



DISSERTATION

'Rebranding Umhlanga as an Intelligent City'

Chelsea Erwee

212546254

Supervisor: Dr Lovemore Chipungu

5th April 2017

A dissertation submitted to the School of the Built Environment and Development Studies, University of Kwa-Zulu Natal, in fulfilment of the post-graduate degree in Town and Regional Planning.

COLLEGE OF HUMANITIES

DECLARATION - PLAGIARISM

I,, de clare that

1. The research reported in this thesis, except where otherwise indicated, is my original research.
2. This thesis has not been submitted for any degree or examination at any other university.
3. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
4. This thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
 - a. Their words have been re-written but the general information attributed to them has been referenced
 - b. Where their exact words have been used, then their writing has been placed in italics and inside quotation marks, and referenced.
5. This thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the thesis and in the References sections.

Signed

.....

ACKNOWLEDGEMENT

To Aunty Annie and Uncle Pete, Jess and Don - my second family - thank you for taking me in as your own; without question, without falter, without ever letting off just how big a task you had taken on. I will forever be indebted to you for the abundance of love, life and normality which you bestowed upon me in very unsettling circumstances. Thank you for being a corner piece to my intricate puzzle. I love you dearly.

To my cousin Dan and her husband Marc. Thank you for opening your home to me when it mattered most in my adult life. You were the stability upon which my higher education was built. Without you, your abundant generosity and your constant support and understanding, I would surely be on a different path. Thank you for making my life easier, always. I love you both dearly.

To my Nan, you have been a constant beam of light in my life; on the darkest and brightest of days. Nothing has ever been too much to ask of you, your selflessness is unwavering and you give wholeheartedly. Thank you for teaching me to smile through the storms, and that diamonds are made under pressure. You have played a pivotal role in my life, always, and I am eternally grateful for all that you have contributed to my life. You are one in a million. I love you.

To Jus - my pillar of strength, my motivator, my biggest supporter. Thank you. Thank you. Thank you. For everything. Your unwavering support, your continuous encouragement and your ability to make me strive to be a better 'me' than I was yesterday, has been the wind beneath my wings whilst achieving my Masters. You have given me stability, taught me the importance of self-belief and proved to me time and again the truth in your favourite motto "without struggle, there is no progress". I love you.

To my amazing friends, where would I be without you all, today? From a young age, you became the support structure I relied on most. Your patience, your understanding, your encouragement to keep pushing in the times I was closest to giving up, has meant more to me than I will ever be able to express. I cannot thank you enough for walking this journey with me. I love you all.

My amazing parents, Mom and Dad - the example you have both set for me to be a hard worker; your encouragement of me being anything I want to be; and the mammoth sacrifices you have made to keep our family bonded have played a huge role in the lessons I have learnt about life and the choices I have made, leading me to the point I find myself at, today. You have both proved to me that all obstacles – no matter the magnitude – can be overcome. Thank you both, as well as Justin and Julian for embracing this journey with me. I hope I have made you all proud! I love you, I love you, I love you.

And lastly, to Dr Chipungu - my supervisor and my mentor; a million thanks would never suffice for all that you have done for me. Your passion for the field and the desire to see your students succeed are the magnetic fields upon which I was drawn to your mentorship. I will forever be grateful for your open-door policy – being able to touch base with you throughout my five years of study often realigned my mind in the times I was closest to giving up. Apart from the fact that your time never ran out for me, you gave me the most critical gift of all - YOU believed in me. THANK YOU. This dissertation would never have been possible without you and your five years of mentorship. Again, thank you a million times. I hope I have done you proud!

ABSTARCT

The notion of the 'intelligent city' has gained popularity over the last two decades in the urban realm. It is an urban movement towards creating cities which are more adaptable to the fast-paced changes and associated challenges of 21st century cities, with much emphasis on technology. Thus, this study emphasises the importance of researching the case study of Umhlanga as an Intelligent City within a localised context of a developing country, due to the varying adjustment capabilities of 'developed' and 'developing' countries to respond to 21st century city challenges, effectively. The aim of this study was to establish the extent to which Umhlanga embodies the principles of the intelligent city, in response to the traditional city challenges of the 21st century. The main theories which were explored for the purpose of this study included: *New Urbanism*, an urban design notion which is sustainability-centred, promoting mixed-use activities within a compact-city design; *Nodal Development*, a spatial restructuring tool which aims to purposefully encourage development in earmarked areas as outlined in municipal integrated development plans (IDP) in a bid to minimise the developmental gap between areas of high development and areas with development disadvantages; *Neoliberalism*, a governmental policy which gives the market the upper-hand in determining supply and demand, by the government playing a facilitative role whilst the private sector invests directly into developments, thereby creating the necessary and highly dependent-on public-private partnerships (PPPs) for the success of the intelligent city, and; the *Non-Place Urban Realm* looks at the Umhlanga Ridge Town Centre's ability to offer itself twofold – as a physical meeting place well-equipped for face-to-face encounters, as well as its presence as a non-physical realm through the necessary infrastructures which allow for cross-boundary transactions which occur via cyberspace and ICTs. A mixed-method research approach was adopted throughout this research paper. Secondary data sources which were explored included journal articles, books, municipal documents such as eThekweni's IDPs and the URTC design framework; whilst the primary sources included a snowball approach to key-informant interviews, questionnaires, GIS mapping and general observations. The main findings of this paper render the Umhlanga Ridge New Town Centre as an intelligent city within a localised context, based on the New Urbanism and Non-Place Urban realm theories, aligned with Hollands' three framing principles of the intelligent city: *Infrastructure-based Services*; *Social Inclusion, Learning and Development*, and; *Business-led Urban Development*. The recommendations for this research includes a new technology which has not yet been adopted in the URNTC, but has been implemented in parts of Durban's CBD, referred to as Light Pole Installations (LPI). These LPIs will ultimately provide ultra-fast cellular communication, ultra-fast Wi-Fi to local traffic environments, and give Wi-Fi connectivity to the public environment. Moreover, it is proposed that stricter parking measures be adopted within the Town Centre so as discourage the use of the automobile between such short distances and optimise the benefit of the New Urbanism design which does put much of its emphasis on walkability within the precinct, as sustainability is a major drive of the intelligent city.

Contents

1. Chapter 1	15
1.1 Introduction.....	16
1.2 Problem Statement.....	17
1.3 Locality of Study Area.....	18
1.4 Aim.....	19
1.5 Objectives.....	19
1.6 Main Research Question.....	19
1.7 Subsidiary Research Questions.....	20
1.8 Hypothesis.....	20
1.9 Chapter outline.....	20
1.10 Chapter Summary.....	21
2. Chapter 2	22
2.1. Introduction.....	23
2.2. Framing Concepts.....	23
2.2.1. Intelligent City.....	23
2.2.2. Smart City.....	23
2.2.3. Information Communication Technologies (ICTs).....	24
2.2.3.1. The role of ICTs to address urbanisation.....	25
2.2.4. Urban Sustainability.....	26
2.2.4.1. Current Urbanisation Trends.....	27
2.2.5. Developing Economy.....	29
2.2.5.1. Leapfrogging in ‘developing countries’.....	31
2.3 Framing Theories.....	32
2.3.1. Neoliberalism.....	32
2.3.2. Nodal Development.....	34
2.3.3. New Urbanism.....	35
2.3.4. Non-place Urban Realm.....	38
2.3.4.1. The city which privileges elites.....	39
2.3.4.2. ‘Connectivity’ over ‘place’:.....	39
2.3.4.3. Place-bound Communication.....	40
2.3.5. Theoretical conclusion.....	40
2.4. Literature Review.....	41
2.4.1. Introduction to the need for Intelligent Cities.....	41
2.4.2. Unpacking the Complexities of an Intelligent City.....	41
2.4.2.1. ‘Intelligent’ as an adjective.....	43
2.4.2.2. ‘Smart’ as an adjective.....	44

2.4.3. Conceptualising the Intelligent (Smart) City	44
2.4.4. Components of the intelligent (smart) city	45
2.4.5. Principles of an Intelligent (Smart) City	47
2.4.6. European Smart Cities:	50
2.4.7. Smart Cities of the 'Global South'	52
2.4.7.1. The scars of 'coloniality'	53
2.4.7.2. Digital Divide in the Global South	53
2.4.7.3. The African investment: Technology, or people?.....	54
2.4.8. Strengths of the Intelligent (smart) City:	55
2.4.9. Weaknesses of the intelligent (smart) city	56
2.5. Precedent Studies	57
2.5.1 Developed Economy: Tallinn, Estonia	57
2.5.2 Developing Economy: (Dar es Salaam) Tanzania, Africa.....	59
2.5.3 Lessons to be learnt.....	61
2.6. Chapter Summary	62
3. Chapter 3	63
3.1 An introduction to the evolution of cities in South Africa	64
3.2. Harris and Ullman's Multi Nuclei Model	64
3.3. Apartheid: a brief overview	65
3.3.1. The spatial order of the apartheid city.....	66
3.3.2. Nodes and the decentralisation of industries:.....	67
3.3.3. Post-Apartheid: restructuring space	68
3.4. Key tools for post-1994 spatial restructuring:.....	69
3.5. The current realities of the post-apartheid city.....	71
3.6. Chapter Summary	72
4. Chapter 4	73
4.1 Introduction	74
4.2 Data Sources.....	74
4.2.1 Secondary data collection: Desktop research	74
4.2.2 Primary data collection: Mixed method fieldwork (qualitative and quantitative research).....	74
4.3 Data Analysis	78
4.4. Limitations to methodology	79
4.5 Conclusion	79
5. Chapter 5	82
5.1 Introduction	83
5.2 Background to Case Study	83

5.2.1 Case Study: Umhlanga Ridge New Town Centre	87
5.3 Data Presentation & Analysis	91
5.3.1 Umhlanga as a communication node	92
5.3.2 The evolution of Umhlanga as a Public-Private Partnership (PPP) initiative.	98
5.3.3 Sustainable development	100
5.3.4 Safety and Security	105
5.3.5 Housing	109
5.4 Planning Perspective	110
5.5 Demographic Profile of Umhlanga	123
5.6 Infrastructure	128
5.6.1 Physical Infrastructure	129
5.6.2 Non-Physical Infrastructure	136
5.7 Developmental Potential of Umhlanga	141
5.8 Umhlanga as an Intelligent City	143
5.8.1 New Urbanism	143
5.8.2 The Non-Place Urban Realm	147
5.8.3 Hollands three Framing Components of an intelligent city:	153
5.9 Conclusion:	154
6. Chapter 6	156
6.1 Conclusion	157
6.2 Recommendations	157
Bibliography	161
Appendices	169

List of Diagrams

List of Tables

<i>Table 1: Interchangeable definitions of the intelligent (smart) city</i>	32
<i>Table 2: Principles of the intelligent (smart) city</i>	38
<i>Table 3: An allocation breakdown of how the quantitative questionnaires were distributed</i>	66
<i>Table 4: Data Collection Techniques (Summary)</i>	70
<i>Table 5: Wi-Fi accessibility at work (Crosstabulation)</i>	83
<i>Table 6: Live-Work Companies that compete in global markets Crosstabulation</i>	84
<i>Table 1: Usage of Umhlanga's Public Open Spaces</i>	85
<i>Table 2: Primary transportation mode used from home to work and back</i>	92
<i>Table 3: Respondents who are attracted by Safety to URNTC (Crosstabulation)</i>	96
<i>Table 4: Income Bracket (Crosstabulation)</i>	103
<i>Table 5: Private Medical Aid (Crosstabulation)</i>	104
<i>Table 6: Usage of Umhlanga's Public Open Spaces</i>	106
<i>Table 7: Highest Level of Qualification</i>	116
<i>Table 8: Income Bracket (Crosstabulation)</i>	117
<i>Table 9: Live-Work Crosstabulation of Parking Issues Experienced</i>	121
<i>Table 10: Summary of findings for Umhlanga as an Intelligent City</i>	140

List of Maps

<i>Map 1: Umhlanga Locality Map: locality of the study area within Durban's greater metropolitan region</i>	9
---	---

List of Photos

<i>Photo 1: Chris Saunders Park, URNTC</i>	86
<i>Photo 2: The Children's Park, URNTC</i>	87
<i>Photo 3: Gateway Hotel</i>	87
<i>Photo 4: Holiday Inn Hotel, URNTC</i>	88
<i>Photo 5: Chris Saunders Park and the man-made dam</i>	91
<i>Photo 6: Footpaths and Greening in URNTC</i>	95
<i>Photo 7: CCTV street surveillance in URNTC</i>	97
<i>Photo 8: Umhlanga Ridge Management Association Response vehicle</i>	97
<i>Photo 9: On-foot security guards</i>	98
<i>Photo 10: Security huts, guards, boom-gates and CCTV cameras in URNTC</i>	99
<i>Photo 11: Residential Estates, Herrwood Drive, Umhlanga</i>	100
<i>Photo 12: Gateway Private Hospital & Medstone Medical Centre</i>	105
<i>Photo 13: Chris Saunders Park, URNTC</i>	107

<i>Photo 14: The Children's Park, URNTC</i>	108
<i>Photo 15: On-going construction takes away from the aesthetic appeal within URNTC</i>	109
<i>Photo 16: N2 & Cornubia link, URNTC – Earthworks</i>	112
<i>Photo 17: IRPTN C9 route construction site within URNTC</i>	113
<i>Photo 18: Aurora Drive, on-street parking</i>	120
<i>Photo 19: Offstreet courtyard parking in Business Parks</i>	121
<i>Photo 20: The 'Cornubia Bridge' over the N2 highway, for the BRT line to URNTC</i>	126
<i>Photo 21: People use ICT devices where fibre optics provides Wi-Fi, in URNTC</i>	128
<i>Photo 22: CCTV monitored public space in URNTC</i>	130
<i>Photo 23: Developmental potential of URNTC</i>	133
<i>Photo 24: A picturesque view of Chris Saunders Park, the dam, and the greenery</i>	135
<i>Photo 25: Mixed-use developments with retail and residential uses</i>	135
<i>Photo 26: Mixed-use Commercial Activities within the URNTC</i>	136
<i>Photo 27: Activities at the Chris Saunders Park, an example of place-bound communication</i>	143
List of Figures	
<i>Figure 1: Urbanisation Trends (1950-2030)</i>	18
<i>Figure 2: Country Classification Systems in Selected International Organisations</i>	20
<i>Figure 3: Strategic Location of Nodes</i>	24
<i>Figure 4: New Urbanism Design</i>	26
<i>Figure 5: New Urbanism</i>	27
<i>Figure 6: Smart cities in Europe.</i>	41
<i>Figure 7: Locality map of Tallinn, Estonia</i>	48
<i>Figure 8: Tallinn's smart transportation card</i>	49
<i>Figure 9: Locality map of Daar es Salaam, Africa</i>	50
<i>Figure 10: Harris & Ullman's Multi Nuclei Model</i>	55
<i>Figure 11: The Apartheid City Model</i>	57
<i>Figure 12: eThekweni Metropolitan Region</i>	74
<i>Figure 13: eThekweni Strategic Economic Intervention Areas</i>	77
<i>Figure 14: eThekweni Metro Spatial Regions</i>	78
<i>Figure 15: Locality of Umhlanga New Town Centre with regard to arterial access routes</i>	80
<i>Figure 16: Residents of Umhlanga Household Wi-Fi</i>	83
<i>Figure 17: Engagement with Umhlanga's Leisure Activities</i>	85
<i>Figure 18: Transportation mode used by respondents within URNTC</i>	93
<i>Figure 19: Percentage of respondents who choose walking over driving within URNTC</i>	93

<i>Figure 20: Percentage of respondents attracted to URNTC by Employment Opportunities</i>	102
<i>Figure 21: Engagement with Umhlanga's Leisure Activities</i>	106
<i>Figure 22: Percentage of people who are attracted to URNTC by its aesthetic appeal</i>	108
<i>Figure 23: Respondents attracted to Umhlanga's Variety of Activities/ Convenience</i>	110
<i>Figure 24: Percentage of respondents attracted to URNTC by Employment Opportunities</i>	111
<i>Figure 25: Race profile of Respondents</i>	114
<i>Figure 26: Age Profile of respondents</i>	114
<i>Figure 27: Gender Profile of Respondents</i>	115
<i>Figure 28: Education profile of the North Municipal Planning Region</i>	115
<i>Figure 29: N2/ M41 Interchange directional flow</i>	123
<i>Figure 30: N2/ M41 Interchange at Mt. Edgecombe/Umhlanga</i>	123
<i>Figure 31: IRPTN Network planned for within the eThekweni Metro</i>	125
<i>Figure 32: The BRT system in London, Canada</i>	125
<i>Figure 33: The Oval Site within the URNTC where the BRT line will connect to</i>	126
<i>Figure 34: Hotel Marina Sidewalk Café, Hotel Marina, URNTC</i>	136
<i>Figure 35: Respondents whose companies compete in the global market</i>	138
<i>Figure 36: Respondents who engage in work matters in places of leisure, i.e. restaurants/coffee shops</i>	139
<i>Figure 37: Access Routes to the Study Area</i>	140
<i>Figure 38: Hollands' three framing components of the smart city</i>	143

Abbreviations:

BI: Business Intelligence

BRT: Bus Rapid Transport

DFA: Development and Facilitation Act

DFA: Dark Fibre Africa

Gb: Gigabytes

GNI: Gross National Income

HDI: Human Development Index

IDP: Integrated Development Plan

IMF: International Monetary Fund (IMF)

IRPTN: Integrated Rapid Public Transport Network

ISP: Internet Service Provider

LPI: Light Pole Installations

LDCs: Less-Developed Countries

NICTBB: National Information Communication Technologies Broadband Backbone

NMPR: Northern Municipal Planning Region

PoP: Points of Presence

RDP: Reconstruction and Development Plan

SDF: Spatial Development Framework

SDP: Spatial Development Plan

STI: Science, technology and innovation

TTCL: Tanzania Telecommunications Company Limited

UDF: Urban Development Framework

UNDP: United Nations Development Programme

URMA: Umhlanga Ridge Management Association

URNTC: Umhlanga Ridge New Town Centre; also referred to as:

- 'the Town Centre'
- Umhlanga Gateway New Town Centre

- Umhlanga Ridge Town Centre
- Umhlanga New Town
- Umhlanga New Town Centre

eThekweni Metropolitan Municipality; also referred to as:

- The Municipality
- The Metro
- Durban Metro

Wi-Fi: a technology for wireless local area networking

1. Chapter 1

STUDY BACKGROUND

1.1 Introduction

For centuries, cities have served as place-bound centres of face-to-face engagements between people for a myriad of interactions and exchanges. On the one hand; for celebration, for religious congregation, for trade, and on the other; protest action, struggle, and resistance (Maylam, 1995), lending to the intrinsically connected, diverse and complex nature of cities. With worldwide urbanization highlighted as one of the 21st century-city's biggest nemesis – with 54% of the world already urbanized (Oü, 2016), along with climate change; city authorities, globally, are riding the wave of the smart (intelligent) city movement, as a responsive tool to the associated magnitude of urban challenges which consequently arise. As technologies have evolved and populations increased, cities have been incrementally adapting to accommodate for the resulting changes. The 21st century city is technologically inclined – some more advanced than others – but with the internet, advanced telecommunications and transport networks easing the movement in-and-between cities and cross-border engagements, place-bound spaces are becoming somewhat less constrictive to economic production and associated networks (Odendaal, 2016, Castells; in Graham, 2004). Mbembe & Nuttall (2004; pp. 360; cited in Odendaal, 2011; pp. 2376) state that “the city is increasingly a key articulator in a new, regional geography of centrality, dispersal, mobility, and connectivity that expands not only to the rest of the continent but around the globe”. This aspect does, however, contribute to a rapid increase in cross-border and cross-continental migration, and this coupled with exponentially rising urbanisation levels and climate change leads to a number of arising challenges which need increasing attention and sustainable solutions.

Literature – although relatively new to the topic – suggests that intelligent cities have emerged in response to the traditional city challenges with the aim of striving towards developing more sustainably liveable cities; by harnessing ICTs, public-private partnerships, sustainable development initiatives and civic engagement (Nam & Pardo, 2011; Mosannenzadeh & Vettorato, 2014; B.A.U.M, 2013). The European Parliament (cited in Oü, 2016; 4) states that the Smart (intelligent) City is “a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership”. Intelligent cities harness the utilisation of ICTs – among other moves towards creating city ‘smartness’ within economic, governmental, environmental, infrastructure, transport and public domains – making the “critical components of a city more intelligent, interconnected and efficient” (Nam & Pardo, 2011; pp 285). Oü (2016) explains that Information Technology (IT) platforms will revolutionize the way everyday life functions: data capturing sensors will be connected via IT systems to gauge various services including transport, water, and air pollution; virtual realities and artificial intelligence will play a revolutionary role in various sectors such as health; and 3D printing will change the face of industrial manufacturing.

The shift towards the intelligent city model embodies a mutually dependent relationship between sustainability and efficiency in order to create a conducive environment for all age groups and diversities to prosper together in a more liveable city habitat. The culture which intelligent cities attract is one of knowledge, creativity and skill which manifests into a desirable quality of life, and attracts the highly-educated, skilled workers – breeding city ‘smartness’ (Nam & Pardo, 2011; Komninos, 2008).

The focus of this study is on Umhlanga, which is developing into a major investment magnet within the greater Durban region, while presenting massive economic development opportunities. Tongaat Hulett Developments (n.d; p. 2) states that “the area forms part of Durban’s Northern Urban Development Corridor, a key region for growth and investment and which is establishing a major new development node on the city’s doorstep”.

1.2 Problem Statement

Twenty-first century urbanisation is occurring at a staggering rate, so-much-so that by 2014, 54% of the world’s population was forecasted to have inhabited cities (Oü, 2016; United Nations, 2014: 1). The United Nations (2014: 1) projects that by 2050, 66% of the world’s population will be urbanised, as compared to 30% in 1950; and whilst Asia and Africa contribute to 90% of the world’s rural population, 56% of Africa is projected to be urbanised by 2050; and Asia, 64% urbanised. This alarming reality of unequivocally rapid urbanisation coupled with the current global beast – climate change – puts an unsurmountable amount of pressure on cities and their ability to function sustainably, presenting traditional cities with an array of outward-spiralling challenges. Jenks and Burgess (2000: 2) state that “cities have been seen as the cause of environmental degradation and resource depletion, casting an ecological footprint across the globe far beyond their immediate regions”; crime, degeneration, the “over-stretching of infrastructure” (Jenks & Burgess, 2000: 2) and the concurrent lack of infrastructure maintenance contribute to urbanisation pressures on cities. Moreover, the unsustainable use of resources such as energy, water and land; food supply; traffic congestion and air-pollution are common challenges, too (Washburn & Sindhu, 2009, cited in Mosannenzadeh & Vettorato), as are social and economic inequalities (Jenks & Burgess, 2000; Backhouse, 2015; Ruble, 2012).

Despite the challenges presented by cities, it is indisputable that cities are drivers of economies or “engines of economic growth and social development” (Daniels, 2004: 501). Cities foster innovation and produce a large portion of global output – reinstating their role as economic wombs for countries’ economies. Daniels (2004) states that cities “serve a primary economic function as the locations where new forms of economic activity and economic organization evolve and gain higher value”. He, (Daniels, 2014; p.501) goes on to describe cities’ functions as “key nodes of capital accumulation, reinvestment in new sectors and focal points of the development of specialised services”, underpinning the importance of proactive, effective and efficient planning of the urban fabric in order to promote economic growth and enhance the quality of life for all. Judith Rodin, president of the Rockefeller Foundation states that “with the right strategies, cities can use Information Communication Technologies (ICT) to ‘advance resiliency’ to a wide range of climate and social changes while fostering economic growth (Green, 2011: 1). However, ‘intelligent cities’ is a relatively new concept in the urban environment, presenting minimal research on what the fundamental contributors to the embodiment of ‘intelligent cities’ comprises of, thus, contributing to the lack of comprehensive understanding around its topic (Oü, 2016; Nam & Pardo, 2011).

An investigation into the intelligent city principles more attuned to the developing world context and their implementation into the urban design fabric of Umhlanga could assist planners to appropriately plan for

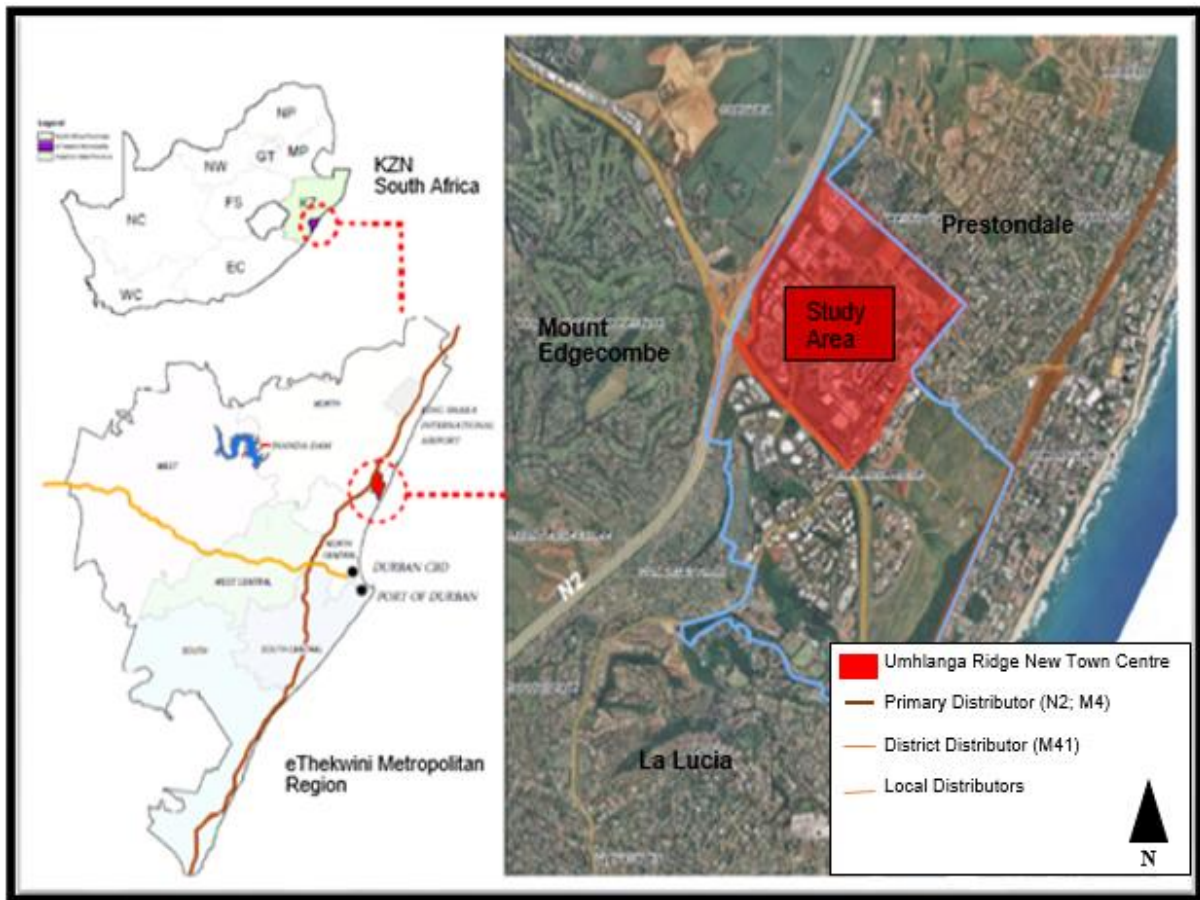
the future, with regards to planning more sustainably liveable habitats with an enhanced quality of life, locally. In addition, although intelligent city principles are expected to be represented more boldly in developed countries due to their better-equipment of smart city enabling resources compared to the developed world; this research topic will serve to gauge whether or not the intelligent city has a strong-standing place in emerging economies of the world, such as the case of Umhlanga, South Africa.

1.3 Locality of Study Area

Umhlanga is a coastal town located 20km north of Durban's Central Business District (CBD), on the east-coast of Kwa-Zulu Natal, South Africa – refer to *Figure 1*, below. It is bordered by La Lucia to the south, Mount Edgecombe western inland, and Umdloti to the north of Prestondale. There are three main arterial roads which intersect Umhlanga, making it highly accessible, and therefore a highly favourable node for development. The M4 highway runs along the coastline through to Ballito, north of Umhlanga; the M41 joins the M4 from the coastline to the inland regions in a westerly direction; and the N2 highway, a national route connecting Cape Town to Durban, via Port Elizabeth. The N2 runs past King Shaka International Airport and Dube Trade Port – not even 20km to the North of Umhlanga, reinforcing the favourability of Umhlanga's location.

In 1972, the Borough of Umhlanga was formed as a marriage between Umhlanga Rocks and La Lucia (Morrison, 2011). It was incorporated into the eThekweni Municipality in the early 2000s – previously under the jurisdiction of the North Local Council, and today forms a strategically vital development node in the greater eThekweni Municipality (Morrison, 2011). Development of Umhlanga in the 1980s spread inland towards the sugarcane fields of Umhlanga Ridge, which today is what forms the Umhlanga Ridge New Town Centre (outlined in red in *Map 1, p. 9*) – a prime retail, residential and office node (Morrison, 2011). As a key economic node in the greater Durban region, Umhlanga's elevated level of development has placed it on the map as one of South Africa's most sought-after, higher-end value real-estate investment locations (Tongaat Hulett, 2014).

Map 1: Umhlanga Locality Map: locality of the study area within Durban's greater metropolitan region



Source: Dlamini (2016)

1.4 Aim

To establish the extent to which Umhlanga embodies the principles of the intelligent city, in response to the traditional city challenges of the 21st century.

1.5 Objectives

The aim of this study will be achieved by the following objectives:

- I. To identify the key actors in the development of Umhlanga.
- II. To gauge whether or not the intelligent city principles serve as an effective response to traditional city challenges in emerging economies, such as the case of Umhlanga.
- III. To establish whether Umhlanga is an intelligent city or not.
- IV. To evaluate the extent to which the Umhlanga Ridge New Town Centre contributes towards the emergence of an intelligent city.

1.6 Main Research Question

Has Umhlanga emerged as an intelligent city in an emerging economy, in response to the 21st century traditional city challenges facing Durban CBD?

1.7 Subsidiary Research Questions

1. What are the key indicators of an intelligent city?
2. What challenges does Durban CBD present, prompting the emergence of an intelligent city?
3. How does Umhlanga reflect or represent an intelligent city?
4. Who are the key actors in the development of Umhlanga?
5. What attracts these key actors to favour investment in the development of Umhlanga, over investment in Durban CBD?

1.8 Hypothesis

The new urban framework of Umhlanga functions effectively as an intelligent city, in response to traditional city challenges of the 21st century facing Durban's CBD.

1.9 Chapter outline

Chapter 1: Introduction

This chapter will incorporate an introduction to the study, the problem statement depicting the challenges and or gaps around the study topic which call for further research to be done; the aim; objectives; research question and sub-questions which all underpin and guide the research outcome.

Chapter 2: Theoretical Framework

This chapter will comprise of the conceptual framework, outlining key relevant concepts; the theoretical framework, speaking to the main underpinning theories; a literature review, giving an in-depth insight into intelligent cities around the world and how they relate to the topic; and precedent studies using two examples from abroad; one from a developed economy and one from a developing economy.

Chapter 3: Evolution of cities in South Africa

This chapter will delve into the depths of the evolution of cities in South Africa, looking into pre - and post-apartheid cities; the dynamics of the apartheid city and how contemporary cities respond. Some of the elements to be explored will include development control mechanisms and urbanization, which have profound impacts on city morphology.

Chapter 4: Methodology

This chapter will represent an exploratory mixed-method research design. Both primary and secondary data research methods will be adopted for this study. A thematic approach to data analysis will be adopted; the research limitations will be presented; and validity and reliability of the research carried out will be expanded on.

Chapter 5: A Case Study of Umhlanga

All the data captured in the methodology will be presented and analyzed in this chapter. The use of diagrams, graphs, maps and various other visual representation techniques will represent the data and the analysis thereof, based on the case of Umhlanga New Town Centre.

