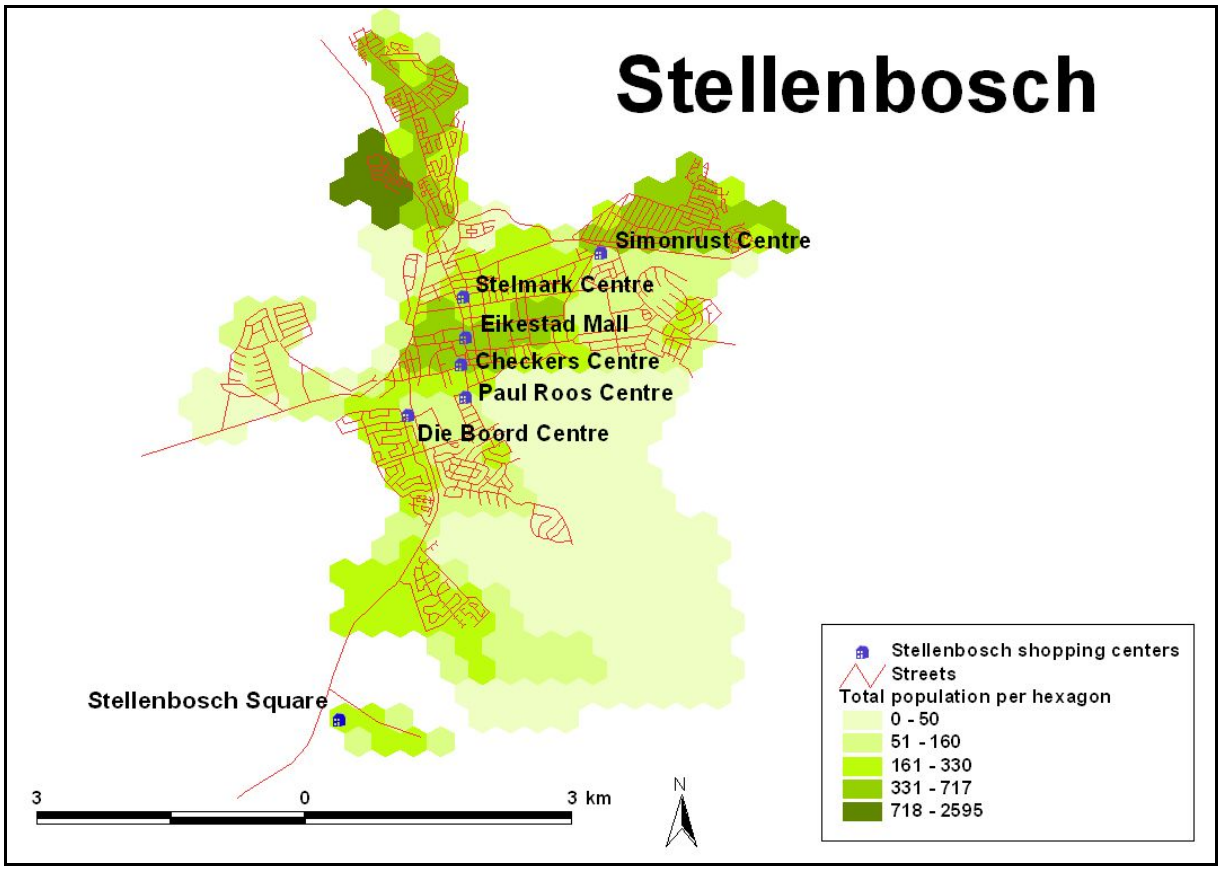

Figure 3.8: Modelled population distribution

The destination attraction value is also set and is determined by the respective floor sizes of the seven different shopping centres. Next, a distance decay function has to be set. An exponential distance decay function was used for computing interactions, because the trips are

relatively short and are within Stellenbosch itself. A power distance decay function computes the interactions between cities.

In order to simulate the actual buying patterns of Stellenbosch as close to reality as possible, it was necessary to calibrate the model with the MTL (1.86km) of the Stellenbosch population. The distance-decay parameter can be used to calibrate the effect of distance to the shopping centres on estimated interactions. With an MTL of 1860.843m a beta (ß) of 0.0005374 was calculated. The ß value is very small and is not necessarily caused by weak distance decay, but in this case was caused by using meters as a distance unit in the model.

3.3.2.2. Results

The model allocated the Stellenbosch population of 55 957 to the seven different shopping centres. The modelled results are displayed in Figure 3.9.

