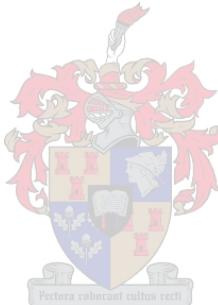


BUSINESS CLUSTERING AND CONCEPTUAL CORRIDOR DESIGN OF
VOORTREKKER ROAD, CAPE TOWN

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Declaration

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Abstract

Segregation policies of the Apartheid Era have led to various spatial development challenges which are still felt to a large degree in our modern urban environment (Warnich & Verster 2005). This is evident in that the City of Cape Town has an ineffective urban form and the poor are still largely inaccessible to the inner-city areas where most of the economic potential lie. This calls for a strategy by which this inequality can be reduced, and ideally eradicated. As such, the researcher proposes the implementation of the corridor concept as an analytical exploration tool as employed in Urban Planning and Management fields. Ultimately, the relevancy of the corridor concept as a flexible development instrument stems from the fact that the corridor directs and emphasises economic growth at certain strategic locations and as such creates further potential for new agglomerations and economic growth which would not have been the situation before these economic agglomerations were present (Brand et al. 2017). Therefore, the researcher shall look at Voortrekker Road in Cape Town through the lens of a conceptual corridor in an attempt to further generate strategies which shall hopefully assist in future economic development of the area.

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Contents

| | |
|---|-----|
| Declaration..... | i |
| Abstract..... | ii |
| Acknowledgements..... | iii |
| Figures | v |
| Chapter 1 : Introduction | 1 |
| 1.1. Background information | 1 |
| 1.2. Problem statement..... | 1 |
| 1.3. Hypothesis and research questions | 2 |
| 1.4. Aims and objectives | 2 |
| 1.5. Study area..... | 3 |
| 1.6. Summary | 4 |
| Chapter 2 : Literature review | 5 |
| 2.1. Theorists setting the foundation for concepts of linear development | 5 |
| 2.2. Historic evolution of the corridor concept | 6 |
| 2.3. Definitions of corridors..... | 7 |
| 2.4. Conceptualizing corridor development..... | 8 |
| 2.4.1. Polycentricity and Network Cities as a precedent model for corridor development.... | 11 |
| 2.4.2. Clustering of economic activity within the corridor | 13 |
| 2.5. Requirements and impacts of corridor development | 15 |
| Chapter 3 : Epistemology and research methodology..... | 17 |
| Chapter 4 : Data and research results..... | 20 |
| Chapter 5 : Discussion of data and results | 35 |
| Chapter 6 : Conclusion..... | 39 |
| References..... | 40 |
| Appendix..... | 43 |

Figures

| | |
|---|----|
| Figure 1.1 Area of research investigation | 3 |
| Figure 2.1 The Copenhagen Finger Plan | 10 |
| Figure 3.1 Research design | 17 |
| Figure 4.1 Composition of businesses | 22 |
| Figure 4.2 Total number of businesses on Voortrekker Road | 23 |
| Figure 4.3 Total number of Category A & D occurrences..... | 24 |
| Figure 4.4 Total number of Category B & C occurrences | 25 |
| Figure 4.5 Total number of Category E occurrences | 26 |
| Figure 4.6 Total number of Category F occurrences | 27 |
| Figure 4.7 Total number of Category G & L occurrences | 28 |
| Figure 4.8 Total number of Category H & I occurrences | 29 |
| Figure 4.9 Total number of Category J occurrences | 30 |
| Figure 4.10 Total number of Category K & O occurrences..... | 31 |
| Figure 4.11 Total number of Category M occurrences | 32 |
| Figure 4.12 Total number of Category N occurrences..... | 33 |
| Figure 4.13 Total number of Category P occurrences | 34 |
| Figure 5.1 Zoning denotations | 35 |
| Figure 5.2 Zoning of the western extend of Voortrekker Road | 36 |
| Figure 5.3 Zoning of the middle extent of Voortrekker Road | 36 |
| Figure 5.4 Zoning of the eastern extend of Voortrekker Road | 37 |

Chapter 1 : Introduction

1.1. Background information

Cape Town has an ineffective urban form. The poor are still largely inaccessible to the inner-city areas where most of the economic potential lie. The aftermath of Apartheid policies is very structural in nature and are still being manifested in the type of planning decision which are being made by those in power. With the segregation policies of the Apartheid era South Africa leading to various spatial development challenges which is still felt to a large degree in our modern urban environment (Warnich & Verster 2005). Economic potential concentrate in the CBD and the poor still live in peripheral areas in relation to where this economic potential has a most favourable effect. This leads to unequal travel choices, depleting the poor's little financial resources even further. As such, a strategy should be called upon by which this inequality can be reduced, and ideally eradicated. In part, this strategy should allow decision-makers to rely on marketing strategies and branding instruments at their disposal to depict a certain 'image' of the 'good city'. By relying on urban planning concepts such as corridor development and the clustering of business activities such depictions of a 'good city' can be achieved.

It is pertinent to note, however, that the wellbeing and vitality of local communities may be overlooked by professionals using top-down, city centre-grounded approaches, which largely ignores the impact of community perceptions and city gateways on the brand of the city (Trueman et al. 2007). According to Parr (1999), the mere specification of economic activity at the planned nodes, even if backed up by investment, is inadequate, unless supported by analysis of the prospects of the specified activity within the problem region. Needless to say, the better the functioning of a regional space economy is understood, the more accurate will be the estimation of the spill over effects of a planned pole.

The researcher, therefore, shall attempt to shed light on the concepts of corridor development and business clustering to ultimately suggest that these concepts can be used as urban planning tools and strategies for urban rejuvenation. To construct a foundation upon which these strategies shall be built the following theoretical frameworks and ideologies shall be drawn on; New Urbanism/Neo-Traditionalism, New Economic Geography, Endogenous Growth Theory, Urban Planning/Management Practices, and Urban morphology.

1.2. Problem statement

The linear nature of the corridor concept allows one to easily see how the principle of least effort manifests along the road identified as the corridor (Whebell 1969). Furthermore, centripetal and centrifugal forces help shape the spatial pattern of the corridor with regards to clustering of certain businesses at preferred locations along the designated corridor area (Dzumbira et al. 2017). The problem, however, lies in the fact that most of the main stream literature cites the above-mentioned

factors as the dominant (if not only) forces at work in the spatial manifestation of clusters along the identified corridor.

1.3. Hypothesis and research questions

Various factors exist, besides the centrifugal and centripetal forces along with the principle of least effort, which has a considerable effect on the composition of business clusters and as result the spatial manifestation of the corridor. The following research questions shall assist the researcher in proving the hypothesis:

- How does the clustering effect manifest itself along the Main road corridor of the City of Cape Town?
- Why does Voortrekker Road hold such a vast array of economic potential, while parallel roads merely a block away are almost barren to the effects of the “corridor process”?
- What effect does lower income areas have on the spatial composition of clustering forces of the Voortrekker Road corridor, and vice versa?
- Where can the clustering effects be seen to be of greater significance relative to the corridor pattern and what implications does that have for the rest of the clusters situated on the Voortrekker Road corridor?
- How does the understanding of linear development affect the conceptualization of corridor development and economic clustering within the corridor?

1.4. Aims and objectives

The aim of this research paper will be to establish which “forces” are involved in the clustering effects of the Main road corridor, and how the spatial pattern/structure is manifested through these forces.

The following objectives are proposed to assist the researcher in meeting the aim:

- A literature review shall be conducted to illuminate concepts of linear development, as well as explore the conceptualization of corridor development and how the clustering of economic activities affects the corridor design
- A database shall be constructed on the business occurring along Voortrekker Road in order to find all the coordinates for a mapping exercise to take place
- An extensive mapping exercise (geocoding) of Voortrekker Road will take place to determine certain business clusters along the conceptual corridor
- The spatial patterns which arise shall be analysed and interpreted
- Business clusters shall be identified, and a typological rubric set up to assist in the analysis of the spatial pattern

1.5. Study area

Voortrekker Road has been selected by the researcher for the area of investigation due to the potential the road has shown as a conceptual corridor based on preliminary ground researcher conducted. Before the researcher walked the stretch of road, however, an initial Google earth search of Cape Town's Voortrekker Road was undertaken to make the researcher more comfortable with the terrain of the study area. This ground research then entailed walking/driving the stretch of land which included identifying hotspots (which has been established through the Google earth search) and then noting down the businesses occurring along Voortrekker Road. Upon navigating the stretch of the road, indicated by the yellow line on the map as can be seen in Figure 1.1, the researcher observed that the road holds a higher than average density of businesses occurring along the road.



Figure 1.1 Area of research investigation

Furthermore, it was noticed that a certain clustering effect was present due to the specific business milieu the road presented as the researcher did his initial ground investigation. As such, it became evident that a mapping exercise will reveal more in terms of business spread and clustering than a ground investigation would. Lastly, the area of investigation was selected due to the ease at which the researcher could visit the area if the need presented itself.

1.6. Summary

In conclusion the composition of business clusters and spatial manifestation of the corridor will form the “golden thread” for the research process. By analysing the spatial patterns, which the geocoding exercise will make possible, new information may come to light which could assist the academic community to make compelling arguments for (or against) the proposal of a corridor concept as a tool or planning strategy for urban practitioners, politicians, developers and policy makers, to name but a few. Furthermore, in researching this “local” corridor, strides could be made towards international literature, meaning that a more holistic response could be formulated to economic reform or growth in areas which shows the need or potential for economic corridor development.

In an attempt to keep the clustering of businesses along the conceptual corridor as the focus point of the research project the chapters to come will follow a filter down structure. Chapter 2 will look at a review of the literature in which the initial theories of linear development will be discussed to set the scene for corridor development to follow. After the foundational aspects have been discussed along with a historic overview of the corridor concept certain definitions of corridors will be provided as to provide a clarification on how the researcher understands corridor development. This will then lead into a conceptual discussion of corridor development and how polycentricity and Network cities might be regarded as a precedent model for corridor development, along with how this relates to the clustering element of economic activity within a developmental corridor.

Chapter 3 will move from the theoretical foundational aspects of corridor development to further theoretical underpinnings which encapsulates the practical nature of the research agenda. Here the methodologies are then further explained and put into action in the next chapter. It is in Chapter 4 that the research results and data are portrayed based on the methodology followed to have obtained the results. The results will then be discussed in a suitable manner in Chapter 5 as to give a clearer understanding of the spatial nature of the conceptual corridor. The research project culminates in Chapter 6 where a summary is provided.

Chapter 2 : Literature review

This literature review will attempt to shed light on the urban morphological aspects of (socio-)economic corridor development. The structure of this Chapter favours a filter-down approach in which the larger foundational aspects of corridor formation is discussed and analysed first as to give a broad conceptualization of where the idea comes from and how it fits in with other urban morphological patterns. Therefore, polycentricity and the idea of Network cities will be discussed in order to situate the debate within this school of thought. Although polycentricity and Network cities are not regarded as the father of the corridor concept, the review has constantly led to the corridor concept being incorporated into the debate on polycentrism and Network collaboration. Thereafter a section has been devoted to foundational theorists whom have contributed to the arguments on concepts of linear development (which can be argued to be more in line with the origin of the idea of corridor development). To further substantiate the origins of corridor development another section has been dedicated to a historic review of the corridor concept.

After these foundational (historic) accounts have been considered, certain definitions of corridor development will be provided to give a better idea of what corridor development entails, before moving on to the section on “Conceptualizing corridor development”. This section will clearly elaborate on the morphological aspects of corridor development with specific reference to underlying socio-economic forces which fuels the process of corridor development. After a clear conceptualization of the corridor concept has been derived, a next section will discuss the further requirements to be in place for a corridor to function as a viable socio-economic entity within the urban landscape. Ultimately the literature review will culminate in an elaboration on how the corridor concept can be used as an instrument for spatial management and development. However, before the paper leads to an elaborate discussion on corridor development reference shall be made to certain theorists who set the foundation stones for conceptualizing linear urban growth. An understanding of urban linear development is necessary to situate the concept of corridor development within a concrete urban growth debate.

2.1. Theorists setting the foundation for concepts of linear development

It was Soria y Mata, in the 1880s, whom proposed the development of a linear suburb around parts of Madrid, Spain (Chapman et al. 2003). He was also one of the initial urban practitioners to look at how transport technologies have influenced the urban form, as well as design a model which was capable of incorporating dynamic transport systems and their accompanying technological dependencies (Priemus & Zonneveld 2003; Furundzic & Furundzic 2012). Building on concepts of linear development, Harris and Ullman brought this principle into their urban models by indicating that zones of development extend outwards in a semi-linear pattern from the economic node (central business district) (Whebell 1969).

It became apparent that location played a big part in the decisions of firms, and as such Isard became intrigued with the concepts of location and trade. The basic argument is that one cannot explain trade without the understanding of location and vice versa (Whebell 1969). Hotelling elaborated on the fact that there were tendencies in competitors to emulate the quality of goods as to gain an edge over the others, and in finding a suitable location for the firm as to gain an advantage over one's rivals, albeit in most cases strategically locating near one's competitors. By locating oneself near other rivals the service area could be maximised. A spatial economic phenomenon such as this may play a part in the conceptualization of why the tendency exists for firms to locate within clusters of the same businesses along a defined corridor (Pillay & Geyer 2016).

Losch, furthermore looked at "City-rich" sectors as having more economic potential (Whebell 1969). However, the idea of business clustering and "City-rich" sectors can arguably be looked at with similar connotations, in that the economic potential is created through businesses' desire to locate somewhere where the maximization of economic benefits could occur. Christaller's traffic principle postulates that when a saturation point can be reached on how many important places can possibly lie along a single traffic route between two towns (nodes) of high importance and with the route being constructed as cheap and as straight as possibly can be. With such conditions in place the dispersal of central places will be most favourable (Whebell 1969). In addition, by looking at the work of Zipf, a tentative elaboration can be provided in the form of the principle of least effort (Whebell 1969).