Chapter 6: Conclusion and Recommendations

This chapter will conclude all the findings of the research and draw on them to make recommendations which could assist planners in the future developments of cities. This chapter is the glue which will stick all the other chapters together to make sense of the outcomes; and propose possible ways forward with the lessons learnt.

1.10 Chapter Summary

This chapter sought to offer a framework upon which this study was based. It briefly explored the concerns surrounding current urbanisation trends and the consequential challenges thereof in the problem statement, to which the intelligent city has become a responsive remedial tool. It outlined the study area, the Umhlanga Ridge New Town Centre; and listed the objectives of the study, the main questions which were to be explored and answered throughout the study and the hypothesis.

2. Chapter 2

THEORETICAL FRAMEWORK

2.1. Introduction

This chapter will comprise of the conceptual framework, outlining key relevant concepts; the theoretical framework, speaking to the main underpinning theories; a literature review, giving an in-depth insight into intelligent cities around the world and how they relate to the topic; and precedent studies using two examples from abroad; one from a developed economy and one from a developing economy.

2.2. Framing Concepts

2.2.1. Intelligent City

Literature, although relatively new to the topic suggests that intelligent cities have emerged in response to the traditional city challenges with the aim of striving towards developing more sustainably liveable cities; by harnessing information communication technologies (ICTs), public-private partnerships, sustainable development initiatives and civic engagement [Mosannenzadeh & Vettorato, 2014; B.A.U.M, 2013; Nam & Pardo, 2011]. The shift towards the intelligent city model embodies a mutually dependent relationship between sustainability and efficiency in order to create a conducive environment for all age groups and diversities to prosper together in a more liveable city habitat. Intelligent cities harness the utilisation of ICTs – among other moves towards creating city ‘smartness’ within economic, governmental, environmental, infrastructure, transport and public domains – making the “critical components of a city more intelligent, interconnected and efficient” (Nam & Pardo, 2011: 285).

The culture which intelligent cities attract is one of knowledge, creativity and skill which manifests into a desirable quality of life, and attracts the higher-educated, skilled workers – breeding city ‘smartness’. Guerrini (2015: 1) describes intelligent cities to be: “cities and regions that use technology not just to save money or make things work better, but also to create high-quality employment, increase citizen participation and become great places to live and work”. If harnessed to the potential it promises, technology can be tweaked in intelligent ways to offer solutions to the needs of the local people. Moreover, intelligent cities strive to reinvent the look and feel of the workplace, one which is designed for the people who work there as opposed to the organization itself. Honeywill (n.d: 1) states that an intelligent city “is characterised by its place in the new or neo-economy with commitment to cultural capital, innovative environments, diversity, high social intelligence and digital leadership”, a city that gives inspiration, shares culture, knowledge and life, and one that motivates its inhabitants to create and flourish in their own lives. Honeywill (n.d) goes on to explain that there is more consciousness about the calibre of people which intelligent cities strive to attract. Therefore a great deal of effort is invested in the design of facilities which are created to cater for ‘high performance teams’ chasing time of the 24/7 international clock, and allowing the freedom for the reconfiguration of their facilities to correlate with their specific work targets – very different to the hierarchical order and function of traditional workplace environments of the traditional city. Komninou and Sefertzi (2009: 1) state that “intelligent cities are part of the orientation towards the creation of environments that improve our cognitive skills, our ability to learn, foresee and innovate”.

2.2.2. Smart City

Smart cities are described by Nam & Pardo (2011: 285) as being “a humane city that has multiple opportunities to exploit its human potential and lead a creative life”. The culture which smart cities attract

is one of knowledge, creativity and skill which manifests into a desirable quality of life, and attracts the highly educated, skilled workers – breeding city ‘smartness’. Technology et al (2007; cited in Mosannenzadeh & Vettorato, 2014: 689) states that “smart cities respond to areas including economy, people, environment, governance, mobility and building”. IBM’s (2007) take on the domains associated with smart cities runs parallel to the former, with business, people and transport; but also includes water, energy and communication to the determinants of a smart city.

The core focus of a smart city is the adoption of Information Communication Technologies (ICTs) to enhance city functions and promote economic growth, by connecting people locally and internationally without the need to travel and embark on face-to-face engagement (Nam & Pardo, 2011). Denise Lee (Urban Gateway, n.d) best sums up that a city is smart when “investments in human and social capital, traditional transport and modern ICT communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources”. Nowadays, most of a city’s transactions are done electronically via ICTs, welcoming a multiplication of transactions within a fraction of the time compared to those done before the dawn of the ‘information age’. This is a milestone of progress for smart cities as the increased frequency of transactions ultimately increases economic growth and concurrently, in theory, enhances the quality of life for all who are engaged with the smart city.

It is important to note that due to the very parallel similarities between the ‘intelligent city’ and ‘smart city’ definitions, they will be rendered equivalent for the purpose of this study, and will be explained in further detail later on in this chapter.

2.2.3. Information Communication Technologies (ICTs)

Urbanisation and ICT are two key phenomena to have emerged in the latter years of the 21st century. Rouse (2005:1) describes ICTs as “an umbrella term that includes any communication device or application encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distant learning”. The root of these two very significant phenomena stem from the 1980s and 1990s, which saw rapid advancements in technology, resulting in subsequently positive effects on economic growth (Cocchia, 2014). The coupling of these two progressive occurrences had positive effects on well-being which prompted urbanisation to more affluent areas, because of the enticements which cities offered over rural areas; such as employment, social aspects, education, and generally a higher quality of life. The resulting effects were twofold: positive in terms of economic growth and job opportunities, but adversely – many issues surfaced as a result, such as traffic congestion, environmental hazards such as increased carbon dioxide (CO₂) emissions, crime and so-on – due to the rapid urbanisation which came about as a result (Cocchia, 2014).

The situation which the world currently finds itself in, with high levels of urbanisation and arising challenges therewith associated, the adaptation to ever-evolving technologies, especially those which

are part and parcel of the global functions of cities such as ICTs, plays a pivotal role in all city functions and interactions. HABITAT III (2015; pp. 2) states that,

“Urbanization trends pose a need for strategic and innovative approaches to urban design, planning, management and governance. The accompanying trends in ICTs play a significant role in 21st Century urbanization as ICTs increasingly support business functions, city logistics and grids, transport, delivery of basic services, environmental management systems, government operations, data-driven industries like finance, and people-to-people interactions”.

2.2.3.1. The role of ICTs to address urbanisation

ICTs, according to Caragliu, 2009; pp. 4) consist of “mobile phones, satellite TVs’ computer networks, e-commerce, internet services”. These digital services presented by ICTs make connections between places separated by vast distances possible, in real-time, at the simple click of a button. Investments in ICT infrastructure started to rise significantly from the new millennium onwards. Cocchia (2014; pp. 26) states that “in these years the ICT infrastructure such as broadband infrastructures, wireless sensor networks, internet based network applications, and open platforms were spread more and more”. Although ICTs alone do not define an intelligent city, they play a vital role in the functioning of intelligent cities. Hernández-Muñoz et al (2011, cited in Escher Group, n.d) claims that it is “embedded intelligence”, which arises out of the use of ICT orientated solutions and other embedded city solutions, is what is ultimately going to differentiate cities as ‘smart’, stating that this ‘embedded intelligence’ “will be the nervous system of modern economies through making cities smarter”. A different perspective of ICTs is provided by Backhouse (2015) where she explains the contributions of ICTs as a two-fold dimension; ‘informed living’ and ‘digitally connected living’. The former is the role which ICT plays in keeping digitally tracked data in order to keep record-of and aid in more accurate estimation of future needs; such as swiping a digital bus card every time one catches a public bus in order for track to be kept of how many people frequent the service daily and also to project the future demands of public transport planning. The latter is more related to the personal connectivity which people have with each other within cyber space; through digital forums such as emails, social media accounts and so on (Backhouse, 2015).

The core focus of a smart city is the adoption of ICTs to enhance city functions and promote economic growth, by connecting people locally and internationally without the need to travel and embark on face-to-face engagement (Nam & Pardo, 2011, Cocchia, 2015). HABITAT III (2015; pp. 3) explains the relationship of all the city’s infrastructures – both hard and soft – as being interdependent networks, which - if harnessed to their full potential with the assistance of ICTs, could positively address the topic of sustainable urbanisation; stating that, “the multiple infrastructure systems in cities are in fact a ‘system of systems’, or a network of systems that support interlocking operations or functions. They have become more integrated using ICTs, leading to the ‘Internet of Things’ (IoT) and enabling integrated management of operations. Harnessing the potential of these networks for sustainable urbanization is a crucial feature of a smart city”. Backhouse (2015; p. 2) suggests that “there is a sense that Smart Cities apply human intelligence to the problems of city living to achieve better end results”. Nowadays, most of a city’s transactions are done electronically via ICTs, welcoming a multiplication of

transactions within a fraction of the time compared to those done before the dawn of the 'information age'. Internet-based infrastructure is a fundamental aspect of e-services which have had significant effects on increased efficiency of the function of cities across the globe; these e-services tap into various facets of the city including healthcare, public safety, environmental management, education and energy – and reveal valuable information regarding these various city components to all citizens (Cocchia, 2014). This is a milestone of progress for smart cities as the increased frequency of transactions ultimately increases economic growth and concurrently, in theory, enhances the quality of life for all who are engaged with the smart city.

Director of the Blacksburg Electronic Village project, Andrew Michael Cohill – who is also from *Virginia Tech University*, argues that telecommunications "...is the highway system of the twenty-first century" (cited in Hollands, 2008; p. 307). Nowadays, location is less significant to economic growth and success, argues Brian Cowley, of the Atlantic Institute for market studies (cited in Hollands, 2008; p. 307), since "... the three most important things now affecting the future prosperity and development of human communities are technology, technology, and technology". Although ICT plays a key role in the functioning of a smart city, it is not the definition of a smart city; for smart cities harness the technological component for the purpose of the benefits which it offers to the people. Smart cities, in effect, harness technological advancements such as ICT to enhance the city's operational efficiency with the ultimate goal of raising the quality of life for all its citizens (Harrison et al, 2010).

2.2.4. Urban Sustainability

Rapid, unsurmountable levels of urbanisation is one of the key challenges facing 21st century cities worldwide. The pressure which current urbanization trends put on the sustainability of cities and their ability to function at optimum, offering a higher quality of life, is threatening. Jenks and Burgess (2000: 2) state that "cities have been seen as the cause of environmental degradation and resource depletion, casting an ecological footprint across the globe far beyond their immediate regions". Cities are responsible for 70 percent of the globally emitted greenhouse gases (Howler, 2015; The World Bank, 2012), calling for a critical intervention by urban planners, government authorities and citizens to work together against climate change; Howler (2015) states that; "how urban planners, businesses and residents respond to the anticipated crush of new urban development could present a make-or-break opportunity for countering climate change". These threats, together with crime; inner-city degeneration; the "over-stretching of infrastructure" (Jenks & Burgess, 2000: 2) and the concurrent lack of infrastructure maintenance, are large contributors to the urbanisation pressures put on cities. The 1987 Brandtland Report strongly advocated for the move towards sustainable development, stating: "The world must quickly design strategies that will allow nations to move from their present, often destructive, processes of growth and development onto sustainable development paths" (World Commission on Environment and Development, 1987: 49).

The call to move towards sustainable urbanisation to counteract urban challenges associated with exponentially rising urbanisation aids in promoting factors such as "efficient management of land and resources, improved mobility, economic dynamism, higher environmental quality, safety, security,

access to urban services and social cohesion” (United Nations, 2016; p. 6). With emphasis on intelligent cities; science, technology and innovation (STI) enable sustainable urbanization through inclusive initiatives to enhance cities; along with various other factors including financing and urban governance (United Nations, 2016).

The general meaning of ‘sustainability’ is described by Khansari et al (2013: 352) as “a harmonious relationship between human and environmental systems which ensures that human needs are not only met in the short term, but continue to be met in the long term by conserving and allowing for the regeneration of the natural environment”. Sustainable development speaks to development which meets the needs of the present population without compromising the needs of the generations to come in the far future, by carefully managing resources (Khansari et al, 2013). The concept of ‘sustainability’ reaches far beyond the natural environment and into societal and economic dimensions, too (Khansari et al, 2013; Walsh, 2011). Urban sustainability speaks to the structures and interactions which occur within the urban space, which calls on strict planning policies, social cooperation by citizens and technological investment (Cutcher-Gershenfeld et al., 2004 in Khansari et al, 2013).

2.2.4.1. Current Urbanisation Trends

One of the most prominent challenges which cities are faced with in terms of trying to manage sustainability is the urban population growth rate (UN, 2016; Howler, 2015). Population density has a major effect on sustainable urbanisation, environment sustainability and the quality of life for all (Khansari et al, 2013). Khansari et al (2013) claim that by 2025, the urban population is expected to hit the 5.5 billion mark, with a 2.5% rate of increase, annually. The global population distribution; most of which is associated with the ‘third world’, the ‘global south’, the ‘developing countries’ (Odendaal, 2016; Oldfield & Parnell, 2014; Preston, 1988) – whichever way one chooses to brand the less-wealthier countries – and the alarming pace at which it is occurring (Preston, 1988), has been a major concern to governments and academics over the past few decades. Jenkins et al (2007: 9) states that: “Population growth will be particularly rapid in the urban areas of so-called ‘developing world’, averaging 2.3 percent per year between 2000 and 2030” – refer to *figure 1*, p. 18.

For developing countries, the urban population is set to reach 4.3 billion; three times more than the projected 1.2 billion for developed countries (Khansari et al, 2013). Africa and Asia’s urban population represented 39 percent in 2003; while Europe and Oceania were at a rate of 73 percent; American countries – Latin America and the Caribbean represented a 76.8 percent rate of urbanization; and North America – 80.2 percent (Jenkins et al, 2007: 9). Alarming, though, Asia’s population of 1.5 billion, alone, surpasses the combined count of urbanites in Europe, Oceania, Latin America, North America and the Caribbean – representing 1.2 billion. By 2030, sub-Saharan Africa is expected to double to a population of 600 million people (United Nations, 2016), yet 70-80 percent of the population in some African countries remain rural. These alarming figures illustrating population densities of current and future trajectories reiterate the urgent need to take sustainability seriously. Jenkins et al (2007: 9) state

that “monitoring these developments and creating sustainable urban environments remain crucial issues on the International Development Agenda”.

Figure 1: Urbanisation Trends (1950-2030)

<i>Development group</i>	1950	1975	2000	2003	2030	1950-75	1975-2000	2000-30
	<i>Urban population (millions)</i>					<i>Average annual rate of change (%)</i>		
Africa	33	103	295	329	748	4.57	4.21	3.10
Asia	232	575	1,367	1,483		3.63	3.47	2.22
Europe	280	446	529	530	545	1.86	0.68	0.10
Latin America and the Caribbean	70	197	393	417	602	4.14	2.76	1.42
Northern America	110	180	250	261	354	1.98	1.32	1.16
Oceania	8	15	23	24	31	2.75	1.51	1.07
	<i>Percentage of urban population</i>					<i>Rate of urbanisation (%)</i>		
World								
Africa	14.9	25.3	37.1	38.7	53.5	2.12	1.54	1.22
Asia	16.6	24.0	37.1	38.8	54.5	1.47	1.75	1.28
Europe	51.2	66.0	72.7	73.0	79.6	1.02	0.38	0.30
Latin America and the Caribbean	41.9	61.2	75.5	76.8	84.6	1.52	0.84	0.38
Northern America	63.9	73.8	79.1	80.2	86.9	0.58	0.28	0.31
Oceania	60.6	71.7	72.7	73.1	74.9	0.67	0.06	0.10

Source: Jenkins et al (2007: 14)

Preston (1979 in Gugler, 1988) offers three main reasons for urbanisation occurring at a more rapid pace in developing countries, as opposed to developed countries. Firstly, rural-urban migration is a steadfast contributor of current patterns of urban growth patterns and according to Preston (1979 in Gugler, 1988), occurs as a result of the uneven distribution of spatial development; Secondly, is the mammoth administrative task of providing public services for an “unplanned population of users” (Preston, 1979, cited in Gugler, 1988: 11) facing governments, and; Thirdly, is the “largely invisible rural masses” which put less pressure on government with their demands, and are therefore seen as less of a threat to order in society as compared to urbanised populations, yet instead of demanding – they opportunistically migrate to the urban areas in search of a better quality of life.

The above presents an overwhelming reality for which these cities need to be planned for, and the use of smart or intelligent systems and infrastructure within the intelligent city model is proposed as a good starting point to try and counteract the challenges which result from inadequate planning provisions in light of the rapid pace of 21st century urbanisation (Backhouse, 2015; Nam & Pardo, 2011). Moreover, the United Nations (2016: 5) states that “the ‘Smart City’ is one dimension of the urban context of sustainability”. The call to move towards sustainable urbanisation to counteract such urban challenges aids in promoting factors such as “efficient management of land and resources, improved mobility, economic dynamism, higher environmental quality, safety, security, access to urban services and social cohesion” (United Nations, 2016; p. 6). With emphasis on intelligent cities; STI enables sustainable urbanization through inclusive initiatives to enhance cities; along with various other factors including financing and urban governance (United Nations, 2016).

2.2.5. Developing Economy

Developed and developing countries – also referred to as ‘less developed countries’ (LDCs) and ‘emerging countries’ (Keupper, 2016) – are differentiated by a variance of factors, and reveal major differences between the social and economic aspects they each represent, when compared respectively. The history of development has much to do with these aspects of inequality, ranging from cultural, economic and social dimensions, to factors including politics and historical influences, geographical considerations, and international relations (Educational Pathways International, n.d).

A ‘developing country’ is defined by the United Nations as *“a country with a relatively low standard of living, undeveloped industrial base, and moderate to low Human Development Index (HDI)”* (Educational Pathways International, n.d).

The HDI is a tool used to compare literacy, education, poverty, life expectancy and various other measures of development for countries all over the world. Developed in 1990 and adopted by the United Nations Development Programme (UNDP) in 1993, the HDI was developed by Mahbub ul Haq – an economist by profession, and has since been used in the UNDP’s annual Human Development Report (Educational Pathways International, n.d). Countries worldwide are often classified by international investors according to their level of economic development, based on Social and economic measurables. These measureable indicators or criteria for classification include indicative factors of performance such as per capita income and overall literacy rates, as well as the life expectancy rate (Keupper, 2016).

Referring specifically to smart cities in developing economies, Kbabra (2014) explains that a smart city is far from a one-size-fits-all model and each application requires a context-specific adaptation. One of the most obvious points of consideration, which has already been mentioned by which he reiterates, lies in the ‘developed versus developing’ world divide; developing countries face challenges different to those experienced in developed nations. The World Bank explains that:

“Many of the needs of developing countries center on providing and maintaining modern infrastructure (roads, power plants, water treatment plants, sewage systems, transit systems). Since this built environment lasts a long time, getting the right infrastructure in place shapes a city for decades to come. Planning a city with the right infrastructure, and not merely replicating past practices that often have been haphazard, means relying more on evidence and analysis about how sustainable cities can and should grow” (World Bank, cited in Kbabra, 2014; pp. 352).

The United Nations, the International Monetary Fund (IMF) and the World Bank are the three main institutions which offer the most comprehensive definitions of development, the varying levels of development and how countries are classified in terms of their developmental contributions. These three institutions, however, do not necessarily use the same measures of development to determine

developmental outcomes, which leaves for some grey areas in terms of concluding a unanimous tool for developmental measurement (Nielsen, 2011; Keupper, 2016). *Figure 2*, p. 20, offers a summarised table of the varying classification systems adopted by the three above-mentioned institutions.

The measures used to differentiate between ‘developing’ and ‘developed’ countries differ in complexity as well as variance, from institution to institution. The World Bank, for instance, primarily uses gross national income (GNI) per capita as a distinguishing tool, which may be combined with additional tools which aid in analysis, during the process. The United Nations is perhaps the least dynamic in terms of the distinguishable conventions it uses, representing the use of fewest between these three institutions (Keupper, 2016).

The World Bank’s methodology for measuring development is somewhat more ‘concrete’ in that it offers a benchmark upon which to compare, and subsequently classify between being a developed and developing country. The per capita income of US\$12,275 sets the comparable level; anything below this amount is classified as a ‘developing country’ (Keupper, 2016: n.p). The World Bank goes one step further, and categorises developing countries according to their income class; from “low income to upper middle-income countries” (Keupper, 2016: n.p). This contributes to the fuzziness in some areas, which needs to be taken into consideration by international investors.

Figure 2: Country Classification Systems in Selected International Organisations

	IMF	UNDP	World Bank
Name of ‘developed countries’	Advanced countries	Developed countries	High-income countries
Name of ‘developing countries’	Emerging and developing countries	Developing countries	Low- and middle-income countries
Development threshold	Not explicit	75 percentile in the HDI distribution	US\$6,000 GNI per capita in 1987-prices
Type of development threshold	Most likely absolute	Relative	Absolute
Share of countries ‘developed’ in 1990	13 percent	25 percent	16 percent
Share of countries ‘developed’ in 2010	17 percent	25 percent	26 percent
Subcategories of ‘developing countries’	(1) Low-income developing countries and (2) Emerging and other developing countries	(1) Low human development countries, (2) Medium human development countries, and (3) High human development countries	(1) Low-income countries and (2) Middle-income countries

Source: Nielsen (2011: 19)

Smart city applications need to be considered within the context of the country within which it is being applied, taking into consideration its level of development; i.e. ‘Is it a developed country?’, or ‘Is it a developing country?’; for the developmental capacities differ in terms of resources. Oldfield & Parnell (2014: 1) paint a picture of characteristic diversities separating cities of the global south from those of

the north, suggesting that “cities from the south, in the third world, beyond the west – however one labels and packages that suite of cities we all recognize by their informality, their diversity, their pace, their youth, their poverty”, offering a vivid image of the urban realities associated with cities of the developing world, as compared to cities of the developed world – associated with urban order. Oldfield & Parnell (2014: 1) point out that with 21st century urbanisation trends, there is a bold shift in the international distribution of cities, and with urbanisation in cities of the global south expected to supersede that of the developed world, they have become “the new epicentre of urbanism”.

It is therefore of utmost importance that planners and relevant built environment professionals remain cognisant of these factors when applying smart-city models, for one city’s ‘best practice’ application may be another’s ‘worst practice’ and therefore the ‘city-specific’ context and the individual identities and composition of cities need to be strongly advocated for when tweaking the smart city model to meet specific needs.

2.2.5.1. Leapfrogging in ‘developing countries’

Leapfrogging in terms of development is associated with the characteristics of sprawl (Gillham, 2002; in Larice & Macdonald). Gillham (2002; in Larice & Macdonald: 290) states that ‘leapfrogging’ is “subdivisions, shopping centres, and office parks that have ‘leapfrogged’ over intervening tracts of farmland or forest or both”, and is prevalent on the city’s suburban fringes.

The concept of technological or ICT ‘leapfrogging’ is most applicable to developing countries where technological investment lags, compared to developed countries. The advantage which this has for developing countries, is that they are “not inhibited by entrenched intermediate technology” (Fong, 2009; pp. 3707), as is the case with the majority of the developed world. Therefore, developing countries can launch forward into advanced technological investment which aids in more rapid economic development (Fong, 2009). What is more is that these ICT advancements reduce user-costs and, due to the features becoming increasingly user-friendly as technology advances, the skills required from the user are less demanding. The idea of leapfrogging is thus significantly attractive for developing countries due to its ability to accelerate economic growth at the reduced cost of advanced technologies. Fong (2009; pp. 3707) claims that “developing countries do not have any alternative in technology adoption, except to leapfrog to new and advanced technologies” A report on smart cities in Africa prepared by Deloitte reveals parallel sentiments, but with more specific reference to African cities and leapfrogging, explained by Urban Gateway (n.d) as “African cities have the opportunity to start with the latest technology available, thereby immediately thrusting them as competitors into the global market place” (Urban Gateway, n.d).

However, the topic stirs some controversy. Large ICT investment in developing countries presents a double-edged sword: with the example of Africa, Chisenga (2000 in Fong, 2009) sees the economic benefit in leapfrogging, claiming that it would integrate businesses on a global scale and offer a more advanced learning environment for Africa’s children and youth. On the other hand, Ochieng (2000 in

Fong, 2009) and Odendaal (2016) raise concerns in that the basic service provision and needs of the poor are put on the back foot due to ICT investment. Although leapfrogging can accelerate economic growth, the capital investment needed to pursue it turns out to be very expensive for developing countries, which tend to be already burdened by high debts (Fong, 2009).

The types of technology associated with leapfrogging comprise mainly of “those that do not rely on a tangible grid” (Fong, 2009; pp. 3708), such as satellite communications, mobile phones, independent power sources such as solar power. Mobile phones serve as wireless ICTs and lead the way for leapfrogging technology. In Africa and China, mobile phones have replaced fixed communication technology networks and prove significantly beneficial to communities. Proof of this lies in studies done which present findings which claim that “at least 50% of small businesses surveyed in South Africa and Egypt attributed profit increases to mobile phone usage” (Fong, 2009; pp. 3708). Moreover, Tanzanian and South African respondents to the same study revealed that 75% of them have benefitted from communication technologies such as mobile phones, due to the improvement in contact with loved-ones, which have strengthened relationships (Fong, 2009). This illustrates a clear reality for the benefits of leapfrogging to communities of the developing world.

Again, the intelligent (smart) city is not merely a uniform solution to every city’s diverse issues, and the context in which the said city is applicable needs to be explored before applying a ‘best practice’ scenario from elsewhere (developing country) and applying it locally (developing country).

2.3 Framing Theories

2.3.1. Neoliberalism

Neoliberalism as a school of thought only really penetrated beyond the parameters of economics in the mid 1970s and became a dominant theory framing urban planning from thereon-out; as a “strategic political response to the sustained global recession of the preceding decade” (Brenner & Theodore, 2002; pp. 305), and by the 1980s it had become the “dominant political and ideological form of capitalist globalisation” (Theodore et al, 2011; pp. 1).

The ideology of ‘neoliberalism’ is grounded upon “the belief that open, competitive, and unregulated markets, liberated from all forms of state interference, represent the optimal mechanism for economic development” (Brenner & Theodore, 2002; p. 350). Neoliberalism is ultimately a process of relationship adjustments between the three spheres of society: the private sector, the public sector, and civil society; to expedite economic growth. Neoliberalism has a significant place in urban planning, arguing that urban economic bureaucratisation increases the cost of transactions; and that urban planning distorts land markets. Thus, neoliberalism advocates for the rollback of government by adopting principles of deregulation and outsourcing (Wright, 2013). Planning, within the neoliberal ideal, thereby incorporates spatial regulatory measures to offer certainty to the market and aid economic growth. The broad policy framework engaged by neoliberal governments would usually adopt principles of decentralization, deregulation, liberalisation, fiscal conservatism, entrepreneurialism, marketization, privatism, and consumerism (Wright, 2013).

Neoliberalism came as a revival of liberalism, in response to the shift away from post-war Keynesian - popular for its attempts to stabilise crippled markets after the great depression. The end of World War II (WWII) welcomed the industrial era which saw developments of a large-scale, mass produced nature; fast-paced development which responded to and rebuilt what was blasted to rubble and ash in the war. Industrialisation strengthened economies and by the 1950s and 60s the world was already prospering (Wright, 2013). Milton Friedman, the economist of his time, focussed his attention on capitalising on this growing strength of the world's economy, and in 1966 he announced the birth of neoliberal economics. With a combination of Friedrich Hayek's classical liberalism which supported individual freedom and limited government intervention; and the classical growth theory which adopted Keynesian thinking, although displacing it; Wright (2013; p. 1) best describes neoliberalism as a "fusion of monetarism and classical liberalism". Neoliberalism, thus, began through the process of disassembling the post-war institutional components and driving an array of policies aimed at extending competition and market discipline across all societal facets, and came in light of a response to the shrinking profit margins of the mass-production monopolies which were shaped by the industrial revolution. Brenner & Theodore (2002; pp 350) best explain the deployment of neoliberal teachings as a justification of "the deregulation of state control over major industries, assaults on organized labour, the reduction of corporate taxes, the shrinking and/or privatization of public services, the dismantling of welfare programs, the enhancement of international capital mobility, the intensification of inter-locality competition, and the criminalization of the urban poor", as well as corporate tax reductions, the undoing of programmes dealing with cases of social assistance and the opening up of international trade barriers. There are essentially two sides to neoliberalism, the first side represents the liberation of markets from all state controls, but in reality – when put into practice – requires state intervention in the form of intense regulatory forms of discipline in order to enforce market rule upon the social aspects of life (Brenner & Theodore, 2002). The flip-side reveals major shortfalls in the neoliberal ideology that markets which are self-regulating will be optimally beneficial to resource and investment allocations, yet in truth, what neoliberal practice has actually generated is failure of markets, greater polarization within the social aspect of society, and severely uneven, intensified development across all spatial scales (Brenner & Theodore, 2002). Gill (1995; pp. 407, cited in Brenner & Theodore, 2002; pp. 351) precisely clarifies that "the neoliberal shift in government policies has tended to subject the majority of the population to the power of market forces whilst preserving social protection for the strong".

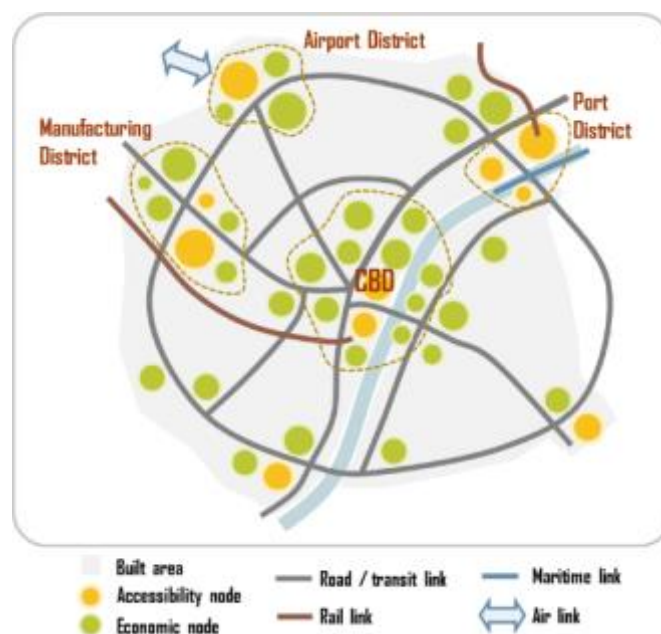
This theory has proved to have had a heavy influence on spatial development from a town planning perspective in that the spatial formation is strongly influenced by market forces. South Africa's GEAR Policy, introduced in 1996 adopted the "neoliberal discourse of competitive, managed cities" (Sutherland: 64), which is represented in the development fabric of Umhlanga. What it ultimately represents is upmarket, private-sector developments which offer commercial and residential opportunities (Sutherland et al: 64). Due to the developments being private-sector driven, the capital investment is high and the opportunities to develop well-designed, appealing urban realms which offer elements favourable to investment such as security, aesthetics, mixed-use convenience; have almost

no limits, as long as the market conductively allows it and investors can fund it. These types of developments tend to. Alternatively, the weaknesses hereby associated is that private-sector driven development and the market's influence on the price to access these developments is exclusionary and relates strongly to affordability. Sutherland's (2013: 64) reference to Umhlanga as 'gated developments' reiterates the exclusions which neoliberal policies induce.

2.3.2. Nodal Development

Nodal development is theorised by the central place theory coined by Christaller in 1933 (Nodal Hierarchy Report, 2015). Christaller strategized locational choice of business according to their location in relation to the close proximity of industrial activities and the concentration of various activities which compliment business environments. Economies of scale also have a highly influential hand in determining where business should locate. The 'central places' which are ultimately nodes, become rooted – by default – in locations where there is an overlapping of market areas for various products and services. Lynch (1960) further elaborates on the importance of nodes and their location, claiming that nodes which are strategically placed in areas of opportunity along main corridors or movement networks increase the efficiency of the movement economy – as illustrated in *figure 3*, p. 24 – as opposed to nodes which aren't as strategically placed. Dawkins (2003:137 in Nodal Hierarchy Report, 2015) claims that it is this process of "monopolistic competition in space" which results in the hierarchy of differentially sized cities each with varying levels of diversity in the products and services they offer. The Umhlanga node is strategically located in the Northern region of the eThekweni Metropolitan boundary, and outlined in eThekweni's Spatial Development Framework (2014/2015) as a 'sub-metropolitan' node, which is accessible at both local and metro-level scales (eThekweni, 2014/2015).