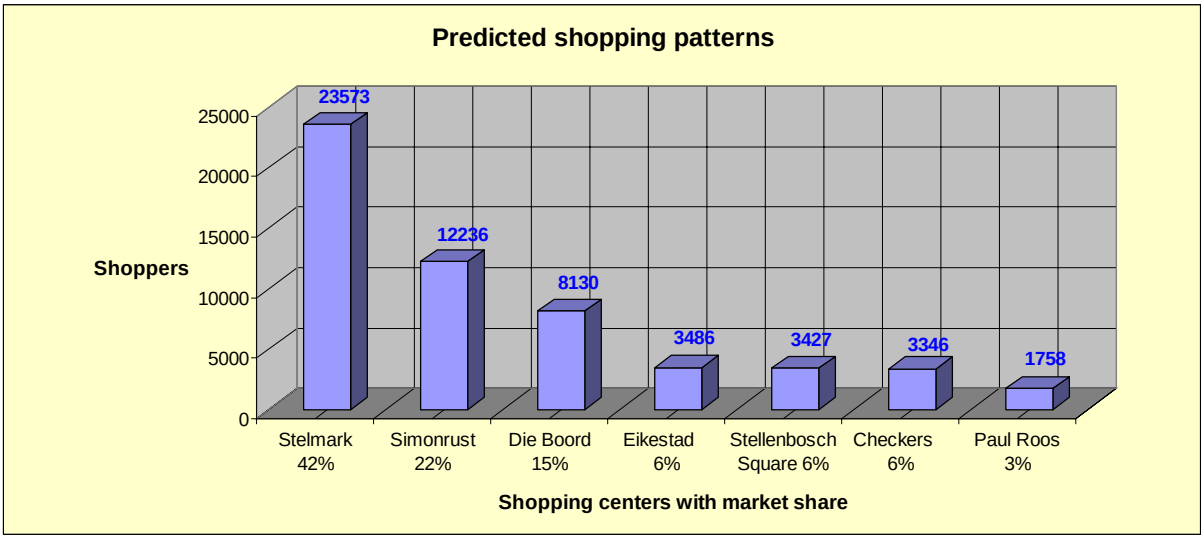

Figure 3.9: Predicted shopping patterns

According to the gravity model, the majority of people in Stellenbosch will shop at the Stelmark (42%) and Simonsrust (22%) centres. This means that 64% of the Stellenbosch population is predicted to shop at the Stelmark and Simonsrust centres. According to the model, 64% predicted market share of these two centres should make them the most popular shopping centres in Stellenbosch.

The Paul Roos centre attracts only 1753 (3%) people, the least number of potential clientele of the seven shopping centres. The Paul Roos centre is also the smallest of the various

shopping centres used in the model, with a total floor space of 1122 m². This meant that the centre's attractiveness was low in comparison to the other centres, but on the other hand it is relatively centrally situated in the study area. The market share of the different shopping centres is also summarised in Figure 3.9 from the highest to the lowest.

The gravity model's results are in the form of a flow matrix. The population of each of the 317 hexagons is distributed to the different shopping centres in the study. The pattern reflects the relative size and accessibility of each store. As may be expected, the shopping centre closest to the various hexagons accounts for the greatest share of trips originating from it.