Lastly, the New Economic Geography (NEG) paradigm is explained by Krugman (1991), in the form of relevant macro locational factors such as the economies of scale, demand, labour and transport cost causes a state of cumulative causation on an industrial scale. This cumulative causation is a big reason for the continued clustering development of industrial and business regions at the cost of development in peripheral regions (Pillay & Geyer 2016).

2.2. Historic evolution of the corridor concept

According to Peter Hall the corridor concept originated in London at the end of the 19th century when space to expand were sought by laboratories and technological companies. The western part of London provided this space further westward due to post WWII policies that proposed the development of military research facilities in the specified area. This provided impetus for the growth of the corridor. In the years to follow, a diverse range of commercial descendants were created by the R&D centres of the military, which in turn attracted other loosely related companies, which resulted in the development and strengthening of the corridor. A notable aspect of this corridor is that the rail and road infrastructure did not initiate the existence of the corridor, but only followed after extensive construction and improvement of the M4 motorway and railway connection to London has been put in place. The new improvements in infrastructure met the demand for the increased mobility (due to the R&D centres) within the corridor and as such created the potential for further development (Sap 2007).

The second half of the 19th century saw cities progressively growing away from the central urban agglomeration of the time, as travel times were drastically cut due to the extensive introduction of train and tram networks. Train networks were generally appreciated for the sub-centres which evolved at individual railway stations. These sub-centres tended to act as small cities with characteristics suitable to that of a walking scale urban agglomeration. Trams, in contrast, created linear expansions which had the tendencies to follow routes within the corridor in question, which so often manifested as “Main streets. In both accounts, however, railway nodes and tram routes provided the impetus for the development of medium-density, mixed-use areas (Newman & Kenworthy 1996).

Most of the linear planning variations, however, started to evolve since around the 1930s when many utopian planners where starting to be affected by the importance of modern transport modes which came to dominate the ideologies of planning and as such urban planners themselves. Soria y Mata arguably had a very influential part in the conceptions of linear planning (Collins 1959). Yet another important plan in terms of linear development came from the plans and planning phases of the Modern Architectural Research Group which worked on a blue print plan for the Greater London area from 1938 to 1942, which was based on certain principles of linear development. Since the evidence suggested that London was too large to spread out indefinitely in a linear fashion, it was suggested that just the administrative, industry and commerce sectors where to be located along the east-west primary arterial route, with the residential areas to be set up along a series of secondary axes which where to be crossed with the primary route and in the end creating a herringbone effect of sixteen ribs (Collins 1959). Similarly, Le Corbusier proposed that the industrial linear city should lie along the major transportation arteries, and to not just spread out across the urban spectrum unchecked. These major routes where to serve as connector routes between existing cities of a nodal nature, which follows the ideology previously proposed by Soria y Mata. It has especially been stressed that arteries of extensive transportation should form the prime real-estate where industries should be located (Collins 1959).

It is therefore of no surprise that in modern times, as stated by Batten (1995), that many urban built up areas comprises a complex webbing of systems, of which corridors form a part. These systems, especially conceptual corridors, can provide urban agglomerations with holistic competitive advantages over other urban counterparts exhibiting monocentric tendencies, in the form of locational and functional relationship advantages. It is on this note that the research paper moves on to certain definitions of corridors as to build a foundation from which the subsequent section on “Conceptualizing corridor development” can move forward.

2.3. Definitions of corridors

According to Marrian (2001: 5), the definition of a corridor is “a linear strip of land or area, connecting large activity nodes, traversing urban or inter-urban areas, surrounding a major transport facility or

facilities providing an appropriate regional level of mobility and accessibility to adjacent areas, and containing a high concentration of population and mixed land uses”.

The CSIR (1999) in Marrian (2001: 6), states that a corridor is “a linear mixed land use element of urban structure which occurs on a series of transportation routes working together. The sphere of influence stretches in a wide band and is characterised by areas of agglomeration”.

Although not specifically referred to as corridor development, the New Urbanism/Neo-Traditionalism movement is primarily based on the same dynamics and principles as that of development corridors. According to Newman and Kenworthy (1996: 1) the advocates of this movement “seek to reconnect transport with land use and, in particular, to establish transit-oriented development where higher-density, mixed use areas built around high-quality transit systems provide a focussed urban structure that can help loosen the grasp of automobile dependency”.

Ultimately Marrian (2001: 7), postulates that “a corridor is defined as a linear spatial element consisting of two outer nodes and strips and/or inner nodes of high intensity non-residential and/or high density residential land use that are connected by at least one mass public transport route which may be fed by supporting feeder routes”.

2.4. Conceptualizing corridor development

Five principles have always been present in the process of shaping humanity’s settlements, and according to Doxiadis (1970), mankind has always acted in compliance with these below mentioned principles. Firstly, mankind has the desire to come into contact with other people, as to socialise, with the desired elements of nature of his/her choice, as to relax and find tranquillity, and with other constructs of mankind such as roads and specific buildings, as to fulfil the basic needs in an urban environment. The second principle builds on the first in that mankind has the desire to be able to minimize the required effort for him/her to achieve the above-mentioned contact points. This second principle can arguably be related to Zipf’s principle of least effort and has a large part to fulfil in the constructs of an urban environment. Thirdly, protective spaces are elaborated upon and deals with the phenomena of mankind making the best use of his/her environment as well as select the ideal space where a person can feel safe and keep his contacts with the aspects of the first principle without causing major discomfort within his/her living situation. The fourth principle deals with the fact that mankind has a desire to improve upon the quality and the relationship he/her has with their surrounding environment. This principle is evident in that mankind always strives to better the environment he/she lives in. Examples of this includes the constant struggle for inner city rejuvenation, architectural prowess and artistic expression, to name but a few. Lastly, mankind seeks a synthesis between the four principles and a way to optimize this synthesis, which are dependent on the ability of humankind to do

so, along with the time and space to do so. Without proper time and adequate space these principles shall not be met, and the shaping of human settlements will inadequately evolve (Doxiadis 1970).

By acknowledging these processes which plays a large role in the shaping of mankind's settlement, it can be seen how a linear pattern for the expansion of cities can be practical. As Thomas Adams indeed observed a natural tendency exists for an urban conurbation to expand out in a tentacular ribbon state with satellite agglomerations forming at peripheral locations. As such, he contends that the process should be rationalized and not be fought or eradicated (Collins 1959). This rationalization comes to fruition by examining the work done by Drury. He takes on the position that "a city is essentially a mechanism by which people and goods are kept in close communication, and that a single axial route with a minimum of cross currents of traffic is the most efficient means of organizing it; a city to him should have the efficiency of an industrial assembly plant, which is linear" (Collins 1959: 82). Nevertheless, it should be noted that different interpretations exist on the conceptualization of economic corridor development. As result the application thereof remains contested within the urban and spatial planning spheres (Brand et al. 2017).

For the purposes of this research paper, however, three meanings of conceptual corridors can be derived at which have briefly been touched upon in the previous section on the definitions of corridors. Firstly, the corridor can be defined in terms of an infrastructural axis. Secondly, the corridor can be defined in terms of an economic phenomenon in that it is a development axis which holds latent and real economic potential. And lastly, the corridor can be seen as an axis along which extensive urbanisation could possibly occur. These interpretations on the corridor concept can indeed be referred to as a good example of "implicit theory" which assumes that not only is infrastructure and traffic a derivative of socio-economic process, but that to a large extent is also a determinant factor of these processes. If one follows such logical explanations then it can be stated with relative ease that the conceptual corridor has a significant effect on the spatial patterns which ensues, as well as the spatial developmental patterns which comes to manifest itself. This is especially true for localities with large quantities of commuters and transportation of goods moving through the area, which in turn makes for an attractive and desirable environment for companies to manifest itself in. Distribution and logistics firms especially benefit from this type of traffic moving through a specific location. This phenomenon eventually then leads to urbanisation effects in areas located between urban nodes which are already there. As such, a ribbon development pattern may start to emerge, with the possibility of new urban growth poles to follow. Spatial policy should start to form an important role at this point (Priemus & Zonneveld 2003).

By further attempting to rationalize the process by which mankind shapes his/her settlements the "string of beads" concept can be drawn upon (Warnich & Verster 2005). The "beads on a string" model, emphasises the notion of an infrastructural line that groups smaller urban areas (or nodes/poles) at certain points along major routes. According to Priemus & Zonneveld (2003), the 1947 Copenhagen

Finger Plan is an evident example of such a spatial manifestation. By directing one's attention to Figure 2.1 below it will become clear that development is proposed outwards from the node in a finger-like pattern. These fingers can be seen as linear expansions outwards, where the most extensive development occurs at major intersections, creating the 'string of beads' effect.

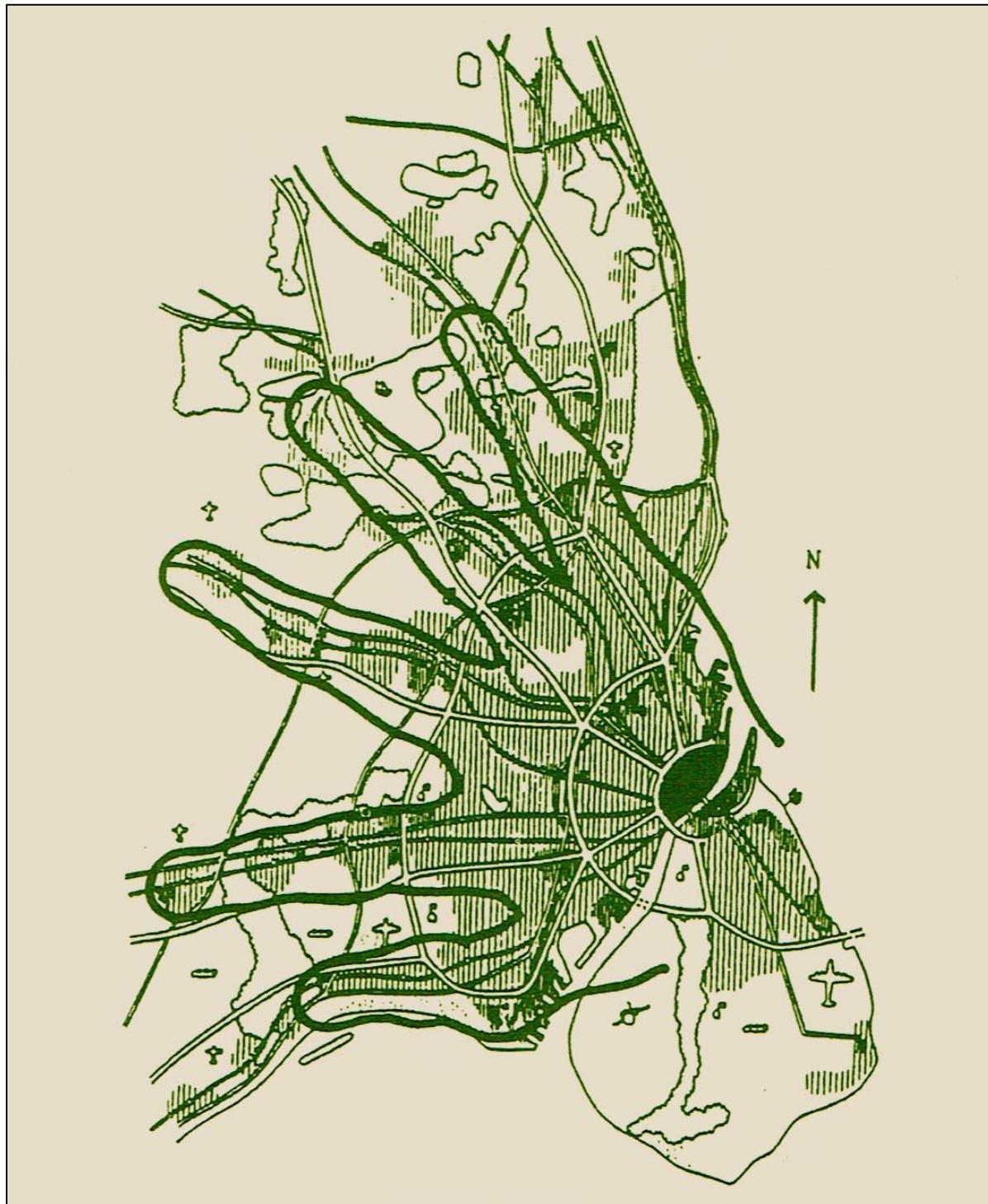


Figure 2.1 The Copenhagen Finger Plan

Source: Priemus & Zonneveld (2003)

Often it is the major roads on the edges of urban environments, along with large centres at these localities, which exhibit stronger dynamics than in inner city areas. These major roads, or arterial routes,

provide the necessary connections to a range of networks for such large economic centres to be viable. The maintenance of such dynamics rests on the accessibility of goods and knowledge along these arterial roads (Priemus & Zonneveld 2003; Priemus 2001). It is the communication axes, or major arterial routes, between development centres (or nodes) which serve as the conduits of economic activities (Geyer 1988; Geyer 1989)

2.4.1. Polycentricity and Network Cities as a precedent model for corridor development

The modern urban environment is increasingly associated with a polycentric structure brought on by the diversity of roles to be fulfilled in the city. It can be argued that in contemporary times the urban environment has obtained its functionality through a spatial differentiation of specialised functions (Musterd & Van Zelm 2001). The differentiation of specialised functions on an urban scale is attributable, in part, to the postmodenisation of production, or the post-Fordist shift in production. This shift resulted in the growing significance of urban agglomerations and settlements tending to spread out in a network-like pattern, with lines of linear urban development usually taking a precedent role in this (new) form of urban growth. A further resultant is the creation of nodal points of interaction (characterised by polycentricity), rather than one centrally located district. These new nodes in the urban network provide stakeholders with the beneficial effects of more space availability, mobility and accessibility, to name just a few advantages (Sap 2007). A (modern) urban morphology should therefore advocate the importance of Network City ideas, as well as the Polycentric Urban Region concept (henceforth referred to as PUR) as a sustainable framework for urban growth. Due to the benefits the spatial structure of the PUR can provide it can be argued that it has the potential for more sophisticated economic systems to interject. This further allows interventions through public policy, which is often seen as the desired framework for planners and politicians alike (Parr 2004). Within this framework the corridor concept can be utilised as a tool to obtain the desired effects of sustainable growth.