Figure 3: Strategic Location of Nodes



Source: <https://people.hofstra.edu/geotrans/eng/ch6en/conc6en/nodeslinkages.html>

Nodal developments are typical of an all-in-one, compact city design which promotes mixed-use communities, and have been used as a strategic tool to induce investment in pockets of promising opportunity. Places of work, entertainment, learning and shopping are all incorporated into the nodal design, with residences and access to services main features, too (Regional District of Nanaimo, n.d). The term 'node' or 'nodal development' is used due to these cities' joint function to cater for their own residents, as well as those from nearby communities; incorporating residential, commercial and service aspects within close walking proximity to each other. Although significantly designed to keep travelling distances at a minimal between work, home and recreational spaces; nodal developments are linked to neighbouring communities by vehicular, bicycle and pedestrian connectivity routes – offering alternatives to strict car reliability and thereby honouring global attempts to minimise the worldwide carbon footprint and promote sustainable living (Regional District of Nanaimo, n.d). Urban nodes are typical of the highest concentration of residential and commercial activities within a walkable parameter, coupled with a great variety of services; intending to have the character replication of a Central Business District (CBD). In addition, it is a typical characteristic for urban nodes to contain a variation of higher density housing, larger retail stores and entertainment facilities (eThekwini, 2014/2014; Nodal Hierarchy Report, 2015). What makes nodal development appealing is its attention to an array of carefully thought-out planning and design principles; including: creating a pedestrian friendly environment; catering for residential diversity; provision of a greater choice of transportation modes with the aim of reducing the dependency on automobiles; good connections between, and in and out of communities; aspect of 'greening', enhancing the natural features and open spaces for beautification and preservation purposes; as well as promoting innovative participatory methods so that the public engages with their surrounds, which will have positive long-term effects for the community (Nodal Hierarchy Report, 2015; Regional District of Nanaimo, n.d).

What defines a city has somewhat changed in the face of 21st century cities and their rapidly changing spatial forms, in light of accommodating traditional city challenges. What has come to the forefront of the debate is the notion of 'cities-within-cities'. Japan-guide.com (2016) states that "cities within a city' are complexes of one or several buildings, consisting of shopping, entertainment and recreational facilities, offices, restaurants, hotels and residential space". Nodal developments have gained increasing acknowledgement as developing into these 'cities within cities; Odendaal (2011:2376) points out that "cities emerge as important nodal points: as circuits of capital, pools of labour, agglomerations of service and social infrastructure and locations for leisure and entertainment".

2.3.3. New Urbanism

New Urbanism dates back to the early 1980s and has become a salient planning movement of the current era, driving development in the built environment towards raising the quality of life for all by creating more liveable habitats through improving sustainability, creating a strong sense of community, and fostering identity of place through place-making (Day, 2003; NewUrbanism.org, n.d). The New Urbanism trend of urban design was initiated in light of a forward-thinking strategy to address the increasing threats and inequalities which have become part of the urban fabric of traditional cities. Urban

sprawl, the widening gap between race and income, environmental degradation and the diminishment of land fit for agriculture, as well as the 'disinvestment in central cities' (Congress for the New Urbanism, 2000; pp. 339), are all seen as one mass, intertwined challenge obstructing community-building (Congress for the New Urbanism, 2000).

New Urbanism seeks to reorder the physical elements and design of the built environment into more integrated, compact urban spaces to achieve complete communities within walking distances of each other, where people can live, work and engage in leisurely activities within a walkable area of one another (Congress for the New Urbanism, 2000; Day, 2003). The higher density design with six – to-eight storey buildings which is a common design principle of New Urbanism; its commitment to place-making and its encouragement of public open spaces between the mixed-uses of live-work-play activities within walking distance from each other, can be seen in *figures 4, p. 26 and 5, p. 27*. These communities ultimately aim to achieve a variety of mixed-use activities – integrated vertically as well as horizontally; from retail, residential, civic facilities, schools, and entertainment; to healthcare and workplaces; all within a compact design. Moreover, new urbanists encourage a reduced dependency of automobile reliance through their design, thereby incorporating alternative modes of movement networks such as footpaths and bicycle lanes (Congress of the New Urbanism, 2000; Day, 2003) .The principles of new urbanism are as follows: mixed housing, quality architecture and urban design, connectivity, walkability, smart transportation, sustainability, and quality of life (Day, 2003; NewUrbanism.org, n.d).

Figure 4: New Urbanism Design



Figure 5 source: <http://cnuflorida.org/wp-content/uploads/2014/01/CityPlace4-CNU-Florida-New-Urbanism.jpg>

Figure 5: New Urbanism



Figure 6 source: http://www.michaelkostiuk.com/newurban/6_ColumbiaMaryland.jpg

The Congress for the New Urbanism (2000; pp. 339) recognises that *“physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework”*. It therefore becomes part of the framework of new urbanism to emphasise the importance of public policy restructuring and urban development practices which will facilitate sustainable urbanism from both a physical and social aspect. The design of the physical structuring of communities should offer alternative modes of transport to the car, with increasing emphasis on pedestrian-friendly neighbourhoods; neighbourhoods should be designed to welcome diversity – from a population aspect as well as the use of space; the local history, climate and building styles of an area should resonate through the architecture and urban design of towns and city centres; and towns and cities should ideally be shaped by community institutions and public spaces which are easily accessible to the community at large – encouraging engagement and a sense of community living (Day, 2003; Congress for the New Urbanism, 2000). The citizens are part and parcel of the design fabric of a town or city, which is why new urbanism strongly advocates for participatory planning with citizen engagement, alongside both public sector and private sector leaders, and stake-holding professionals.

What defines the urban realm for the public is the way in which the architecture is positioned, shaped and enhanced, the creation of public open spaces in the form of parks and gardens, sidewalks for pedestrian movement and bicycle mobility, streets, avenues and boulevards calmed by traffic circles. This is the very context within which the move towards the green building initiative is encapsulated through architecture (GAPP, n.d). These environments need to offer themselves as platforms upon which local economies and aspiring businesses can base themselves and grow. Ultimately, new urbanism needs to define the complexity of a vibrant, mixed-use nodes (Congress for the New Urbanism, 2000).

A relationship can be found between the compact city design – encouraged by new urbanism – and nodal development and corridors, as suggested by Harrison et al (2009, in Sutherland et al, 2013: 64) stating that spatial planning which have “nodes, corridors and urban edges related to the production of compact city”. The compact city design is believed to be a more sustainable city model in that larger densities of society can benefit from the resources and mixed-use activities concentrated in more compact areas, as well as offering inter-modal transport alternatives in anticipation of lowering greenhouse gases emitted by automobiles. New Urbanism is usually private-sector driven development and therefore can be limited to affordability factors. It requires large capital investment and is usually a product of the neoliberal policies, since governments tend to prioritise funding for ‘pro-poor’ initiatives, whilst the private sector can fund itself.

2.3.4. Non-place Urban Realm

“The great urban paradox of the twenty-first century is that we could be living in a predominantly urban world without cities – that is without spatially based systems of cultural communication and sharing of meaning, even conflictive sharing” (Castells, in Graham, 2000; pp. 89).

Patel (in Oldfield & Parnell, 2014: 37) explains how the late 20th century city has advanced cross-border possibilities through a diverse range of international boundary flows and movement networks, “of capital and labour, together with signs/symbols, organized in intersecting circuits”. This is, however, a reiteration of a remarkable, ‘prescient’ prediction of an alternative to community structures which were traditionally defined by place, proposed more than fifty years ago. Hogan (2011) mentions that Melvin Webber’s early presuppositions, rooted as far back as the early 1960s, predicted that future-communities would eventually become forged out of economic and socially connected networks, as opposed to the traditional creation of community – through physical space and proximity.

Webber coined this prediction as ‘community without propinquity’, in an essay he wrote back in 1963, titled *Order in Diversity: Community without Propinquity*. ‘Propinquity’ is defined, in terms of kinship as “nearness of blood”, and in terms of proximity, as “nearness in place or time” (Merriam-Webster, n.d). This forecast seems to present itself as an absolute reality for the present state of cities in the face of globalisation, in the twenty first century. His idea of community without propinquity was attached to the theory of the ‘non-place urban realm’, which he coined as a term which describes “the long-distance connections, facilitated by telephones, cars, air travel and personal computers” (Graham, 2004; pp. 50). Webber’s non-place urban realm’ was later reinforced in Castells’ work – which he refers to as “the space of flows” (Graham, 2000; pp.82), the “accelerating domains of translocal and transnational technological movement and flow” (Graham, 2000; pp.82). Webber’s list of experiences varied from editor, to teacher, from professional planner to “theorist and analyst of deep urban social changes” (Teitz, 2016) – perhaps his deepest influence of contributions. Webber’s interest and involvement in the urban realm struck this ‘prescient’ predication in that he recognised at a very early stage “what few had then seen, but many would see much later” (Teitz, 2016; n.p), that the city’s definition was increasingly being altered by communications and the speed at which they were evolving, and subsequently

changing. What this meant for companies and the way in which business, relational and social transactions were done, was that location seemed to be less significant for business and other transactions which were once reliant on face-to-face interaction, “once they could locate and maintain their market contacts outside the traditional city” (Teitz, 2016), thus, the realisation was that the once-restrictive barriers of location were starting to be dismantled – opening up communicative flows beyond the place-bound urban realm.

2.3.4.1. The city which privileges elites

Webber viewed the city as a “giant communications mechanism” (Teitz, 2016), likening it to a switchboard which is connected to the world at large. Communication technologies, however, implicated more in their development. People at large were used to being limited to a single place where all interactions took place; political, social, work and family; which was about to change in the wake of transport and communications advancements, offering more porosity to these once-confining boundaries. Teitz (2000; n.p) explains that this change implied more than physical change with people moving more frequently across boundaries, from place to place, but that “it would affect patterns of the mind and expectations in deep ways”. Webber’s two essays written in 1963 and 1964, respectively, which unpack the non-place urban realm and community without propinquity, illustrate his far-advanced enlightenment into the life within the urban realm and the constant changes it faces, which is where the strength of his argument lies. Teitz (2016, n.p) sums up the two essays, which ultimately “note the vaporization of the traditional meaning of “city” into networks of relationships at varying distances, perhaps privileging elites” (Teitz, 2016, n.p). In essence, the ‘privileged elites’ being those who could afford to opt for these ‘networked relationships’ which occur beyond place-based boundaries; through long-distance travel, internet, ICTs – aspects which are not equally accessible to all of society (Boden & Molotch, in Graham, 2000).

2.3.4.2. ‘Connectivity’ over ‘place’:

Webber aimed to lessen the focus on ‘place’ and pay more attention to connectivity, insisting that we should adjust our view of cities to see them as “giant switchboards”, and that in order to comprehend how they function, the key would be to focus on the communication systems by measuring them and planning for them. Webber is repetitive about the benefits of increasing accessibility to and from the city, arguing that it is one of – if not – thee, most vital aspect to cities’ existence. In this sense, a transformation occurs from the aspect of place, into the city becoming a “web of interactions at varying geographic scales” (Teits, 2016; n.p), relating the aspect of space to the existence of the non-place urban realm. Furthermore, he deduced urban realms to be the declaration of “interest communities” (Teitz, 2016; n.p) that are apparent at scales ranging from the local level to the global scale, without definite boundaries, and with the continuous growth and improvement of communications, he predicted these geographic scales to stretch even wider. Webber’s insights have propelled into the urban spotlight over the last two decades, specifically due to the technological advancements of the 1990s, which has seen ICTs balloon at a rapid rate, and become even more entwined into cities and their modern day functions.

2.3.4.3. Place-bound Communication

As much as the 'non-place urban realm' seems so applicable to life as we know it, face-to-face communication still serves huge benefit to society at large; business transactions, social gatherings, networking and-so-on, all have relevance to place-bound existence. Hillis (in Graham, 2000; pp. 280) also speaks of body language and the importance of it in co-present communication, for 'human bodies form a basis for social relationships'. In terms of ICT and its place in the new urban fabric of cities with regard to the relationship between the non-place urban realm and place-bound communication, Odendaal (2011: 2377) suggests that it is an interdependent relationship: "ICT enables spatial transcendence yet encourages physical proximity", reinforcing this stance with Servon's (2001, in Odendaal, 2016: 5) claim that "IT is deeply rooted in geography". Moreover, Odendaal (2011) further explains that ICT advancements together with transportation improvements have opened up global markets enhanced processes of economic production. Furthermore, cross-boundary connectivity between national and international borders has been opened up by the "relaxation of trade barriers and liberalisation of national economies" (Odendaal, 2011: 2376), rendering space as a constraint to economic trade null in void due to advancements in network connectivity making it possible for bigger businesses to locate in more than one country.

2.3.5. Theoretical conclusion

These theories all have relevance to the restructuring of urban space and have a profound linkage with one another, with direct relevance to the evolution of Umhlanga. The transition to neo-liberal based policies in the early 1990s emphasised by the rolling back of government's interference in the market, and down-scaled control in the form of regulatory guidelines for city stakeholders (Odendaal, 2016; Todes, in Bridge & Watson, 2003). Nodal development, in the South African context, was adopted post-1994 as spatial restructuring tool aimed at addressing the spatial fragmentation of the apartheid era – focussing on encouraging investment in nodes cherry-picked for development (Donaldson, 2001). New Urbanism was an internationally-borrowed form of place-making, promoting the use of different convenient design systems in a mixed-use fashion, and the provision of services all within walking distance. Umhlanga adopted the New Urbanism design model in order to create a mixed-use, compact urban realm as a move towards spatial integration. The Non-Place Urban Realm proposes that technological advancements and the growing dependency of urban systems on the internet which foster globalization through cross-border relations, urban centres have allowed for "simultaneous spatial concentration and decentralisation, ushering a new geography of networks and urban nodes throughout the world, throughout countries, between and within metropolitan areas" (Castells, cited in Graham, 2004: 83). Umhlanga promotes itself as a desirable node for high-end capital investment and offers the necessary infrastructure to attract global market players through its major fibre-optic roll-outs; it also offers itself as an attractive location for face-to-face engagement. This study aims to establish the extent to which Umhlanga embodies the principles of the intelligent city, in response to the traditional city challenges of the 21st century experienced in light of rapidly inclining urbanization pressures.

2.4. Literature Review

2.4.1. Introduction to the need for Intelligent Cities

The 'smart city' concept has catapulted to the forefront of urban development strategies for the optimization of cities' functions, over the past two decades. A common topic which arises as one of the key focal areas is the use of ICT infrastructure, as well as an increasingly emphasised focus on the role which human capital, social capital and inter-relational exchanges of these concepts with the environment play in the growth of urban areas, and cities (Nam & Pardo, 2011; Caragliu, 2009).

Much of the literature around the concept of smart cities has emerged from the 1990s onwards, with most of its emphasis exponentially ballooning in the new millennium onwards (Nam & Pardo, 2011). This renders minimal research on the topic, since the relatively young application of the smart city proves not to have been rolled out for long enough for there to be a universally unanimous, conclusive definition of what a smart city encapsulates (Ou, 2016; Mosannenzadeh & Vettorato, 2014; Honeywill, n.d). In addition to the topic's youth; and due to the changing nature and characteristics of cities universally, there is no definitive set of principles which define a smart city – because of the magnitude of the smart city agenda and all it encapsulates. (Backhouse, 2015; Nam & Pardo, 2011). What authors such as Backhouse (2015), Komninos (2015), Walsh (2012), Mosannenzadeh, & Vettorato (2014), Carter (2013), Guerrini (2015), Nam & Pardo (2011), Komakech (2005) all share in common, is the sentiment that smart cities have emerged as a key responsive tool to try and combat traditional city challenges. Moreover, they argue that if honest efforts to improve the urban framework are adopted in line with smart city principles, then economic growth will progress; thereby enhancing the quality of life for all in the exponentially urbanizing world.

Since there is no universal definition of an 'intelligent city' (Komninos, 2015), often the terms *smart city*, *knowledge city*, *digital city*, *ubiquitous city*, *learning city*, *wired city* and *information city*, are used interchangeably, although they may reveal minor differentiations between them (Backhouse, 2015). Some have more of an emphasis on technological aspects such as ICTs and network infrastructure (wired city, ubiquitous city, digital city), others lean more towards the harnessing of educational and human capital aspects (knowledge city, learning city), which leads us to the smart city – which is the most commonly used of the terms, since it appears to be the most holistic, incorporating technological, social (human capital) and institutional varieties (Nam & Pardo, 2011). It is therefore pertinent to offer some clarity on the terms 'smart city' and 'intelligent city', the two main relevant concepts which will be rendered equivalent for the purpose of this research, and thereby used interchangeably (Albino et al, 2015; Hollands, 2008).

2.4.2. Unpacking the Complexities of an Intelligent City

The terms 'intelligent' and 'smart' differ slightly in meaning, especially in their application of the 'intelligent city' and 'smart city' models, yet they also reveal the most parallel similarities of all of the associated 'smart city' terms, such as knowledge city, information city, ubiquitous city, digital city, and

so-on (Backhouse, 2015). There is no universal definition for an 'intelligent (smart) city' (Ou, 2016; Komninos, 2015, Backhouse, 2015), and although the closely related terms; 'knowledge city', 'wired city', 'digital city', 'ubiquitous city' and 'information city' – to name a few - are used interchangeably, although they may reveal minor differentiations between them (Backhouse, 2015). Conjunctively, Hollands (2008) and Cocchia (2014) attribute the difficulty of defining Smart City, to three main aspects:

1. The interpretation of the meaning to which we associate the adjective “smart” with, has an influence on the context in which it is used and therefore results in a range of city typologies which are attached to the smart city concept, including Digital City, Information City, Wired City, Knowledge City, and so on;
2. “Smart city” as a label, due to the variance of city discourses and the interchangeability of their propositions on the smart city, causing blurriness between the terms and their attributions, and;
3. Incorrectly labelling cities as ‘smart’ because of their marketing appeal, something which Hollands’ (2008) alludes to being an ‘urban labelling phenomenon’. Attributing the term ‘smart city’ to infrastructural changes or workable policies which effectively adopt IT as a core driver of the smart city agenda - a standpoint for which Hollands (2008) calls for ‘real smart cities to please stand up’ – is what the ‘real’ intelligent (Smart) city is about.

Komninos, cited in Hollands (2008: 305) and Albino et al (2015: 8), present four possible meanings of the ‘intelligent city’ - illustrating the wide range of different meanings which can be attached to the concept of intelligent cities and reiterating the lack of consistency in the use of the term, making it difficult to conclusively define a single, universal definition:

1. Application of a wide range of electronic and digital applications to communities and cities;
2. Use of ICT to transform life and work within a region in significant and fundamental ways;
3. Embedded information and communication technologies in the city;
4. Spatial territories that bring ICTs and people together to enhance learning, innovation, knowledge and problem solving

Table 1, p. 32, will provide definitions of the interchanged terms to offer an understanding of the associated confusion around the difficulty in providing a single, universal definition for the intelligent (smart) city:

Table 11: Interchangeable definitions of the intelligent (smart) city:

TERM	DEFINITION
SMART CITY	<p>“Connecting the physical infrastructure, the IT infrastructure, the social infrastructure, and the business infrastructure to leverage the collective intelligence of the city” (Harrison et al, 2010; p. 1).</p> <p>“A smart city is a humane city that has multiple opportunities to exploit its human potential and lead a creative life.”... “A smart city is a centre for higher education and better-educated individuals, similarly, a smart city is a centre full of skilled workforces” (Nam and Pardo, 2011; pp. 285).</p>

LEARNING CITY	“The term ‘learning’ in ‘learning cities’ covers both individual and institutional learning. Individual learning refers to the acquisition of knowledge, skills and understanding by individual people, whether formally or informally. It often refers to lifelong learning, not just initial schooling and training. By learning, individuals gain through improved wages and employment opportunities, while society benefits by having a more flexible and technological up-to-date workforce” (OECD, 1999).
KNOWLEDGE CITY	Knowledge cities “frequently focus on the relation of universities and academic knowledge and their links to the business world (Slaughter and Rhoades, 2004; Deem, 2001; cited in Hollands, 2008; p. 306).
INTELLIGENT CITY	“... territories with high capacity for learning and innovation, which is built-in the creativity of their population, their institutions of knowledge creation, and their digital infrastructure for communication and knowledge management” (Komninos, 2006; p. 1 cited in Hollands, 2008; p. 305)
INFORMATION CITY	“digital environments collecting official and unofficial information from local communities and delivering it to the public via web portals” (Nam & Pardo, 2011; pp. 258) “digital environments collecting official and unofficial information from local communities and delivering it to the public via web portals are called information cities” (Anthoupoulos et al, 2010).
DIGITAL CITY	“A connected community that combines broadband communications infrastructure to meet the needs of governments, citizens, and businesses” Ishida (2002; cited in Albino et al, 2015; pp. 6). “A digital city denotes an area that combines broadband communication infrastructure with flexible, service-oriented computing systems. These new digital infrastructures seek to ensure better services for citizens, consumers and business in a specific area” (Komninos, 2008).
UBIQUITOUS CITY	“ ‘U-City’ is a 21st century futurist city which enables the service such as one-stop administration service, automatic traffic, crime prevention, fire prevention system and home-networking of residential places which fused high-tech infrastructure and ubiquitous information service into the urban area” Jang, M. & Suh, S. (n.d:2).

Source: Author (2017)

2.4.2.1. ‘Intelligent’ as an adjective

According to the Oxford English Dictionary (OED, n.d), as a noun, intelligent may refer to “a person who is well versed in an art or a skill”; as an adjective, someone that “understands or knows”, or has a “keen understanding”. With reference to action, speech and appearance, the term suggests “showing a high degree or good measure of understanding”. Moreover, the term lends itself to the aspect of ‘information’ which is a key topic in intelligent and smart city agendas, “bearing or conveying information or intelligence; informative; communicative”. Interestingly, the OED (n.d) goes as far as to define intelligence in terms of buildings, which again, has importance in the design fabric and urban form of

smart and intelligent cities and how they can offer functionality parallel to adhering to sustainable development, as the world attempts to move collectively towards more sustainable measures of living. An 'intelligent building' is "an office or building containing a set of integrated services such as heating, lighting, electronic office equipment etc. controlled by a central computer system which is capable of the most efficient and sound use of resources" (OED, n.d).

2.4.2.2. 'Smart' as an adjective

Similarly, to the above, the term 'smart' will be defined so as to provide a platform on which to base a city as 'smart'. The word 'smart' has a variance of meanings depending on the context to which it is referred. If applied to a person it means "clean, tidy, and well dressed"; referring to an object it suggests a "bright, fresh appearance" and when using it in context of a place, "fashionable and upmarket" best describes it (Oxford Dictionaries Online, n.d). These descriptions relate mainly to appearance and are illustrated in smart city agendas to create places of attraction which lure in investment and people, to create areas of aesthetic appeal which will contribute to the sense of place and an increased quality of life which they aspire to achieve, and to offer an environment which residents can feel safe in and proud of (Backhouse, 2015). Moreover, the term has parallel relevance to 'intelligent' in that its application to a person means "quick-witted intelligence" (OED, n.d; cited in Backhouse, 2015; pp. 2). Smart also refers to a device, as "programmed so as to be capable of some independent action" (OED, n.d; cited in Backhouse, 2015; p. 2), a description which has direct relevance to the ICT element of smart cities, whereby information collected and disseminated through the use of smart devices can aid in responding to the needs and interests of city residents.

The more "elitist term" (Nam & Pardo, 2011; p. 283) *intelligent*, is somewhat less inclusive than that of the term *smart*, and while 'intelligent cities' is, according to Hollands (2008) and Albino et al (2015), the most aligned and similar of all the sister terms, *smart* appears to be more inclusive of the social as well as technological aspects of the smart city agenda, rendering it a more holistic, user-friendly descriptive term (Nam & Pardo, 2011). In clarity, the elements of an intelligent city have more probability of being uniform to those of a smart city, therefore fitting into the broader nature of the smart city; but the smart city may offer more inclusivity. Having said that, the terms are context specific and there appears to be no evidence of two of the same cities which represent the adoption of every smart city or intelligent city principle, nor with replicated successes. Hence, the terms *intelligent city* and *smart city* will be loosely interchanged for the purpose of this research.

2.4.3. Conceptualising the Intelligent (Smart) City

The inconsistency in the interpretations of the smart city concept point out that the different uses of the concept create a hazy blur around what truly underpins the 'real' smart city, as opposed to cities which adopt the word 'smart' because of its buzzword appeal. As previously discussed, Hollands (2008) warns against cities adopting the label 'intelligent (smart) city' for the sake of its attractiveness – or as a sort of marketing tool – without being truly representative of what a smart city is or should be.

Muente-Kunigami & Mulas (2015) point out that smart cities are generally categorised by two main overarching directions of thought:

1. A technology-oriented city which is ICT intensive; public services are thus made more efficient due to the advantages which real-time data collected by ICTs and networked devices can offer. An example would be the technological advantage of sensors embedded in much of the city's infrastructure; such as those in public trash bins which signal when they are full. Technology found in buildings, which encourage sustainability, such as smart metres and systems designed to promote energy saving, are considered intelligent (Muente-Kunigami & Mulas; 2015)
2. A smart city which leans more towards creating more sustainable relationships between civil society and governments, through various technologies such as ICT. This is a more people-centred approach in the sense that governments harness the feedback produced by citizens to provide more effective and efficient services – according to their needs. A good way for this relationship to be fostered is by, for example, allowing community members to have more participation in the management of their own community neighbourhoods. Citizens use smartphone apps to engage with government through government's open data sharing platforms; such as technologically based waste-removal routes, dictated by, say, reports of full trash bins (Muente-Kunigami & Mulas, 2015).

These two approaches proposed by Muente-Kunigami & Mulas (2015) are believed to assist in the improvement of public service delivery in cities of developing countries. What they propose is a “smart city development framework”. Komninos (2015: 178) suggests a pattern of intelligent city emergence, stating that “there is a trend towards smart and intelligent clusters, in which economies and innovation capabilities are further enhanced by digital networks, smart environments, web applications and hybrid products and services”. Nam & Pardo (2011) have narrowed down the broad components of a smart city found across literature, into three fundamental elements; *technology* – all the physical and non-physical elements of infrastructure such as the software and hardware; *institution* – the governmental component which includes policy, and; *people* – the humanistic element which relates to learning, creativity and diversity. Hollands' (2008) three framing or core elements of a smart city are closely related to Nam & Pardo's; *infrastructure-based services* (mirroring 'technology'); *business-led urban development* (indirectly relative to 'institutions') and; *social inclusion, learning and development* (people-centred approach).

2.4.4. Components of the intelligent (smart) city

This study will be based on Hollands' (2008) three framing components of the smart (intelligent) city:

1. '**Infrastructure-based services**', with a particular focus on ICT;
2. '**Business-led urban development**', speaking to the issue of creating attractive business environments through infrastructure provision and attracting adequately skilled workers to the city, and;

3. **'Social inclusion, learning and development'**, combining governments', residents' and business' use of new technology to transfigure the quality of life and work - working smart to address community needs.

Drawing on Hollands' (2008, Backhouse, 2015) three main areas of focus on which he bases smart cities; infrastructure-based services; business-led urban development and social inclusion, learning and development; will be expanded on and will form much of the base upon which the case study of Umhlanga will be investigated, for the purpose of this research.

Infrastructure is the 'backbone' to a city's economy and functioning. Carter (2013) makes an important distinction between the elements of infrastructure; distinguishing them as physical and non-physical infrastructure. *Physical infrastructure* refers to underlying structures that support city systems; drainage systems, sewerage systems, transport networks, bridges, energy channels and so on. *Non-physical infrastructure* has more direct relevance to Hollands' (2008, Backhouse 2015) first of three framing topics on which he bases a smart city; *infrastructure-based services*. This constitutes the invisible components of infrastructure which are holistic to cities of the information age. This infrastructural component "occurs in cyberspace and creates functional relationships between the city and humans" (Carter, 2013: 505), through systems including mobile technology and social media. Hollands' (2008; Backhouse, 2015) relates his first discourse to the topic of ICTs and their involvement in enhancing the way in which information and knowledge is disseminated amongst people and institutions to enhance city functioning and promote a higher quality of life for all citizens. This relates to the services and infrastructure components of a city which, through 'smart computing technologies', can promote efficiency and intelligence through digital interconnectivity (Backhouse, 2015). Healthcare, transportation, local government administration, education and public safety are all made more efficient and effective through such measures.

Business-led urban development is the second of Hollands' three framing topics of smart cities. This refers to the creation of attractive business environments by facilitating infrastructure investment as a draw-card to entice skills and investment into the city (Backhouse, 2015). Smart cities become an investment magnet for businesses due to the quality environments they promote. Moreover, this topic emphasises the competitive goal amongst cities to achieve economic growth, which is enhanced by capital investment into these cities as well as skills accumulation. Here, innovation is harnessed to benefit the needs and desires of the elite, the so-called skilled – skilled enough to fit the mould of human intelligence which the intelligent city invites. Backhouse (2015: 3) describes these knowledge elitists as 'knowledge workers', and those who fall short of the mould, fall short of the benefits. Here, the primary goal which reigns supreme above all is the maintenance of social harmony so as to avoid the disruption of achieving business and economic-oriented goals.

Last of the three topics is *social inclusion, learning and development*, which speaks to the element of community participation through the needs identified by the people, in a bid to create the quality of life they strive to have, through collaborations with government (Hollands, 2008 in Backhouse, 2015). The

services and needs which people have will differ from city to city and place to place, it is therefore crucial for this collaboration between civil society and government to be adopted in order for context-specific needs to be met. Without people, there would be no city, smart or not, and in order for growth to occur – economically, intelligently, sustainably – the advantages of intelligent living need to be fostered. With all the varying – but closely related principles of an intelligent city – Nam & Pardo (2011) suggest that these principles are context-specific to the city's individual, differentiated environment to that of another, and therefore can differ slightly.

2.4.5. Principles of an Intelligent (Smart) City

The Centre of Regional Science at the Vienna University of Technology underlines six main elements as being the key principles of a smart city: smart economy, smart people, smart governance, smart environment, smart living and lastly, smart mobility (Caragliu et al, 2009). These elements are reiterated throughout literature (Kumar, 2015; Cohen, 2012; Nam & Pardo, 2011) – some giving more emphasis to these dimensions than others. Nam & Pardo (2011: 283) acknowledge these dimensions but critique writings which cite these dimensions as key, as being 'rosy visions and ideal images', whilst failing to offer a true reflection of what really makes a city smart. A shortfall which contributes to the minimal understanding of the smart city agenda is the lack of comprehensive success factors of smart cities, upon which other, emerging smart cities can borrow from and successfully adopt.

Nam & Pardo (2011) have narrowed down the broad components of a smart city found across literature, into three fundamental elements; *technology* – all the physical and non-physical elements of infrastructure such as the software and hardware; *institution* – the governmental component which includes policy, and; *people* – the humanistic element which relates to learning, creativity and diversity. Hollands' (2008) three framing or core elements of a smart city are closely related to Nam & Pardo's; *infrastructure-based services* (mirroring 'technology'); *business-led urban development* (indirectly relative to 'institutions') and; *social inclusion, learning and development* (people-centred approach). Arguably the most fundamental of all key components of a smart city – although of no real significance without the others – technology, such as ICT, plays a vital role in transforming areas of living and working, ultimately striving to enhance the quality of life. Infrastructure – physical and technological, as well as human infrastructure, all form part of the technological component. Smart computing technology is, according to Washburn et al, an integral part of the smart city, when 'applied to critical infrastructure components and services' (Nam & Pardo, 2011: 286). It is predicted that ICTs will have a significant effect on the reduction of globally produced CO₂ emissions - by as much as 20 percent; keep the CO₂ emission level at the 2015 mark, thereby effectively separating the coupling of economic growth from the growth in CO₂ emissions (Global e-Sustainability Initiative, 2015).