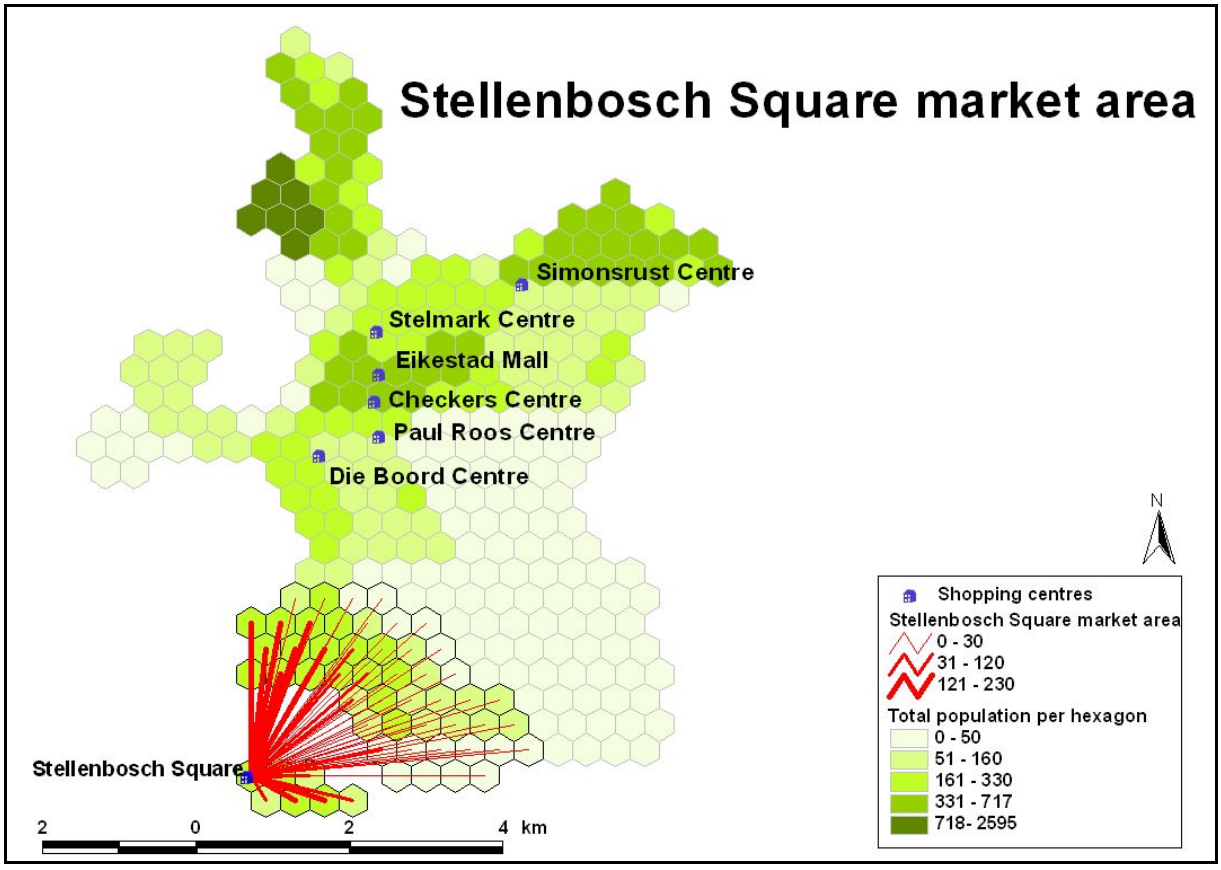

Figure 3.10: Stellenbosch Square market area

Figure 3.10 was constructed by using the information in the predicted interaction matrix to illustrate the predicted number of people originating from the different hexagons that would actually go and shop at Stellenbosch Square. The drawing power of Stellenbosch Square is especially high for hexagons 22-26; 31-35; 51-55; 78; 79-105, as seen in Figure 3.10. Stellenbosch Square attracts 84% of all its predicted customers from these hexagons.

Looking at the stores that attract the most (Stelmark centre) and least people (Paul Roos centre), according to the model, 23 573 and 1758 respectively, it is evident that the combined effect of high accessibility and relatively large size (4740m²) greatly enhances the competitive position of the Stelmark centre. But there is also another factor that contributes to the apparent successful market share of the Stelmark centre. The population density is very high around and to the north west of the centre. Stelmark and Simonsrust shopping centres are well positioned regarding the population distribution of Stellenbosch. Kayamandi, Cloetesville and Idas valley are high-density neighbourhoods relative to the rest of Stellenbosch. The Kayamandi neighbourhood is to the north west and has a population density of 220 people per hectare, the highest in town.

Private car ownership in these neighbourhoods is low, especially in the poor neighbourhood of Kayamandi. Residents of these neighbourhoods are greatly dependent on travelling by foot or by taxi. Thus travel distance plays a big role in their choice of shopping centre. The closest shopping centre will be a very attractive destination for them. When the mobility of a shopper is increased, the various possible shopping destinations also increase.

On the other hand, the disadvantage of the Paul Roos centre is also evident in its predicted market share of only 3%. The Paul Roos centre is the smallest of the seven centres in Stellenbosch, with a total floor trading area of only 1122m² and it attracts only 1758 people, as predicted by the gravity model. Sixty-six percent of this centre's buying power originates from hexagons 113-117; 138-143 and 159-164. It must be added that the Paul Roos centre is situated right in the centre of an area with three big secondary schools, namely Paul Roos Gymnasium, Bloemhof and Rhenish, and that it also relies on frequent visits from scholars. The variety of goods offered by this centre is not really comparable with that of the Stelmark centre.

When focusing just on the Paradyskloof neighbourhood the following results were produced by the model. 70% of the Paradyskloof residents, according to the model, will shop at Die Boord and only 29% will shop at Stellenbosch Square.
Running the gravity model without Stellenbosch Square, the following results became evident. When the Paradyskloof residents do not have the option of going to Stellenbosch Square, 97% of them will travel to Die Boord shopping centre. This means that 27% of the

residents of Paradyskloof are predicted and expected to shop at Stellenbosch Square once it becomes an option for them.

After having predicted (modelled) the shopping patterns of the Paradyskloof neighbourhood, with regards to the 7 shopping centres of Stellenbosch, it is now also important to analyse the actual shopping patterns determined by the questionnaire survey.
The modelled results can then be compared to the actual buying patterns as established in the questionnaire survey.

3.4. Paradyskloof: Actual shopping patterns

Paradyskloof neighbourhood is situated in the southern part of Stellenbosch. It is a relatively new residential development and has expanded rapidly over the last couple of years. The reason why the Paradyskloof neighbourhood was chosen as part of the study was because of its location. This neighbourhood is positioned right between the newly developed Stellenbosch Square shopping centre and the Stellenbosch central business district with its various shopping centres. If one assumes that the residents of Paradyskloof will travel the shortest possible distance to do their shopping, one could say that the Boord centre would have been the most popular choice for the Paradyskloof residents before Stellenbosch Square was constructed. But with the erection of the new Stellenbosch Square shopping centre the shopping patterns of Paradyskloof were bound to change.

The modelled shopping patterns for Paradyskloof residents to Stellenbosch Square centre is illustrated in Figure 3.10. Stellenbosch Square attracts shoppers from a variety of zones, but the Paradyskloof region has a very high number of trips that gravitate to Stellenbosch Square and Die Boord centres. Stellenbosch Square is the largest shopping centre in Stellenbosch and its immediate surrounding has a variety of shops and restaurants. The attractiveness of the centre is very high in comparison with the rest of the shopping centres. If one takes into account that the average floor space (attractiveness) of the seven centres is 5733m², it is evident that Stellenbosch Square shopping centre with its 12 940m² has the greatest potential attractiveness.

The actual retail buying patterns of Paradyskloof respondents were obtained with the aid of the questionnaire survey. Conclusions as to how Stellenbosch Square impacted on buying patterns of Paradyskloof respondents were now possible.