Drawing from gravity-model theories, Parr (2004) postulates that the centres encompassing a PUR will have a greater level of socio-economic interaction than centres of comparable size not situated within a PUR. A significant aspect of such an urban network is the interactions formed based on trading of goods and services between stakeholders and clients of the area. As such, retailing may be the dominant form of trade for smaller PURs, whereas for larger PURs intermediate goods, including a variety of business services, may be the prevalent form of trade. It is important to conceive of the fact that this type of trade has minimal restrictions in terms of the hierarchy of different sizes of centres. Trade and knowledge exchange thus takes place between centres or nodes of various sizes. (Parr 2004). A true networking effect embeds itself within the region and allows for various sorts of interactions to occur. It is indeed stated by Batten (1995) that network cities are being developed in a way for interactive growth to flourish, meaning that competitors can benefit from each other in ways not previously thought of. By locating near each other the spill over effects may induce competitors and partners alike to learn from

creative ideas formed in the race for superior economic performance. One of the most important ideas when it comes to network power, however, is the potential for the agents involved to build and improve on the strategies available to them since innovative and creative ideas are being created in a collective manner. Networks, therefore, are valuable for its ability to allow practitioners and stakeholders to implement strategies independently yet be able to rely on the cooperation of other businesses within the network. These businesses then evolve and adapt when it is required due to the fact that collective ideas shape the particular business milieu (Booher & Innes 2002). Furthermore, network cities can also achieve substantial economies of scope provided they have efficient corridors of communications and knowledge-based infrastructure, as well as be able to meet the high transportation demands. Knowledge-based activities such as education, research and the creative arts also seems to have a higher priority when it comes to the more creative network cities. In urban systems such as these closer linkages are formed not purely on the ability for the goods and service demands to be met and the distance thresholds to be covered, but rather more on the complementary functions the system can provide (Batten 1995).

It is pertinent to note, however, that Booher & Innes (2002) argues for the fact that there should be three conditions in place to allow for network power to arise in a significant way. Firstly, there should be a diverse range of stakeholders and agents involved within the network as to allow for all relevant issues to be discussed in a way that brings in a full range of ideas and interests. This diversity can then provide the opportunity for different problems to be met with more creative solutions and ensure that stronger and more practical strategies be applied to current issues. Furthermore, it is this diversity which allows for the processes of learning and innovation to take place through the provisioning of a variety of resources, experiences, personalities, information and various points of view which come into play. Secondly, a certain degree of interdependence is necessary and as such to fulfil one's own interests will invariably depend on other stakeholders in the network to fulfil their own actions. In other words, this means that stakeholders in the network has something to offer to others in the network, yet in return they will want something from others in the network which they need. Thirdly, the communication and information flow within the network must be trusted by the stakeholders, as well as be accurate. If this is not the case full advantage will not be able to be gained from the stakeholder's diversity and interdependence. In collaboration these three conditions will feed back into the network by spawning more interdependence as well as more cooperative actions from the various stakeholders within the network. This is the process which network power postulates and has the advantages of accumulation and growth of the network itself if carried out effectively (Booher & Innes 2002).

Bringing this back to clustering along economic corridors it becomes evident that this may be a process responsible for the agglomeration of certain activities in favourable locations due to the inherent network capacities. This process will likely continue and grow in the favoured location unless investments and policies are implemented to improve the accessibility of lagging or economically

peripheral areas. By connecting these lagging areas to the economic hubs trade capacities will be able to be improved (Brunner 2013). Therefore, when conceived in terms of corridor design, polycentricity could propose that ‘bundles of infrastructure’ be arranged in such a fashion as to form a linear development, also identified by Chapman et al. (2003) as ‘braids’. These braids act as the communication axis and mobility lines where development is most likely to occur, and further fulfils the function of spreading access and development potential throughout a wider corridor (Chapman et al. 2003). For ease of reference these bundles of infrastructure can be thought of as a clustering effect which shall form the emphasis for the next section.

2.4.2. Clustering of economic activity within the corridor

Economic centres, or nodes, has a pertinent part to fulfil in the development of corridors. In combination it is the varying nodes from different exchange environments which makes it possible for interactive growth to take place in a dynamic and synergistic manner. Paired with reliable corridors of transport and communications infrastructure certain economies of scope can be achieved (Brand et al. 2017). Furthermore, it is commonly argued that centrifugal and centripetal economic forces play a big part in the clustering effect of businesses. The two primary nodes of the corridor will anchor the corridor and exert the so-called centrifugal and centripetal forces which culminates in the spine of the corridor (defined as the infrastructural bundle connecting the two identified nodes) becoming saturated with businesses. As result development will persist in a linear-orientated fashion between the core growth nodes, with this linear development being labelled the spine of the conceptual corridor. Thus, urbanization forces are driven along by trade and knowledge exchange occurring along the spine of the development. It can further be argued that the vibrancy and size of the corridor’s end poles or nodes can be directly correlated with the strength of the conceptual corridor, with an indirect correlation attributable to the distance the two end nodes are from one another (Dzumbira et al. 2017). The type of vibrancy and activity at the individual nodes further constructs a type of environment which attracts as well as repel certain types of businesses depending on the milieu being created.

Thus, the benefits of creativity, innovation and learning are derived from the economic clustering of activities at individual nodes which in turn builds dynamic competitive advantages. This clustering effect can consequentially become a node where processes of cumulative causation can take place causing growth at certain areas due to other businesses taking advantage of what the area has to provide (Brand et al 2017; Pillay & Geyer 2016). However, it should be noted that there are limitations when it comes to spatial levels of economic clustering based on the type of knowledge transfer which takes place on a frequent face-to-face basis. Furthermore, the competitive advantages are only maintained when permanent innovation takes place. As such, competitive clusters cannot grow indefinitely and only occupies an area as far as the advantages stretch (Kloosterman & Lambregts 2001).

In line with the above, clustering can be explained according to external economies of scale. Firms which congregate in the same area are able to lower their cost of operations due to the lower transaction costs, the already mentioned knowledge and information exchange, and a wider base for matching demands. The gains in productivity remains in the area where the benefits can be reaped (Kloosterman & Lambregts 2001). As such, firms do not have to get too big when located within a cluster and will still be able to draw from the benefits without obstructing their innovation and flexibility. This close proximity to other firms of the same type further reduces the costs of matching demand and supply of acceptable labour as well as the costs of the workforce moving between firms within the same locality (Kloosterman & Lambregts 2001). For example, just as Mittal and Kashyap (2015) proposes Theme Cities as economic nodes at a regional scale, the nodes at a city scale can also take on a themed activity to promote similar business investments in the proposed area/node, therefore reaching economies of scale for the proposed activity. As such, due to a node's ease of access to other nodes it is easy for people to use different facilities of easy to reach nodes to facilitate the activities of the node in question. This locational advantage will allow firms to share facilities such as warehouses and other business services, and will allow for a wider labour market with a more flexible range of demand and supply (Parr 2004).

At this point it might be relevant to draw on the theories of the principle of least effort. Whebell (1969) claims that certain locations succeed as areas for settlement and that the movement and the spatial development to follow between these settlements will take on the route of most convenience in order to avoid major obstructions. This will consequentially lead to knowledge and information trade to follow these routes. As such, a principle of least effort is followed, and the node's position within the network will increasingly determine the potential of the certain location (Sap 2007). Furthermore, according to Dzumbira et al (2017), the nodes which are in close proximity to each other often merge along the axes of communication to form a clustered city in a linear fashion. If the nodes are further away from each other secondary nodes may result. As such, it follows to reason that corridors of a lengthier nature will need larger nodes at the end to become a more vibrant corridor. Therefore, it is evident that the corridor is merely an extension of the activities of certain nodes along a single axis, which arguably follows the principle of least effort.

Due to the nature and understanding of individual nodes Sap (2007) postulates that planners are able to gain control over corridor development and as such guide this development. Centripetal and centrifugal forces can arguably be harnessed into lines of growth as to benefit and solidify a more wholesome and holistic environment. It should be clear that economic corridors do not operate in a vacuum and forms part of a larger network of economic interaction. Therefore, it is important to take note of the shape and characteristics of such an economic network since this shall form a critical part in understanding the particular economic corridor within the specific environment (Brunner 2013). On the other hand, the consequences of improvement to an economic corridor are also not limited to the particular locality in

which these enhancements take place. As such, it is pertinent to get a conception of the structure of a larger environment in which the development corridor occurs (Brunner 2013). This is necessary due to the inertia the urban environment holds.

The pre-existing urban fabric creates inertia in which development follows a certain trend (or desired lines of travel) which can be predicted (Whebell 1969). This makes the corridor concept an important spatial instrument for planned economic development. However, it should be noted that the connection between areas around the infrastructural axis and the development of connectivity is not always one way when it comes to causality. For example, due to areas already developed a demand for connectivity may arise, whilst on the other hand improved connectivity of the area might lead to furtherer improvement of the locality (Srivastava 2011: 6).

2.5. Requirements and impacts of corridor development

According to Marrian (2001) certain conditions must be in place for the development of a viable economic corridor. These requirements can be classified into 7 categories for ease of analysis, and ideally the implementation and management thereof. The first category addresses economic conditions which needs to be present. The second category looks at the institutional capacity to enforce or implement the concept as an instrument for spatial planning. The third category expands on the physical requirements, such as transport systems and modal choices, which can make the corridor concept valuable with regards to its capacity as a spatial planning instrument. The fourth category looks at the behavioural requirements, whereas the fifth category addresses issues such as the political will to implement the idea/concept of corridor development. The sixth category investigates the required perceptions of larger society that needs to be instilled for the corridor concept to seem viable and appropriate among the public. Lastly, the seventh category looks at the actual planning requirements which needs to be present. In addition to these conditions Geyer (1989) differentiates between three attributes which are fundamental when it comes to corridor development. Firstly, vibrant development nodes should be present at the ends of the axis which connects the two development centres. Secondly, these nodes should be dependent on one another to create a supportive environment wherein economic activities can flow along the communication axis. And thirdly, potential for further development should be created along the axis between the two nodes.

According to Warnich & Verster (2005) the following are potential impacts which corridors may have on the urban landscape: the promotion of movement systems which are efficient and effective; it can promote local economic growth due to higher densities of interaction, which provides the threshold for these economic activities to be viable; land use can be optimised and serve as an effective strategy against the continuation of urban sprawl; and it has the capacity to further promote the social integration of the urban fabric through the promotion of social interaction in the proposed locality. Furthermore, the corridor concept can act as an influential strategy to integrate the planning of transport facilities and

infrastructure with land use management and control (Warnich & Verster 2005). In addition, the concept of “armature” as proposed by Chapman et al. (2003), could be used as a viable spatial framework to promote corridor development, but to not be restricted by the overriding linear element thereof. An armature can be defined as a wire framework which supports the modelling of a sculpture, but the term has been developed as much more than a mere framework of support. The armature can be conceptualised as multi-layered and multi-dimensional, in which infrastructure and flows can be represented as the complex matrix which actually exists, rather than confining them to a potentially limited linear zone. The interactions between different infrastructural and institutional systems at various nodal points can readily be represented in this model.

The relevancy of the corridor concept, therefore, as a flexible development instrument stems from the fact that the corridor directs and emphasises economic growth at certain strategic locations and as such creates further potential for new agglomerations and economic growth which would not have been the situation before these economic agglomerations were present (Brand et al. 2017). The corridor concept can thus be used as a tool to effectively implement private-public partnerships. By providing the framework, the entrepreneurs will gain confidence in the area and may themselves be willing associates in developing the infrastructure so that they can use their investments productively. As such, private-public partnerships could be a vehicle to attract private sector investment in urban infrastructure development (Mittal & Kashyap 2015).

It is pertinent to note, however, that the vibrancy of the corridor does not only rest on economic viability, but also on the completeness of the transport networks serving the individual economic nodes. Transport network completeness decreases the transaction length (in terms of cost and time) in an economic hub and network. Cooperation partners can be reached more frequently and more reliably. Network resilience increases dramatically with the higher completeness of a transport network. Furthermore, increased intermodal connectivity adds to the completeness of a network and establishes lifeline linkages to the outside world (Brunner 2013). What development corridors and the accompanying principles of business clustering linked to strong transportation networks do offer is the notion of greater policy freedom in the restructuring of urban economic spaces than what would have been the case without them (Brand et al. 2017).

Chapter 3 : Epistemology and research methodology

This Section looks at the underlying ideology which influences the research design. Once this has been established the specific research design employed shall be covered, along with guidelines to help the spatial analysis and theoretical synthesis of the research project.