Table 2, p. 38, serves to offer a brief summary of the general – sometimes overlapping – principles of the intelligent (smart) city, as interpreted by various academics and authors:

Table 12: Principles of the intelligent (smart) city

AUTHOR	PRINCIPLES:
Kumar (2015)	Innovation Economy Urban Infrastructure Governance
Nam & Pardo (2011)	People Institutions Technology
Technology et al (in Mozannenzadeh & Vettorato, 2014; p.689)	Economy People Environment Governance Mobility Building
IBM (2009; cited in Mozannenzadeh & Vettorato, 2014; p.689)	People Business Transport Communication Water Energy

Source: Author (2017)

With all the varying – but closely related principles of a smart (intelligent) city – Nam & Pardo (2011) suggest that these principles are context-specific to the city's individual, differentiated environment to that of another, and therefore can differ slightly.

Innovation economy:

This aspect calls for continuous innovation in various industries and city clusters, it encourages a workforce which is based on skills and knowledge, and it involves intensive companies which breed knowledge (Komninos, 2008; Kumar, 2015).

Urban Infrastructure:

Urban infrastructure is ultimately the spine of the city, therefore in order for cities to function at optimum, transport systems need to be current, efficient and sustainable. Energy systems and various utilities are also core to cities' operation and their relevance to economic growth. Another aspect which is gaining increasing attention is the issue of environmental protection within the urban realm (Kumar, 2015). Connectivity networks, both hard and soft, are core to the city's infrastructure. Since ICT is a core aspect of the city, infrastructures which facilitate ICT need to be invested in, such as broadband accessibility. Odendaal (2011:2382) states that "ICT is treated as an enabler of effective municipal functioning, including the promotion of e-administration and e-governance". Moreover, efficient services

are provided through good infrastructure, including water, electricity, roads and the like. Urban infrastructure is crucial for economies to achieve positive growth.

Governance:

Kumar (2015) explains this aspect as being the two-way relationship between government and citizens; the administrative duty of- and the way in which citizens communicate information to the government, as well as the service which government has to its citizens in a sense of the quality of life they offer their citizens. Nowadays, this relationship is enhanced by services such as 'e-governance', an ICT centred initiative which is supposed to make communication between citizens and governments' more efficient with the primary objective of enhancing the quality of life for all (Odendaal, 2016; Kumar, 2015). Odendaal (2011: 2383) suggests that ICT enables municipalities to function effectively through e-administration, "for financial systems, procurement and human resource systems, etc." and e-governance, "with the creation of an Internet portal and the ability to access services electronically". Odendaal (2011: 2379) offers a perspective on e-governance from an African perspective, alluding to the fact that it is "closely aligned with decentralisation agendas". Where there is a lack of support from the state or the pure absence thereof, e-governance through information technology offers a platform for local governments to engage with local citizens in decision making processes. This is offered via knowledge and information dissemination through internet portals, allowing for the public to give inputs and feedback and into policy documents (Odendaal, 2011).

Additionally, public-private partnerships are key to smart city developments, according to Herbert (2015), who explains that it is crucial for governments to invest in the very technologies which enable 'smart (intelligent) city' growth. Herbert (2015: n.p) quotes examples of these enabling technologies such as "nanotechnology, battery technology, wireless spectrum allocation, and other basic and applied science developments relevant to smart city initiatives". Much of the time, this unfolds in partnerships involving universities, governments and companies who provide such technologies. It is argued that many municipalities go beyond the technological investment initiative in that their contribution to technological investment is much more than the end product of their contribution; for this aspect has a huge impact on the way citizens see and experience different aspects of the city (Herbert, 2015).

Technology:

Arguably the most fundamental of all key principles of a smart city – although of no real significance without the others – technology, including ICT, plays a vital role in transforming areas of living and working, ultimately striving to enhance the quality of life (Nam & Pardo, 2011). According to Herbert (2015: n.p) this component includes "sensors, devices, network infrastructure, wireless connectivity, software, machine-to-machine learning, analytics, apps, security safeguards and system management". Infrastructure – physical and technological, as well as human infrastructure, all form part of the technological component. Smart computing technology is, according to Washburn et al (in Nam & Pardo, 2011: 286), an integral part of the smart city, when 'applied to critical infrastructure components and services'. It is predicted that ICTs will have a significant effect on the reduction of globally produced

CO2 emissions - by as much as 20 percent; keeping the CO2 emission level at the 2015 mark, thereby effectively separating the coupling of economic growth from the growth in CO2 emissions (Global e-Sustainability Initiative; 2015), thereby keeping in line with sustainability goals.

People:

Herbert, (2015) stresses the importance of people in the city's fabric; and more so their importance in the move towards the intelligent city agenda. With much of the focus of the intelligent city being on the importance of networked infrastructures such as ICTs, some perhaps, do not give enough credit to the role which the city's citizens play in creating successful smart (intelligent) cities. Herbert (2015) states that "beyond the technology, there is much to be done on the people and process fronts" (Herbert, 2015). An integral part of successful smart city transitions is the engagement of citizens throughout various phases of the transition; from planning phase to service delivery rollouts, to the management of cities, argues Memoori (2015). Castells (cited in Graham, 2000; pp. 91) states that:

"indeed it is public space that makes cities as creators of culture, organisers of sociability, systems of communication, and seeds of democracy, by the practice of citizenship. This is in opposition to the urban crisis characterised by the dissolution, fragmentation, and privatisation of cities".

Memoori (2015; n.p) states that "a smart city places people at the centre of development, incorporates ICT into urban management and uses these elements as tools to stimulate the design of an effective government that includes collaborative planning and citizen participation".

Quality of Life:

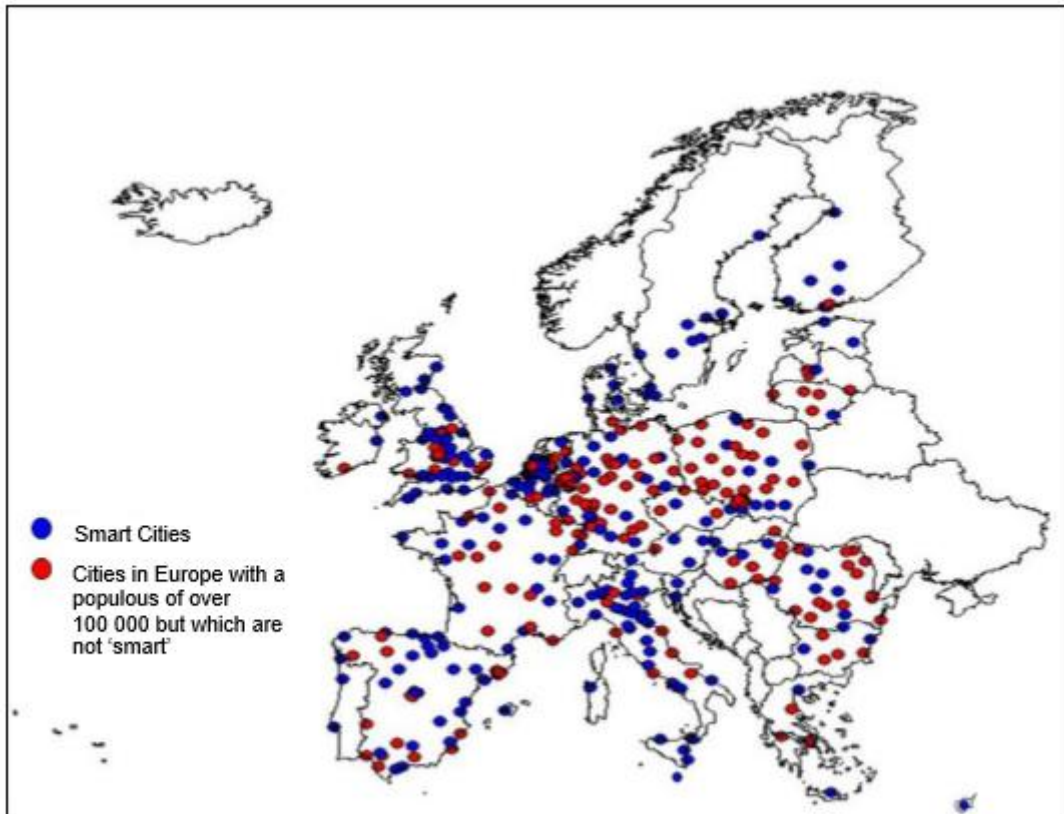
A number of factors form the basis upon which a person's quality of life can be gauged. Odendaal (2011) presents a few 'key' elements, including a person's access to information, opportunities to build on their education, and technology. South Africa's National Development Plan (NDP) outlines a long-term vision until 2030 and "aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and the reduction of inequality" (SAGI-SoNA, 2011:1 cited in Zarenda, 2013; pp 3). The plan outlines several core elements regarded fundamental to a decent standard of living – which in turn contribute to one's quality of life. These include: Safety and security; safe and reliable public transport; quality education and skills development; recreation; employment; social protection; adequate nutrition; housing, water and electricity; and a clean environment (Zarenda, 2013).

2.4.6. European Smart Cities:

According to a study done by the European Parliament on smart cities, 'Study6', Amsterdam, Copenhagen, Amsterdam, Helsinki, Manchester, Vienna and Barcelona are ranked the highest amongst the dense concentration of smart cities in Europe – refer to *figure 6*, p. 41 – in terms of their smart activity (Ou, 2016; Cohen, 2014). For their higher densities, their highly invested public transport systems, their commitment to walking and cycling as more sustainable modes of transport and their

emphasis on a collective citizen engagement throughout the process to achieving smarter, more sustainable cities; European smart cities are seen to be leaders of the smart city agenda: “Europe is the model for the rest of the world to learn from” (Cohen, 2014).

Figure 6: Smart cities in Europe.



(European Parliament, 2014: 39)

Three of these top ranking European smart cities mentioned above will be briefly explored below:

Copenhagen:

With sustainability at the forefront of Copenhagen's conscience to better itself as a modern-day city, it has found itself ranking as one of the leading 'Green Cities' thanks to its commitment to drastically reduce carbon emissions; through its carbon reduction plan which is quoted as being “the most ambitious carbon reduction plan of any major city in the world” (Cohen, 2014). Its goal to achieving “carbon neutrality by 2025” (Cohen, 2014) is to be realised through its stringent targets which it has set to implement including green building standards, energy efficiency plans, including renewables. Moreover, according to Cohen (2014) 40% of Copenhagen's commuters are cyclists – which has lead the city to partner with MIT of late, to produce a bicycles fitted with sensors to offer real-time data to the users as well as administrators, to evaluate challenges associated with air pollution and traffic congestion in a bid to offer innovative solutions.

Amsterdam:

Amsterdam has a very strong commitment to sustainable transport modes, with “67% of all trips done by cycling and walking” (Cohen, 2014). Cohen (2014) elaborates on the ‘smartness’ of Amsterdam, explaining that Amsterdam as a smart city exists as a public private partnership which seeks to use open-data systems within the city to enhance its performance in necessary areas which will lead to an improved quality of life, stating that the PPP is “focused on using the city as an urban laboratory for the use of open data, new mobility solutions and ultimately improved quality of life for all residents and visitors”. This project has been in support of over 40 smart city projects, including smart parking.

Vienna:

Vienna boasts a high quality of life, and with the leadership of Vienna’s planning department’s skipper, Thomas Madreiter, a public private entity called ‘TINA Vienna’ has been set up to co-develop strategies aimed at making the city smarter. One of the projects elaborated on in a 100 project-rich document aimed at smart city projects within the city, is that of a “Citizen Solar Power Plant”. This project has welcomed a PPP between local authorities and Wien Energy – a provider of energy to the city of Vienna – to achieve the goal of “obtaining 50% of their energy from renewables by 2013” (Cohen, 2014) by offering the incentive of a guaranteed 3.1% annual return on energy panels purchased by its citizens.

From the evidence provided above, common practice which European cities adopt in their quest to reinvent themselves as ‘smart cities’ lies in their commitment to improving the quality of life within them, with much of their successes pointing to the PPPs which they embark on to achieve such. The people (citizens), government (governance), and the private sector, evidently have a collective role to play in the journey to making cities ‘smart’. European cities are denser than the dispersed, sprawled nature of cities in the global south, but they also have stronger economies and tend to have a higher density of educated individuals; all factors which contribute to the success of these smart cities as compared to those of the global south. Access to good education in Europe is considerably more accessible than the poorer countries of the South, which is a contributing element to the level of skilled citizens which European smart cities are able to benefit from.

2.4.7. Smart Cities of the ‘Global South’

City models are by no means equal across the globe, and there is no exception to the rule for the intelligent (smart) city model (Oldfield & Parnell, 2014). Vainer (in Oldfield & Parnell, 2014: 48) explains the disjuncture between the application of the same models applied in the developed world, and the developing world, stating that:

“...they are conceived in economic, political and cultural contexts that are completely different from the cities to which the concepts and theories are disseminated, packaged up as ‘tool boxes’ and action models. Effacing the realities and social and territorial problems of the global periphery, they propose solutions that are, in the end, supposedly all-purpose ‘instruction’ on ‘best practice’; applied in situations and contexts entirely different from the ones for which they were conceived”.

The smart city agenda is one which is often associated with European cities and cities of the Far East (Backhouse, 2015), but its application to cities of the 'global south', and more specifically to the local continental context of Africa presents very thin findings (Odendaal, 2016; Backhouse, 2015). Despite many African cities making the transition to the smart city and all that it encompasses, the lack of understanding of how it is panning out on the African continent adds to the misinformed assumption that the smart city is a one-size-fits-all application. Stellenbosch Innovation District's Pieter van Heyningen (cited in Smedley, 2013: n.p) states that:

"Smart cities are very much a developed world concept. When we look at the criteria for smart cities we talk about smart governments, smart healthcare, smart buildings, smart mobility, smart infrastructure, smart technology. A recent report suggested this is a \$3.3tn (£2tn) market opportunity. That's huge. But if we look at the map of investments on a global scale in terms of clean technology, Africa doesn't feature".

2.4.7.1. The scars of 'coloniality'

Simone (2003) paints a very different picture of the African city which sets them far apart from how one would associate the stereotypical city to form and function – as is the case with most developing countries. What sets African cities apart is their deep-rooted history in colonialism and 'coloniality' best described by Oldfield (in Oldfield & Parnell, 2014: 8) as "knowledge shaped in colonial relations – sustains the dissemination of 'best practice' city modelling built on what was European, and is now largely a North American model", and the proceeding changes they have adapted to at the breakdown of colonial rule, resulting in activities of an unstructured formation taking place and thus defining the 'new' urban fabric of the African city (Simone, 2003). Oldfield & Parnell (2014) point out that the misfortune which formally-colonised cities of the south are faced with is that "critical approaches to urbanism in the South" are hindering the cities of the global south from breaking out of the mould they are set in by the north, and exploring new avenues of their own which are better suited to their local contexts, keeping them locked into systems which go against their organic nature.

2.4.7.2. Digital Divide in the Global South

The global south – and with particular reference, African cities – are facing a major digital divide in the face of globalisation and the age of technological advancements (Odendaal, 2016; Howler, 2015; Smedley, 2013). Infrastructure provision in African cities remains a daily challenge due to variable reasons including urban sprawl, the vast landscapes needing to be serviced, political agendas and the lack of financial capacity to roll out projects. Odendaal (2016:5) reveals that a study regarding ICTs done in Durban, with specifics of internet access, cell phones and fixed-line phones "reflect Apartheid geographies and subsequent post-Apartheid investment patterns". The reality is that developing countries are dramatically different from cities of the global north in terms of the level of ICTs and the potential development it presents. A range of limitations to the optimization of ICTs in cities of the global south, which extend beyond the infrastructure provisions and technological access and filter into capacity training and literacy levels. A more holistic understanding of the digital divide is suggested by Odendaal (2016) to be attributed to influential factors such as indicators of poverty, language and the perceptions people have of technology.

Chris Vein, The World Bank's chief innovation officer for global information and communications, also shares concern regarding the distribution of technologies which contribute to city 'smartness', stating that, "There is a saying 'the future is here, it's just not evenly distributed yet'. I think on behalf of our clients at the World Bank that is especially true. Cities in the developing world are all striving for economic growth and improved living conditions, but their capacity to do so varies wildly" (Vein, cited in Smedley, 2013: n.p). Thus, the importance of applying smart city principles to contextually applicable needs and resources becomes extremely important when considering the shift towards smart city initiatives for cities in developing countries.

2.4.7.3. The African investment: Technology, or people?

Howler (2015) offers a perspective of the daily African reality which is often a desperate grappling for life's absolute basics; basic services, shelter, food. Informalities cities of the global south are rife and have become part of the urban fabric. The informal settlements strewn over the cities in desperation for access to the city and its opportunities are characterized by the widespread lack of basic services such as water and electricity; functioning toilets in these settlements are replaced with pit-latrines and the natural environment is compromised by the absence of formal cleansing systems – resulting in much pollution and dire living conditions. What Howler (2015) puts forward is that technologies associated with the smart city, such as sensors, are not what these types of cities need to address their issue, and are a far cry from the realistic, ground-based needs of a dominant portion of most of the global south's populations. Although smart technologies have the ability to assist with some sustainability issues, the concern lies with the way in which Big Data is contextually adopted.

Investors, businesses, and political bodies have shown common interest in the potential of smart cities in cities of the global south, and in Africa-particularly. Howler (2015) expands on this interest to them: "Viewing infrastructural vice as a virtue, they believe underdeveloped cities can skip over old technologies to embrace smarter ones". However, Emma Stewart of Autodesk (in Howler 2015) flags the reality that Big Data cannot save poor planning and design.

A move away from the strong emphasis on hardware and software investments as a blanket approach to the diversity of cities and their challenges – especially those in the global south – is encouraged, and instead, a stronger focus on investing in the people is needed, claim Emma Stewart and Robert Muggah (in Howler, 2015). Robert Muggah (in Howler, 2015) warns of the danger of prioritizing technology over basic needs, stating that "The emphasis on new technologies may blind city authorities to the very real and persistent gaps in old, or traditional, services and infrastructure"; and that the marketing appeal of the smart technologies has great potential to "overlook human capacity and local infrastructure in the rush to implement new smart city systems". Some examples to draw from smart cities in the global south will be explored, below:

Nairobi

The example of Nairobi as a smart city presents its shift thereto in its Integrated Urban Development Master Plan (NIUPLAN) for 2014-2030, which outlines its committed intensions to offer a framework which serves as a guideline for the management of urban development, as well as fostering an integrative approach to planning across sectoral divisions (Backhouse, 2015). Nairobi's government aims to address the smart city agenda by focussing on key themes – each of which will have its own master plan within the NIUPLAN –, of which there are six; namely: land use and human settlements, transport, environment, populations, social systems and urban economy, infrastructure, and governance and institutions (Backhouse, 2015).

With the consciousness surrounding the role of telecommunications and ICTs in the shift towards acquiring smart city status, Nairobi has presented a master plan for telecommunications in support of Kenya's goal to develop itself into a 'middle-income country' (Backhouse, 2015: 4). The European Parliament (2014: 23) cautions about the mentality of smart cities being solely defined by the deployment of sensors to gather data for analysis – which can result in a top-down, blanket approach to fostering economic growth and sustainability – stating that “While ICT is a definitive component, Smart Cities cannot simply be created by deploying sensors, networks and analytics in an attempt to improve efficiency”. Nairobi's approach to enhancing the ICT and telecommunication component of the shift to smart city status is through promoting the expansion of digital infrastructure and expanding the capacity of national broadband (Backhouse, 2015). 5 of 9 projects outlined in the plan are emphasised as priorities, most of which are focussed on the provision and improvement of ICT infrastructure in a bid to encourage the city to be attractive to living and working, through innovative approaches to city challenges which the said infrastructural investments will aid in achieving.

Johannesburg:

The city of Johannesburg, South Africa, has claimed its place in the journey to becoming a smart city by outlining its commitment to such in its Integrated Development Plan. It approaches such by offering a cited definition which highlights the interrelated relationship between people, technology and economic development to achieve the goal. Much like Nairobi's approach to the smart city agenda, the city of Johannesburg is looking to enhance ICT usage in all of its operations by capacitating staff with the necessary skills training. Additionally, through a joint venture with Gauteng's provincial government, the city of Johannesburg is to improve city-wide broadband accessibility as well providing public libraries with internet access (Backhouse, 2015).

2.4.8. Strengths of the Intelligent (smart) City:

Pieter van Heyningen (cited in Smedley, 2013; n.p) claims the smart city technologies' industry to be estimated at “\$3.3tn market opportunity”, reiterated by figures published by the New Jersey Institute of Technology (NJIT), “smart city technologies will grow to an industry worth \$27.5 billion by 2023” (Gutierrez, 2015). This is largely with direct correlation to the 2025 worldwide population projection estimated to reach eight billion people (Gutierrez, 2015).

Datta (2016) reinforces the important role which ICTs play in the process of creating city smartness, stating that “any feature which uses information and communication technologies to make a city more efficient or more accessible, is said to come under the umbrella of the “smart city”. The provision of access to Wi-Fi networks to the greater public of cities is one step towards city smartness, offering a platform for increased efficiency in the engagement between citizens and their city (service provision platforms and the like). The more connected citizens are, the more data cities have as responsive feedback to address some of the issues experienced and to better provide more efficient services and solutions (Datta, 2016). Chief Strategy Officer, Reshaad Sha (2016) of Dark Fibre Africa explains this with particular reference to South African citizens and their ‘reinvented’ role in the quest for our local cities to become smarter, “the evolving South African citizen of the future will be highly knowledgeable and more tech-savvy than ever before. They will expect enhanced, highly personalized service from cities and will move between cities to get what they want”.

The Internet of Things (IoT) is a term relating to computer orientated technologies which are internet-connectable. The benefit which IoTs provide is the ability for general household appliances – such as washing machines, fridges, vacuum cleaners and the like – to become data generators when tweaked to IoT compliancy, for the greater benefit of sustainability through their ability to generate useful feedback concerning the environment, or how they perform certain tasks. The adaptation of this information can aid in enhancing the efficiency of such appliances and their functions with environmental sustainability in mind (Gutierrez, 2015). Additionally, these technologies can be adopted to increase efficiencies in service delivery; by being adapted to perform sensory functions, a range of services can be monitored. Gutierrez (2015) explains that sensors can be put into water supply systems in order to gauge chemical content of the water, its pressure through the system and the nature of its flow. This information can enable authorities to offer corrective steps to address any associated inefficiencies of issues.

2.4.9. Weaknesses of the intelligent (smart) city

Odendaal (2011) suggests a number of hindrances to achieving the smart city status, namely: “physical access to technology, affordability, the availability of appropriate technology, capacity and training and socio-cultural factors”. Although technology is a key component in the move towards creating smart cities, and technological advancements are continuously being explored by engineers and tech-fundi’s to benefit the city in smarter ways, one needs to ask the question – “Who are these technologies actually for?”; and “How are they going to benefit the citizens of these cities - as citizens of a ‘smart city’?”

Datta (2016) presents three core issues experienced throughout the process of the smart city application:

1. “Smart cities create winners and losers”;

There is widespread concern that the smart city model increases polarization in Income levels between the rich and the poor. The hype around the smart city and the magnitude of its market potential is alluring to big investors and businesses – the ‘winners’ who can have a share in the pie, but the ‘losers’

are those who are beyond the concern of private, capital intensive ventures; the poor, whose basic needs are often irrelevant to the functions of smart-technologies.

2. Failure in bridging the 'digital divide' gap;

There are still many areas which are untouched by digital infrastructure, making the smart city somewhat exclusive, leaving many cities worldwide in the 'dust' kicked up by cities which have the means to advance, galloping ahead;

3. The issue of internet rights and user-protection;

The internet is advancing at lightening pace, but as it advances, so does internet insecurity. Data capturing in real-time via digital smart sensors which are embedded in every day personal devices, means that information such as peoples whereabouts can be tracked through GPS locations, and personal information, attained. Although this type of information might be used by data analysts to offer innovative solutions to certain challenges, issues such as internet 'hacking' are real, leaving many people victim to internet trolls. This calls for more attention to be paid to internet security.

2.5. Precedent Studies

Due to the nature of the study topic and the need, as previously mentioned, to differentiate the study context in terms of its place in a developing country, a precedence study of two international cases will be drawn from; one from a developed economy: Tallinn, Estonia; and one from a developing economy of the 'global south': Tanzania (African Continent).

2.5.1 Developed Economy: Tallinn, Estonia

Tallinn is the northern capital city of the European country, Estonia, which is situated on the Gulf of Finland's coastline (Eltis, 2014) – refer to *figure 7*, p. 48. It covers an area of 159.2 km² and is home to 35 percent (430 000) of Estonia's overall population (Oü, 2016: 5). Although Estonia's greater population is on the decline, Tallinn's is on the incline, with close to half of Tallinn's population a mix of migrants, of which 38% percent are Russians (Oü, 2016).

Figure 7: Locality map of Tallinn, Estonia



Source: <http://www.mapsofworld.com/where-is/tallinn.html>

Tallinn has shown great advancements in terms of intelligent city growth. Its economic growth is huge, thanks to its harnessing of ICTs in overcoming post-Soviet economic ruin. More specifically, Tallinn has adopted a large-scale digital skills training programme, has incorporated an extensive transition to e-governance, and introduced an award-winning smart ID card – refer to *figure 8*, p. 59 – (Nam & Pardo, 2011 & Albino et al, 2015). The world-class ID cards have an array of smart uses and avails the Estonian citizens to tap into a range of e-services; they can be used for ‘i-voting’, as a European Union (EU) cross-border travel card, for digital signatures, and for fetching e-prescriptions. It serves the purpose of an overall ID card for all of these e-services and allows citizens to even file online tax returns with it, increasing the service efficiency in all of these areas (e-Estonia.com). The number of active e-ID cards represents 94% of the total population of Estonia, with 1.2 million users out of a total of 1.3 million registered citizens – a clear representation of its success (e-Estonia.com). In addition, the implementation of high-tech parks has catapulted Tallinn’s contribution to Estonia’s direct foreign investment, to an impressive 80% (Nam & Pardo, 2011). In a bid to move towards a more sustainable city, Tallinn opened its free public transport network to its city-registered citizens on the 1st January 2013, as a way of enticing the use of public transport over the private automobile and other unsustainable transport methods (Eltis, 2014).

Figure 8: Tallinn's smart transportation card



Source: <http://www.eltis.org/discover/case-studies/introducing-free-public-transport-tallinn-estonia>

It has proven a successful project through a comparison in the decrease of cars in the city and the subsequent increase in people utilizing the provided public transport, since its inception a mere three years ago (Eltis, 2014). A participatory approach was taken before the project was implemented; the local government held a referendum 9 months before the project launched so as to encourage citizens to get involved in the decision making process, and give feedback – whether they had positive or negative feelings about it. More than 75% of the near-68 000 participants voted in favour of the project, thus “locking the decision politically and ensuring it was something that could not be reversed easily” (Eltis, 2014). What is required of the citizens to use the free public transport system which offers a range of mobility choices, specifically “buses, trams, trolley buses and commuter trains” (Eltis, 2014), a ‘green card’ needs to be purchased at a cost of €2 to the user, who has to register their residential address as a prerequisite for being granted the travel card. The signed travel card has to be presented and scanned for every trip the user makes, and is available to outsiders at a once-off payment for the card, and runs on a top-up basis, depending on the trips wishing to be travelled – much like London’s ‘oyster card’ system.

2.5.2 Developing Economy: (Dar es Salaam) Tanzania, Africa

Dar es Salaam is largest East-African city by population (4, 364, 541), situated on the East coast of Tanzania. It covers a total metro regional area of 1,590.5 km² - refer to *figure 9*, p. 50.

Figure 9: Locality map of Daar es Salaam, Africa



Source: <http://www.dailymail.co.uk/sciencetech/article-3664442/Has-2-000-year-old-lost-city-Rhapta-Ancient-ruins-coast-Tanzania-Roman-market-town.html>

Tanzania's government is currently involved in a project, *National Information Communication Technologies Broadband Backbone* (NICTBB), which is heavily focused on the rollout of ICTs to promote development of varying e-services. Large investment will be channelled into a large-scale fibre network, under the NICTBB project, with major focus being on the enhanced usage of applications underpinned by ICTs. The development of electronic services such as e-governance, e-commerce and e-health are core to the promotion of such large-scale investment.

- Broader objectives which the project intends to address include cross-boundary benefits to neighbouring countries by providing “international connectivity to all land-locked neighbouring countries”.
- Additionally, points of presence (PoP) are to be established throughout Tanzania's administrative regions;
- As part of competition stimulation, licensed operators are to be given equal access to the fibre network;
- Affordable internet is to be offered to all of the country' citizens;
- The usage of ICTs is to be increased;
- E-government initiatives are to be facilitated and implemented

(Trends in telecommunication reform, 2016; pg. 13)

Tanzania Telecommunications Company Limited (TTCL) is the operator outsourced by the Tanzanian Government to manage NICTBB, through a public-private partnership (PPP), but operates as a separate, independent entity to NICTBB. In 2010, the Tanzanian government rolled out fibre cables on electricity networks, gas networks and rail networks. In essence, what the NICTBB provides is “high-

capacity, long-distance, wholesale capacity to fixed and mobile operators and ISPs (internet service providers)” (Trends in telecommunication Reform, 2006; pp. 13). The purpose of PoPs across the country’s territory allows connections between operators and the national ‘backhaul’ network. NICTBB is the primary source of ICT network connection between all major towns and cities in Tanzania, and also stretches to the country’s borders to offer connection to its neighbours.

The fruits bared from the NICTBB rollout, since inception, include 31 PoPs which are in full operation after phased implementation. By the close of 2014, NICTBB spanned a total distance of 7560km, covering 24 regions. All border points intended to have been created as a gateway of connectivity between Tanzania and its neighbours through NICTBB, have also been reached, and NICTBB has additionally landed a contract totalling USD 6.7 million to provide Rwanda with bandwidth over the coming ten years. The impact of the NICTBB project proves to have had positive effects since its inception; e-governance, e-education and e-commerce have all increased in provision – meaning that through e-services, Tanzania has welcomed accelerated economic development as a result of previously disconnected citizens being able to efficiently participate in such electronic services.

Moreover, Dar es Salaam, Tanzania, has initiated a monitoring system for rapid urbanization, which invests in skills development of local students with smart technologies (Smedley, 2013). It is a way of encouraging citizen participation, combined with skills training as a move towards smart city initiatives. This particular example revolves around the students being trained up on an application called *OpenStreetMap*, on the tablet computers which are allocated to them for project purposes, following which they utilise the skills they have learnt by going into slums and mapping them, themselves. The product of this project was a map of the slum – the first official mapping to have ever been done of it, rendering it the first time the government had seen the slum mapped out. This offered a visual representation of the slum and its layout as well as its needs, from an infrastructure and people perspective, allowing government to make sense of the necessary steps which were needed for a positive intervention to take place (Smedley, 2013). What the project also spelled out was the benefits which technology brought to economic development. Smedley (2013; n.p) claims that “the students involved in the project have since formed a start-up, selling their services back to the government and the private sector”. This is another added benefit, which boasts ‘smartness’; from up-skilling student with technological applications and devices, to economic growth, and to long-term gains such as the utilisation of these experiences to benefit themselves and both public and private sectors – through their public-private collaborations.

2.5.3 Lessons to be learnt

Whilst smart cities in the northern hemisphere – such as the evidence presented by the precedent study on Tallinn – are considerably technologically advanced as compared to developing countries of the global south – such as Daar es Salaam – developing countries are forging ahead with their own context-specific applications of the smart city. The provision of non-physical infrastructure such as broadband and internet provision are the leading priorities of developing countries in their quest to become smarter.