Some results can be deduced from the questionnaire survey. Figure 3.11 illustrates the various shopping centres that are frequented by Paradyskloof respondents.

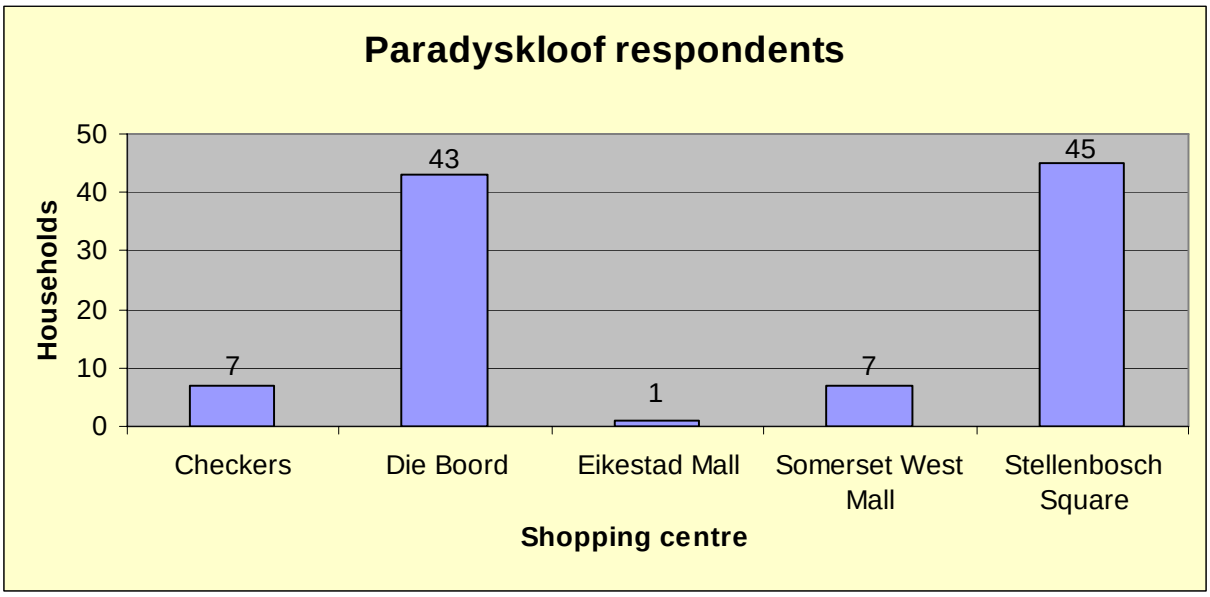

Figure 3.11: Paradyskloof respondents' choice of shopping centre

The majority of the respondents in the questionnaire survey will either do their shopping at Stellenbosch Square (44%) or at Die Boord centre (42%). Thus, 86% of the respondents in Paradyskloof either shop at Stellenbosch Square or at Die Boord centre. These two shopping centres are the closest to the Paradyskloof residential area. The combined number of households that visit the Checkers centre, Eikestad Mall and Somerset West Mall comprise only 14%. The fact that the Pick and Pay at Stelmark centre is not visited by any of the Paradyskloof residents is due to the fact that Stellenbosch Square also has a Pick and Pay store and that travel distance varies a lot between the two shopping centres. Except for Die Boord and Stellenbosch Square the other shopping centres are much further away. The results indicate that travel distance is a major factor in the choice of shopping venue.

Since the opening of Stellenbosch Square on the 23rd of September 2004, 100 of the 103 respondents have at some time visited Stellenbosch Square at least once. Thus 97% of the respondents have a good idea of the services and products that are available at Stellenbosch Square. A thorough knowledge by respondents of all the possible opportunities available in the vicinity makes for informed decisions regarding where to buy what and at what cost. As Jones and Simmons (1990: 107) rightfully state in their book entitled *The Retail Environment,* the shopping decisions begin in the consumer's head. This boils down to the accumulation of information about where stores are and what they offer. The consumer's role in ascertaining retail trends can't be discounted.

A high percentage (89%) of the respondents in the Paradyskloof neighbourhood has a shopping frequency of daily and weekly trips. Most of the respondents will visit their favourite shopping centre at least once a week. This means that the number of trips made by a household to do shopping is relatively high. A factor contributing to the high number of trips made by the Paradyskloof residents is a high level of mobility. All 103 respondents own a motorised vehicle and depend on private transportation to do their shopping. Over the last 30 years the activity patterns of consumers have changed quite dramatically (Birkin, et al. 2002). People spend more time travelling with motorised vehicles, both to work and to shop.

It is evident that the high level of ownership of private transportation indicates a prosperous lifestyle. Forty percent (40%) of the respondents spend an average of more than R3000 per month on general shopping. General shopping includes the consumer products that a household uses daily. It does not include products such as furniture, electrical appliances and clothing. Income is the crucial factor that drives the expenditure of any household. With a higher income, more will be spent on a variety of products rather than only spending on the basic needs.

The average household size in Paradyskloof is 3.7 persons. The families are predominately small, with only one or two children. As mentioned earlier, 37% of the Paradyskloof residents are 18 years or younger and still in school. Although there are a large number of scholars in the area, it is also important to state that 45% of the households consist of 1 or 2 persons. This means that, despite the large numbers of children, there are also small families that may consist of single parents, young couples and the elderly.