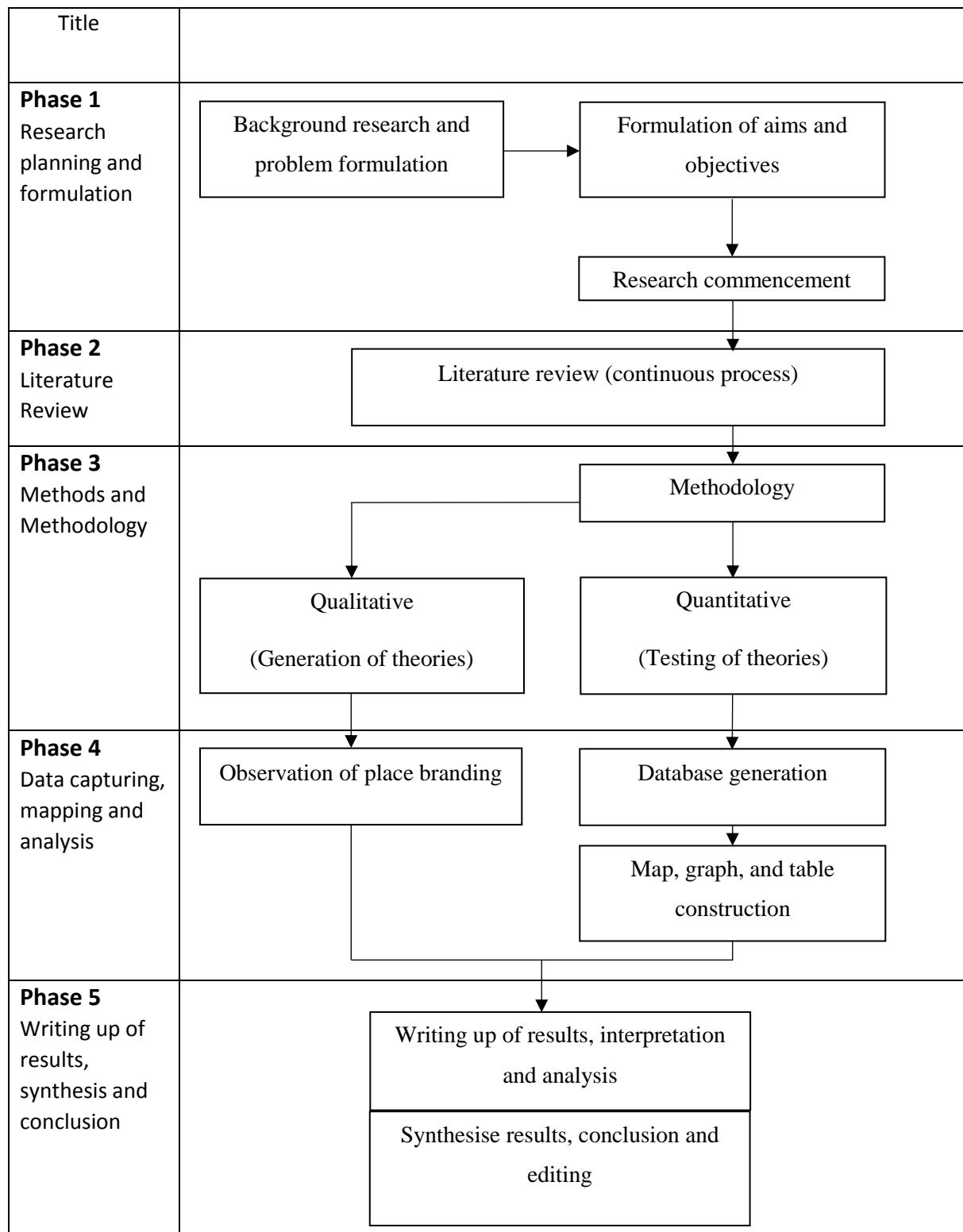


Figure 3.1 Research design

The following schools of thought shall assist the researcher in the analysis and synthesis of theoretical data and spatial information: New Economic Geography, Endogenous Growth Theory, Urban Planning/Management, and Urban morphology. With these schools of thought in mind a research design has been formulated.

According to Bryman (2012), the cross-sectional design encompasses collecting data at a single point in time for more than one specific case. Usually there are more than two variables for the body of data being collected in order to see whether there are any patterns of association in the varying cases chosen. Although one case study has been selected (i.e. Voortrekker Road in Cape Town), the smaller cases will be made up of the individual business clusters which shall be identified once the collection of data has been completed. However, since an extensive examination of a particular setting is proposed (Voortrekker Road) the emphasis shall rest on a case study research design. Furthermore, a mixed methods research strategy shall be employed. By utilising both qualitative and quantitative data a clearer representation of the study area can be provided. According to Bryman (2012) quantitative methods use deductive approaches to data analysis, i.e. the testing of theories. As such, the proposed research entails quantitative methods as it is testing the spatial patterns which emerge against previous research conducted on the topic of business clustering along conceptual corridors. On the other hand, Bryman (2012) also postulates that the use of qualitative methods seeks for the generation of theories. Therefore, the proposed research also entails qualitative methods in that it aims to generate new theories based on similarities and differences of operation when it comes to business clustering along the conceptual corridor of Voortrekker Road in the City of Cape Town.

In terms of the quantitative research proposed an initial Google earth search of Cape Town's Voortrekker Road will be undertaken to make the researcher more comfortable with the terrain which shall be visited. This ground research will entail walking/driving the stretch of land which includes identified hotspots (which has been established through the Google earth search) and the researcher will then note down the businesses occurring along Voortrekker Road. Furthermore, a typology of businesses shall be used (in this case the Standard Industrial Classification of Economic Activities) to allow the researcher to colour code certain types of businesses in order to help analyse the trends which will hopefully appear. As such a classification technique in terms of colour coding will assist the researcher to more easily make sense of the aerial views which he has at his disposal.

After the ground research has taken place geocoding and mapping will commence. With different businesses taking on different colours of dots on the map (the dot shall represent the specific business in a specific location) certain trends will be analysed. This will hopefully lead to the identification of different business clusters within Voortrekker Road. In addition, different clusters will be analysed relative to the location of other clusters within the study area. After the clusters have been identified it

will also be possible to analyse “outlier” businesses relative to which cluster it should be situated in for potential maximum gain.

In terms of the qualitative research component the researcher shall attempt to analyse the place/space identity of the conceptual corridor. This will build on theories of place branding and how one should deal with a type of milieu when trying to improve on what is already there. This is important for future innovations in terms of building on what is already there and to not destroy the semiotics of the local community. This part of the research will then encompass the aspect of cross-sectional design in terms of different business clusters being analysed as specific (smaller) cases.

Chapter 4 : Data and research results

In this chapter the researcher will present the results which has been obtained through extensive Google Earth analysis as well as the ground research which has been conducted. After looking at the overall pattern which has emerged along with the composition of businesses in each proposed category, the individual business categories will be presented on maps to further analyse the locational patterns which has emerged. To have a clear grasp of this chapter, however, Table 4.1 below should be read with each map to give a clear concept of what has been represented on the maps to follow.

Table 4.1 Adapted SIC categories

| Category | Description of businesses to fall within the category | Examples of businesses to fall within category |
|-----------------|---|--|
| A | Manufacturing | Manufacturing of textiles, leather tanning, printing and service activities related to printing, manufacturing of chemical and adhesive products, manufacturing of glass and glass products, manufacturing of rubber products, casting of metals, machinery repairs |
| B | Electricity, gas, steam and air conditioning supply, and waste management | Electric power generation, transmission and distribution, manufacture of gas, steam and air conditioning supply, waste collection, waste treatment and disposal, material recovery |
| C | Transportation and storage | Postal and courier activities, cargo handling, warehousing and storage, freight transport |
| D | Construction | Shop fitting, plumbing, painting and decoration, rental of construction machinery and equipment (with operator), building completion and finishing, electrical installation, site preparation |
| E | Wholesale and retail trade; repair of motor vehicles and motorcycles | Sale of motor vehicles, sale of motor vehicle parts and accessories, maintenance and repair of motor vehicles; wholesale and retail in foodstuffs, meat products, beverages, hardware equipment, plumbing equipment, clothing, footwear, jewellery, toys, electrical household appliances, furniture |
| F | Accommodation and food service activities | Short term accommodation activities, hotels, motels, guesthouses, restaurants, food service activities of take away counters, event catering and beverage serving activities |
| G | Information and communication | Publishing activities, programming and broadcasting activities, telecommunications, computer programming and consultancy activities, information service activities |
| H | Financial and insurance activities | Central banking, activities of holding companies, financial leasing, insurance, reinsurance and pension funding |
| I | Professional, scientific and technical activities | Legal activities, activities of head offices, scientific research and development, advertising and market research, photographic activities, specialised design activities, technical testing analysis, management consultancy activities, auditing and bookkeeping activities |

| | | |
|---|---|---|
| J | Administrative and support activities | Rental and leasing activities, travel agencies and tour operators, private security activities, employment placement, packaging activities, cleaning activities, office administrative and support activities |
| K | Public administration and defence; compulsory social security | Defence activities, foreign affairs; public order and safety activities at National, Provincial and Local Government level and general public administration at National, Provincial and Local Government level |
| L | Education | Pre-primary, secondary and higher education; other educational activities |
| M | Human health and social work activities | Hospital activities, medical and dental practitioners, optometrist, social work activities |
| N | Arts, entertainment and recreation | Gambling and betting activities; creative, arts and entertainment activities |
| O | Real estate activities | Real estate agencies and accommodation rental agencies |
| P | Other service activities | Repair of computers and communication equipment, repair of consumer electronics, hairdressing, laundry services, funeral services |

Source: Adapted from the Standard Industrial Classification of all Economic Activities (2012)

When comparing the Standard Industrial Classification categories (refer to the Appendix for a broad structure of the Standard Industrial Classification of all Economic Activities) with the adapted typology the researcher has presented, it immediately becomes apparent that the first two categories of the SIC has been omitted. This is due to the fact that no businesses in the two respective categories were identified within the study area. Furthermore, the last two categories of the Standard Industrial Classification have also been omitted due to the same reason. The electricity, gas, steam and air conditioning supply category and the waste management category has been merged in the adapted typology for ease of referencing when it comes to the geocoding of the data. Furthermore, the study area has shown to hold a minimal amount of businesses within the two respective categories, and as such the researcher has decided to combine the two categories to make a new category namely electricity, gas, steam and air conditioning supply, and waste management.

From this point forward each business category shall be referred to by the respective code the category has been assigned with as has been done in Table 4.1 above. For example, the group of businesses to fall within the “Manufacturing” category shall be referred to as Category A, the “Electricity, gas, steam and air conditioning supply, and waste management” category as Category B, the “Transportation and storage” as Category C, and so forth. As such, when it comes to analysing the maps the category delimitation has been used in the Legend to refer back to Table 4.1 above. Furthermore, in Figure 4.1 below the category delimitations has also been used to illustrate the composition of the businesses along Voortrekker Road making use of a pie chart.

By referring to Figure 4.1 below it is immediately apparent that one category dominates the composition of businesses, namely Category E. However, more reference shall be made to this at the respective map analysis and explanation; Figure 4.5. First the number of businesses shall be covered.

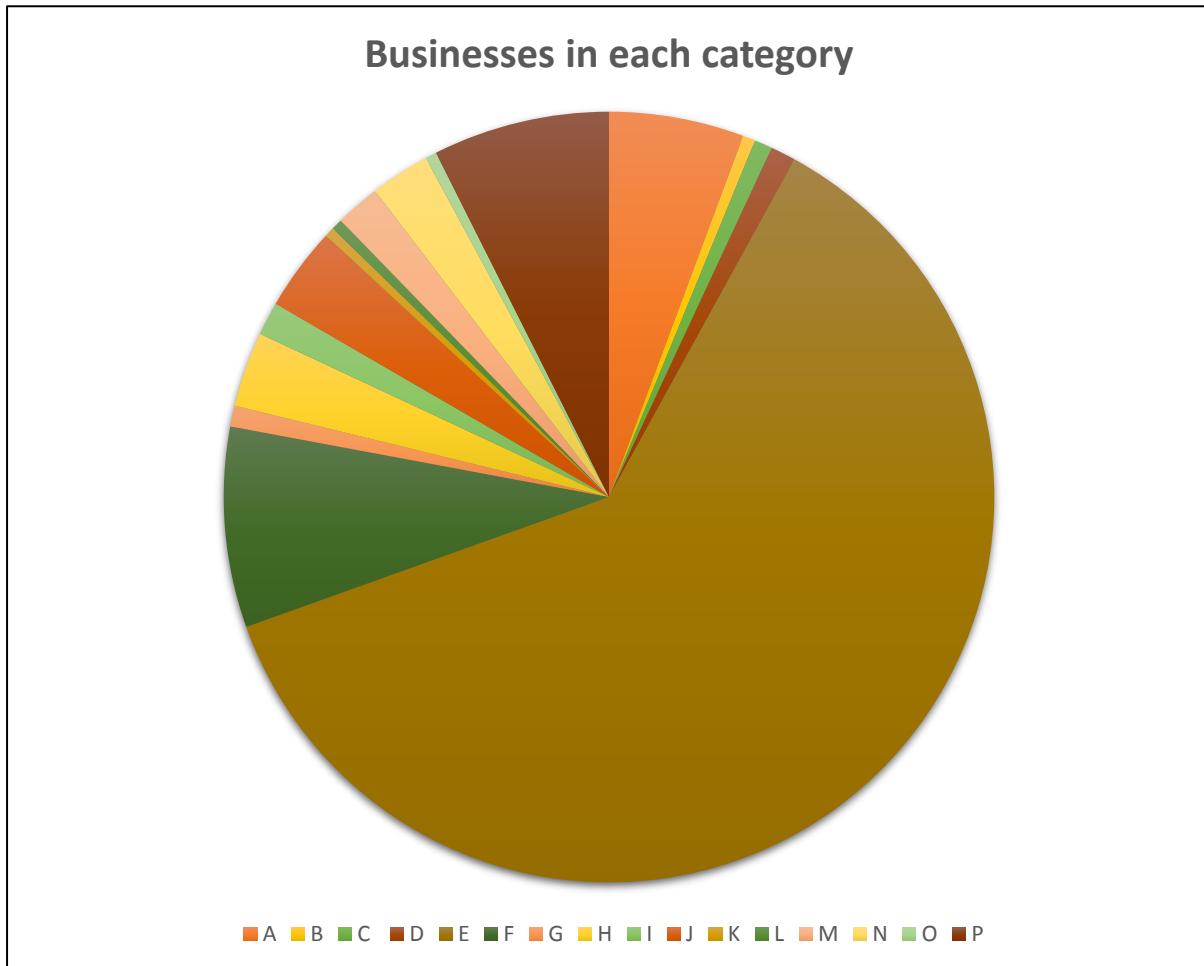


Figure 4.1 Composition of businesses

A total number of 1713 businesses has been found by the researcher to occur along Voortrekker Road and in its immediate vicinity. Figure 4.1 above indicates the composition of these 1713 businesses. In Category A a number of 97 occurrences has been found. A mere number of 9 occurrences has been found to exist in Category B along Voortrekker Road and its immediate vicinity. Category C contains 13 entries, with Category D containing 18 entries. The bulk of the data entries lies in Category E with a number of 1054. Category F has the second most at a total number of 144 occurrences. Category G has shown to contain 15 entries, and Category H has shown to contain 54 entries. Category I and J has shown to have 24 and 60 entries respectively. Categories K, L and O has been found to contain the least amount of entries with Category L and O having both 8 entries and Category K having only 7. Category M and N has 32 and 43 occurrences respectively, and lastly Category P has been found to have 127 entries within the database.