Developing countries lag behind developed countries in terms of development and technological advancements, which has always seen developing countries having to play 'catch-up', and never quite reaching a near level of development to the first world. What is important in the precedent studies is to note that each of the studies and the evidence which they presented were measures taken to enhance themselves within their related needs, and their abilities to respond to those needs were context specific – a point which is hugely emphasised in the research paper.

2.6. Chapter Summary

This chapter sought to offer a clearer standpoint on the position of the smart city, borrowing from literature and the examples of existing smart cities, in the developed countries as well as the developing. This chapter also strived to make clear the difference in smart city interpretations and the way in which they are contextually applied to different arising challenges. This formed the baseline for which this study was defined by.

3. Chapter 3

AN EVOLUTIONARY VIEW OF SOUTH AFRICAN CITIES

3.1 An introduction to the evolution of cities in South Africa

South Africa is a country with deep scars of historical inequality and fragmentation across all aspects of sustainability; culturally, socially, economically and environmentally. Apart from being categorised as a developing country, South Africa's cities are uniquely characterised by a strong historical past of the racial segregation, marginalisation and spatial disparities inflicted by colonialism and the apartheid regime. Although usually associated with political construction, apartheid was very much about the implementation of its policies through architecture and planning (Findley & Ogbu, 2011). The state's culture of power became increasingly associated with its adoption of design practices to physically segregate spaces according to social and racial divides (Findley & Ogbu, 2011). These effects are evident in the spatial formation of the South African landscape, which presents the product of various deep-rooted political orders driven by severe measures of control, of which the repercussive ills are still receiving corrective treatment through the spatial policies of the democratic government which have sought to address the spatial fragmentation of the former era. What South Africa represents spatially is a vast area, sprawled with varying settlement patterns – much of which are situated in the unserved rural areas beyond the city's glistening lights. The unique spatial landscape of South Africa is further characterised by an extremely complex settlement pattern which is comprised of a complicated range of settlement typologies; such as villages, agri-villages, rural settlements, dispersed settlements, small towns, large towns and large urban areas such as the eThekweni metro (eThekweni Municipality, 2015; Donaldson, 2001).

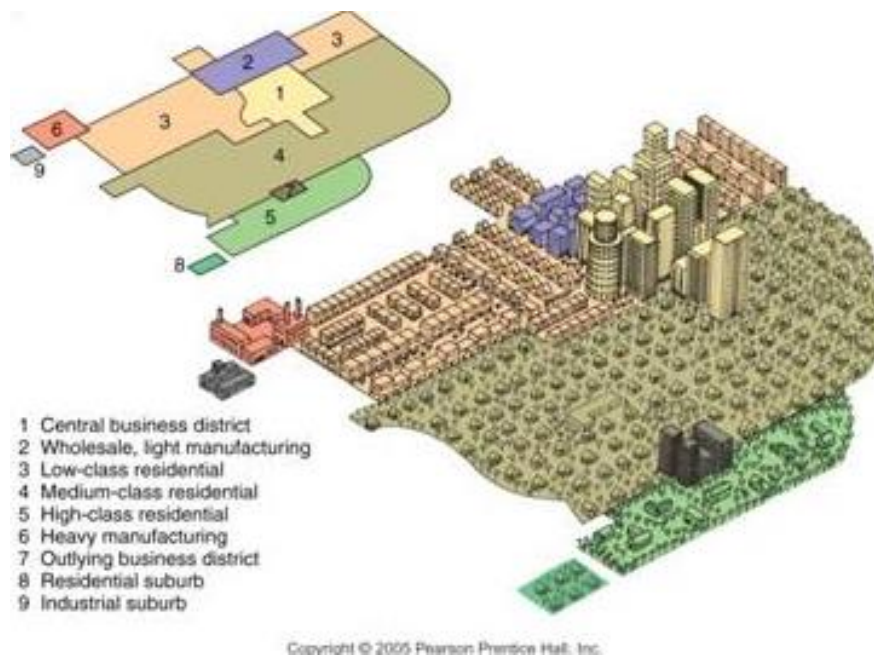
Schensul & Hellar (2010) explain that the rate of urbanization caused by rural urban migration at the dispensation of the democratic government in the early 1990s as well as the ever-increasing poverty and inequality divides exasperated by financial pressures experienced by local municipalities, are still obvious more than 20 years into democracy. Furthermore, settlement patterns in South Africa are so complex in nature that the multiple types are not easily categorized, and spread far beyond the common rural-urban categorization – adding to the intrinsic realities of the complicated spatial characteristics which define South Africa (Schensul & Hellar, 2010; Donaldson, 2001).

3.2. Harris and Ullman's Multi Nuclei Model

It is pertinent to explain the significance of Harris and Ullman's Multi Nuclei Model at this stage, in order to provide an understanding of the spatial formation of cities in South Africa best relates to.

Geographers Chauncy D. Harris and Edward Ullman were the creators of the multi nuclei model – illustrated in *figure 10*, p. 55 –, a model of city form which is defined by the city being structured by a multitude of central points or 'nodes' which the activities of people and businesses are concentrated on. The multiple nuclei model of urban development demonstrates the understanding of American cities in the later 20th century. This model represents the fact that particular activities revolve around certain nodes whereas others try to avoid that node in particular.

Figure 10: Harris & Ullman's Multi Nuclei Model



Source: <http://harrisullman.weebly.com/uploads/1/8/9/9/18996239/1879355.png?478>

The multiple nuclei model is described through Harris in 'The Nature of Cities' which he wrote alongside with Ullman in 1945. In the article he describes the layout of the city's CBD was becoming less significant within the city's greater boundary, and instead of it being viewed as the core of the city, should instead be seen as a nucleus within the greater metropolitan area.

This model is of great significance to the eThekweni metropolitan area, and to this study in particular; reinstating the role and importance of Umhlanga as a key investment node in the region.

3.3. Apartheid: a brief overview

One cannot ignore the historical setting which sets South African cities vastly apart from other cities, especially those of the first world, westernised countries for which the original descriptive frameworks such as colonialism, were developed. The Apartheid Regime spatially segregated the city and its people along racial lines which resulted in the city being divided into sectors of an urban hierarchy in which resources were unevenly distributed (Todes, 2008; Seekings, 2010). Apartheid policies were characteristic of the modernist planning approach which promoted rational planning methods to address "spatial chaos and disorder" (Brookes and Harrison, 1998: 93; cited in Donaldson, 2001: 1), giving power to the state to control society at every level, through which cultural diversity and differences in gender were suppressed.

Segregatory laws separated the South African population according to their racial grouping; Blacks, Whites, Indians and Coloureds; whilst residential segregation was based upon the former, it was enforced as a measure of controlling urbanisation (Seekings, 2010). Residential segregation divided residential areas according to racial groupings, under the Group Areas Act (Seekings, 2010). Forced removals were rampant in the 1960s, resulting in people being forced into 'group areas', designated for

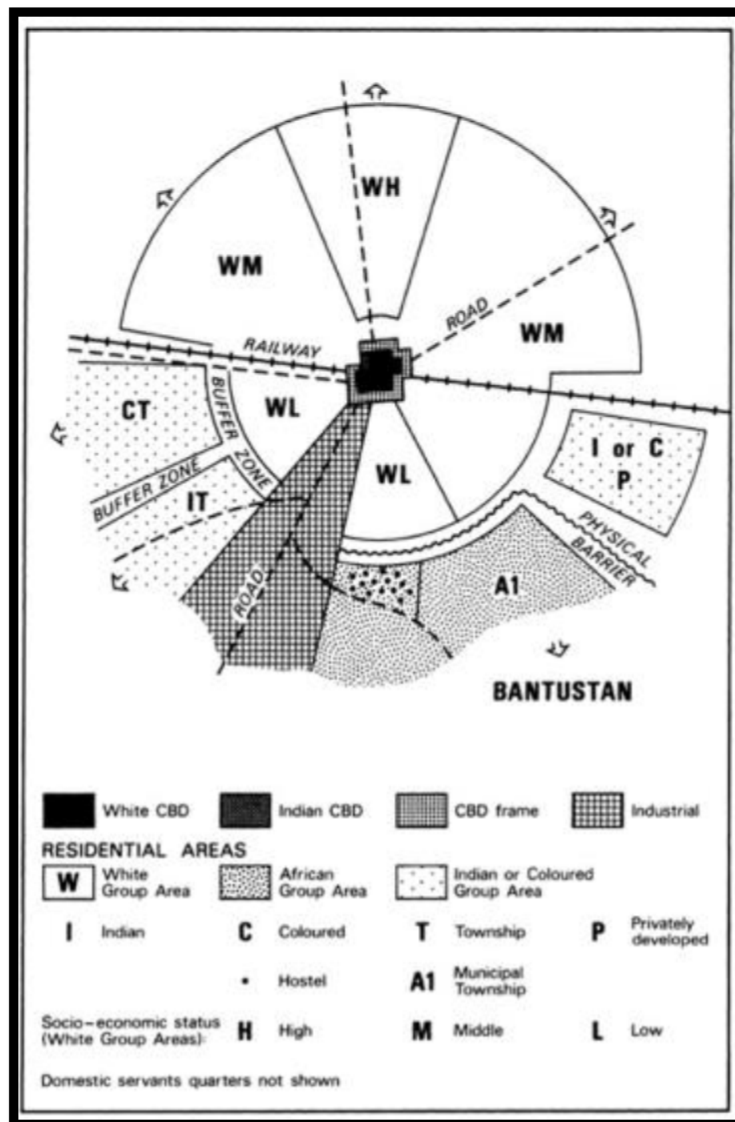
racess of a kind. Moreover, 'influx controls' controlled the movement of blacks between their places of work and residence under the 'pass' laws; in effect, this was a tool expended to stunt African urbanisation, and to dictate where Africans were to live in exchange for access to the city.

3.3.1. The spatial order of the apartheid city.

'White' South African cities prohibited informal settlements from creeping into their unspoiled, spacious urban realms, which were strategically separated from the highly planned, non-white townships. Blacks were denied the right to exercise a 'normal' family life; black males engaging in employment in the city were 'confined to overcrowd migrant hostels' (Seekings, 2010: 2). African families living in the city had access to houses of a standardised nature in the planned townships, however, majority of the country's women and children – as well as men who weren't employed – weren't welcome in the apartheid city, and were forcibly removed (Seekings, 2010).

The South African landscape was shaped by heavy control mechanisms to benefit the white minority - whom lived in properly serviced, spacious neighbourhoods and had access to "lucrative pockets of commercial activity" (Seekings, 2010: 3), whilst poorly serviced black homelands were situated on the city's peripheries, far from employment opportunities – resulting in sparsely separated settlement patterns which were connected by long travelling distances. Transport routes were particularly designed with the intension to limit the interaction between the city's core and the peripheral areas (Schensul & Hellar, 2010). Buffer Zones separated racially divided suburbs, urban sprawl became a definitive characteristic of the city and land uses which served singular functions were part and parcel of the unintegrated, fragmented city – refer to *figure 11*, p. 57.

Figure 11: The Apartheid City Model



Source: <http://www.nickybm.com/moving-against-the-grid/>

3.3.2. Nodes and the decentralisation of industries:

The Regional Industrial Development Policy (RIDP) – a policy document of the 1960s – was the first to introduce development nodes as a spatial development strategy aimed at promoting economic growth in less established areas, in conjunction with the industrial decentralisation programme, therewith associated (Nodal Development Report, 2015). This policy's focus was to encourage industrial activities to cluster in decentralised areas in the form of nodes, close to the homeland borders, which were appointed specifically for industrial growth so as to absorb the labour market from these areas which were a distance from the city centre.

The poor standards of living associated with the homelands, coupled with the economic opportunities within cities has been in the spotlight as a repetitive concern for governments from the second quarter of the 20th century. Rural-urban migration from homelands to cities was completely looked down upon,

however, the Native Laws Commission of 1948 argued in favour of the creation of a stable, urban African, family-orientated population – disagreeing with the fragmentation caused by migrant labour laws which kept labourers separate from family life. However, the Apartheid government sworn into power in 1948 was totally against non-whites being part of the urban fabric of cities, and so, politicised ‘border area’ development over homeland decentralisation, following the 1950 Tomlinson Commission report, as a means of decentralising industry as a tool to separate development altogether. Industrial decentralisation was a political agenda more so than an economic one, aimed at segregating the population along racial lines and increasing the population of blacks living and working in the homelands. However, ‘border areas’ became the preferred relocation areas.

From the early 1940s, regional development policies focussed on spatially integrating the former KwaZulu Homeland and Natal into what is known today as KwaZulu-Natal - one of South Africa’s nine provinces (Donaldson, 2001). The spatial integration of these two formally separate provincial components was initially a way of integrating apartheid policies but changed to accommodate post-apartheid spatial restructuring from the onset of the democratic era (1994 – onwards). Although policies within the apartheid and post-apartheid era’s differed respectively in terms of rationale and the content which they held, what stands consistent in both era’s is the encouragement of nodal developments as a tool to promote economic growth in “depressed areas” (eThekwinin Municipality, 2015; pp. 19).

3.3.3. Post-Apartheid: restructuring space

South Africa’s political transition phase in the early 1990s went through a rigorous restructuring and policy transformation phase with much of its focus on reconciling the fragmented South African Society and restructuring the landscape to accommodate and promote previously disadvantaged areas. During this transition phase, integrated spatial development planning was paused from being implemented due to local governments being reorganized (Donaldson, 2001). What transpired was the formulation of fragmented policies- policies which were formulated in isolation from each other with little to no cross-departmental collaboration resulting in disintegration across policy documents and a clear picture of conflict and fragmentation across government departments – launching the democratic government off shaky ground with a “confused, cumbersome planning system” (Donaldson, 2001. 2) .

The focus of post-apartheid planning policies moved away from the rational, modernist planning which had a focus on general urban planning, to policies which were more centred on promoting integration through development planning (Donaldson, 2001). In conjunction with the realization for the need to undo apartheid legislation, the Constitution (Act 108 of 1996) put emphasis on local authorities’ at municipal level to facilitate the constitutional goals which include; improving the quality of life for all citizens, to promote a democratic and open society which will equally protect all citizens through law and to create society which is based on social justice, human rights and democratic values. The Integrated Development Plans (IDPs) became a key tool in guiding local governments to achieve the visions of the Constitution (Odendaal, 2016, Sutherland et al, 2013), and reintegrate people and spaces.

Moreover, the democratic planning paradigm has adopted the ‘Central Place Theory’ (CPT) – which includes the hierarchical system of development nodes – as the trumping spatial planning perspective

adopted by all levels of government. Formally, the 'growth pole theory' was the overarching theoretical paradigm upon which the hierarchy of South African settlements were spatially developed, with specific relevance to KwaZulu-Natal (Nodal Development report, 2015). The urban ills –rooted in Apartheid - which had contaminated and fragmented the South African society, and the way in which it was spatially ordered was never going to be corrected by a straight forward 'quick-fix' (Donaldson, 2001); and, as Donaldson (2001; pp. 1) states, "restructuring, transforming, restructuring and integrating separate and divided cities pose pertinent spatial planning challenges".

The Reconstruction and Development Plan (RDP) of 1994 was the ANC's baseline policy document through which it aimed to redress the Apartheid ills. The Urban Development Framework of 1997 (UDF) was also a key policy, and together with the Development and Facilitation Act (DFA), went hand-in-hand in terms of spatially restructuring the urban environment. The new planning approach put much emphasis on the compact city design which was to be encouraged in order to minimize urban sprawl and support sustainable city building. However, as stated in the Local Agenda (2000: 2; in Donaldson, 2001: 3), "there is no universal answer and no model for a sustainable African city".

The current status of South African city development is not necessarily defined by a development model, such as the 'Apartheid city model' , but what Donaldson (2001) proposes is to analyze 'post-apartheid' development outcomes against the apartheid city model in order to understand the current status of contemporary South African cities, "in an attempt to create a way of interpreting place and space within the context of a twenty-first century South African city identity" (Donaldson, 2001: 3). 21st century South African Cities are rooted in 'emerging new spaces' (Donaldson, 2001: 3) such as the conversion of previously fragmented suburbs to developments in the form of buffer zones. Thus, what Donaldson (2001) refers to as 'new urban spatial outcomes' are what replace areas formally referred to by the race groups they were allocated to.

3.4. Key tools for post-1994 spatial restructuring:

As mentioned above, the UDF and the DFA went hand-in-hand as key policies adopted by the democratic government of South Africa to address the spatial fragmentation and integrate the urban environment. The UDF is driven by four key implementation programmes: 1. integrating the city; 2. improving housing and infrastructure; 3. promoting urban economic development, and; 4. creating institutions for delivery (Donaldson, 2001).

Integrating the city through Integrated Development Plans (IDP) prepared by cities as their 5-year development plans were core to overall city integration and development, post-1994; as were the principles of environmental management, in-situ upgrading of informal settlements and townships, encouraging higher density development and integrating land-uses, and reforming the planning system. Development corridors integrated with urban transport routes are believed to be key to achieving integration. Additionally, policies which encourage compact city development outline numerous principles, including the disparagement of urban sprawl, higher residential densities, inner city regeneration, urban infill, housing and service provision, mixed land uses, encouraging public transport

nodes, better employment accessibility and the development of corridors are "fundamental elements of contextualisation" (Donaldson, 2001: pp. 3).

A much elaborated point in this paper is that of development nodes in decentralised areas. They are a common feature of current cities and date back to the 1970s in the form of suburban shopping centres – a parallel characteristic associated with Umhlanga in terms of it having being developed as a key investment node around the biggest shopping centre in the Southern Hemisphere. What is common in these nodal areas are mixed land-uses and more compact development which welcomes a higher urban density, often resulting in these nodes growing so much so that they are regarded as "cities-within-cities" (Donaldson, 2001:4).

Nodal developments have also become a key tool in the restructuring of space, as a way of inducing investment into decentralised areas, often spanning large enough development to be considered "cities-within-cities" (Donaldson, 2001:4). Donaldson (2001) attributes the Central Business Districts' (CBD) inner city decline associated with traditional city challenges

Corridor development became a leading element of metropolitan planning policy in the early 1990s. It does, however, have roots in the apartheid government's 'industrial deconcentration' philosophy which dates back to the beginning of the 1980's – making it relevant to South Africa's inter-urban development scale. Secondly, the concept of urban corridors also had relevance to the intra-metropolitan scale, and was adopted as a tool to counteract the planning practices of the 1970s and 1980s (Donaldson, 2001; Hindson, n.d). The second of both approaches is most relevant to the current contemporary planning thought upon which urban development is based on (Donaldson, 2001; Hindson, n.d)

The apartheid city model's low density urban sprawl presented a situation of vast travelling distances between places of residence and work. Thus, it became pertinent for post-1994 policies to pay acknowledge the potential of transport routes as a form of urban integration between sparsely separated areas and would offer an opportunity for economic advancement to previously disadvantaged areas characterized by low-income earnings. The industrial decentralization strategies adopted in the 1970s brought about contestation due to the inefficiencies therewith associated, and so in 1982, the South African government reassessed the RIDP (Donaldson, 2001; Hindson, n.d).

What the information above illustrates are the vast differences which sprawled, segregated settlements present as compared to densified cities – which are usually the ones which are able to fast track themselves to smart city status. Dispersion hampers the ability to maximise infrastructural benefits, which otherwise densified areas leverage much of their success off – in terms of developmental potential, in terms of business attractiveness, in terms of densified foot-traffic to-and-within these areas because of the infrastructures they offer; which foster economic growth through business enticement. Infrastructure investments require capital mass and the cost of investing in such, is unfavourable as compared to investing in denser areas.

Through The Housing Act of 1997, government strived to create communities which offered a better quality of life through their improved habitability and safety, by focussing on housing and infrastructure provision, explained Donaldson (2001). RDP housing developments were carried out by the democratic

government in mass rollouts. Going against the UDFs mandate to create densification through compact city models; “the UDF (1997:31) propagates urban densification projects ‘aimed at moving away from the ‘one household one plot’ scenario” Donaldson (2001: n.p), the RDP housing roll outs were lacking in infrastructure and amenities, were characteristic by ‘matchbox’ houses, (Donaldson, 2001) encouraged sprawl, denied the ease of access to economic opportunities and overall failed to. The housing was located on cheap land far from the city centre and ignored aspects of sustainability such as economic, social, environmental and cultural sustainability.

3.5. The current realities of the post-apartheid city

The realities of the post-apartheid city and its associated spatial changes are attributed to three overarching concerns, as presented by Schensul and Hellar (2010);

1. Both social and spatial fragmentation of the post-apartheid city has worsened. Cities in South Africa are continuing to sprawl outwards, despite efforts by governments to induce spatial integration. Deindustrialisation, greenfield developments, suburbanisation are all characteristics of the current South Africa cities. According to Schensul and Hellar (2010) the inequalities of the past have only been deepened, illustrated by the high-end, privately developed gated communities, and the ever-expanding informal settlements.
2. The spatial changes which have occurred in the city are largely to do with the neoliberal market forces. Schensul & Hellar, (2010: 3) explain that “the post-Fordist economy has increased income inequality between skilled and unskilled workers and further segmented the housing market. Concentrated manufacturing industry has been displaced by smaller, more flexible production units and services fuelling the sub-urbanisation of the economy and multimodal patterns of growth”. Moreover, spatial inequality has witnessed a shift in segregation - from race, to class; in light of the dismantling of racial barriers which controlled movement patterns. This is evident in the price of land (Schensul & Hellar, 2010)
3. Racial desegregation along with economic desegregation has been ill-enforced by the state, regardless of their committed efforts to reintegrate cities in response to apartheid segregation. What’s more is that government’s attempts to assist the poor through housing provision, housing under the Reconstruction and Development Programme (RDP) have tended to be developed on cheap, unfavourable land in the peripheral areas, with no consideration for social services. This has been dammed as a reinforcing apartheid-akin spatial structures and forms of exclusion.

Areas characterised by crime, degeneration and social dilapidation are attributed to longstanding histories of poverty, unemployment and homelessness which have subsequently become part and parcel of the post-modern urban formation. What is becoming more and more evident in the post-apartheid city formation is the increase of privately developed and owned gated communities which are controlled security enclaves. However, Jacobs (1962: 42 in Donaldson, 2001: n.p) proposes that ‘thinning out a city does not ensure safety from crime and fear of crime. This is one of the conclusions that can be drawn within individual cities too, where pseudo-suburbs or superannuated suburbs are

ideally situated to rape, muggings, beatings, holdups and the like”, presents effects which trickle into the urban surrounds of the controlled security enclaves.

Control of ‘non-white group areas’ represent areas with little, or no control. Donaldson (2001) attributes this to the absence of land-use regulations being implemented in terms of informal trading – which is a dominant characteristic of the African streets. It is the very absence of control measures that have allowed the platform of informalities and the mixture of land-uses and incomes, to become the dominant identity of the African urban space (Donaldson, 2001).

3.6. Chapter Summary

South African cities have a spatial representation unique to other cities, globally. Much is attribute to the historical past of Apartheid, whilst current spatial (and social) patterns have somewhat mimicked the characteristics of apartheid. Odendaal (2011) and Todes (1998) explain that despite local municipal efforts through strategic marketing and investment to position cities on the global map, attempts to restructure the fragmented aftermath of the apartheid city have been less than fruitful. In terms of the intelligent (smart) city model, it is somewhat ignorant to assume that the spatial, social and economic disparities of South Africa can be solved by technology alone. What South Africa desperately needs is to have a contextual approach which prioritises the people and their needs. Although technology can support and mitigate sustainable measures of development, the levels of sustainability are so widely dispersed and the technological divide prohibits those with the direst of needs from being addressed.

4. Chapter 4

METHODOLOGY

4.1 Introduction

This research made use of a case study of the Umhlanga, and adopted a mixed-use method of primary data collection; including quantitative and qualitative methods. In addition, this study adopted exploratory nature to research; research which served to contribute to; and improve the basic understanding and knowledge on the subject, and to enter into the unexplored areas of the topic.

4.2 Data Sources

The sources of data collection for this research incorporate both primary and secondary sources. In summary, my research will take on the following:

4.2.1 Secondary data collection: Desktop research

Secondary data collection is often referred to as desktop research because of the nature of the data collection process; it ultimately requires the researcher to review 'second-hand' data and apply it to the research at hand (Kumar, 2011), using published material from books, journal articles, government frameworks and so on to inform a particular area of study. The secondary data used served to form, as well as inform the background to the research topic as well as guide the study with theoretical and conceptual underpinnings. It formed the base of the theoretical framework of this paper – secondary research was core to the compilation of chapters 1 to 3 – but this data collection approach was also used throughout the paper's chapters to reinforce the primary data findings, so as to prove an alignment or misalignment in the study's findings.

The secondary data used for this study was collected from various publications in the form of books, journal articles and online publications which shed light on an opportunity to further investigate the area of study in a localised context; and government frameworks, such as: eThekweni Municipality's Integrated Development Plans (IDP); Spatial Development Plans (SDPs) and the Umhlanga Ridge new Town Centre (URNTC) design framework.

4.2.2 Primary data collection: Mixed method fieldwork (qualitative and quantitative research)

Primary sources of data collection included gathering first-hand information relative to the research topic. This kind of data offers opinions and attitudes of people, which requires the researcher to physically engage in the process of information gathering with the primary informants and subjects, to gather raw, unpublished information as opposed to gathering 'second-hand' information – or *secondary data* collection, which has been discussed above. Primary data collection included: interviews with key informants in the development of Umhlanga, GIS mapping, straight observations, and a combination of non-probability snowball; and purposive sampling - in the form of quantitative, numerical questionnaires. An assortment of primary data collection techniques were adopted for this study and will be discussed in further detail, below:

In-depth interviews:

Taylor & Bogdan (1998, p.77; Kumar, 2011; p. 151) describe in-depth interviews as being “repeated face-to-face encounters between the researcher and informants directed towards understanding informants’ perspectives on their lives, experiences or situations as expressed in their own words”.

The unstructured, open-ended, in-depth interviews with key informants served to offer a more informed, richer response to the research at hand due to the flexibility which this approach allows. In addition, the nature of URNTC and the rate at which it is continuously and rapidly expanding means that snowball sampling pointed to avenues of rich informative research which may have otherwise been missed. Therefore, the key-informant interviews ran parallel with snowball sampling for this study. Interview guides were drafted to loosely guide the interviews and keep the interviews focussed - and the information as wholesome and accurate for the study objectives to be achieved – bearing in mind that every interview will be different, even if only slightly, due to the different roles which each key informant has played in the development of the URNTC.

Sampling:

Sampling for qualitative research is different from that of quantitative research in that with qualitative research sampling, it is unlikely that the researcher has a sample size in mind. Instead, the researcher relies on purposive sampling; sampling which is guided by the researcher’s judgement as to who is likely to provide the most informative, valuable information relative to the subject (Kumar, 2011).

Qualitative sampling:

The sampling method adopted for this study’s qualitative data collection was that of non-probability, snowball sampling; a purposive approach to data collection. As mentioned above, snowball sampling allows for new leads in the research to be followed (Kumar, 2011).

Quantitative sampling:

The sampling method which was adopted for the quantitative data collection application was carried out in the form of purposive, numerical questionnaires. A cluster sample approach was adopted, with two main clusters providing the target population: 1). the mixed use developments with the specific target being the business component, and; 2). the high-density residential communities. A cluster sample size of 100 people was applied, according to the following breakdown:

The Umhlanga Ridge New Town Centre boundary was divided into four ‘blocks’; from blocks 1-4 (Refer to *Annexure 4*). 25 individual questionnaires were allocated to each block; which were distributed at a ratio of 10% of the relevant overall land use within that specific block. For example; in block 1, there is a relatively equal mix of residential and mixed-use developments which are *viable for data collection to be carried out*. The 25 questionnaires were distributed evenly by these two dominant land uses.

With regards to the residential aspect of the mixed-use developments, the first floor or two is zoned for commercial use, while every other floor from the third floor upwards is zoned for residential use. Residential can go up to six floors in the mixed-use developments, totalling a

maximum of 8 storeys from the ground floor up. However, some of the buildings zoned for mixed-use are fully occupied by commercial sector and therefore offer no residential footprint to be surveyed (such is the case with a couple particular buildings adjacent to Chris Saunders Park).

It is of particular importance to note that upon observations which were carried out, some of the development sites within the URNTC site boundary were crossed off the list of sites fit for data collection (questionnaires) due to one of two main reasons: 1). Some sites haven't commenced with development and are still completely untouched, or; 2). Some sites are in the building phase of development – or - some site developments are complete but have no occupancy yet – perhaps due to the final internal works not quite 100% complete, or the possibility of the signing off of the building, pending. This narrowed down the plausible sample target. The following table (*table 3*, p. 66-67) will illustrate the target sample ratio per block:

Table 13: An allocation breakdown of how the quantitative questionnaires were distributed

ZONING	Block 1	Block 2	Block 3	Block 4	ISSUES EXPERIENCED
Mixed-use	50% footprint, but <i>mainly</i> commercial activity within this particular block's mixed-use developments	20% footprint	40% footprint	30%	People are hesitant to get involved in research; people are too busy to involve themselves; Often have to go through a communication channel such as an HR correspondent
Residential	50 % footprint	40% footprint: BUT, the density of high-rise residential development in this block outweighs commercial and mixed-use combined; so 60% of the 25 questionnaires	N/A	N/A	Heavily secured residential complexes – difficult to access; Most people are out working during the day, making it difficult to capture residential data.

		will be distributed here.			
Commercial	N/A	40% footprint: low density of people occupying the commercially zoned space; so 20% of the 25 questionnaires will be distributed here.	60% footprint	70%	Very low density of people in the commercially zoned spaces so there is a higher rate of unwillingness to partake in data provision = low rate of return.
Total allocation of questionnaires	Mixed-Use: x 13 Residential: x 12 Commercial: NA	Mixed-Use: x 8 Residential: x 15 Commercial: x 7	Mixed-Use: Residential: Commercial:	Mixed-Use: Residential: Commercial:	

Source: Author (2017)

Although the 2011 census report of Umhlanga reveals a population size of 24 238 (Census, 2011), the statistical value represents the whole of Umhlanga. The study area focuses on the URNTC, ignoring much of the residential area beyond the URNTC.

Quantitative questionnaires

Survey research is defined by Blackstone (2012) as “a quantitative method whereby a researcher poses some set of predetermined questions to an entire group, or sample, of individuals”. This method is useful in gauging the general contributions of the sample target population in a quicker manner, to help inform the in-depth interviews which will be considerably more time-intensive.

Surveys can be in two forms, depending on the nature in which they are carried out; a *structured interview* is a survey which is administered by the researcher to the interviewee; and a *questionnaire* is a survey whereby the questions are administered by the interviewee (Blackstone, 2012). For the purpose of this study, a combination of the two survey methods were adopted in a closed-ended manner: structured interviews were carried out to ensure the data was captured immediately; but because of the nature of the commercial environment in Umhlanga and the big corporate institutions, a substantial number of participants preferred to take the questionnaires away for completion in their own time, due to time-constraints, following which they were collected by arrangement of an agreed time and date.

Observations:

Observations serve as a ‘purposeful, systematic and selective’ (Kumar, 2011; p. 134) measure of listening to and/or watching how certain subjects interact with and respond to scenarios as they happen. The observations carried out contributed to the qualitative method of data collection. Indirect

observations were carried out in an unobtrusive, non-participant nature: passively observing and using evidence of what was visualised to substantiate the way in which the study was carried out; and drawing conclusions from the visual observations, whilst the objects being studied are oblivious to the observatory collection of data (Blackstone, 2012). The observations were recorded by means of *photographic recording* - a more qualitative approach to data collection, to validate as close to the truest reflection of what was observed, for the purpose of data analysis; such as observing which buildings were plausible for sampling allocations. This form of observation recording was also used to offer photographic evidence of the types of buildings, infrastructure, use of public spaces, and so on, within the URNTC.

GIS Mapping:

This technique of data collection involved using Geographic Information Systems (GIS) to create a series of maps relative to the study area, to illustrate existing development and activities in the area and to draw on salient issues which may not have presented themselves in the previously mentioned primary data collection techniques. In addition, maps and figures were able to visually depict certain indicators of an intelligent city, such as the existing infrastructure, attention to New Urbanism design principles, locality in terms of accessibility to surrounding areas and so on – refer to Annexures 1-3.