Three quarters of the respondents travel from their homes to do their shopping and only 15% travel from work. With the relatively young population of Paradyskloof, it is surprising that not more shopping trips originate from the children's schools. Only 5 of the respondents do their general shopping on the same trip when they take their children to and from school. Four of these respondents then do their shopping at Die Boord centre. Thus Die Boord centre, because of its location close to the schools, is very popular with households that are travelling to and from school.

Woman still do 83% of the general shopping. This means that most of the decision making regarding where to shop still lies with women in the household. According to Terblanchè

(1998), the consumer should be the pivot on which all marketing activities are focused. A retailer who wants to remain competitive and survive has to take cognisance of the behaviour of customers. The fact that a very large number of shoppers are women is crucial information for the shopping centre's marketing strategy.

Every household is a dynamic unit that differs from other households. They base their buying patterns on various factors that are important to them. In the case of the residents of Paradyskloof it is no different. Parking space was the most important factor to the participants in the study. Most (65%) of the respondents felt that the availability of parking space at their designated shopping centre is a prerequisite. Because of the central town's layout and age, it has limited parking space available and does not have the capacity to handle huge volumes of traffic. Parking in the central business district is not free and has a time limit imposed on it. Thus Die Boord centre and Stellenbosch Square with their free and ample parking will be popular choices for the residents of Paradyskloof.

The modelled results and the actual buying patterns of Paradyskloof residents are now known. An interpretation of results will follow and certain deductions will be made regarding the role of Stellenbosch Square and the interaction with the Paradyskloof neighbourhood.

3.5. Interpretation of results

Stellenbosch Square has a number of unique traits in its favour. It is the youngest of the seven shopping centres in Stellenbosch and it was completed only in the latter part of 2004. The shopping centre is in a very good condition. Its age is not the only feature that makes it different from the other shopping centres. It is also the largest shopping centre of Stellenbosch. It has a wide range of tenants, but what sets it apart from the other shopping centres is its strong emphasis on its restaurant node, which is an open-air courtyard overlooking the Stellenbosch vineyards. The centre also offers shoppers an array of up-market boutique clothing and accessory stores like Bright House, Wordsworth and John Wilson liquor merchants. Stellenbosch Square is promoted as an up-market shopping centre and this is evident from all the designer boutiques and its physical characteristics.

Stellenbosch Square is situated on the edge of the southern fringe of Stellenbosch urban area and this means that most of its Stellenbosch customers will be coming from this town. But

according to Krige (2004: 11) from the *Eikestad News*, many of the people frequenting Stellenbosch Square are commuters working in Stellenbosch and living in Somerset West and vice versa. This means that customers are also coming from Somerset West.

From the questionnaire survey it becomes clear that one of the biggest pull factors of Stellenbosch Square is the combination of Pick and Pay and Woolworths. These two franchise retailers are the anchor shops of the centre and play an important role in the success of the shopping centre. Having two anchor shops is also much more attractive for tenants of smaller shops, because of the exposure they might get from people who visit the anchor shops. Pick and Pay and Woolworths are well-known retail companies and are attractive enough to generate efficient shopping trips. In the case of Stellenbosch Square, the two anchor shops lie at the opposite corners of the shopping centre and this means when visiting both Pick and Pay and Woolworths the shopper has to walk past all the other smaller shops, thus increasing their much-needed exposure.

As was deduced from the gravity model's predictions, Die Boord was predicted to be the most popular shopping centre for the residents of Paradyskloof. 70% of the Paradyskloof residents are predicted by the model to buy at Die Boord shopping centre. In reality, however, it appeared that the shopping trips were almost equally distributed between Stellenbosch Square and Die Boord centre. The predicted and actual shopping behaviour differed markedly from each other.

Stellenbosch Square has been doing business for about two years, and before that the only other alternative shopping centre closest to the Paradyskloof neighbourhood was Die Boord centre. One might thus expect a certain level of patronage among the Paradyskloof residents in continuing to visit Die Boord centre rather than Stellenbosch Square, despite the fact that Stellenbosch Square is indeed bigger than Die Boord centre.

Patronage can consist of a plurality of factors and, according to McGoldrick and Tompson (1992: 166), it is difficult to capture the level of success of a shopping centre within a single patronage variable. The questionnaire survey indicated that the residents of Paradyskloof go mainly to either Die Boord centre or Stellenbosch Square. With the reasons given by the respondents as to why they visit Die Boord centre, it becomes clear that the banking and postal services provided by the centre are a huge pull factor. It also plays an interception role. The residents of Paradyskloof may travel past Die Boord shopping centre on their way to the

CBD, University, schools or workplaces. Die Boord centre thus has a competitive advantage over Stellenbosch Square.

From analysing the captured data, one would expect that Stellenbosch Square would have to play a different role in the day-to-day activities of the residents of Paradyskloof in comparison with the other shopping centres in Stellenbosch. According to the modelled predictions, Stellenbosch Sqaure attracts only 3427 people from Stellenbosch and has a market share of 15%. A shopping centre of that magnitude could not possibly hope to survive with a 15% market share. The fact is that Stellenbosch Square's market area extends beyond the study area of Stellenbosch. The model predicted that 29% of the Paradyskloof neighbourhood will gravitate to Stellenbosch Square and 70% to Die Boord, but in reality 44% of the respondents gravitate to Stellenbosch Square.