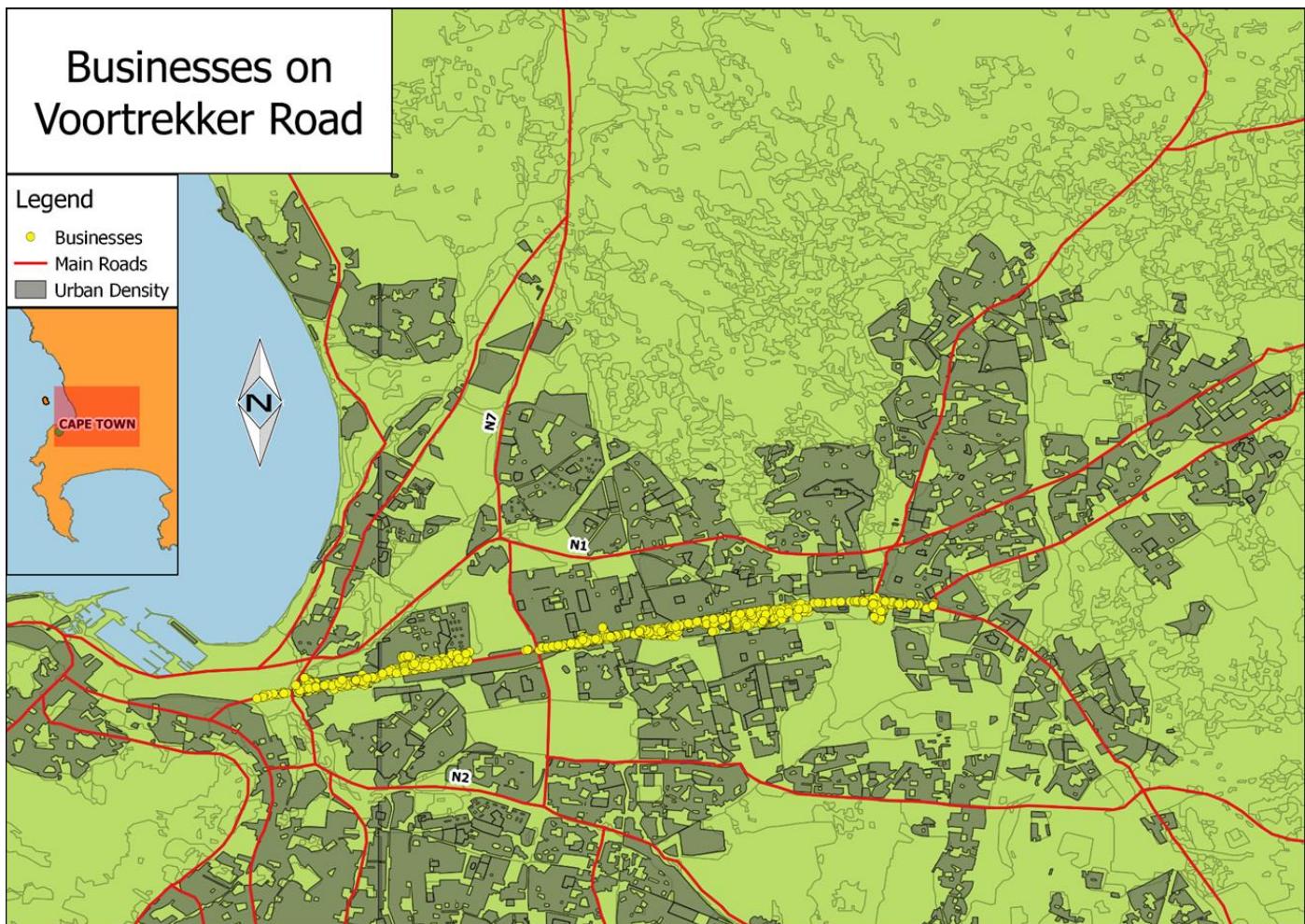


Figure 4.2 Total number of businesses on Voortrekker Road

Voortrekker Road is approximately 17 kilometres long. The entire stretch of the study area has already been indicated in the Introduction section, however, when referring to Figure 4.2 the total amount of businesses in all the categories has been indicated. Due to the clutter of results on the map a number of other maps has also been constructed in order to indicate where the individual Categories have been spread out. This shall give a clearer indication of where certain clusters exist, if they exist at all. Nevertheless, Figure X has been provided to show the overall density of businesses to occur along Voortrekker Road and its immediate vicinity.

It is worthy to note for ease of referencing on the maps to follow, the titles have been allocated to each map according to the category of businesses it represents. In the case a map represents two categories the title shall read the category represented at the top of the legend of the respective map first with the second category to follow. For example, the following map will read Manufacturing & Construction in its title and in the legend the first entry is Category A and then D. As such, it is easy to see that the manufacturing activities are represented by Category A and the construction activities are represented by category D. This method has been followed so that the reader will not have to page back to the business typology the whole time.

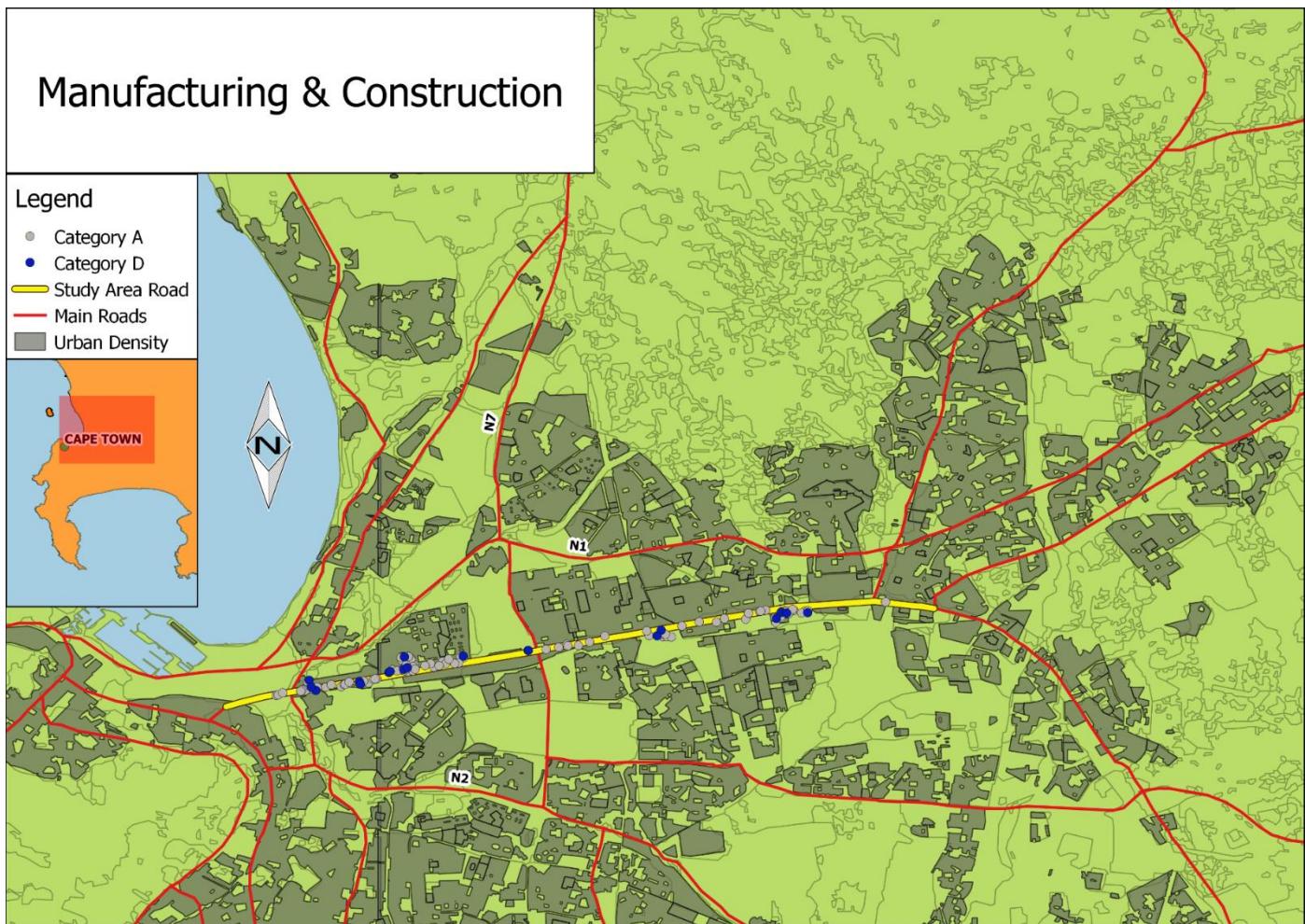


Figure 4.3 Total number of Category A & D occurrences

The manufacturing activities, represented by Category A, seems to spread out along Voortrekker Road, yet a clustering effect is evident on the western (left) side of the map when looking at Figure 4.3. The density of the manufacturing activities seems to be higher at the western end, with the density becoming less when moving to the eastern side of the map. The construction activities, represented by Category D, does not illustrate such a clear picture of clustering, however, it can be seen that they also favour the western end of Voortrekker Road. When looking at the construction activities occurring at the eastern end of the map it is worthy to note that, although not a lot of these Category D activities occur at this end of the road, the ones that are found here are indeed clustered together.

When looking at Category A and D in conjunction, it is relevant to note that where the density of Category A is higher so are the density at which Category D occur. More simply stated this means that where there are more manufacturing activities more construction activities are also found, or vice versa.

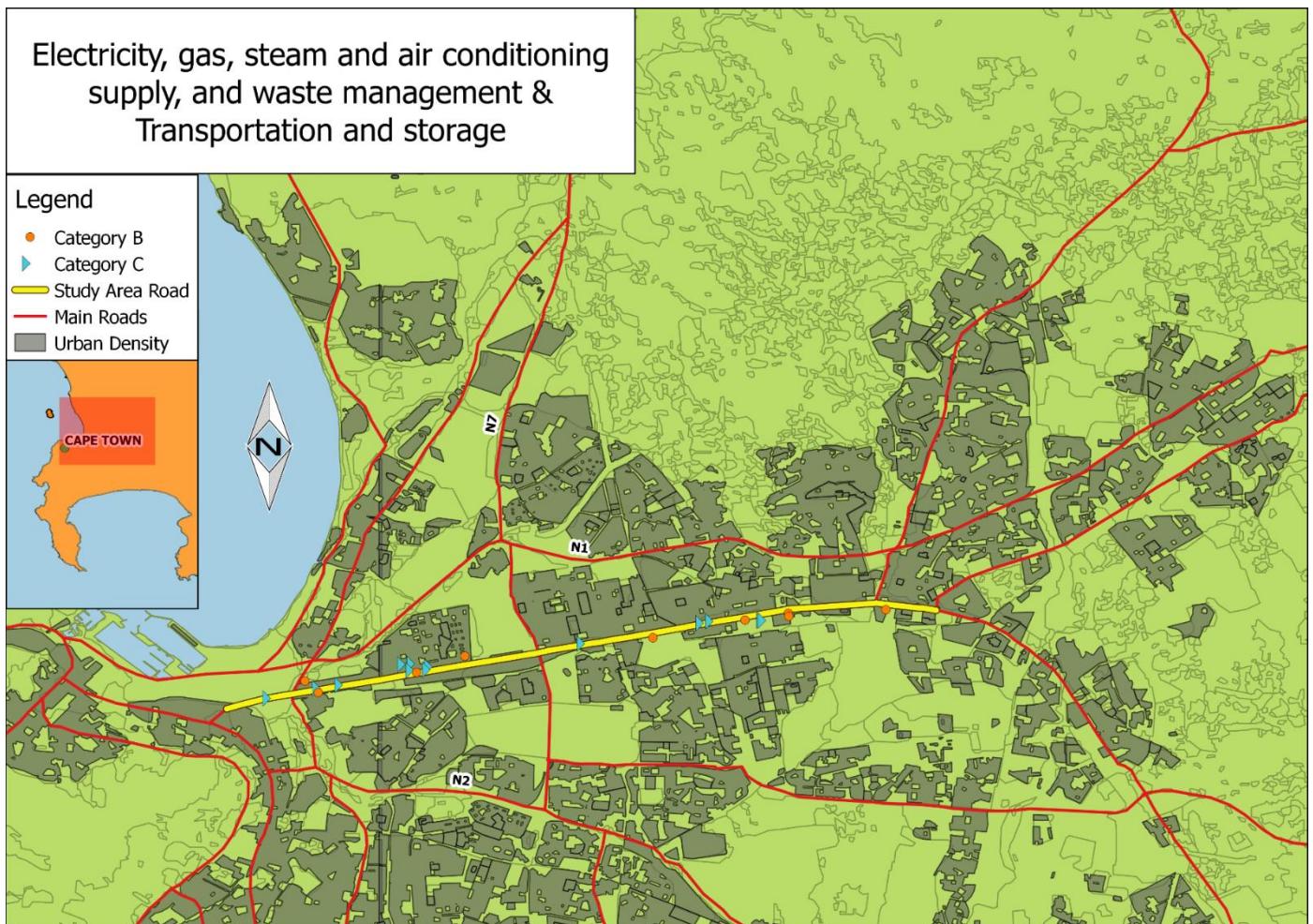


Figure 4.4 Total number of Category B & C occurrences

Upon referral to Figure 4.4 it becomes clear that Category B does not show any real clustering effects. This makes sense, however, as the nature of the activities in this category dictates the dispersal of activities in order to function optimally. Whereas Category C shows a certain degree of clustering. This is evident in that the western side of Voortrekker Road plays host to more of these activities than on the eastern side. Nevertheless, a few of the transportation and storage activities do congregate in the middle, and more to the east of the road. When cross-referencing this with Figure 4.3 it reaffirms the clustering effect since the pattern of clustering in Category C closely follows that of the Category A and D patterns. More specifically the density of clustering of Category C follows the trend of being denser on the western side of the road versus that of the eastern side, as has also been noted with Category A and D. Furthermore, there is not an absence of Category C activities on the eastern side, it just does not represent the same type of density at which the activities agglomerate on the western side of the road. Which is also the case for Category A and D.