Furthermore this research combined observations and mapping, by mapping out the existing development footprint on-site as compared to the official development framework of the URNTC, with the use of a combination between GIS and ArchiCAD –refer to Annexure 4. This served a critical necessity in terms of outlining the target areas for questionnaires to be carried out. The observations were then translated into GIS maps as a representation of the findings, which provided a clear visual reference when doing fieldwork.

4.3 Data Analysis

All collected data; from primary and secondary sources combined; required analysis to better understand and structure the findings of the research. The data analysis technique which was adopted was the triangulation method, whereby the observations, interviews and questionnaires were all cross-analysed to offer a more wholesome research outcome. Additionally, the research followed a thematic approach to data analysis, whereby the quantitative questionnaires were coded in the SPSS coding programme, following which the responses were analysed and compared to the findings from the in-depth interviews to offer the most recurring simultaneous responses which then informed the themes. GIS mapping also served as a technically illustrative representation of what exists in the URNTC, and went hand-in-hand with the rest of the data findings. The purpose of using the mixed-method approach to primary data collection was to reinforce the findings with anticipation of offering a more concrete argument on the basis of the research objectives. This allowed for a richer research outcome, especially for cases such as this particular research area where little is known about the broader research topic in a localised context – such as that of the intelligent city and its relevance and applicability to the context of South Africa, and more importantly – the Umhlanga Ridge New Town Centre. Thus, having cross-analysed the data through the triangulation method of the data analysis process offered a more detailed research outcome.

4.4. Limitations to methodology

Difficulties surfaced with regards to distributing the questionnaires, especially to the residential areas. The residential communities within URNTC are highly secured and accessing them for questionnaire distribution proved almost impossible. The argument was that people pay for the service and type of secure lifestyle they have in URNTC and do not want to be disturbed after working hours in their homes – understandably. Body corporate members were contacted to try and fast-track access, but in most cases proved unsuccessful, citing the above-mentioned reasoning's. This posed an issue for the original target allocation which resulted in a skewed distribution of questionnaires, with more having to be allocated to the mixed-use commercial activity areas. This culminated into a very low return of respondents who live in Umhlanga, meaning that the sample size for this category was regrettably very small. However, some of the residential estate managers were on duty at the time of distribution and were accommodating beyond expectation, having allowed questionnaires to be left at front desk with them, and them having arranged with residents who were willing, to participate. Dates and times were arranged for collections, following which such was done. The added limitation of this was that leaving questionnaires with respondents and not being present when they responded meant that there was a missed opportunity to clarify any questions they may have had with the questionnaires, resulting in a possibility of them having filled in answers which may not have been the closest answer to the best possible one they may have otherwise been able to give. In addition, questionnaires may have been falsely or inaccurately answered by participants who fail to give a true answer because they want to answer what they think the researcher is looking to uncover. In every possible case where participants conversed with the researcher, it was emphasised that each question should be answered with the utmost honesty in order to offer the truest reflection of the study.

Mapping also brought about some issues in terms of outdated data files, making it difficult to represent what is physically on site through official documentation – refer to Annexures 1-3. The alternative was to improvise through trying to replicate on a map – refer to Annexure 4 – what was visually apparent on-site through observations, and translating the information into a graphical representation in order to offer a clearer perspective on the developmental situation at the time of the study's primary research phase. Thus,

4.5 Conclusion

Table 4, p. 70-71, serves to offer a concise summary of the data collection techniques adopted for this study, and the specifics of which techniques were used; where.

Table 14: Data Collection Techniques (Summary)

OBJECTIVE	SOURCES OF INFORMATION	RESEARCH TECHNIQUE	METHODOLOGY
1. To analyse the challenges experienced in traditional cities, which	<ul style="list-style-type: none"> ◦ Newspaper articles ◦ Online publications ◦ Journal Articles 	<ul style="list-style-type: none"> ◦ Secondary sources 	<ul style="list-style-type: none"> ◦ Qualitative

may have prompted the flight of key investors from Durban CBD to Umhlanga.	<ul style="list-style-type: none"> ◦ eThekweni Municipality website 		
2. To identify the key actors in the development of Umhlanga.	<ul style="list-style-type: none"> ◦ Snowball sampling ◦ Interviews with key informants ◦ Online publications 	<ul style="list-style-type: none"> ◦ Primary and secondary sources 	<ul style="list-style-type: none"> ◦ Qualitative
3. To identify the indicators of an <i>Intelligent (smart) City</i> .	<ul style="list-style-type: none"> ◦ Books ◦ Journals ◦ Online publications 	<ul style="list-style-type: none"> ◦ Secondary sources 	<ul style="list-style-type: none"> ◦ Qualitative
4. To evaluate the extent to which the Umhlanga Node - Precinct Plan contributes towards the emergence of an intelligent (smart) city.	<ul style="list-style-type: none"> ◦ Observations ◦ In-depth interviews with key informants in the development of Umhlanga ◦ GIS Mapping ◦ Alignment of government frameworks to the developmental objectives of Umhlanga Ridge New Town Centre (URNTC) – such as eThekweni Municipality's Integrated Development Plans (IDP), Spatial Development Plans (SDP); with URNTC's design framework 	<ul style="list-style-type: none"> ◦ Primary sources and secondary sources 	<ul style="list-style-type: none"> ◦ Qualitative
5. To gauge whether or not the intelligent city principles serve as an effective response to traditional city challenges in emerging economies, such as the case of Umhlanga.	<ul style="list-style-type: none"> ◦ Interviews with key informants ◦ Quantitative Questionnaires 	<ul style="list-style-type: none"> ◦ Primary sources 	<ul style="list-style-type: none"> ◦ Quantitative and qualitative

Source: Author (2017)

5. Chapter 5

DATA PRESENTATION & ANALYSIS

5.1 Introduction

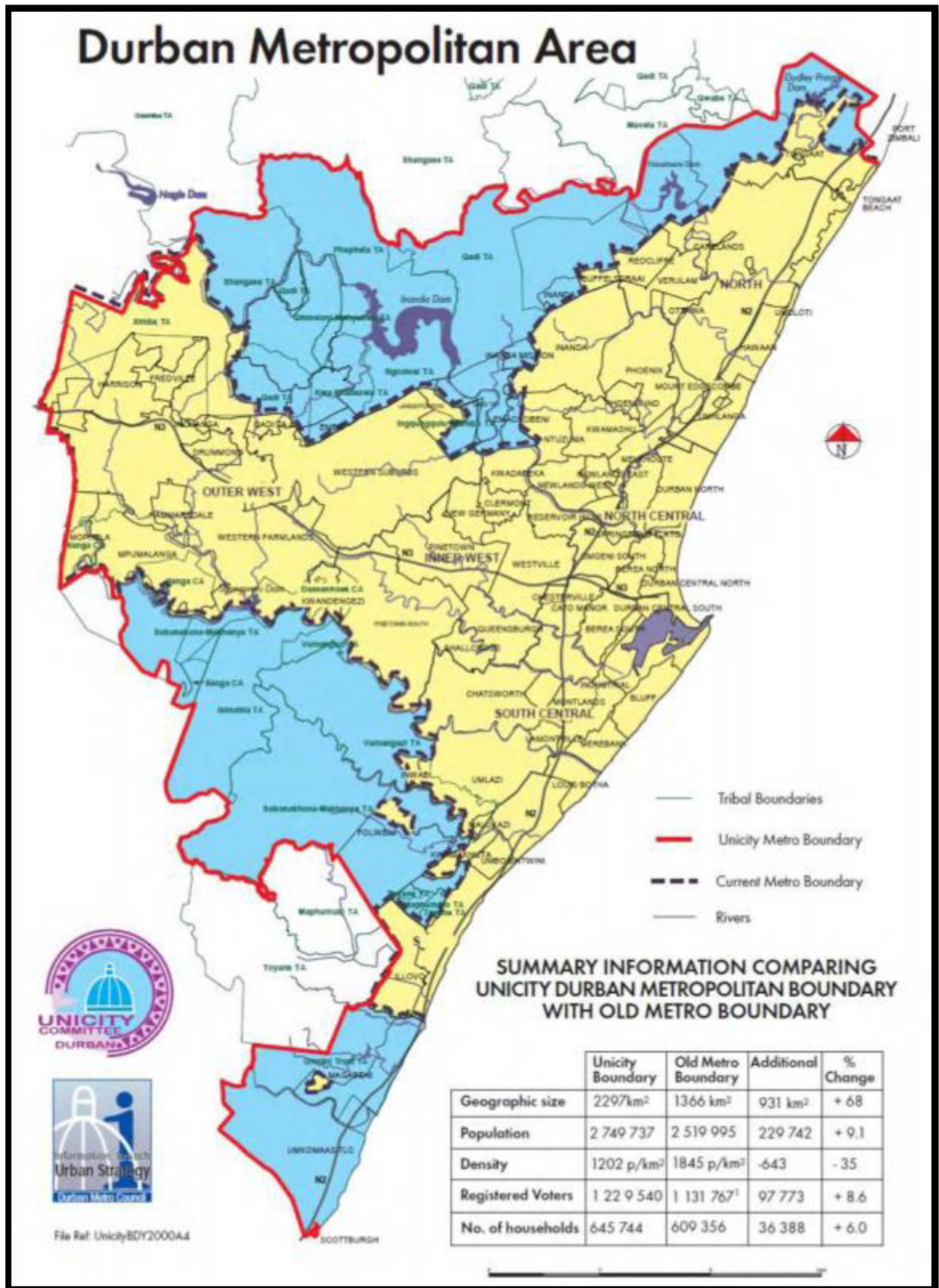
This chapter will serve to present the methodological findings of the research on the case study of Umhlanga Ridge Town Centre, on the North Coast of KwaZulu-Natal, South Africa. The use of diagrams, graphs, maps and various other visual representation techniques will represent the data and the analysis thereof, based on the case of Umhlanga New Town Centre.

5.2 Background to Case Study

Before KwaZulu and Natal were consolidated in 2000, during the process of municipal restructuring when eThekweni was introduced as a metropolitan region – see dotted boundary line in *figure 12*, p. 74 – KwaZulu was an adjacently located rural homeland to Durban Metropolitan Area (DMA), providing a labour pool close to the urban core of the city (Sutherland et al, 2014). At the inception of the unicity's consolidation in the early 2000s, the city's land area increased by a major 68%, proceeding the Municipal Demarcation Act of 1998s restructuring process, which saw the rural land areas – represented in yellow in *figure 12*, p. 74 – previously excluded from the city's boundary, such as the outer west and the north local council - being incorporated into the new Metro of eThekweni's jurisdiction (Respondent 1; Sutherland et al, 2014).

Sutherland et al (2014) explain that about 45% of the Municipal area is rural; peri-urban constitutes 30% of the land while the remaining 25% is urban area. What separates the character of rural land in the eThekweni metro compared to rural land elsewhere in South Africa, is the fact that 90% of eThekweni's rural land is geospatially defined by features from hills, uneven landscapes, dispersed settlements representing the traditional dwelling type and communal land holdings, unique to KZN's Ingonyama Trust – a traditional land holding Trust. This has direct implications for municipal management systems to provide services to these areas, which in turn impacts on the sustainability of municipal finances due to the costs involved with regards to pulling services to these dispersed settlements, at great distance from existing infrastructure, with complicated access. Although there is significant urban migration being experienced in the cities, eThekweni's rural areas have also, in recent years, experienced a great amount of growth in terms of a residential aspect (eThekweni IDP, 2015/2016).

Figure 12: eThekweni Metropolitan Region



Source: Sutherland et al (2013; pp. 11)

eThekweni's population as of January 2014 stood at an approximated 3.6 million people and is projected to reach an estimation of about 4 million in the next four years, by 2020 (Sutherland et al, 2013; pp. 3). The greater city region is subject to major socio-economic challenges, with close to 42% of the population living in poor living conditions associated with poverty. Sutherland et al (2013) elaborate on the spatial challenges of the city which have resulted in majority of the population travelling vast distances between places of work and economic opportunities; stating that "the spatial form of Durban is economically challenging as there is a clear separation of residential uses from economic activity which means that in most areas people do not live where they work" (Sutherland et al, 2013: 3). Sutherland et al (2013) explain that the neoliberal policy agenda is a dominant policy agenda adopted by eThekweni municipality– as is the case with most of the country's development areas – presenting a challenge for the local metro to find a balance between the socio-economic divide which suffices from the pro-growth agenda of neoliberalism and the needs of the poor, who are often without the most basic of services.

Urban sprawl is a long-standing characteristic of the city, presenting current trends of fragmentation which aren't very far removed from those experienced by the blatant segregatory patterns of the apartheid era. According to Sutherland et al (2013), urban sprawl and fragmentation present a further challenge for achieving efficient development which correlates with sustainability and equitability, stating that: "The eThekweni Municipality, as with all development spaces in South Africa, has to balance the more dominant neo-liberal pro-growth agenda with the poor-poor agenda. The city's sprawled, fragmented spatial structure is a major obstacle to achieving "sustainable, efficient and equitable development" (Sutherland et al, 2013: 3-4). This is one of the city's biggest reigning challenges, despite efforts to counter-address this mammoth issue through its post-1994 restructuring policies (Sutherland et al, 2013). Gillham (2002; in Larice & Macdonald, 2004: 290) puts forward some of the "most widely cited characteristics of sprawl", as per Professor Reid Ewing's analysis; the two most applicable to the evolution of Umhlanga being:

- Leapfrog or scattered developments
- Commercial strip development

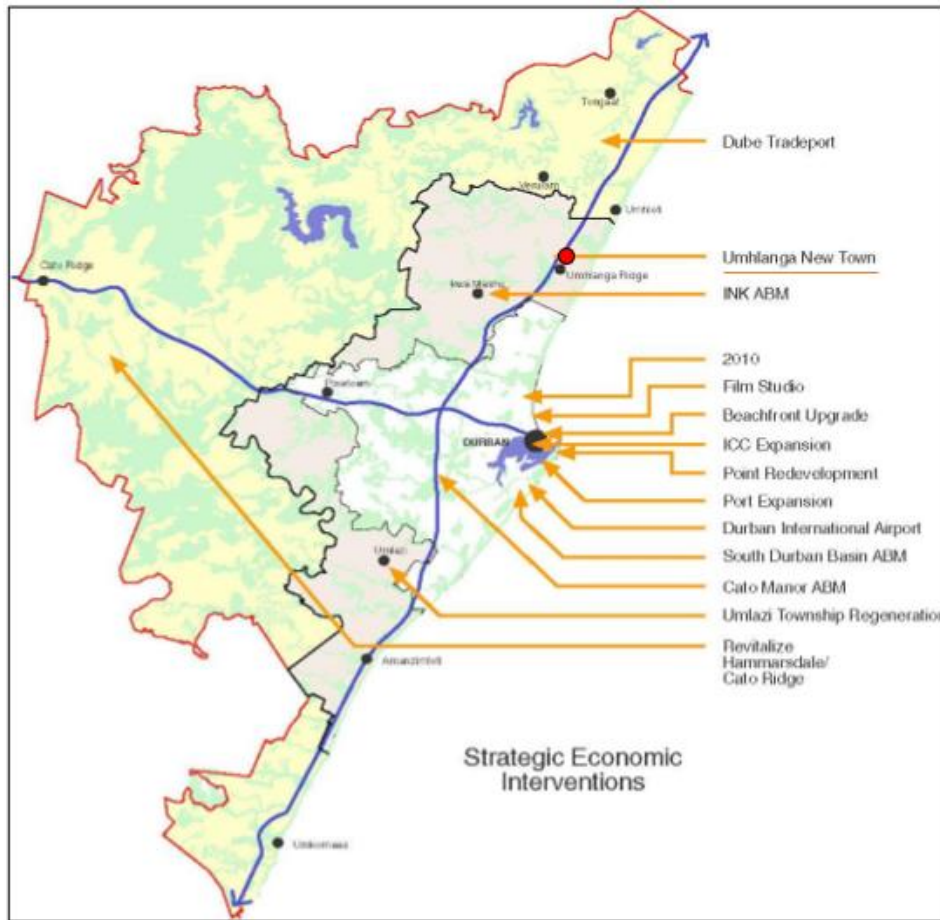
Leapfrog development is stated by Gillham (2002; in Larice & Macdonald, 2004: 290) as being "subdivisions, shopping centres, and office parks that have "leapfrogged" over intervening tracts of farmland or forest or both". What is evident in these types of developments is the open patches of land left between them and other existing developments, which eventually get developed on as time progresses. This pattern of sprawl is indicative of contemporary suburbia and "exurban fringe areas" (Gillham,2002; in Larice & Macdonald, 2004: 290). Given the locality of Umhlanga and its history of being nothing but vast area of sugarcane land before the new millennium, it can be considered a leapfrogged development; an urban development which went from nothing to the Umhlanga one sees today, in less than a 20 year timeframe.

Moreover, commercial strip development rings true to the relevance of Umhlanga's development when taking Gillham's (2002; in Larice & Macdonald, 2004: 290) description of it into account, stating that: "commercial strip development is characterised by huge arterial roads lined with shopping centres, gas

stations, fast-food restaurants, drive-thru banks, office complexes, parking lots, and many large signs". The security-conscious, convenient office complexes which are characteristic of Umhlanga, the off-street parking lots which make doing business in Umhlanga safe, convenient and efficient; the variety of shopping centres: Gateway and the Crescent; the widespread choice of restaurants and fast-food outlets within the Umhlanga Ridge New Town Centre (URNTC); all point to Umhlanga's relevance of commercial strip development type sprawl. Although all the above is true to Umhlanga, one must bear in mind that eThekweni Municipality is evidently conscious of the long-standing issues of South Africa's spatial fragmentation and sprawling patterns of development with highly uneven levels of development, and have consequentially made an asserted effort throughout its 'Package of Plans' to respond to this issue by earmarking Strategic Economic Intervention nodes (eThekweni Municipality, 2010) – such as Umhlanga, in the Northern Municipal Planning Region (NMPR) in locations which have been cherry-picked for investment and the creation of employment opportunities (eThekweni Municipality, 2013/2014). Thus, the applicability of the nature of Umhlanga as a product of 'sprawl' should not be seen in the negative light in which 'sprawl' is often associated with.

The appointment of Strategic Economic Investment Nodes – see *figure 13*, p. 77 – form part of the planning approach adopted in the eThekweni Metro to induce investment into areas of more convenient accessibility to those who are at a financial disadvantage of relying on employment in Durban's CBD due to its distance from many outward lying areas which are characterised by poor development, high levels of unemployment and poverty (eThekweni Municipality, 2010; eThekweni Municipality, 2013/2014).

Figure 13: eThekweni Strategic Economic Intervention Areas

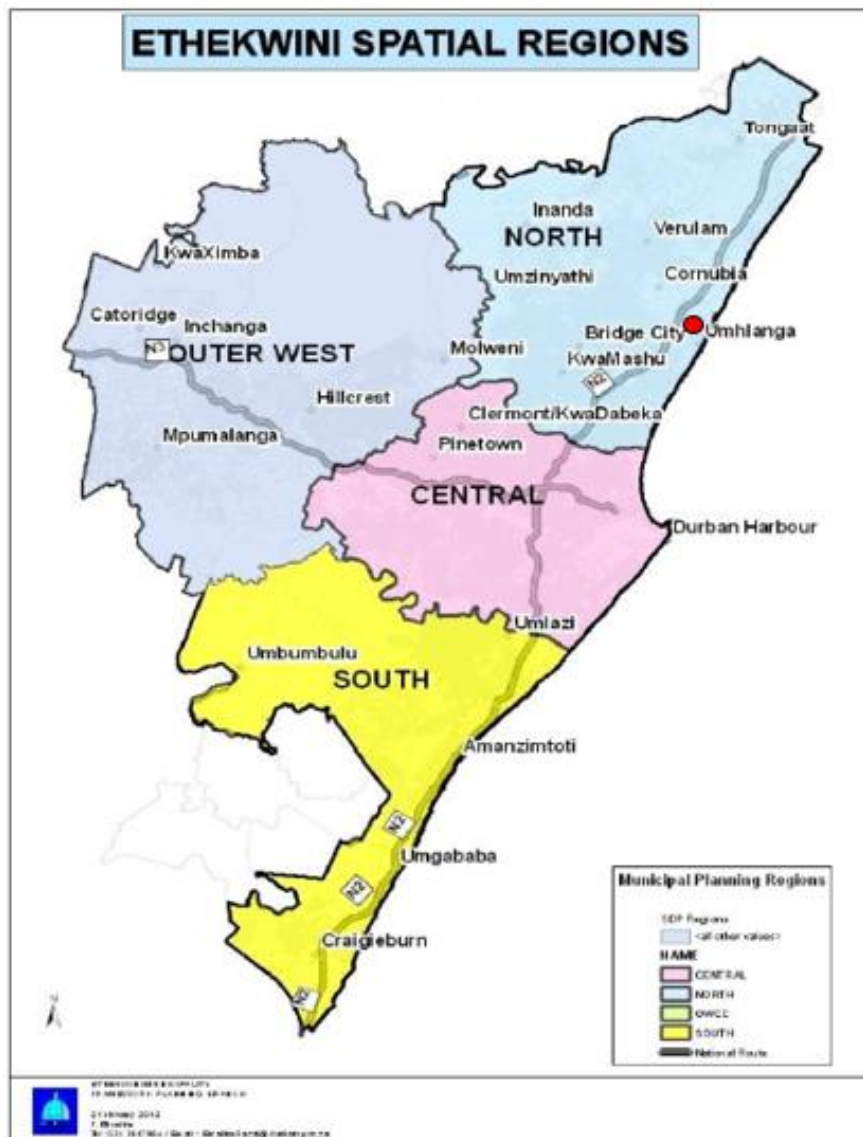


Source: eThekweni Municipality (2010: 58)

5.2.1 Case Study: Umhlanga Ridge New Town Centre

Umhlanga – a booming development node with an ever-attractive urban fabric – presents promising opportunity for growth in the Northern Municipal Planning Region (NMPR) – refer to *figure 14*, p. 78 – of greater Durban due to its strategic location within – what is now, and has been since the early millennium – the eThekweni Metropolitan boundary (eThekweni Municipality, 2010). The URNTC rezoning report (Moreland Properties, 1999: 40) states that “the Umhlanga Gateway New Town Centre site lies at the core of a region that has become the investment and development focus of the Durban Metropolitan Area. The focus is epitomised by the start of construction of Old Mutual’s multi-million-rand Gateway "Shoppertainment Centre" and the unparalleled success of the la Lucia Ridge Office Estate”.

Figure 14: eThekweni Metro Spatial Regions



Source: eThekweni Municipality (2013/2014: 10)

The NMPR's economy is driven by a range of activities, including agriculture (mainly sugarcane – much of which was rezoned for the development of the Umhlanga Ridge New Town Centre), manufacturing and warehousing with relation to domestic goods and services production, tourism (with a focus on the nodes of Umdloti and Umhlanga - popular coastal holiday hubs), and entertainment, business and retail (eThekweni Municipality, 2013/2014). A study carried out by Vancometrics (2005, in eThekweni Municipality, 2013/2014) concluded that Umhlanga is one of the most affluent parts of the north region, along with Durban North and La Lucia – all of which represent high levels of development and employment, respectively; as compared with less affluent, poorly developed areas in the north region which represent unemployment rates as high as 56.6%, including Inanda, Ntuzuma, and KwaMashu (INK). Despite the unfavourable levels of destitution within the NMPR, an appreciable impact is expected for the north's economy, owing to the high levels of development commencing in; and planned-for within the region (eThekweni Municipality, 2013/2014). The King Shaka International Airport

and Dube Trade Port will play a significant role in achieving this, with the Trade Port planned to offer new facilities relating to airfreight and logistics “within a national multi-modal transport network” (eThekweni Municipality, 2013/2014: 45). eThekweni Municipality (2013/2014) recognises the significance of the ‘multi-modal transport network’ and the infrastructural investment therewith attached, with regard to new opportunities for business. Associated businesses will include those related to ICT, “high-value manufacturing” (eThekweni Municipality, 2013/2014: 45), logistics and agri-processing, but are not restricted thereto (eThekweni Municipality, 2013/2014).

Given the magnitude of infrastructural and economic development in Umhlanga and its surrounds over the past decade and a half, the ‘city within a city’ debate has come to light with regards to this study, and research shows that Umhlanga has marked its place on the local map as a ‘city within a city’, confirm Respondents 1 and 2. Respondent 1 offers a standpoint from which he defends Umhlanga as a city within a city, stating that:

“A city is defined around its economy. Is it the bases of a new urban economy? If it is, then it’s a city. If it has an urban economy – it’s a city. What is the net product of the city? It is its economy and that doesn’t mean an economy making money for developers, it’s about creating jobs, creating energy, employment. So there’s nothing distasteful about creating economies... we need it so badly it’s unbelievable. And it’s not some capitalist agenda either; creating economies is terribly important in communist, in society – social societies. Whatever you doing you have got to create economy. Economies aren’t a capitalist idea, it’s how you run economies which starts to go into the nuance of whether they are socialist or capitalist”.

With regards to Umhlanga’s strategic, favourable location which has allowed it to be the high-investment node that it prides itself on, Respondent 3 explains that the inland corridor along the R102, the coastal corridors; the M4 and the N2; and then between that what one could identify with as “the old sort of apartheid buffer strip”, all contribute to the favourability of the identification of this location for the inducement of high investment development. Moreover, the major transport infrastructure upgrades to the M41/N2 interchange, its prime location relative to King Shaka International Airport and Dube Trade Port – a mere 20km or-so to the north; and its overall easy and efficient accessibility to- and from Umhlanga make this node even more attractive to investment due to the hassle-free experience which companies can offer their clients, elaborates Respondent 3. Thus, Umhlanga’s locality to these strategic movement corridors – refer to *figure 15*, p. 80 – evidently sits at a place where the east and west could start to be integrated into the marginalised periphery. This integration is already being fostered and is evident in the locational relationship between the Umhlanga New Town Centre and Cornubia – which sits almost adjacent to Umhlanga on the western side of the N2 corridor - which “actually starts to stitch this unconnected spatially inefficient city form in this region”, states Respondent 3.

Figure 15: Locality of Umhlanga New Town Centre with regard to arterial access routes



Source: <http://www.cornubia.co.za/location/>

Umhlanga has thus played a significant role in providing sub regional employment and economic opportunities, with the NMPR contributing around “15-17 % of the GDP (R 20-23bn)” (eThekweni Municipality, 2013/2013: 45), rendering it “significant in terms of the Municipality’s GDP” (eThekweni Municipality, 2013/2014: 45), since much of the NMPR is dominated by grave levels of unemployment and poverty. Additionally, Umhlanga has lent itself to blurring the vivid lines of the previous patterns of spatial segregation by inducing integration through the strategic placement of investment nodes (post-eThekweni) – and in the unique case of Umhlanga, much of which is owed to its sustainable compact city design, explains Respondent 3.

Respondent 3 sheds light on the spatial pattern of Durban just after the dispensation of the democratic government (pre-eThekweni), explaining that at that time, majority of Durbanites resided north of the Umgeni River, but travelled south for employment; so the one objective for proposing Umhlanga as an investment node was to “try and reverse that flow to create work opportunities for people who worked north of the Umgeni” (Respondent 3). Traffic patterns about twenty years ago would have resembled an 80:20 percent ratio for traffic travelling south versus north, daily; and today it is “probably 50:50, even slightly more coming north than going south” explains Respondent 3, further.

The Umhlanga New Town Centre was originally rezoned as ‘Umhlanga Business Centre’ in the mid-1990s, during the period when the proposal for a shopping centre only as big as 60 000m² – compared to the sub-regional shopping complex, Gateway, which would soon-after change the plans for Umhlanga - was put on the table (Respondent 3). The original plans for Umhlanga were very much suburban in nature, explains (Respondent 3). It was out of the city and was designed around a shopping centre on a very low density scale, which was to support a local community (Respondent 3). Respondent 3 further explains that although not entirely sure on the rationale behind the smaller, proposed shopping centre being exchange for the super-regional shopping centre, today known as ‘Gateway’ – due to it being slightly before his time with Moreland (now Tongaat Hulett Developments) – he suspects that it stems from the retail side of things when Old Mutual proposed the shift in the mall’s

magnitude. Moreland took serious consideration of the idea of the proposed super-regional venture and saw scope in the extended opportunities which could be leveraged off of this, resulting in an international trip to Europe and the States by some of the Moreland team members and consultants, in the hope of being able to borrow some sustainable design solutions from abroad and adopt them in the design of Umhlanga. What found considerable favour with the consultants and team was *New Urbanism* as a compact city design notion and soon thereafter became core to Umhlanga Ridge New Town Centre's design (Respondent 3). Umhlanga Ridge New Town Centre's development principles are outlined in the 'Annexure C: Special Zone' section of the 1999 rezoning report (Moreland Properties, 1999), and include the following:

- A Grid Based structure
- Pedestrian friendly urban design
- Human scaled
- Urban quality of life
- Mixed-use developments
- Maintenance of a clean, well-managed and safe environment.

The initial vision for the development of the URNTC was to create a high intensity environment which boasted a mixed-use town centre, centred on the principles of New Urbanism – which Respondent 3 explains to have been “very novel at the time, as it had not been done in Durban”. The vision for Gateway shopping complex was to create a shopping centre which would be integral to the town centre, providing porosity and flow of people and activities, and essentially to create an integrated, dense, compact city where people can walk around happily and have all their amenities there; being able to live, work and shop in the area (Respondent 3; Moreland Properties, 1999).

From a spatial planning perspective, the development of Umhlanga has always been based on a Package of Plans approach (Moreland Properties, 1999). The North Local Council was a very small local authority which predated the uni-city – a time when budget allocations did not exist, explained Respondent 2. Thus, the North Local Council relied public private partnerships (PPP) between themselves as the local authority, and private sector from a funding point of view (Moreland Properties, 1999; Respondent 2). By doing so, local council was able to leverage rates from PPP developments, such as that of the Umhlanga Ridge New Town Centre (URNTC). Since the consolidation of the uni-city in the early millennium, the URNTC has found itself incorporated into eThekweni Municipality's planning frameworks as a strategic investment node within the metropolitan boundary, still adopting a Package of Plans approach (eThekweni Municipality, 2010; eThekweni Municipality, 2013/2014).

5.3 Data Presentation & Analysis

There were five main themes which were picked out of the mixed-method data collection. They include Umhlanga as a communication node; the evolution of Umhlanga as a Public Private Partnership (PPP); Sustainable development; Safety & Security, and; Housing. Sustainability is a major topic on the intelligent (smart) city agenda and speaks to ways of living more sustainably in a rapidly urbanising

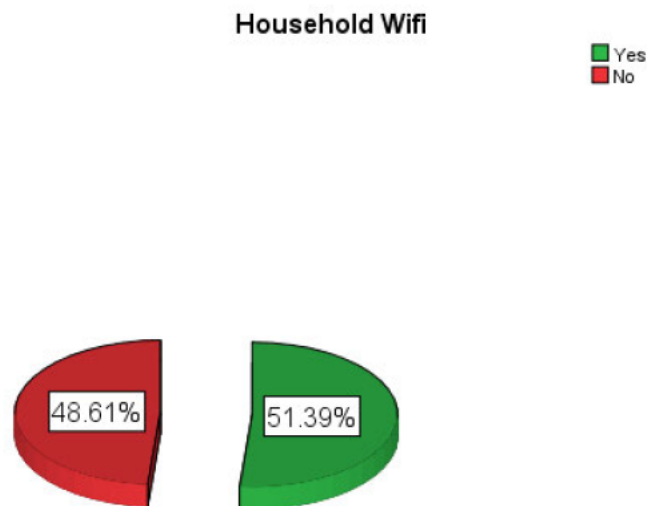
world, whereby cities' limited resources are needing to be stretched much wider to accommodate a much higher concentration of people without jeopardising the quality of life within them. The theme relating to Safety and Security will be explored in terms of the URNTC's ability to respond to crime and offer a safer environment for residents, employees and visitors thereof. Crime is a major deterrent of business and people from degenerated, traditional CBDs, whilst heightened security and surveillance of the streets increase the safety of the smart city, making it more favourable for businesses and residents to relocate to. The study findings with relation to the planning perspective of the Umhlanga Ridge New Town Centre will be discussed, with much focus on the Quality of Life in Umhlanga - one of the underpinning aspects of the move towards an intelligent (smart) city, whereby a city strives to encourage inclusivity and raise the quality of life for all. The demographic profile of the URNTC will be presented, as per the study findings, to offer an understanding of the success or failure of the URNTC in achieving holistic integration; from a spatial perspective as well as a socio-economic one. The findings on infrastructure – both hard and soft - , which incorporates the rollout of fibre optics in the Umhlanga Ridge New Town Centre will be presented. Additionally, findings of the developmental potential of the URNTC will be laid out, so as to offer a standpoint on whether or not the URNTC has the capacity to sustain future growth and city densification, in keeping with the intelligent city model. Lastly, this chapter will present a conclusion on the study findings regarding Umhlanga being an intelligent city, using the theoretical underpinnings of New Urbanism and the Non-Place Urban Realm as comparative checklists.