Stellenbosch Square received quite a lot of media attention since its opening in 2004. Various perceptions were held by the shoppers, tenants and the media on the success of Stellenbosch Square. Reactions from the public and tenants vary. *Eikestad News* (2004) reported that many of the tenants don't want to comment on the lack of shoppers in general. From the tenant's side it becomes clear that certain features set Stellenbosch Square apart from the rest. They call it the 'shopping centre with a view', because of its beautiful views of the vineyards and Table Mountain. The shopping centre is not over-crowed like some of the other shopping centres and it offers a pleasant and relaxing shopping experience. The tenants also regard the ample free and secure parking as a valuable attribute of Stellenbosch Square, as reported by *Eikestad News*. As deduced from the questionnaire, the residents would favour Stellenbosch Square as the most attractive option to do their shopping.

With 83% of the household shopping still done by women from the Paradyskloof neighbourhood, it is important to bear in mind that women must be seen as a priority group when marketing Stellenbosch Square. It is reported that many customers with young children find that Stellenbosch Square does not have any facilities or entertainment for the young ones. Potential customers therefore visit larger malls, where they can leave their children while doing shopping. It has been shown that the majority of the Paradyskloof residents are very young and still at school. Thus the possibility that there are many mothers with young children in the Paradyskloof neighbourhood is high. Furthermore, there might be many professional women who visit Stellenbosch Square.

Terblanchè (1998) argues that professional and career-driven women are on the increase and that they have to be regarded as a noteworthy changing consumer group. The female labour force in South Africa is expanding much faster than their male counterparts. This is attributed to the fact that more married women are entering the labour market than previously. The Bureau of Market Research predicts an average rate of increase in the labour force of 3.2% and 2.4% for woman and men respectively up until the year 2011 (Van der Reis 1994: 61). The implications of this finding for retailers, including Stellenbosch Square, are clear. There are certain features that have to be put in place to ensure the continued success of Stellenbosch Square. Longer trading hours, children's entertainment areas and more convenience in operations and merchandise will be necessary to accommodate the larger numbers of professional women customers.

Most of the tenants feel that more aggressive marketing is needed to put Stellenbosch Square on the map (Krige 2005:17). Marketing is a very important aspect of any successful shopping centre. O'Brien and Harris (1991:31) state that the key function of marketing is getting the right goods to the right markets in response to consumer demand.

Stellenbosch Square could or should aim to be a niche lifestyle and convenience centre. The retail sector is constantly seeking niche market segments and from time to time new consumer groups appear to become important (or more important). The "niche market" that Stellenbosch Square should also aim at, is the commuters from Somerset West to Stellenbosch and vice versa. In addition, a large office park is situated within a kilometre and another one is directly adjacent to Stellenbosch Square. The trading hours of Stellenbosch Square are set particularly to accommodate the working hours of eight to five. People travelling from work to residence can still shop at Stellenbosch Square. Across the road a luxury golfing estate with 300 to 500 housing units is being developed. This estate is a high-income, low-density residential area, and it is expected that many potential shoppers from this estate will be attracted to Stellenbosch Square because of its proximity.

Finally, multi-functional trips in the direction of town can play a role in the shopping patterns of Paradyskloof residents. In this case Die Boord shopping centre its ideally equipped and located to meet this requirement. There are also other practical considerations that come into play. With many school-going children in Paradyskloof, it is inevitable that trips to and from schools will be undertaken. Die Boord centre is located very favourably in close proximity to 5 schools, and add to that the mentioned postal and banking facilities available there, then it is

no wonder that Die Boord presents stiff competition to Stellenbosch Square in attracting potential customers, as shown by the predicted and actual results.

The dynamic nature of the retail environment was emphasised in this chapter. The competition between shopping centres and the behavioural characteristics of consumers are more complex than what might initially seem to be the case. Therefore, the concluding remarks and recommendations for future research are provided in the last section.

4. DATA SYNTHESIS

4.1. Conclusions

A town's retail environment is dynamic and complex, and Stellenbosch is no exception. A changing population, various new residential developments and an overcrowded and traffic-congested CBD are just some of the factors that retailers have to deal with. To succeed in the long term, retailers must anticipate and plan for this changing environment. The dynamic character of retailing in Stellenbosch is evident from the development of two new shopping centres, the Simonsrust centre and Stellenbosch Square over the last year or two. New ideas and marketing strategies are coming to the fore from the shopping centres. The development of these new shopping centres is an indication of an increase in demand.

A GIS was used to model and predict shopping patterns of the Stellenbosch population with regards to seven selected shopping centres in general and the shopping patterns of the residents of the Paradyskloof neighbourhood in particular. A questionnaire survey conducted in the Paradyskloof area provided the actual shopping patterns of the said neighbourhood.
The results indicate that the actual patterns differ from the modelled or predicted patterns. More respondents utilised the Stellenbosch Square centre that was predicted. Stellenbosch Square shopping centre has therefore had a marginally bigger impact on Paradyskloof respondents in reality. The model actually predicted that Die Boord should be the most favoured shopping centre for the residents of Paradyskloof.