Figure 4.5 bellow illustrates wholesale and retail trade activities, which includes the sale and repair of motor vehicles and motorcycles. One thing immediately becomes clear when looking at the point data for Category E; the fact that the activities cluster throughout the entire study area.



Figure 4.5 Total number of Category E occurrences

Several possible explanation points exist for this; nevertheless, the researcher will not be able to reach a clear consensus on this category due to certain limitations. Firstly, the sale and repair of motor vehicles and motorcycles has been clumped together with all other retail and wholesale activities according to SIC, which immediately makes the category a recipient for holding a large amount of activities within it. Secondly, the researcher cannot clearly state that the study area is a cluster of Category E activities since a larger study will have to be done on all economic activities in Cape Town in order to state that this is a clear clustering of Category E activities. However, it can be stated that the study area consists predominantly of Category E activities, which consequentially will influence the nature of Voortrekker Road. It has been found that the road contains numerous businesses which sells second-hand vehicles, along with shops which sells parts for vehicles, as well as various auto repair shops. A number of registered vehicle dealerships do exist, however, the second-hand vehicle sales activities far outweighs the official dealerships. Furthermore, a number of food retailers and wholesalers has been found to exist along Voortrekker Road. This includes the numerous Meat Markets and Spice Shops located throughout the entire study area. In addition, several hardware stores, plumbing suppliers, clothing and footwear stores, jewellery stores, electrical household appliances shops and furniture stores where located throughout the study area.

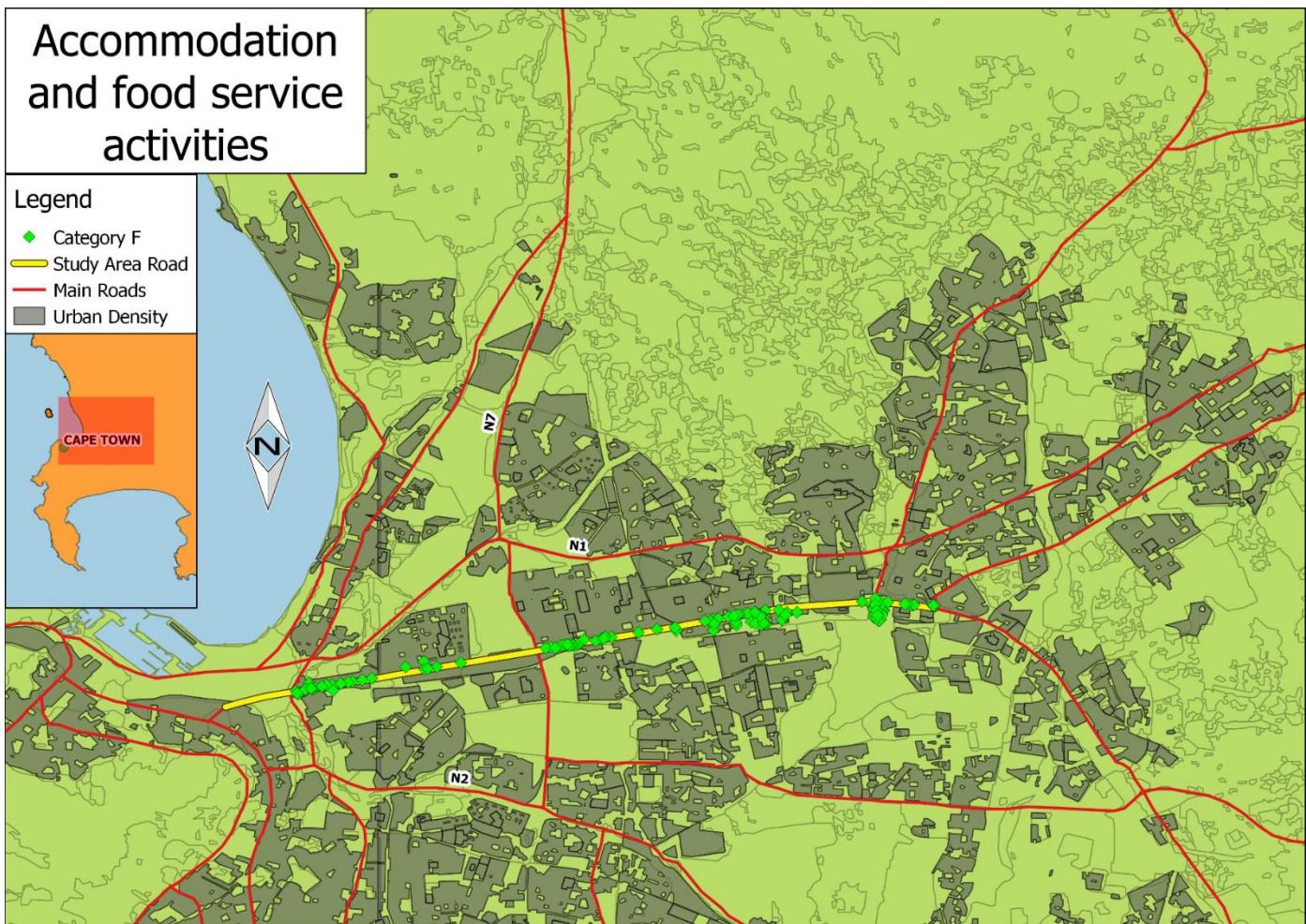


Figure 4.6 Total number of Category F occurrences

When reference is made to Figure 4.6 above the localities of Category F, namely accommodation and food service activities, has been depicted. This category includes all the activities of hotels, motels, guesthouses, restaurants, food service activities of take away counters and event catering and beverage serving activities. Not many instances of hotels, motels or guesthouses where found to exist along Voortrekker Road. Instead, the bulk of this category was made up of the food service activities.

As such, Figure 4.6 illustrates that a clustering effect is evidently present. A few clusters can be discerned starting from the western side of the road. After this first cluster a few individual food service activities are depicted before moving on towards the middle of the road where two major clusters of food service activities are observable separated by yet more individual food service activities. Reaching the eastern end of the map another cluster is apparent.



Figure 4.7 Total number of Category G & L occurrences

As can be seen on Figure 4.7 a certain degree of clustering is displayed in terms of Category G, namely information and communication activities, as well as for Category L, namely the education activities. The Category G activities are shown to be spread out along Voortrekker Road, however, it is clear that they cluster more towards the eastern end of the road with a higher density of these activities evident at this locality. In conjunction with Figure 4.8 below it will become more apparent that Category G activities seem to congregate in space along with the financial and insurance activities represented by Category H. This makes sense due to the close nature of the two categories in question.

Moreover, the educational activities are seen to agglomerate at the eastern end of the road. This further reinforces the notion that the activities which locate towards the eastern end of the study area are of a higher degree of technical operation in contrast to those occurring at the western end. As such, a pattern starts to emerge in terms of functional economic operation.

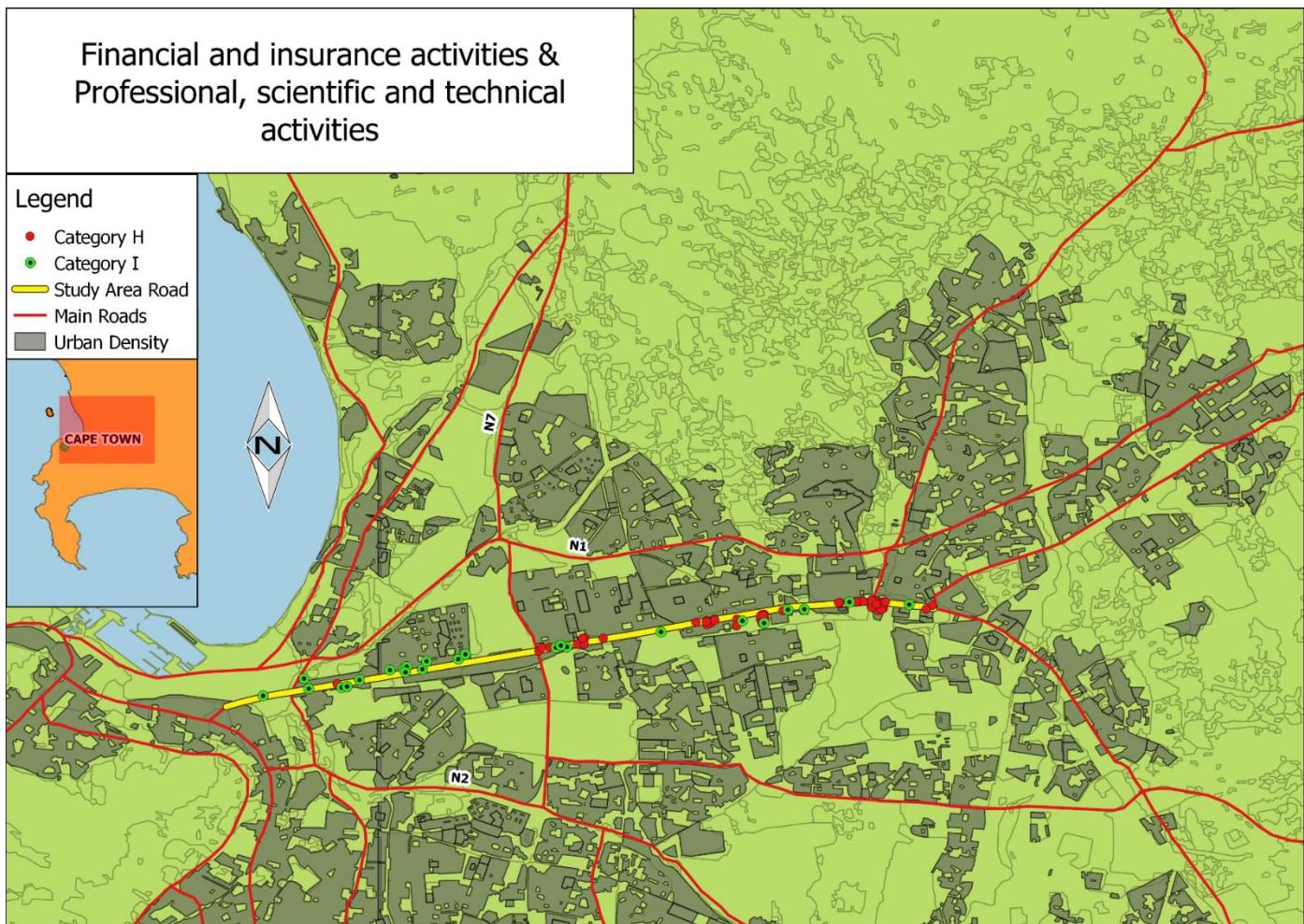


Figure 4.8 Total number of Category H & I occurrences

As has already been noted, according to Figure 4.8, the financial and insurance activities are seen to cluster in the middle, and more towards the eastern end of the road. These Category H activities include all the banking services, along with financial leasing, insurance, reinsurance and pension funding activities. The professional, scientific and technical activities, on the other hand, seems to be more spread out along Voortrekker Road and its surrounds. The higher density of activities for Category I, nevertheless, seems to be situated on the western side of the study area. The type of businesses within these categories includes, but are not limited to, legal activities, activities of head offices, scientific research and development, advertising and market research, and specialised design activities. A lot of the businesses within this category were found to be interior design activities which clustered towards the western side of the road.

Comparing this with Figure 4.3, depicting construction activities, it makes sense that these type of design activities are congregated within the same space as Category D activities. Since construction and design are related activities it would be beneficial for the two to cluster together, and which are indeed shown to do so.

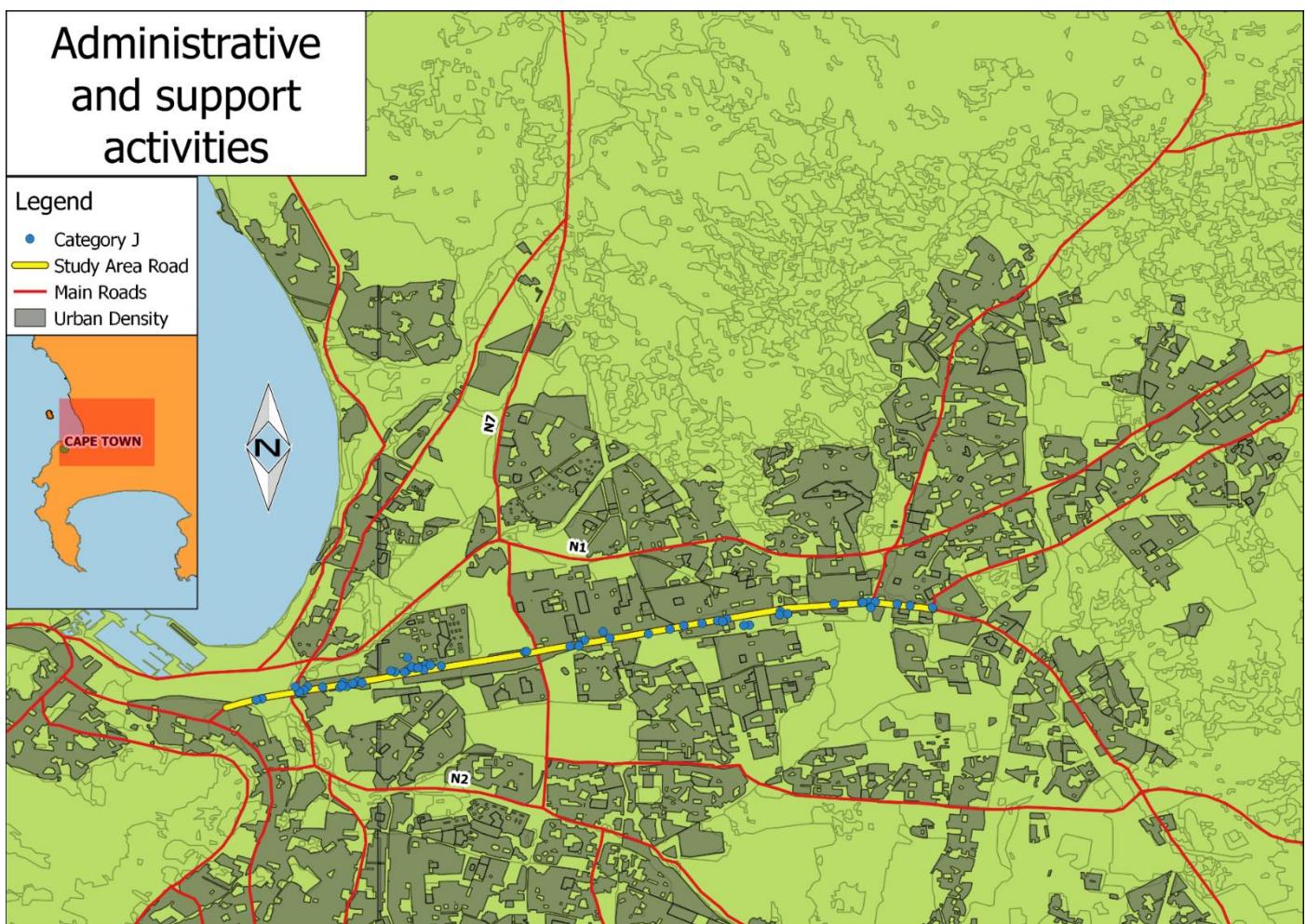


Figure 4.9 Total number of Category J occurrences

Figure 4.9 illustrates all the administrative and support activities. Within this Category J the following activities are present; rental and leasing activities, travel agencies and tour operators, private security activities, employment placement, packaging activities, cleaning activities. This category does not show any real clustering effect but seems to be spread out along the entire stretch of the study area. Due to the nature of this category it is to be expected.