5.3.1 Umhlanga as a communication node

The eThekweni Municipality's IDP outlines the importance of the Integrated Urban Development Framework as being one of government's focal initiatives due to it being key in leveraging the potential of South Africa's towns and cities which have utmost importance as drivers of economic growth and employment generators. In as much as urban areas present rising challenges in relation to rising urbanisation levels, they offer many advantages in terms of their connection to international markets, their concentration of economic opportunities, access to new technologies, and "the reality of knowledge economies" (eThekweni, pp 11).

There is almost an even break between the respondents who live in Umhlanga and have Wi-Fi at home, and those who do not; with just over half (51.4 percent) having household Wi-Fi – see *figure 16*, p. 83.

Figure 16: Residents of Umhlanga Household Wi-Fi



Source: Author (2017)

The study found that only 51.39 percent of the respondents who live in Umhlanga are equipped with household Wi-Fi access. The highest count of people who have household Wi-Fi represent those who do not actually live in Umhlanga but work there (20 people, equating to 52.6 percent). This speaks volumes to the fact that there is such a high investment of fibre optic currently being rolled out in the URNTC, yet the residential estates are not equipped with the infrastructure. When probed about whether or not the residential estates within the Town Centre benefit from the fibre optic rollouts in the Town Centre, Respondent 4 alluded to the fact that there are bureaucratic barriers brought about by ‘middlemen’ wanting to make profit out of the installation process, and often it is up to the body corporates of these estates to decide whether or not to offer the service to their residents. Since these issues may hinder one and all from benefitting from fibre, many households might opt for internet via cellular networks and the use of data – which is much costlier than fibre. Thus, attention needs to be paid to diffusing the bureaucratic barriers which hinder the residents from benefitting from cheaper connectivity, since the infrastructure is in place.

Table 15: Wi-Fi accessibility at work (Crosstabulation)

		yes	no	9999		
Live_Work	Live and work	Count	17	3	0	20
		% within Live_Work	85.0%	15.0%	0.0%	100.0%
	Live only	Count	2	3	1	6
		% within Live_Work	33.3%	50.0%	16.7%	100.0%
	Work only	Count	29	9	0	38
		% within Live_Work	76.3%	23.7%	0.0%	100.0%
	Neither	Count	3	3	2	8
		% within Live_Work	37.5%	37.5%	25.0%	100.0%

Total	Count	51	18	3	72
	% within Live_Work	70.8%	25.0%	4.2%	100.0%

Source: Author (2017)

Table 5, p. 83-84, presents the findings of the respondents' Wi-Fi accessibility at work. There is a much higher representation of people with Wi-Fi access at work as compared to those who have household Wi-Fi access, representing a total of 70.8 percent. 85 percent of people who live and work in Umhlanga have Wi-Fi access at work, and 76.3 percent of people who only work in Umhlanga have got Wi-Fi access at work. The fact that there is a higher return of positive responses to work-Wi-Fi accessibility indicates that the fibre optic rollouts in the URNTC are favourable to business affairs and are therefore enticing to businesses opting for URNTC as a viable location to do business in. The fact that 76.3 percent of respondents have Wi-Fi accessibility at work still accounts for nearly a quarter of those who do not, and this points to a number of possible reasons, including: Some companies may opt for land-line internet connections for certain positions in companies as a preventative measure for employees abusing Wi-Fi for their personal use. Additionally, companies which provide certain services which do not rely on internet; such as the call centres, wouldn't necessarily provide free Wi-Fi usage to employees who operate switch boards, since it is of no benefit to the company's profit generation to do so.

Table 16: Live-Work Companies that compete in global markets Crosstabulation

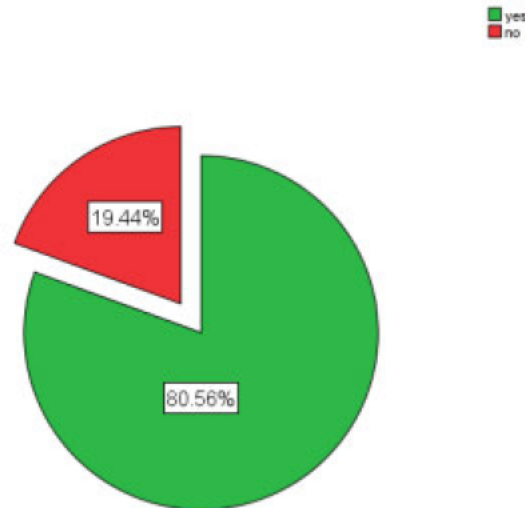
			yes	No	9999	
Live_Work	Live and work	Count	14	6	0	20
		% within Live_Work	70.0%	30.0%	0.0%	100.0%
	Live only	Count	2	3	1	6
		% within Live_Work	33.3%	50.0%	16.7%	100.0%
	Work only	Count	26	11	1	38
		% within Live_Work	68.4%	28.9%	2.6%	100.0%
	Neither	Count	1	4	3	8
		% within Live_Work	12.5%	50.0%	37.5%	100.0%
Total		Count	43	24	5	72
		% within Live_Work	59.7%	33.3%	6.9%	100.0%

Source: Author (2017)

The percentage of people who work in Umhlanga and have indicated that their companies compete in the global market – presented in table 6, p. 84 – is represented by 68.4 percent of people who only work in Umhlanga, and 70 percent of people who live and work in Umhlanga. This indicates quite a high concentration of businesses which participate in globalisation and therefore require faster, cheaper internet which fibre optics enables. Having faster, cheaper internet allows for businesses to complete more transactions in shorter periods of time, adding to economic growth and speaking to the 'non-place

urban realm' which was coined by Melvin Webber – being able to communicate and exchange business across physical boundaries, without having to physically travel or embark on face-to-face engagement.

Figure 17: Engagement with Umhlanga's Leisure Activities



Source: Author (2017)

The overall count of participants who engage in Umhlanga's leisure or recreational activities such as coffee shops, restaurants and so on; represent 80.6 percent – as presented in figure 17, p. 85. 19.4 percent of the overall sample size indicated that they do not engage in Umhlanga's recreational activities. A huge majority of those who live and work in Umhlanga – 95 percent – make use of such activities. Every person who only lives in Umhlanga engages in these leisurely activities; while 76.3 percent who only work in Umhlanga engage in such; and only 50 percent of those who neither live nor work in Umhlanga travel to Umhlanga to partake in what Umhlanga offers on a recreational level.

Table 17: Usage of Umhlanga's Public Open Spaces

Live Work	Live and work	Count	No	Chris Saunders Park	Children's Park	Chris Saunders & Children's Parks	9999	20
			20.0%	45.0%	20.0%	15.0%	0.0%	
Live only	Count	0	3	1	2	0	6	
	% within Live_Work	0.0%	50.0%	16.7%	33.3%	0.0%	100.0%	

Work only	Count	21	14	2	0	1	38
	% within Live Work	55.3%	36.8%	5.3%	0.0%	2.6%	100.0%
Neither	Count	3	3	2	0	0	8
	% within Live_Work	37.5%	37.5%	25.0%	0.0%	0.0%	100.0%
Total	Count	28	29	9	5	1	72
	% within Live Work	38.9%	40.3%	12.5%	6.9%	1.4%	100.0%

Source: Author (2017)

Table 7, p. 85-86, presents the findings on the respondents' use of Umhlanga's public open spaces. 38.9 percent of the respondents do not engage in the public open spaces provided for in Umhlanga – be it the Chris Saunders Park or the Children's Park. The balance of the respondents do engage in the public open spaces; be it at one, the other, or both – provided they have children to enter the children's park. Just over 60 percent of all respondents make use of the public open spaces provided in URNTC, including Chris Saunders Park – see *photo 1*, p. 86; and the Children's Park – see *photo 2*, p. 87. The Children's Park is particularly unique to Umhlanga, boasting strict monitoring controls and a 'no children, no entry' policy (St Clair, 2016). A child minder is provided by Umhlanga Ridge Management Association to ensure the safety of the children by monitoring who comes in to the play area (Respondent 5). The child minder has got radio access to the URMA control room for quick-response purposes. St Clair (2016) indicates that this colourful, attractive family environment is open Tuesday to Sunday and closed on Mondays for maintenance purposes.

Photo 1: Chris Saunders Park, URNTC



Source: Author (2017)

Photo 2: The Children's Park, URNTC



Source: Author (2017)

Umhlanga sits strategically positioned, nestled between the M4 highway and the Eastern boundary of Northern Urban Development Corridor (NUDC), while Cornubia sits almost opposite to Umhlanga, on the Western side of the NUDC (eThekweni, 2015/2016). King Shaka International Airport is roughly an 18km drive in a North-Westerly direction from Umhlanga and is easily accessible via the M4 highway and the N2 highway, respectively. Umhlanga's position in relation to Durban's CBD is roughly the same distance in the opposite direction (SSE) to its relation with King Shaka International Airport. Its prime positioning and all that it has to offer in terms of commercial activity, the anchorage of key businesses in the marketplace, recreation and most importantly, accomodation – with a choice of hotels (see *photo 3, p. 87; and 4, p. 88*) within the town centre and surrounds – all within a short distance of each other, makes Umhlanga a favourable, convenient node for the exchange of face-to-face meeting purposes over Durban's CBD.

Photo 3: Gateway Hotel



Source: <http://kznpr.co.za/?s=umhlanga&submit.x=0&submit.y=0>

Photo 4: Holiday Inn Hotel, URNTC



Source: <http://kznpr.co.za/?s=umhlanga&submit.x=0&submit.y=0>

5.3.2 The evolution of Umhlanga as a Public-Private Partnership (PPP) initiative

The Umhlanga Ridge New Town Centre's inceptive designs predate the eThekweni Municipality, and were approved by the North Local Council - which was integrated into the eThekweni Metropolitan Municipality following the marriage of all local councils in the greater Durban area into the uni-city, in the early millennium (Moreland Properties, 1999; Respondent 1; Respondent 2). Respondent 3 acknowledged that without government's support, the implementation of the vision for Umhlanga could not have materialised, stating that: "we can't do anything without government; so we own the land – we've got a big responsibility in making sure that what we do on the land is the right thing, and that it adds value for the greater society – but we operate within municipality's [then- North Local Council; now – eThekweni] plans". Respondent 2 shares the same sentiment from the public-sector side stating that "if they didn't have us, they would never have had that (Umhlanga)". Respondent 2 extends on the North Local Council's partnership with the private sector, stating that "the Borough (the North Local Council) had no money to fund it so without them we would have had nothing. All we did was facilitated the applications and got the rezoning approved and they (THD) brought in the money to make this thing go live", so the partnership was very much based on the financials coming from the private sector (THD), and development expertise from a statutory legal point of view – in terms of application administration – coming from council, explained Respondent 2. Respondent 3 explained that everything carried out in town planning is statutory driven and relies on legislation; the town planning ordinance stipulates the laws and legal processes which are applicable at that particular time, for a particular development. The Town Planning Ordinance which applied to the development of Umhlanga was 27 of 49, and in particular, 47, claimed Respondent 2.

Most of the investment which is injected into the development of Umhlanga is put in place by the private sector, guided by the eThekweni Municipality's package of development plans – or 'Package of Plans'

(Moreland Properties, 1999; eThekweni Municipality, 2013/2014) – such as the Integrated Development Plans (IDP) Spatial Development Plans (SDP), Spatial Development Frameworks (SDF), Precinct Plans; and the like. This approach to development is underpinned by neoliberalism and forms the basis of development planning in the Durban metropolitan region (Sutherland et al, 2013). Public private partnerships drive the development of the Intelligent (smart) City and are an essential aspect to their success, as most governments have an obligation to direct their funding allocations to socio-economic and basic needs programmes for the poorer populous, and therefore rely heavily on the private sector to fund large-scale developments for the facilitation of economic growth. The N2/M41 interchange at Mount Edgecombe is a prime example of the PPP between eThekweni Municipality and the private developers; it illustrates the current activity of the public sector through its infrastructural investment which private sector is able to tap into and leverage benefits from.

Much of the developmental success of Umhlanga is owed to the public-private partnership forged between local authorities – at inception, the North Local Council; and since the introduction of the uni-city, the eThekweni Metro – and the private sector, with Tongaat Hulett Developments playing a vital developmental role. The 1999 rezoning report for URNTC (Moreland Properties, 1999: 29) acknowledged the need for an ongoing, sturdy relationship between private sector (then – Moreland Properties) and public sector; stating that: “It is vital that a project of this size receives dedicated, ongoing attention and this requires that Moreland maintains close liaison with the North Local Council”. As a result of the above, a steering committee was introduced to represent all parties involved in the venture of developing the URNTC; Moreland, the Council and the Lot Owner’s Association; which would effectively guide the management of the project (Moreland Properties, 1999).

The relationship between the private and public sectors, respectively, was based on a balance between the North Local Council providing the planning frameworks, whilst Moreland Properties (now THD) was responsible for the implementation thereof (Respondent 2; Moreland Properties, 1999). Respondent 1 describes the relationship between THD and with the North Local Council as having been a “close working relationship”, owing everything which needed to be done to see Umhlanga’s plans come to life, to the collaboration between them. Respondent 3 commends the North Local Council’s ability to “embrace with open arms” the new planning approach which Umhlanga represented – given that planning within a special zone with a ‘basket of rights’, was all essentially a new kettle of fish, which the North Local Council were extremely supportive of, and is what effectively enabled everything to happen, claims Respondent 3. Respondent 1 reiterated the ease with which the relationship between THD and the North Local Council was forged; for the North Local Council, Umhlanga promised to generate a good rates base which was appealing to them.

The PPP between all those involved in Umhlanga is further illustrated by the allocation of infrastructural responsibilities between public and private sector. As part of Moreland’s (THD) development approval, and their position as the Primary Developer in Umhlanga, they were expected to deliver on the construction of all the bulk services in Umhlanga, from storm water and sewers, to the roads; whilst it was the Municipality’s responsibility to provide the basic services to the serviced plots once they had been signed off after developmental completion by the developers (St. Clair, 2016; Moreland Properties,

1999; Respondent 1). Moreover, the Metro strives to promote 'customer care' by building ICT solutions and e-governance. This is evident in their public-private collaboration with a number of data providers to invest in infrastructure, both physical and non-physical. Teraco Data Environments launched a R35 million data infrastructure centre in Umhlanga in 2011, in partnership with eThekweni municipality (Teraco Data Environments, 2011). Additionally, eThekweni Municipality has partnered up with the Durban Institute of Technology, ISETT, Siemens, Business Connection and the Department of Trade and Industry to establish 'SmartXchange', an ICT Hub. Teraco Data Environments states that "the city's progressive broadband strategy and significant infrastructure investment is fulfilling its goal of being Africa's first 'Smart City'" (Teraco Data Environments, 2011).

Following the municipal restructuring in the early millennium which resulted in the unicity being consolidated and operational from 2002, Umhlanga being pulled back into the eThekweni Metro stirred a very strong feeling of "denial", suggests Respondent 1. Respondent 1 explains the hesitation and reluctance of the new Metro to shift their focus away from the city centre, as they felt the city should be fundamentally designed around its core centre, and so they did not subscribe to a "poly-nuclear" city or metropolitan format. Respondent 1 further expands on this by suggesting that "they still saw themselves as fundamentally a centralist city centre mentality; many of them had to find road maps to come and see it (Umhlanga)". However, Umhlanga has fast grown into a renowned location which attracts people with varying interests through all it has to offer, and its current developmental success suggests that the relationship between eThekweni Municipality and the private investors has maintained a co-operative partnership throughout the near-two decades.

5.3.3 Sustainable development

In light of the worldwide effort to collectively and consciously move towards a sustainable future, no country – be it 'developed' or 'developing' is exempt from the "common responsibility in delivering on the global vision" (eThekweni Municipality, 2016: 26). Sustainable development remains a priority of eThekweni Municipality and is portrayed in the design of Umhlanga. The Millennium Development Goals (MDGs) were replaced with the Sustainable Development Goals (SDGs) in 2015, and adopted by the United Nations (UN) Assembly, with intent to be "a universally shared common, globally accepted vision to progress to a just, safe and sustainable space for all inhabitants" (eThekweni Municipality, 2016: 26).

Respondent 1 and Respondent 3 both make reference to the notion of the compact city being sustainable in itself. Respondent 3 stated that: "compacting the city obviously enables you to put more into fewer hectares", allowing for infrastructure to be shared. Moreover, THD provides the developers or owners with a framework for the production of more sustainable buildings. In essence, the design of buildings can incorporate and promote sustainable building measures, such as the incorporation of solar heaters, water recycling and other similar sustainable building practices – which are all strongly promoted in THD's design processes and guidelines; but it ultimately boils down to what the developer or owner themselves want to implement, claimed Respondent 3. Both Respondent 1 and Respondent 3 highlight the challenge of achieving sustainable building ratings from a capital cost point of view; producing a 'Green Building' – Umhlanga predates the Green Building Council – is extremely costly from a capital cost point of view, but from an operational cost point of view, they are "a lot more efficient

and effective”, stated Respondent 3. Thus, there are not many subscribers to the Green Building idea in Umhlanga Ridge New Town Centre, as majority of decisions made are based on capital costs and not operating costs (Respondent 1; Respondent 3). It is for this reason that few buildings in URNTC are certified by the green building council, as well as the fact that the development of Umhlanga predates the Green Building Council (Respondent 1). The Growth Point building at Lincoln on The Lake – see photo 5, p. 91 - has a 5-star rating, Mayfair - next door to Lincoln on The Lake - has a 4-star rating, with one or two others (which do not necessarily fall within the study boundary). Respondent 1 explained that the rating of buildings by the Green Building Council relies also on the existence of public transport systems which effects their star-status level, and Umhlanga’s public transport network is almost non-existent.

Additionally, the man-made dam in the Chris Saunders Park pools water from the Mhlanga River – see photo 5, p. 91 –, and not only serves as an aesthetic element of the park to enhance the serenity and natural feel of the public open space, but is used to irrigate the all the landscaping in the Town Centre (The Ridge Management Association, 2016) – another smart move towards sustainability, whilst keeping the sense of place at optimum.

Photo 5: Chris Saunders Park and the man-made dam



Source: <http://spacetolet.growthpoint.co.za/Pages/buildinginform.aspx?BID=1891&Sector=Office>

eThekweni’s IDP outlines *Facilitating Development in Priority Nodes and Corridors* as a ‘strategic focus area’ (eThekweni IDP, 2015/2016: 218), wherein specific mention is made of the adoption of New Urbanism design principles as a tool through which the effects of the Apartheid City model strives to be undone. If South Africa is to move away from the detrimentally unsustainable spatial patterns of its colonial past, then more sustainable, compact city designing offers an answer as to the how city planners could address the issue of sprawl and create densification in an ever-urbanising world, of which Umhlanga is no exception.

Transport sustainability:

An investigation into the primary modes of transport used by the respondents to work (from home) were carried out in the questionnaire, to establish the extent to which people use alternative modes of transport to the private car, in keeping within the New Urbanism design principles which strive to create a compact city which lessens the dependency on the private motor vehicle.

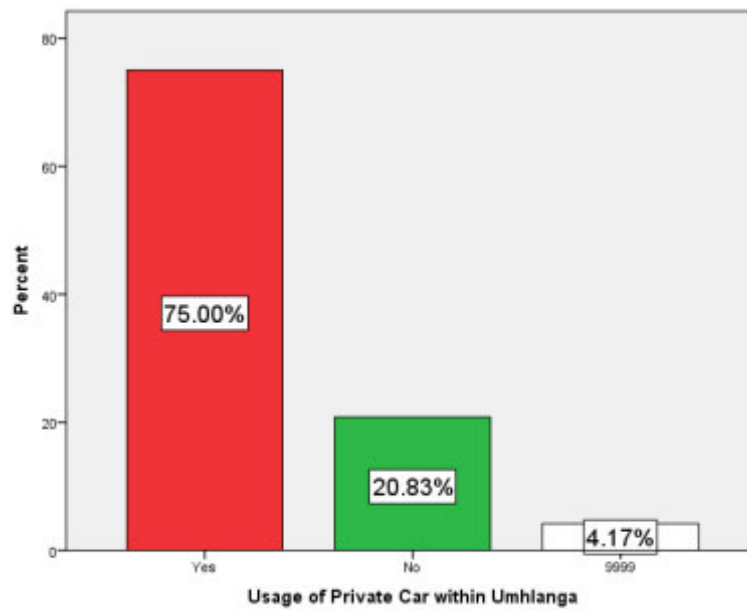
Table 18: Primary transportation mode used from home to work and back

		Private car	Walk	Public transport	Private car and walk		
Live_Work	Live and work	Count	17	2	0	1	20
		% within Live_Work	85.0%	10.0%	0.0%	5.0%	100.0%
	Live only	Count	5	0	0	0	5
		% within Live_Work	100.0%	0.0%	0.0%	0.0%	100.0%
	Work only	Count	33	0	5	0	38
		% within Live_Work	86.8%	0.0%	13.2%	0.0%	100.0%
	Neither	Count	5	1	0	0	6
		% within Live_Work	83.3%	16.7%	0.0%	0.0%	100.0%
Total	Count	60	3	5	1	69	
	% within Live_Work	87.0%	4.3%	7.2%	1.4%	100.0%	

Source: Author (2017)

The overall findings indicate that the use of the private car trumps the use of any other mode of transport, representing a high figure of 87 percent – refer to *Table 8*, p. 92. It is understandable that 86.8 percent of people who only engage in Umhlanga for work purposes use a private car, as well as 100 percent of people who only live in Umhlanga but travel outside the boundary for work, as there is no reliable public transport system – except for minibus taxis which operate along Umhlanga Rocks Drive, just outside the study boundary – which service the Town Centre. Out of the 20 respondents who live and work in Umhlanga, 85% of them drive to work in a car, while only 10% (two people) walk, and 5% (one person) mixes their mode of transport between a car and walking.

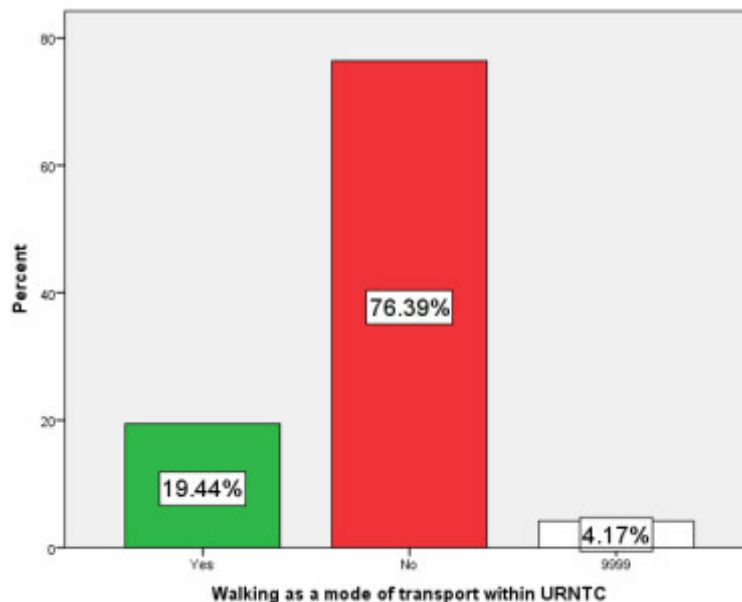
Figure 18: Transportation mode used by respondents within URNTC



Source: Author (2017)

Figure 18, p. 93, indicates the usage of the private car by the respondents. Once people have travelled to Umhlanga (excusing the use of the private car from places of vast distances), the figure which represents the use of the private car within and between other places in Umhlanga is still unfavourably high to the principles of New Urbanism and sustainability, representing an overall high of 75 percent.

Figure 19: Percentage of respondents who choose walking over driving within URNTC



Source: Author (2017)

Although URNTC has been designed as a compact city based on mixed-use developments, in trying to keep all activities in close proximity, only 19.4 percent of the respondents walk within Umhlanga – presented in figure 19, p. 93. The expectation of the New Urbanism design is that the automobile would

be replaced by other modes of low-carbon emitting transport such as walking and/or cycling. An alarming figure of people who live and work in Umhlanga (95 percent) use a private car to get around Umhlanga.

eThekweni's 2010-2015 Integrated Transport Plan (ITP) outlines the policy objectives in support of achieving a sustainable public transport system which trumps private automobile usage, by prioritising "public transport upgrades and budget allocations at the expense of car users" (eThekweni, 2015/2016: 262). This indicates URNTC's commitment to long-term, sustainable development by taking advantage of the infrastructures provided by the Municipality, from which it can leverage benefits and thereby densify. Respondent 3 acknowledged that one of the most critical shortcomings in Durban is the lack of public transport – a point which Respondent 1 desperately emphasised. Respondent 1 expressed his frustrations about the lack of public transport in Umhlanga [Town Centre included], stating that "it is my greatest embarrassment with regard to the town centre; is its lack of public transport and there is just nothing to latch onto. Respondent 1 explained that despite the private sector's desperate cries to the Municipality to assist in integrating a public transport network into Umhlanga, nothing materialised because of Municipality's unwillingness to climb on board with those requests; while the private sector's hands are tied by municipal laws. In light of the lack of a reliable, sustainable public transport network; what Respondent 3 suggested was that creating denser types of development – such as what Umhlanga strives to be – enables public transport to happen, and it is already in the development stage in the form of the new Integrated Rapid Public Transport Network (IRPTN).

What the study suggests with regards to the preferred transportation modes adopted by the respondents to get to work and back home again, alludes to the fact people are stuck in the South African mentality of having to drive far distances between places. People have therefore failed to make a conscious effort to minimise the use of the private car – even when they are within walking distance of their places of work from their homes – as per the New Urbanism design principles upon which Umhlanga Ridge New Town Centre is designed. There are ample footpaths provided for throughout the Town Centre – see *photo 6*, p. 97; which eradicates the excuse of having nowhere safe from vehicular traffic, and nowhere convenient to walk. For an urban development modelled on the principles of New Urbanism, alternative modes of transport to the private car are underutilised, although the infrastructure is provided. Figure 22 also visually demonstrates the greening efforts by the developers to create 'place making' (Moreland Properties, 1999) and sustain the natural environment. The automobile plays a pivotal role in the manifestation of urban sprawl, Gillham (2002, in Larice & Macdonald: 295) states that: "History and economics tells us that without a transportation system capable of serving this pattern, sprawl simply would not exist". With regard to South Africa's historical past of spatial segregation, cars became the dependent mode of transport by which people were connected over vast distances across the dispersedly spread out settlement patterns. In the wake of post-1994 democratic change whereby integration has replaced segregation as a key spatial planning initiative, densification of areas has become a priority in order that the dependability on the automobile will be reduced – among all the other benefits of densification – yet one cannot ignore that it is a mere 22 years on from democracy and it is going to take a much longer while for the scattered landscapes of this country to be 'stitched-up'. Adding

to that, South Africa’s generally-poor public transport network – in terms of safety, in terms of reliability, in terms of authentication – leaves many no alternative but the private automobile. Therefore, the private car is still a very dependent mode of transport for a large number of the South African Population. Umhlanga, being a key node in the spatial integration plans of the municipality shows a deliberate attempt to integrate places of far wider dispersion into areas of opportunity; but Umhlanga – although designed to reduce the dependency on cars, internally – automobile usage is still a dependent mode for outsiders to access Umhlanga because of its locality within the greater Durban region.

Photo 1: Footpaths and Greening in URNTC



Source: Author (2017)

5.3.4 Safety and Security

One of the major drawcards which attracts people to Umhlanga is the aspect of a safer environment (Respondent 1; Respondent 2; Respondent 3 & Respondent 5). Crime in South Africa is a daily threat and people are attracted to areas which are well governed in terms of security, claimed Respondent 1. The security surveillance in Umhlanga is undertaken by Enforce Security, whom are contracted by the Umhlanga Ridge Management Association.

Table 19: Respondents who are attracted by Safety to URNTC (Crosstabulation)

			Yes	No	
Live_Work	Live and work	Count	14	6	20
		% within Live_Work	70.0%	30.0%	100.0%
	Live only	Count	4	2	6
		% within Live_Work	66.7%	33.3%	100.0%
	Work only	Count	19	19	38
		% within Live_Work	50.0%	50.0%	100.0%
	Neither	Count	4	4	8
		% within Live_Work	50.0%	50.0%	100.0%

Total	Count	41	31	72
	% within Live_Work	56.9%	43.1%	100.0%

Source: Author (2017)

Table 9 on page 95 presents the findings of the respondents who are attracted to the URNTC by safety. Of the variety of choices to select which were most attractive for the respondents to Umhlanga; only 56.9 percent selected safety as one of them. 70 percent of those who live in Umhlanga selected safety as one of the main attractions to Umhlanga; 66.7 percent of those who only live in Umhlanga selected safety; half of those who only work in Umhlanga selected safety; and again, only half of those who neither work nor live in Umhlanga are attracted to Umhlanga because of the safety it offers.

The CCTV camera technology adopted in Umhlanga operates in 'virtual reality' whereby virtual realities of different scenarios can be created to solve certain situations – refer to *photo 7*, p. 97. In essence, this surveillance technology allows the operator to create “virtual wall” with the cameras. Respondent 1 and Respondent 5 explained that the cameras are then able project a virtual place that people start to penetrate. Instead of multiple TV monitors being analysed for more than ten minutes at a time by one person – which soon becomes too over-loading for one person; this Cathexis technology allows virtual alarms to be created which will ring and alert the control room operator that the virtual reality for which it has been set to ring for, has been penetrated. Respondent 1 explained this by elaborating that “the cameras project a virtual realm of how the street should be and where there is an alarm ringing, someone has walked across and goes through a boundary that we know is an impenetrable boundary”. Once the alarm rings, the control room operator(s) are alerted to the monitor which is linked to the camera which raised the alarm, and the operator can then watch in real life what is happening. This is the point at which the control room operator can identify what is going on in the public realm of URNTC and respond with the necessary precautions such as sending out a patrol car or an on-foot security guard – refer to *photo 8*, p. 97; and *photo 9*, p. 98.

eThekweni Municipality (2013/2014: 20) acknowledges the importance of safety and security of all its citizens and is committed to creating a city which resembles this right being fulfilled, stating that “The safety, health and security of citizens are critical to quality of life. The Constitution asserts the rights of all citizens to be safe, healthy and secure... The Municipality has committed itself to creating a caring city, with all citizens, businesses and visitors feeling safe and confident that their health and security needs are being met”.

Photo 7: CCTV street surveillance in URNTC



Source: Author (2017)

Photo 8: Umhlanga Ridge Management Association Response vehicle



Source: Author (2017)

Photo 9: On-foot security guards



Source: Author (2017)

With regards to URNTC, Enforce Security and the Umhlanga Ridge Management Association (URMA) operate in partnership to provide a security service to the residents and visitors of Umhlanga, through their advanced CCTV surveillance technology, their on-foot security guards and the high-visibility of their security vehicles (Respondent 4). Respondent 1, Respondent 3 and Respondent 5 all confirmed that this service (which stretches beyond security) is funded by the levies paid by the building tenants of Umhlanga – both businesses and residents – to the Umhlanga Ridge Management Association. The levies paid also cover the maintenance and cleansing of the URNTC and its assets (Respondent 3; Respondent 5; Moreland Properties 1999). This is outlined in Moreland Properties' (1999: 39) rezoning report which states that: "a fundamental aspect of the proposals is the commitment to an ongoing review of design quality, urban management, cleaning, maintenance and, most importantly, security within both the public and private domains".