Stellenbosch Square is not getting the number of predicted customers as the gravity model points out. From the questionnaire survey it is evident that Stellenbosch Square is more attractive to Paradyskloof neighbourhood than was anticipated buy the model. If the attractiveness (size) of Stellenbosch Square is the only factor taken into account, then, according to the Law of Gravitation, Stellenbosch Square should have been a much more attractive destination to the residents of the Paradyskloof neighbourhood.

The survey on the retail buying patterns of Paradyskloof respondents revealed that the residents of the Paradyskloof neighbourhood predominantly shop at Stellenbosch Square or Die Boord centre. An overwhelming majority of the customers were female shoppers. A large number of the Paradykloof population is still at school and therefore parents travel to and from school at least twice a day. Parents choose to make their trips as cost effective as possible and this need manifests itself in the multi-functional trips. The questionnaire survey

indicated that free and secure parking was the most important factor in choosing a shopping destination for the respondents. With an overcrowded and traffic-congested Stellenbosch CBD, it comes as no surprise that the Paradyskloof residents were looking for some convenience and safety at Stellenbosch Square.

The various reasons why the Paradyskloof residents have a divided loyalty between Die Boord and Stellenbosch Square are also deduced from the questionnaire survey. It was evident from the analysis that the predicted and actual buying patterns of the Paradyskloof residents differed from one another. More people shop at Stellenbosch Square than what was predicted by the model. Although Die Boord centre is located in the direction of Stellenbosch's busy CBD, where as Stellenbosch Square is on the edge of town, there are still valid reasons for this behaviour as indicated below:

- High level of mobility of respondents;
- Large number of children still attending schools closer to Die Boord centre;
- Multi-functional trips;
- The availability of banking and postal services at Die Boord centre;
- A certain degree of inertia exists (people take time to adapt fixed behaviour to recent changes).

With a market share of only 15%, it must be concluded that Stellenbosch Square's trading area extends further than the boundaries or population of the current study area. Stellenbosch Square is also aiming at a niche market. Its location on the edge of town overlooking the vineyards contributes to this purpose. The intention is to create a unique shopping experience. A substantial percentage of Stellenbosch Square's clientele are inter-urban working commuters and therefore extended trading hours are set. Easy access and free and secure parking enhances the attractiveness of Stellenbosch Square, whereas the model only took floorspace into account. The development of residential, recreational and business facilities in the immediate vicinity of Stellenbosch Square can only benefit the shopping centre and ensure long-term sustainability.

The long-term sustainability of the shopping centres in Stellenbosch lies in the way they anticipate and plan for the future. South Africa has a diverse population and Stellenbosch is no exception. The retail environment is constantly changing and its dynamic character is evident in the transformation of demographics, economic activity and technological improvement.

The stated null hypothesis that “The buying patterns of the residents of Paradyskloof did not change significantly after the building of Stellenbosch Square, a shopping centre situated between Stellenbosch and the Somerset West shopping centre” can therefore be rejected.
The alternative hypothesis that the centre has impacted the buying patterns of Paradyskloof residents’ significantly can only partially be accepted.

4.2. Recommendations

Further research can be done through calibrating the gravity model by including much more detailed descriptions of the study area. Stellenbosch has many one-way streets, especially in the CBD. The constraining effect of this can also be built into the model. The attractiveness of the various shopping centres can also be amplified by using more detailed information about aspects such as parking space, trading hours and variety of goods or shops.

Gravity models are particularly attractive because of their ‘what if’ analysis possibility for evaluating alternative strategies in store development. These kinds of analyses can only be done if the environment is modelled as accurately as possible. Different ‘what if’ situations can be calculated by the model: what if the floor space of one of the shopping centres increases by 4000m² or decreases by 2000m²? What if a new shopping centre enters the market? What effect will these changes have on the other shopping centres and how will the customer’s buying patterns be altered?

Modelling human behaviour patterns and comparing them with real-world behavioural patterns presents vast scope for further research.

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6. Appendices

Appendix 1.A

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot · your knowledge partner

Geografie en Omgewingstudie
Geography and Environmental Studies

1 Wat is u verwantskap tot die hoof van huishouding? ……

2 By watter **winkelsentrum** in en om Stellenbosch doen u gewoonlik die meeste van u huishoudelike aankope?

3 Noem die DRIE belangrikste redes waarom u by hierdie winkelsentrum koop. (Belangrikste eerste)

1……

2……

3……

4 Het u al Stellenbosch Square winkelsentrum besoek vir algemene inkopies?

Ja	Nee

5 Indien nie, hoekom nie?

……

6 Hoe gereeld doen u gewoonlik inkopies?

Daagliks	Weekliks	Tweeweekliks	Maandeliks

7 Watter persentasie van u maandelikse huishoudelike aankope doen u gewoonlik by die volgende supermarkte?

(Totaal tel op tot 100%)

	Stellenbosch Square	Stellenbosch	Somerset-Wes	Ander
7-Eleven				
Checkers				
Pick & Pay				
Shoprite				
Spar				
Woolworths				
Ander				
	100%			