Nevertheless, a small indication of higher densities is shown to occur at the western end of Voortrekker Road. An explanation to this higher density can be provided in terms of Category D activities, depicted on Figure 4.3, which are also located at this end of the road in higher densities compared to the eastern end. Taking packaging activities, for example, it is clear that this type of activities would ideally want to be situated closer to raw manufacturing activities in order to effectively and efficiently supply the end products of manufacturing with the needed packaging before the products can be released to the public.

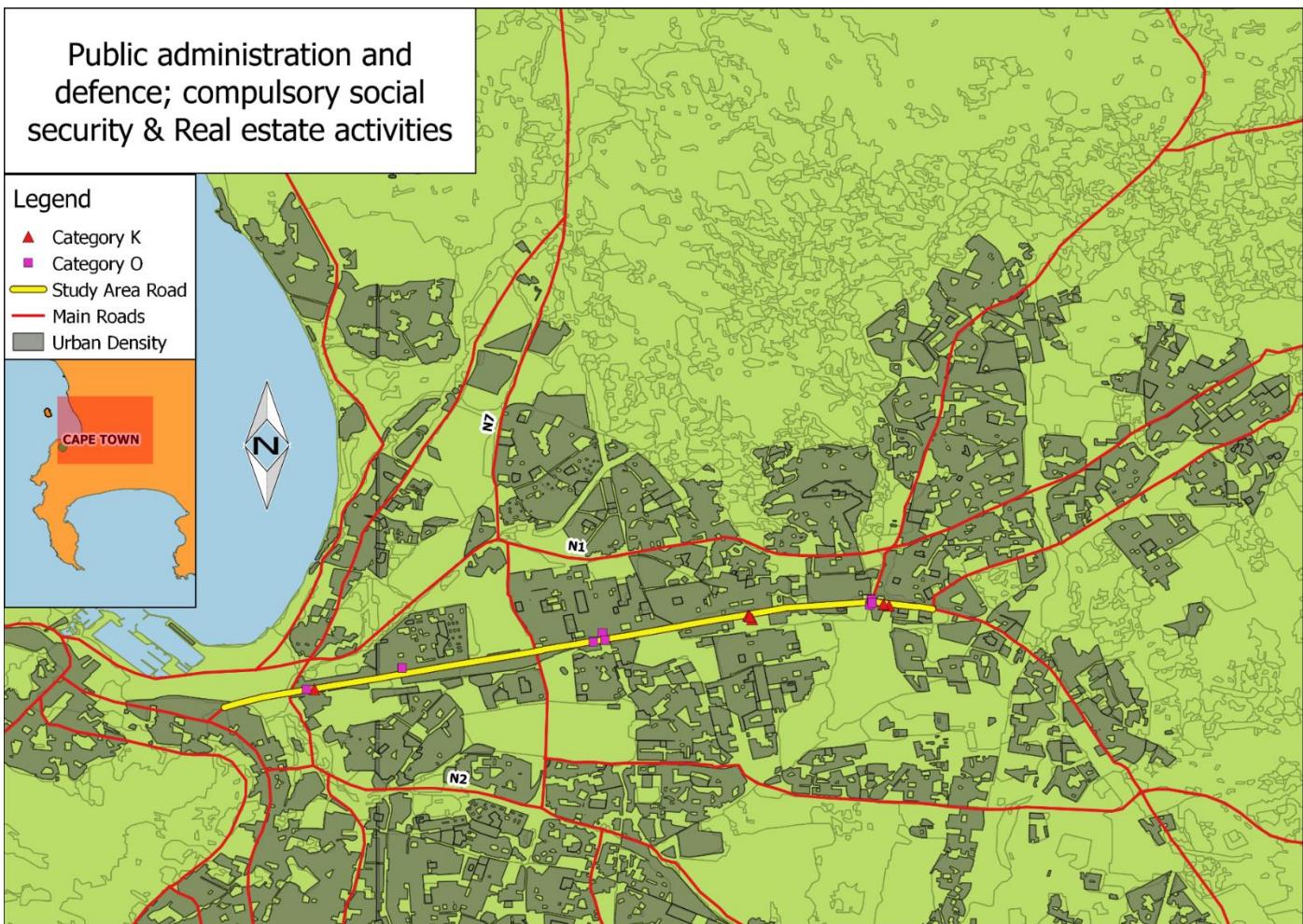


Figure 4.10 Total number of Category K & O occurrences

When referring to Figure 4.10 it can be seen that Category K and O indeed contains the least amount of entries in the researcher's database. Regardless of the amount of entries, however, a pattern of agglomeration is still present. Looking at public administration and defence, represented by Category K, it can be stated that an individual cluster is present at the very eastern end of Voortrekker Road. Moving westward from this point two more Category K activities can be seen to clump together, with another Category K activity being present at the western side of the study area. An explanation can be provided for the dispersal of these activities in terms of defence activities present in the area. Police stations can be found at each point where Category K activities are present. Thus, the dispersal of the Category K activities makes sense in terms of police stations being spread out in order to service a larger area more effectively. Furthermore, the other Category K activities are then made up of public administration buildings such as the Department for Water and Sanitation. Looking at the real estate activities, represented by Category O, yet another clustering effect is in operation according to Figure 4.10. Here two individual clusters of real estate activities can clearly be seen to be situated at the eastern end of Voortrekker Road, as well as in the middle of the road. Furthermore, two more real estate activities are present on the western side of the map, although not clustered together.



Figure 4.11 Total number of Category M occurrences

The human health and social work activities, represented by Category M on Figure 4.11, shows a certain degree of clustering, yet it is spread out along the eastern side of Voortrekker Road. The density at which these activities cluster, however, are much higher at the eastern end of the road. It would make sense for these activities to spread out in order to service a broader area due to the fact that it is human health operations. However, due to the larger amount of foot traffic at the eastern end of the study area, more Category M activities are indeed expected to be situated in the area. Since the western side of Voortrekker Road can be identified more with a construction and manufacturing milieu foot traffic will be negated to a certain extent. As such the environment will be less appropriate for medical and human health activities to be situated in the area.

Furthermore, due to the milieu which is starting to emerge on the eastern side of Voortrekker Road, represented by categories such as the financial and insurance activities, along with educational activities, as well as the information and communication activities, it can be argued that this is a more appropriate setting for activities of human health and social work.



Figure 4.12 Total number of Category N occurrences

Yet another category seems to spread out along the stretch of Voortrekker Road, according to Figure 4.12. This, however, is also expected from this category. The arts, entertainment and recreation activities, represented by Category N, should be spread out as to provide leisure activities to a wider area. It was found that numerous pubs and bars were spread out across Voortrekker Road, as well as gambling and betting places. However, it should be noted that the density of these activities are much higher in the middle of Voortrekker Road. One possible explanation for this is that the area in the middle draws people from both milieus identified on the opposite sides of Voortrekker Road looking for some down time or for leisure.

Furthermore, it is evident that Category N activities are indeed present on both the western and eastern ends of the road, with the eastern end hosting a larger number of these activities. This might, yet again, be due to the fact that the western side of the study area is not conducive for the type of activity in question since the area is more identifiable with construction and manufacturing activities. The eastern side on the other hand holds more potential for recreational activities due to the foot traffic aspect already mentioned above.



Figure 4.13 Total number of Category P occurrences

According to Figure 4.13, four distinct clusters are evident when it comes to Category P activities. This category includes activities such as repair of computers and communication equipment, repair of consumer electronics, hairdressing, laundry services, and funeral services to name but a few.

Chapter 5 : Discussion of data and results

This chapter will discuss the results presented in the previous chapter in terms of a broad overview of the zonation of Voortrekker Road as has been set out by the City of Cape Town Municipal Planning By-Law (2015). As can be seen in Figure 5.1 the zoning denotations has been set out in a legend which is applicable to the next three figures to follow; Figure 5.2 – Figure 5.4. The denotations of most importance can be regarded as General Business 1 – 7, General Industrial 1 & 2, Local Business 1 & 2, as well as Mixed Use 1 – 3.

| | | | |
|---|-------------------------------------|---|--|
|  | Community 1 Local |  | Limited Use Zone |
|  | Community 2 Regional |  | Local Business 1 : Business Interface |
|  | General Business 1 |  | Local Business 2 : Local Business |
|  | General Business 2 |  | Mixed Use 1 |
|  | General Business 3 |  | Mixed Use 2 |
|  | General Business 4 |  | Mixed Use 3 |
|  | General Business 5 |  | Open Space 1 : Environmental Conservation |
|  | General Business 6 |  | Open Space 2 : Public Open Space |
|  | General Business 7 |  | Open Space 3 : Special Open Space |
|  | General Industrial 1 |  | Risk Industry |
|  | General Industrial 2 |  | Rural |
|  | General Residential 1 Group Housing |  | Single Residential 1 : Conventional Housing |
|  | General Residential 2 |  | Single Residential 2 : Incremental Housing |
|  | General Residential 3 |  | Transport 1 : Transport Use |
|  | General Residential 4 |  | Transport 2 : Public Road and Public Parking |
|  | General Residential 5 |  | Utility |

Figure 5.1 Zoning denotations

Source: City of Cape Town (2019)

Upon referral to Figure 5.2 – 5.4 it becomes evident that the Municipal By-Laws has a big role to play in the spatial manifestation of businesses along a certain predefined route. In this instance the defined route is Voortrekker Road and it is apparent that most of the land use has been zoned as General Business as can be seen by the higher density of land use which has been denoted in blue. This is

especially true for the middle and eastern extent of Voortrekker Road depicted by Figure 5.3 and Figure 5.4. On the other hand, when looking at Figure 5.2 which depicts the western extent of Voortrekker Road most of the land use zoning can be interpreted as Mixed Use, with the land use on the very left side of the western extent being zoned as General Industrial.

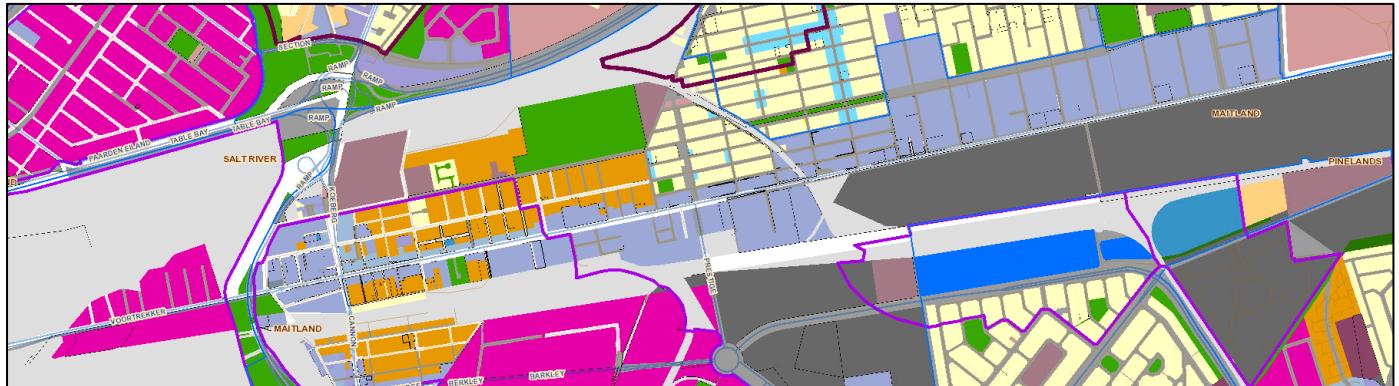


Figure 5.2 Zoning of the western extent of Voortrekker Road

Source: City of Cape Town (2019)

Furthermore, when comparing the Manufacturing and Construction activities, represented by Figure 4.3, with the zonation of land use along Voortrekker Road, represented by Figure 5.2 – Figure 5.4 as a whole, it should be noted that the clustering effect of the Category A and D occurrences (Manufacturing and Construction) broadly follows the General Industrial zoning of land use denoted in pink and purple. In other words, the Category A and D activities tend to congregate around the General Industrial zones and spread out from there, with the Mixed-Use zonation providing further space for Manufacturing and Construction activities to situate themselves, as can be seen on Figure 5.2 in comparison to Figure 4.3 where the clustering effect is shown to occur at higher densities on the western extent of Voortrekker Road.

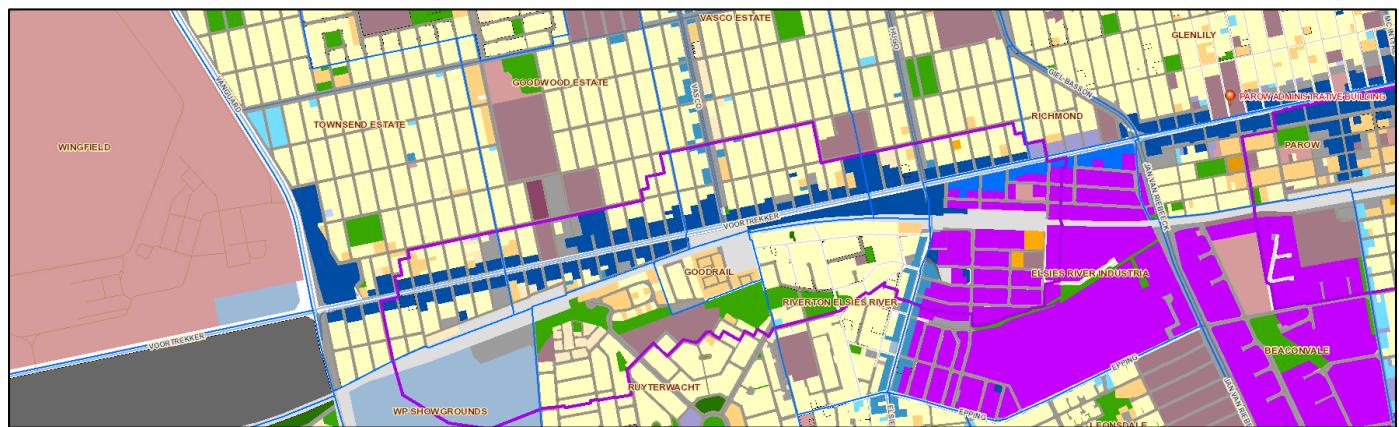


Figure 5.3 Zoning of the middle extent of Voortrekker Road

Source: City of Cape Town (2019)

When referring back to Figure 4.8 it can be seen that the financial and insurance activities, represented by Category H, cluster in the middle and more towards the eastern end of the road. In comparison to Figure 5.3 and 5.4 it is clear that these activities situate themselves in a General Business zonation with a bulk of these activities being found towards the eastern end of the road where a large part of the land

use has been zoned as General Business. Similarly, when looking at Figure 4.7 it is evident that Category G, namely information and communication activities, follows a spatial trend closely related to the financial and insurance activities. On the other hand, a higher density of activities for Category I seems to be situated on the western side of the study area. The type of businesses within these categories includes, but are not limited to, legal activities, activities of head offices, scientific research and development, advertising and market research, and specialised design activities. It seems odd at first why these types of activities would be situated on a Mixed-Use land zonation, however, when looking at the type of activities in this Category it could be said that they require a land use zonation which are laxer on the rules of location.

Figure 4.9 indicates the total number of administrative and support activities and it is depicted that this category does not show any real clustering effect but seems to be spread out along the entire stretch of the study area. Nonetheless, higher densities of this activity occur at the western end of the road. As has already been explained in the previous section the spatiality of this category is hinged, to a certain degree, on the spatiality of industrial activities such as construction and manufacturing and therefore will follow a similar spatial trend to that of Category A and D activities. In other words, the density of Category J activities are higher where the land use has been zoned as General Industrial, or at least seems to congregate and spread out from the General Industrial zones. To reiterate, this type of activities would ideally want to be situated closer to raw manufacturing activities to effectively and efficiently supply the end products of manufacturing with the needed packaging before the products can be released to the public.

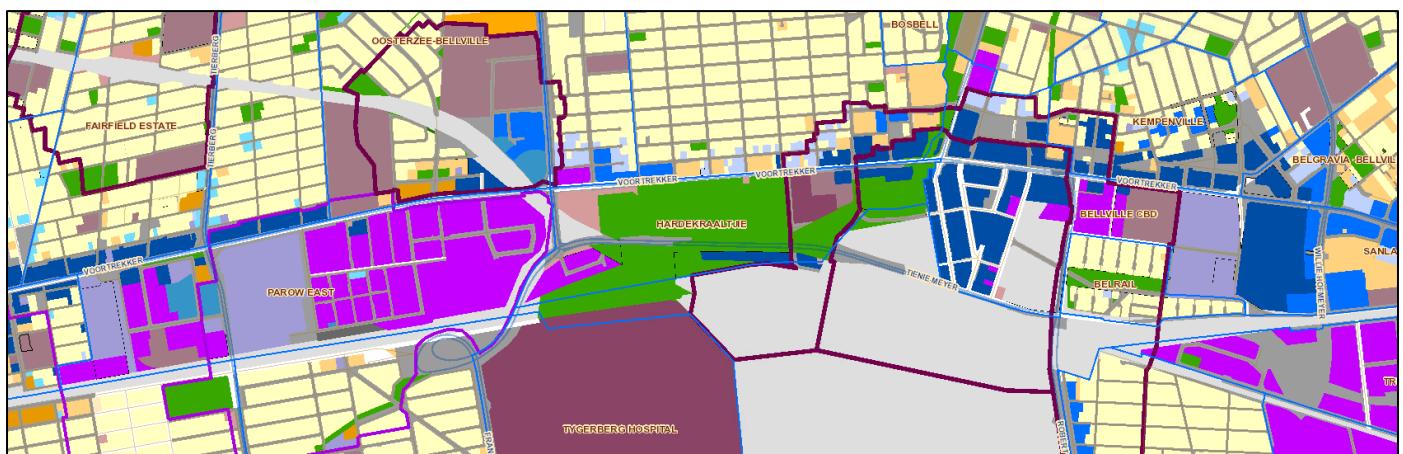


Figure 5.4 Zoning of the eastern extend of Voortrekker Road

Source: City of Cape Town (2019)

Upon referral to Figure 4.11 and 4.12 it should be apparent that the human health and social work activities, as well as the arts, entertainment and recreation activities are more spread out in the middle and towards the eastern end of Voortrekker Road. When looking at the nature of these activities it can be said that they require a more stringent zonation of land use to be allocated on, and as such are situated within the General Business zones where rules of the land use can be amended in such a way as to regulate the type of activities in the area. For example, the human health activities require more stringent

codes in terms of medical procedures. On a similar note, the recreational activities, which include pubs, bars and gambling places requires places where they're operating procedures can be set out in a clear and consistent manner in terms of, for instance, betting licenses and liquor licenses.

Chapter 6 : Conclusion

In conclusion it is pertinent to note that clusters have been found to exist on Voortrekker Road. The western side of the road contains activities which are more manufacturing and construction oriented, with the eastern side representing a more technical and financial environment. These specific milieus which are presented dictates the type of activities to take place in the specific environment. This is due to the type of vibrancy and activity at the individual nodes which further constructs a type of environment and attracts as well as repel certain types of businesses depending on this milieu being created. It is the varying nodes from different exchange environments which makes it possible for interactive growth to take place in a dynamic and synergistic manner.

Due to a node's ease of access to other nodes it is easy for people to use different facilities of easy to reach nodes to facilitate the activities of the node in question. This locational advantage will allow firms to share facilities such as warehouses and other business services and will allow for a wider labour market with a more flexible range of demand and supply (Parr 2004). It is evident that Voortrekker Road has this locational advantage in terms of easily reaching different facilities in one trip. With the western side being more manufacturing oriented and the eastern side being more financial oriented an all-purpose trip is possible for a visitor of this area.

Furthermore, the principle of least effort is clear when it comes to the spatial layout of Voortrekker Road. The structure is very linear in nature and businesses congregate in such a manner as to allow for the most convenient structure to manifest in terms of accessing businesses of the same type in a specific area. By locating oneself near other rivals the service area could be maximised.

References

- Batten DF 1995. Network Cities: Creative urban agglomerations for the 21st century. *Urban Studies*, 32(2): 313 – 327.
- Booher DE & Innes JE 2002. Network power in collaborative planning. *Journal of Planning Education and Research*, 21: 221 – 236.
- Brand A, Geyer HS and Geyer HS Jr. 2017. Corridor development in Gauteng, South Africa. *GeoJournal*, 82: 311 – 327.
- Brunner HP 2013. What is economic corridor development and what can it achieve in Asia's subregions. *ADB Working Paper Series on Regional Economic Integration*, 117: 1 – 40.
- Bryman A 2012. *Social research methods*. Oxford University Press: New York.
- Chapman D, Pratt D, Larkham P & Dickins I 2003. Concepts and definitions of corridors: Evidence from England's Midlands. *Journal of Transport Geography*, 11: 179 – 191.
- Collins GR 1959. Linear planning throughout the world. *Journal of the Society of Architectural Historians*, 18(3): 74 – 93.
- City of Cape Town 2019. City of Cape Town online zoning viewer [online]. Available from: <http://emap.capetown.gov.za/EGISPbdm/> [Accessed 11 February 2019].
- City of Cape Town 2015. City of Cape Town Municipal Planning By-Law [online]. Available from: <http://resource.capetown.gov.za/documentcentre/Documents/Bylaws%20and%20policies/City%20of%20Cape%20Town%20Municipal%20Planning%20By-law%202015.pdf> [Accessed 11 February 2019].
- Doxiadis CA 1970. Ekistics, the science of human settlements. *Science*, 170(3956): 393 – 404.
- Dzumbira W, HS Geyer Jr & HS Geyer 2017. Measuring the spatial economic impact of the Maputo Development Corridor. *Development Southern Africa*, [online]. Available from: <http://dx.doi.org/10.1080/0376835X.2017.1318699> [Accessed 24 August 2017].
- Furundzic DS & Furundzic BS 2012. Infrastructure corridor as linear city. *Proceedings of the 1st International Conference on Architecture & Urban Design*, 19 – 21 April 2012.
- Geyer HS 1988. The development axis as a development instrument in the Southern African development area. *Development Southern Africa*, 4(2): 271 – 301.
- Geyer HS 1989. The terminology, definition and classification of development axes. *The South African Geographer*, 16(1/2): 106 -120.

- Kloosterman RC & Lambregts B 2001. Clustering of economic activity in polycentric urban regions: The case of the Randstad. *Urban Studies*, 38(4): 717 – 732.
- Marrian B 2001. Towards a general theory of corridor development in South Africa. *Proceedings of the 20th Southern African Transport Conference*.
- Mittal J & Kashyap A 2015. Real estate market led land development strategies for regional economic corridors: A tale of two mega projects. *Habitat International*, 47: 205 – 217.
- Musterd S & Van Zelm I 2001. Polycentricity, households and the identity of places. *Urban Studies*, 38(4): 679 – 696.
- Newman PWG & Kenworthy JR 1996. The land use – transport connection: An overview. *Land Use Policy*, 13(1): 1 – 22.
- Parr J 1999. Growth-pole strategies in regional economic planning: A retrospective view. Part 2. Implementation and outcome. *Urban Studies*, 36(8): 1247 – 1268.
- Parr J 2004. The polycentric urban region: A closer inspection. *Regional Studies*, 38(3): 231 – 240.
- Pillay X & Geyer HS 2016. Business clustering along the M1-N-N1 corridor between Johannesburg and Pretoria, South Africa. *South African Journal of Geomatics*, 5(3): 340 – 357.
- Priemus H 2001. Corridors in the Netherlands: Apple of discord in spatial planning. *Tijdschrift voor Economische en Sociale Geografie*, 92(1): 100 – 107.
- Priemus H & Zonneveld W 2003. What are corridors and what are the issues? Introduction to special issues: The governance of corridors. *Journal of Transport Geography*, 11: 167 – 177.
- Sap HA 2007. Corridors and/or linear cities; a historic contribution to the contemporary discussion on corridor development. Working paper. Eindhoven University of Technology. Faculty of Building, Architecture and Planning. Urban Design Group.
- Srivastava P 2011. Regional corridors development in regional cooperation. *ADB Economics Working Paper Series*, 258: 1 -21.
- Standard Industrial Classification of all Economic Activities 2012. Statistics South Africa Standard, [online]. Available from: http://www.statssa.gov.za/classifications/codelists/Web_SIC7a/SIC_7_Final_Manual_Errata.pdf [Accessed 24 July 2018].
- Trueman MM, Cornelius N & Killinbeck-Widdup AJ 2007. Urban corridors and the lost city: Overcoming negative perceptions to reposition city brands. *Brand Management*, 15(1): 20 – 31.

Warnich S and Verster B 2005. The answer is: Corridor development, but what is the question?
Proceedings of the 24th Southern African Transport Conference.

Whebell CFJ 1969. Corridors: A theory of urban systems. *Annals of the Association of American Geographers*, 59(1): 1 – 26.

Appendix

Broad structure

The individual categories of SIC have been aggregated into the following 21 sections.

| Section | Division | Description |
|---------|----------|--|
| A | 01-03 | Agriculture, forestry and fishing |
| B | 05-09 | Mining and quarrying |
| C | 10-33 | Manufacturing |
| D | 35 | Electricity, gas, steam and air conditioning supply |
| E | 36-39 | Water supply; sewerage, waste management and remediation activities |
| F | 41-43 | Construction |
| G | 45-47 | Wholesale and retail trade; repair of motor vehicles and motorcycles |
| H | 49-53 | Transportation and storage |
| I | 55-56 | Accommodation and food service activities |
| J | 58-63 | Information and communication |
| K | 64-66 | Financial and insurance activities |
| L | 68 | Real estate activities |
| M | 69-75 | Professional, scientific and technical activities |
| N | 77-82 | Administrative and support service activities |
| O | 84 | Public administration and defence; compulsory social security |
| P | 85 | Education |
| Q | 86-88 | Human health and social work activities |
| R | 90-93 | Arts, entertainment and recreation |
| S | 94-96 | Other service activities |
| T | 97-98 | Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use |
| U | 99 | Activities of extraterritorial organizations and bodies, not economically active people, unemployed people etc. |