8 Hoeveel bestee u gemiddeld maandeliks aan huishoudelike inkopies?

<R1000	R1001 – R2000	R2001 – R3000	>R3001

9 Vanwaar doen u gewoonlik u inkopies?

Woning	Werkplek	Kinders se skool	Ander

10 Watter wyse van vervoer gebruik u gewoonlik om u inkopies te doen?

Eie private vervoer	Openbare vervoer	Geleentheid	Ander

11 Hoe lank neem dit gemiddeld om by die supermark te kom waar u gewoonlik u inkopies doen? (minute)

……

12 Wie doen gewoonlik die huishoudelike aankope?

Man	Vrou	Assistent	Ander

13 Vir hoeveel persone doen u die aankope? ……

14 Is u die broodwinner?

Ja	Nee

15 Watter faktor is vir u die belangrikste as u gaan inkopies doen?

Parkering	
Ritafstand	
Handelsure	
Verskeidenheid	

Ander (Spesifiseer) ……

Appendix 1.B

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot · your knowledge partner

Geografie en Omgewingstudie
Geography and Environmental Studies

1 Your relation to the head of the household? ……

2 At which **shopping centre** in and around Stellenbosch do you do most of your household shopping?

……

3 Name the THREE most important reasons why you shop at this shopping centre. (Most important first)

1……

2……

3……

4 Have you visited Stellenbosch Square for general shopping recently?

Yes	No

5 If not, why not?

……

6 How often do you shop?

Daily	Weekly	Every two weeks	Monthly

7 What percentage of your household shopping do you do at the following shopping centres?

(Total is 100%)

	Stellenbosch Square	Stellenbosch	Somerset West	Other
7-Eleven				
Checkers				
Pick & Pay				
Shoprite				
Spar				
Woolworths				
Other				
	100%			

8 How much do you spend monthly on average on household goods?

<R1000	R1001 – R2000	R2001 – R3000	>R3001

9 From where do you do your shopping?

Residence	Workplace	Children's school	Other

10 What mode of transport do you usually use to do your shopping?

Private transport	Public transport	Opportunity	Other

11 How long does it take on average to travel to the supermarket where you usually do your shopping? (minutes)

……

12 Who usually does the household shopping?

Husband	Wife	Assistant	Other

13 For how many people do you do the shopping? ……...

14 Are you the breadwinner?

Yes	No

15 Which factor is the most important to you when doing shopping?

Parking	
Travel distance	
Trading hours	
Variety	

Other (Specify) ……..

Appendix 2.A

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot · your knowledge partner

Geografie en Omgewingstudie
Geography and Environmental Studies

Posbus 12655
Die Boord
7613
Julie 2005

Geagte Heer/ Dame

Marinus van der Merwe, 'n Meestersstudent in die Departement Geografie en Omgewingstudie aan die Universiteit van Stellenbosch, doen tans navorsing oor die kleinhandel inkopiepatrone van die Paradyskloof inwoners. Die doel van die studie is om die omvang van die huidige inkopiepatrone te beskryf en in konteks te plaas ten opsigte van die Stellenbosch Square winkelsentrum naby Jamestown.

Dit sal hoog op prys gestel word indien die huishoudingshoof die ingeslote vraelys so akkuraat moontlik sal voltooi. Wees asseblief verseker dat alle inligting as **streng vertroulik** beskou sal word. Die inligting word slegs vir akademiese doeleindes verlang en sal nie aan enige buite-instansie meegedeel word nie. Geen individu se identiteit of adres sal in die finale tesis vermeld word nie en die voltooide vraelyste sal vernietig word sodra die verkreë inligting verwerk is.

U vriendelike samewerking sal waardeer word.

Die uwe

……..

Studieleier: Mnr PJ Eloff
Telefoonnommer: (021) 808 3095
E-posadres: pje@sun.ac.za

Student: Marinus van der Merwe
Telefoonnommer: 084 240 1151
E-posadres: 13554824@sun.ac.za

Aanwysings:

- *Use the English questionnaire if preferred.*
- *Indien u so verkies, pos die voltooide vraelys aan die student se adres (sien regs bo) of department se adres (sien onder).*

Appendix 2.B

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot · your knowledge partner

Geografie en Omgewingstudie
Geography and Environmental Studies

PO Box 12655
Die Boord
7613
July 2005

Dear Sir/Madam

Marinus van der Merwe, a Masters student in the Department of Geography and Environmental Studies at the University of Stellenbosch, is currently engaged in research on the retail buying patterns of Paradyskloof residents. The aim of the study is to describe and explain the extent of the current retail buying patterns of the Paradyskloof residents in regards to the Stellenbosch Square shopping centre near Jamestown.

It will be greatly appreciated if the head of the household could kindly answer the following questions as accurately as possible. Please be assured that the information will be regarded as **strictly confidential**. It is required for academic purposes only and will not be disclosed to anyone else. No individual's identity or address will be identified in the thesis and the questionnaires will be destroyed once the data has been extracted.

Your kind co-operation in the research will be appreciated.

Your sincerely

…….

Supervisor: Mnr PJ Eloff
Telephone number: (021) 808 3095
Email address: pje@sun.ac.za

Student: Marinus van der Merwe
Telephone number: 084 240 1151
Email address: 13554824@sun.ac.za

Instructions:

- *Gebruik die Afrikaanse vraelys as u so verkies*
- *If preferred you may post the completed questionnaire to the student's address (see top right) or the department's address (see below).*