What the data presented found was that those who live in Umhlanga have a higher satisfaction with the feeling of safety in Umhlanga, as opposed to those who interact with Umhlanga only for employment or other activities such as recreational ones. This could be as a result of the residents getting the full 'safety' experience in the URNTC because of the tight security measures adopted in the gated housing estates; guards, boom gates and CCTV surveillance all contribute to the feeling of security.

Photo 10: Security huts, guards, boom-gates and CCTV cameras in URNTC



Source: Author (2017)

5.3.5 Housing

Respondent 3 explained that housing provision within the New Town boundary caters for all income groups, which is one of the positives about Umhlanga New Town Centre's design. Respondents 1, 2 and 3 explained that ten percent of every development in the high-density, residentially-zoned area – 'Parkside' – to the right of the study boundary which borders Autumn Drive, had to incorporate 10 percent inclusionary housing. Respondent 3 makes an example of the new developments along Herrwood Drive, having stated that "there are prime, high-end apartments selling for probably more than 10 million; and then you have the likes of Manhattan Mews – which is an example on the other side of apartments on the 'backside' or the west side of Gateway – again with quite a variety of income groups. It does cater across the board". The going rate for the inclusionary units in the residentially zoned area go for anything between R500 000 to R1million (Respondent 3) – with the higher priced units falling within the mixed-use zone as opposed to the residentially zoned area. Respondent 1 – on peoples' perception of Umhlanga being a capitalist society, stated that "It doesn't matter what is designed, the system gets hold of it; and *the system* – of course – is capitalist. And has it been perverted? I don't think so. Is the economy still fundamentally very agated to say there's a helluva lot of crossover of the socio-economic profile? More-so than you will get out of the Durban city centre. I don't think you will find a product that more naturally morphs into a very agated socio-economic profile".

What this information alludes to is the fact that neoliberal policies which encourage the private sector to lead development within governmental guidelines, creates a situation whereby the market determines the value of the developments, which can have adverse effects: it creates socio-economic upliftment

for the immediate area and its surrounds and creates employment opportunities; but it also increases the gap between the rich and the poor. Those who can afford to buy into mixed-use developments can enjoy the appreciation of their investments as rentals and land values are said to increase over the long-term in mixed-use developments as compared to free-standing developments typical of a single-use nature (Wardner, 2014). Wardner (2014: 6) explains that mixed-use developments – such as that of the URNTC – give the land more value, stating that “for developers, the economies of scale in developing mixed-use projects generate construction efficiencies and more rapid realisation of the site’s potential”, much of which has to do with the stretching of infrastructure between a higher concentration of users.

Umhlanga’s developers have, however, made a concerted effort to provide housing opportunities which are marginally protected from true market value, by being allocated as inclusionary, such as 10% of the residential estate illustrated in *photo 11*, p. 102. However, bearing in mind it is a private development, Respondent 1 and 2 ascertained that it is not the private sector’s objective to provide housing for the low-income bracket. However, there is an effort on the private developers’ side to try and minimize the gap of exclusivity. Additionally, Cornubia Mixed-Use developments is strictly a low-income orientated development and lies adjacent to Umhlanga on the Western side of the N2 highway. The C8 BRT line is planned to connect Bridge City and Umhlanga via the interception of Cornubia, which will create enhanced integration between these areas.

Photo 11: Residential Estates, Herrwood Drive, Umhlanga



Source: <http://kznpr.co.za/?s=umhlanga&submit.x=0&submit.y=0>

5.4 Planning Perspective

The inception development plans for URNTC predate the consolidation of the eThekweni Metropolitan Municipality – and were passed by the North Local Council (Moreland Properties, 1999). The vision for the development of Umhlanga was to foster an integrative approach to planning in the north, as a response to addressing the segregatory spatial and socio-economic patterns of development which were entrenched by the Apartheid government. Moreland Properties (1999: 39) made clear its intentions for the development of the URNTC, stating that: “The Umhlanga Gateway New Town Centre

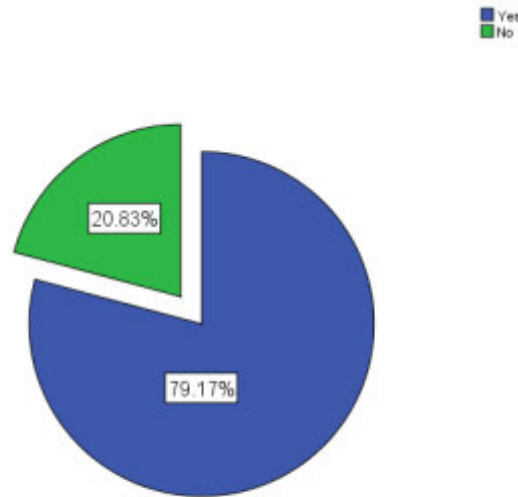
will cement the current development dynamic in the northern region and will provide the foundation and impetus for continued growth and maturation in a holistic, integrated and comprehensive manner". Ethekewini's vision states that, "By 2020 the eThekewini Municipality will enjoy the reputation of being Africa's most liveable city, where all citizen live in harmony. This vision will be achieved by growing its economy and meeting people's needs so that all citizens enjoy a high quality of life with equal opportunities, in a city that they are truly proud of" (Sutcliffe, n.d). The Quality of life indicators in this study include: *Income brackets; affordability of a good quality of life in Umhlanga, private healthcare, use of public open spaces*. Moreover, in line with job creation and raising the quality of life for all citizens, the IDP (pp. 214) states that "The New Growth Path intends to reduce unemployment from 25% to 15% through the creation of 5 million jobs by 2020, NDP (2011) aims to do the same between 2021 to 2030 by providing an additional 6 million jobs". Moreover, the URNTC rezoning report (Moreland Properties, 1999: 1) states that: "by lending weight to the objectives of wider planning concerns, and by establishing an urban new town centre that has both created, and grown on, the initiatives of the Gateway Resort, an important sub-regional threshold is crossed in terms of urban consolidation, access to opportunities, balancing the metropolitan pattern of development, promoting a stronger local economy and generating economic growth and job opportunities in keeping with population growth and the development dynamic".

The second of eThekewini's 8-point plan – outlined in the 2015/2016 IDP – is aimed specifically at 'Developing a prosperous, diverse economy and employment creation', under which there are a number of strategic focus areas pinpointed to achieve this; namely: "economic leadership and intelligence, facilitating partnerships, maximising the benefits of infrastructure development, nodal and corridor development, investment promotion and facilitation... and ensuring sustainable livelihoods" (eThekewini Municipality, 2015/2016: 215). Strategic Focus Area (SFA) 'Facilitating Development in Priority Nodes and Corridors' is one with particular relevance to the URNTC. It specifically states therein that New Urbanism developments are adopted "to reverse the effects of the Apartheid city" (eThekewini Municipality, 2015/2016: 218). eThekewini's 2015/2016 Integrated Development Plan (IDP) review makes specific mention of Umhlanga's developmental success, claiming that its unique mixed-use style which incorporates a space spanning a total of 150 000 squared metres for a combination of mixed-use and commercial land-uses, 100 000 squared metres of office space and residentially zoned land for the total of 3 000 units, the overall development is stated to "attract approximately R10-billion in investments to the area and generate 65 000 construction jobs and 16 000 permanent jobs" (eThekewini, 2015/2016: 55).

The study found that a 79.2 percent overall response of employment opportunities being one of the key attractions to Umhlanga – see figure 20, p. 102. The remaining 20.8 percent of respondents did not select employment opportunities as a key attraction, as many of the respondents do not work in Umhlanga but may engage in Umhlanga for residential or recreational purposes instead. 95 percent of those who live and work indicated that they were attracted to Umhlanga for employment reasons; 97.4 percent of those who only work in Umhlanga indicated that employment opportunities attracted them to

Umhlanga – with one person not indicating this element as attractive to them – although they are solely employed in Umhlanga.

Figure 20: Percentage of respondents attracted to URNTC by Employment Opportunities



Source: Author (2017)

These findings illustrate that Umhlanga is a true representation of what the planning frameworks set out to achieve, by creating job opportunities in the area. A response of close to 80% of respondents being employed in Umhlanga – hence their attraction thereto – is telling of this.

In terms of the respondents' income brackets, the study found equal percentages of 30.6 percent represent the overall percentages of those who earn between 0-R10 000, and R11 000- R20 000. 13.9 percent earn a higher salary of between R21 000 – R30 000 (see *Table 10*, p. 103); only four people earn between R31 000 – R45 000 – representing 5.6 percent; 6.9 percent earn over R45 000 (only 5 people); and over 10 percent of the total sample size didn't participate in answering this particular question – as many people feel uncomfortable sharing this kind of private information. The biggest percentage of people who live and work in Umhlanga earn between R11 000 – R20 000 – representing 35 percent. 10 percent of this category earns only up to R10 000. This says a lot about the affordability to live in Umhlanga on a relatively low to middle-income salary, however, it is still a small representation of the whole sample size which limits a true reflection. 25 percent of the people who responded in this category earn between R21 000 – R30 000; while only 15% earn a more comfortable salary – in the higher earning category of between R31 000 – R45 000. One person earns more than R45 000 and 2 people out of this category didn't respond. Those who only live in Umhlanga earn above R21 000, up to R45 000 – with only 50% of this category having answered this question. Those who only engage with employment in Umhlanga earn as little as between 0 – R10 000 – 36.8 percent, with the same proportion earning between R11 000 – R20 000. Only 7 people who fall within this category earn above R21 000, and up to R45 000 (2 people). 75 percent of those who neither work nor live in Umhlanga

earn below R10 000 a month, with only one person earning up to R20 000. *Although this is a very small representation of the overall participants, this – when compared to the earnings of those who live in and work in Umhlanga – suggests that the job opportunities and the lifestyle which Umhlanga has to offer is favourable for a higher quality of life.*

Table 20: Income Bracket (Crosstabulation)

		0-R10 000	R11 000- R20 000	R21 000- R30 000	R31 000- R45 000	R45 000+	9999		
Live k	Wor work	Count	2	7	5	3	1	2	20
		% within Live Work	10.0%	35.0%	25.0%	15.0%	5.0%	10.0%	100.0%
Live only	Live only	Count	0	0	1	0	2	3	6
		% within Live Work	0.0%	0.0%	16.7%	0.0%	33.3%	50.0%	100.0%
Work only	Work only	Count	14	14	4	1	2	3	38
		% within Live Work	36.8%	36.8%	10.5%	2.6%	5.3%	7.9%	100.0%
Neither	Neither	Count	6	1	0	0	0	1	8
		% within Live Work	75.0%	12.5%	0.0%	0.0%	0.0%	12.5%	100.0%
Total	Total	Count	22	22	10	4	5	9	72
		% within	30.6%	30.6%	13.9%	5.6%	6.9%	12.5%	100.0%
		Live Work							

Source: Author (2017)

With regards to the quality of life indicators; private healthcare featured as an indicator in this study – refer to *Table 11*, p. 104. The overall count of respondents who have got private medical cover make up 65.3 percent of the total; as opposed to 34.7 percent who do not have private medical aid. Seventy-Five percent of the respondents who live and work in Umhlanga have got Private medical aid plans, while 5 people – totalling 25 percent of this category – do not have private medical aid. Of the respondents who only live in Umhlanga, 83.3 percent of them are on private medical aids, and 16.7 percent are not. Those who only work in Umhlanga represent a total of 63.2 percent on private medical aid, and 36.8 percent have no private medical cover. The respondents whom neither live nor work in Umhlanga represent a 37.5 percent to 62.5 percent ratio of those who have private medical aid (the former), compared to the latter, who don't. This translates to the fact that those who live and work in Umhlanga can afford to have medical insurance; thereby translating, again, to the upliftment of the quality of life which Umhlanga offers.

Table 21: Private Medical Aid (Crosstabulation)

		Private Medical Aid		Total	
		Yes	No		
Live_Work	Live and work	Count	15	5	20
		% within Live_Work	75.0%	25.0%	100.0%
	Live only	Count	5	1	6
		% within Live_Work	83.3%	16.7%	100.0%
	Work only	Count	24	14	38
		% within Live_Work	63.2%	36.8%	100.0%
	Neither	Count	3	5	8
		% within Live_Work	37.5%	62.5%	100.0%
Total		Count	47	25	72
		% within Live_Work	65.3%	34.7%	100.0%

Source: Author (2017)

Observations done in the URNTC revealed three different Private Medical Centres within the study boundary; Umhlanga Netcare Hospital, Gateway Private Hospital and Medstone Medical Centre – refer to *photo 12*, p. 105. ‘Smart health’ is one of the aspects of an Intelligent (smart) City (Mozannenzadeh & Vettorato; Nam & Pardo, 2011), and Umhlanga’s provision of new, private medical facilities are likely to be equipped with some of the latest smart healthcare technologies since these developments fall within the notion of ‘leapfrogged’ (Gillham, 2002; in Larice & Macdonald, 2004) developments; from an infrastructural and technological point of view.

Photo 12: Gateway Private Hospital & Medstone Medical Centre

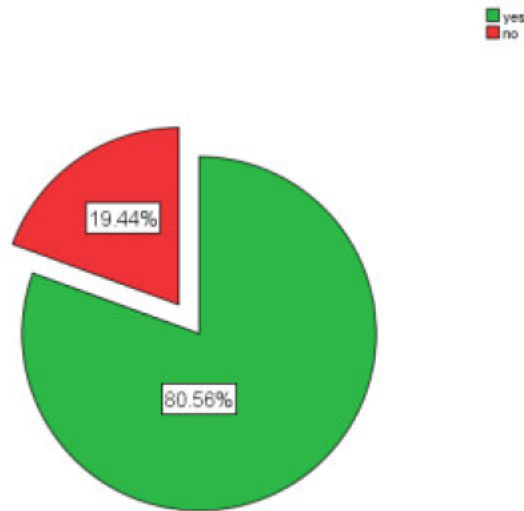


Source: Author (2017)

Engagement of respondents with Umhlanga's Leisure Activities

The overall count of participants who engage in Umhlanga's leisure or recreational activities such as coffee shops, restaurants and so on; represent 80.6 percent – see figure 21, p. 106. 19.4 percent of the overall sample size indicated that they do not engage in Umhlanga's recreational activities. A huge majority of those who live and work in Umhlanga – 95 percent – make use of such activities. Every person who only lives in Umhlanga engages in these leisurely activities; while 76.3 percent who only work in Umhlanga engage in such; and only 50 percent of those who neither live nor work in Umhlanga travel to Umhlanga to partake in what Umhlanga offers on a recreational level.

Figure 21: Engagement with Umhlanga's Leisure Activities



Source: Author (2017)

The study indicates a high response (80.6 percent) of people who engage in leisure activities in Umhlanga – whether its due to convenience for the residents of the area and its surrounds, or by the simple attraction of its variety of activities which draws in those who travel from outer lying areas to take advantage of all it has to offer. What the study found was that only half of those who do not live nor work in Umhlanga travel in to Umhlanga to engage in leisurely activities, so it still goes to show that Umhlanga is not exclusionary and is welcome to anyone and everyone – whether they choose to engage or not. What's more is that there is an extremely high rate of usage of these leisurely offerings which people who live and work in Umhlanga engage with.

Umhlanga Ridge New Town Centre's Public Open Spaces

The findings present that 38.9 percent of the respondents do not engage in the public open spaces provided for in Umhlanga – be it the Chris Saunders Park or the Children's Park – see *Table 12*, p. 106-107. The balance of the respondents do engage in the public open spaces; be it at one, the other, or both – provided they have children to enter the children's park.

Table 22: Usage of Umhlanga's Public Open Spaces

Live_Work	Live and work	Count	No	Chris Saunders Park	Children's Park	Chris Saunders & Children's Parks	9999	20
			4	9	4	3	0	
		% within Live_Work	20.0%	45.0%	20.0%	15.0%	0.0%	100.0%

Live only	Count	0	3	1	2	0	6
	% within Live Work	0.0%	50.0%	16.7%	33.3%	0.0%	100.0%
Work only	Count	21	14	2	0	1	38
	% within Live Work	55.3%	36.8%	5.3%	0.0%	2.6%	100.0%
Neither	Count	3	3	2	0	0	8
	% within Live Work	37.5%	37.5%	25.0%	0.0%	0.0%	100.0%
Total	Count	28	29	9	5	1	72
	% within Live Work	38.9%	40.3%	12.5%	6.9%	1.4%	100.0%

Source: Author (2017)

Just over 60 percent of all respondents make use of the public open spaces provided in URNTC, including Chris Saunders Park – see *photo 13, p. 107*; and the Children’s Park – see *photo 14, p. 108*. The Children’s Park is particularly unique to Umhlanga, boasting strict monitoring controls and a ‘no children, no entry’ policy (St Clair, 2016). A child minder is provided by Umhlanga Ridge Management Association to ensure the safety of the children by monitoring who comes in to the play area (Respondent 5). The child minder has got radio access to the URMA control room for quick-response purposes. St Clair (2016) indicates that this colourful, attractive family environment is open Tuesday to Sunday and closed on Mondays for maintenance purposes. The public open spaces were a fundamental aspect of the URNTC design, in aiming to create an attractive public urban space: “In re-establishing a public environment predicated on pedestrian movement and the integration of public spaces, parks and sidewalks, shoppers; residents, workers and visitors will be able to move around in a well maintained, clean and safe environment”(Moreland Properties, 1999: 39)

Photo 13: Chris Saunders Park, URNTC



Source: Author (2017)

Photo 14: The Children's Park, URNTC

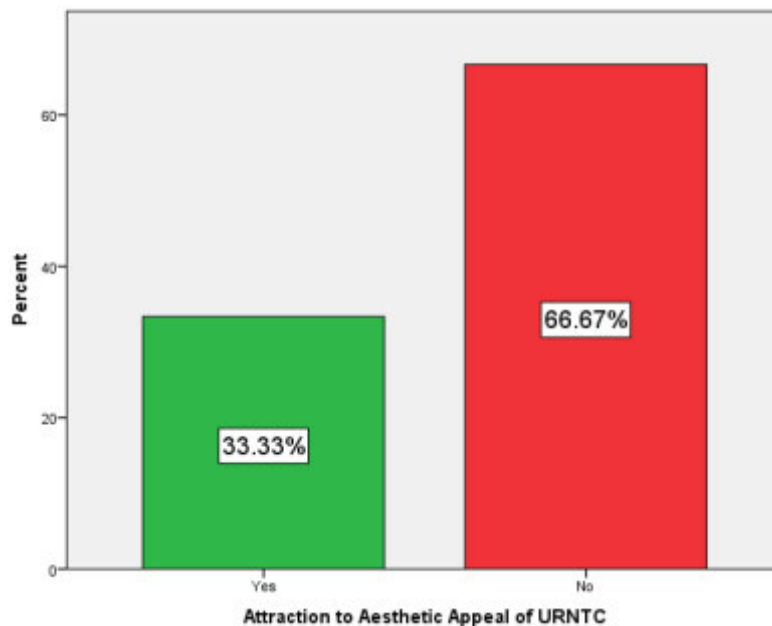


Source: Author (2017)

Attraction to the aesthetic appeal of Umhlanga:

The study found that 33.3 percent of the overall participants selected 'aesthetic appeal' as one of the main attractions to Umhlanga; while only 66.7 percent of people did not select it – refer to figure 22, p. 108. Those who are most attracted by the aesthetic appeal are the category of people who only live in Umhlanga – representing only 50 percent of the respondents in this category. The second highest percentage of people who selected aesthetic appeal as attractive to Umhlanga are 42.1 percent of the people who only work in Umhlanga. A very low percentage of people who live and work in Umhlanga are attracted by the aesthetic appeal – representing only 20 percent. Those who neither live nor work in Umhlanga represent the lowest interest in Umhlanga's aesthetic appeal, with only one person (12.5 percent) having selected it as an attractive feature.

Figure 22: Percentage of people who are attracted to URNTC by its aesthetic appeal



Source: Author (2017)

The study represents a low attraction to Umhlanga by its aesthetic appeal, according to the questionnaires' respondents – with only a third of them indicating that it was one feature which attracted them to URNTC. Umhlanga's design is based on the New Urbanism Charter (Congress for the New Urbanism, 2000) – which promotes a compact city through the use of mixed-use developments, with attention to the urban design of the area which is supposed to create a better sense of place through its aesthetic enhancement. The developers designed URNTC on the founding principle of it being a “total' urban environment which has its own particular quality and 'sense of place'” (Moreland Properties, 1999: 39). Therefore, the response to this particular question does not necessarily reflect a correlation between what the developers were aiming to achieve, and the perception which the locals have of the area. One must, however, keep in mind that there is still a substantial amount of on-going development within the New Town Centre which means that a lot of sites are still construction sites and therefore the aesthetic enhancements have not reached their full potential – refer to *photo 15*, p. 109. Additionally, it can be said that the respondents prioritised the choices which they could have indicated as attractive to them; which doesn't necessarily mean they do not find Umhlanga Attractive, but rather that they are more attracted by other features such as employment, over the aesthetics.

Photo 15: On-going construction takes away from the aesthetic appeal within URNTC

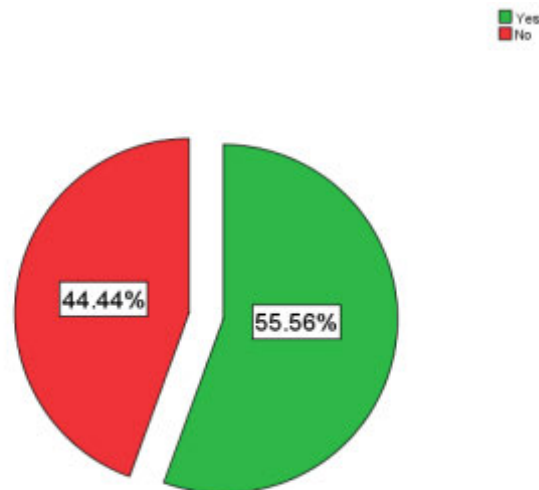


Source: Author (2017)

Attraction to URNTC by Variety of Activities/ Convenience

Just over half of the total sample size is impressed by the variety of activities which Umhlanga has to offer, with a 55.6 percent representation – refer to figure 23, p. 110. Those who have chosen to live in Umhlanga without having any work commitments in Umhlanga are particularly drawn by the variety of activities, with 83.3 percent of them indicating so. Those who neither work nor live in Umhlanga are not particularly moved by the variety of activities on offer in Umhlanga, representing only half; although one should bear in mind that 50 percent is only a count of four people – a very low representation.

Figure 23: Respondents attracted to Umhlanga's Variety of Activities/ Convenience



Source: Author (2017)

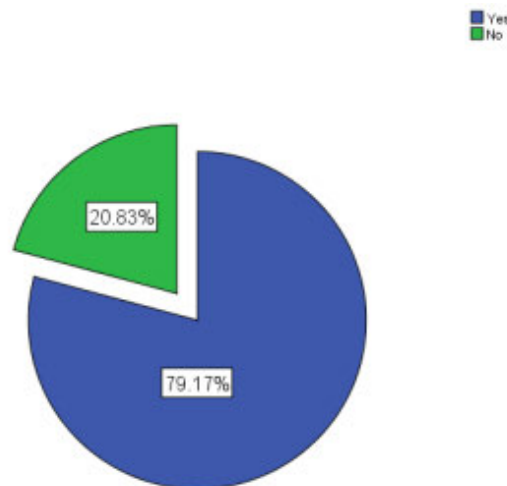
Respondent 3 explained that Umhlanga has been developed to attract high value investment and some of its main attributes being the “natural attributes of the area; the sea views” as well as accessibility. Additionally, the managed environment which Umhlanga Ridge Management Association provides is a major ‘plus’ in that it takes care of security issues in and around the Town Centre, creating an “attractive public environment which people have confidence in” – something which Respondent 3 feels strongly about, stating that: “If people are going to invest in that area they need to know that their investment is secure and is actually going to add value”. Respondent 3 explained that Gateway was a key catalyst in the area (as outlined in Moreland Properties’ 1999 rezoning report for URNTC), and Deloitte was the first corporate office development, with a number of other highly acclaimed corporate anchors having made flight to Umhlanga’s office parks; such as big accounting firms, law firms and engineering firms elaborated Respondent 3. Generally speaking, Respondent 3 claimed that “it’s probably one of the biggest commercial hubs- certainly the biggest in Durban and the rates being generated here probably outweigh the rates from the city centre”. Respondent 3 also emphasises that this trend has also increased; alluding to the patterns of one business testing the water, and upon approval of the water’s temperature, other businesses follow suit, stating that “business follows business”. Additionally, the residential areas surrounding the commercial offers convenience, yet the Town Centre is still lacking in public transport, admits Respondent 3.

Attraction to URNTC by employment opportunities

These findings presented a 79.2 percent overall response of employment opportunities being one of the key attractions to Umhlanga – see *figure 24*, p. 111. The remaining 20.8 percent of respondents did not select employment opportunities as a key attraction, as many of the respondents do not work in Umhlanga but may engage in Umhlanga for residential or recreational purposes instead. 95 percent of those who live and work indicated that they were attracted to Umhlanga for employment reasons; 97.4 percent of those who only work in Umhlanga indicated that employment opportunities attracted them to

Umhlanga – with one person not indicating this element as attractive to them – although they are solely employed in Umhlanga. The strong attraction to Umhlanga for employment purposes indicates eThekweni Municipality’s commitment to create employment opportunities in the Metro region and reduce unemployment rates.

Figure 24: Percentage of respondents attracted to URNTC by Employment Opportunities



Source: Author (2017)

eThekweni Municipality’s 2010/2011 IDP review outlines the ‘Development of priority nodes and corridors’ as its third programme under ‘Plan Two: Economic Development and Job Creation’ (eThekweni municipality, 2010). Again, mention is made of *Facilitating Development in Priority Nodes and Corridors* as a ‘strategic focus area’ in eThekweni’s (2015/2016: 218) IDP, wherein specific mention is made of the adoption of New Urbanism design principles as a tool through which the effects of the Apartheid City model strives to be undone. This reinstates the Municipality’s ongoing commitment to investing in these nodes and corridors, with Umhlanga portraying ongoing developmental success as a result. What this particular programme sought to achieve was to guide the “spatial aspects of economic development” (eThekweni Municipality, 2010: 58) by facilitating opportunities through Local Economic Development (LED) initiatives which would enable communities to engage in economic development in areas of closer dependency than that of Durban’s CBD, which is not easily accessible, nor affordable for many due to the scattered nature of settlements in the region. By strategically scattering such economic interventions across the municipal area, the municipality is “bringing opportunities closer to the people while increasing the overall competitiveness of the Municipality’s economy” (eThekweni Municipality, 2010: 58-59). Umhlanga, along with a few other key areas, is made specific mention of under this programme as one of the nodes which have made “significant progress” (eThekweni Municipality, 2010: 59) in terms of economic upgrades.

eThekweni’s 2015/2016 IDP review outlines Umhlanga as a “priority node” in Programme 2.4, for the promotion of investment in the greater Durban region, and also makes reference to it as a “secondary

CBD” (eThekweni, 2015/2016: 218). The IDP clearly outlines the objective of the above mentioned programme as one which is aimed to “reinforce existing nodes and corridors that build an efficient urban form and which are responsive to the needs of the poor”. Furthermore, over and above the hierarchy of prioritization of nodes and corridors; from regional, to citywide and then those within ‘key planning areas’ (eThekweni, 2015/2016: 218), the IDP also outlines the aim of Programme 2.4 as one which “speaks to the development of an overarching strategic approach to nodal regeneration for the City as well as targeted interventions in secondary CBDs”, with specific mention of Umhlanga, amongst others, stating that the aim is to “improve business confidence and the functioning of the nodes” (eThekweni, 2015/2016: 219).

Programme 2.5, as outlined by eThekweni’s 2015/2016 IDP review, is aimed at “Facilitating investment into infrastructure for catalytic projects” (eThekweni, 2015/2016: 219). This programme’s underlying objective is to “ensure the provision of support to facilitate investment into key catalytic projects and encourage investment into key strategic infrastructure projects” (eThekweni, 2015/2016: 219). The areas which it specifies as being focal to the programme include Cornubia, Dube Trade Port and bulk infrastructure which will be key to development in the North of Durban – all of which have a large influential effect – whether direct or indirect – on the future growth of Umhlanga. The IRTPN is also made mention of in terms of requiring dedicated support for the development thereof (eThekweni, 2015/2016), as the investment into a good public transport network is crucial to the densification of Umhlanga and surrounding areas, and will thereby facilitate progressive growth of the area and its economic output. Programme 3.5 is specifically aimed to at ensuring the implementation of a reliable public transport system, which strives to be an “effective, efficient, sustainable and safe public transport system”, of which the supporting transport policy is outlined in the Integrated Transport Plan (ITP) (eThekweni, 2015/2016: 262). Photos 16, p. 112; and 17, p. 113 illustrate the IRTPN site within the study boundary, from different angles.

Photo 16: N2 & Cornubia link, URNTC - Earthworks



Source: <http://kznpr.co.za/?s=umhlanga&submit.x=0&submit.y=0>

Photo 17: IRPTN C9 route construction site within URNTC



Source: Author (2017)

The Municipality's Spatial Development Framework (SDF) serves as a spatial representation of all it seeks to achieve, as stipulated in the IDP. eThekweni Municipality (2016: 20) states that its SDF serves as a "strategic spatial framework that guides the desired spatial distribution of land uses, spatial priorities and strategic infrastructure provision within a Municipality in order to give effect to the vision, goals and objectives of the municipal IDP".

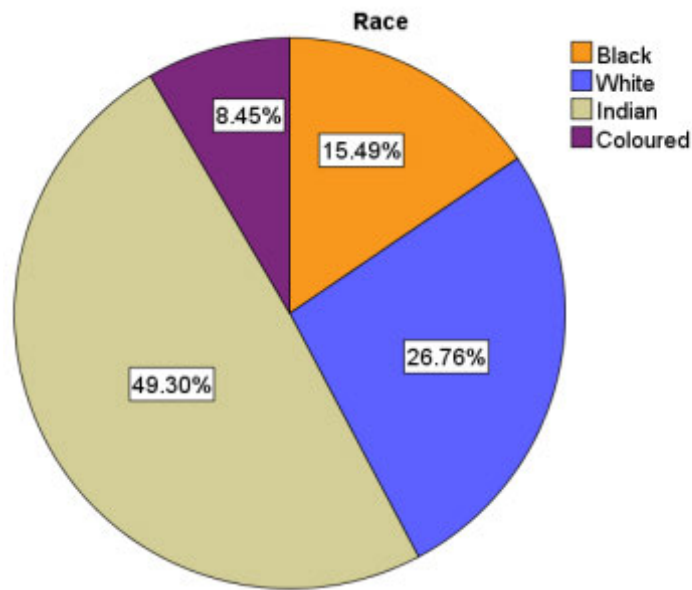
5.5 Demographic Profile of Umhlanga

The Stats SA Community Survey (2011, cited in eThekweni Municipality, 2013/2014) found that the NMPR's populous makes up 34% of eThekweni's total population count with 1 157 109 people located therein, as compared to the Metro's overall population count of 3, 442 361 people.

Race Profile:

The study revealed that just about half of the respondents to the questionnaire were of the Indian populous, representing 49.30 percent – refer to *figure 25*, p. 114. The white population accounted for 26.76 percent of the respondents, whilst black African's represented 15.49 percent, and the remaining 8.45 percent – coloureds. The URNTC was designed as a safe, convenient urban environment (Moreland Properties, 1999) which is welcoming to all races. The hierarchy of races which partook in the study illustrates the materialisation of the PPP between eThekweni Municipality and Tongaat Hulett Developments to create a node which serves to stitch up the segregated land patterns in the north by promoting integration and providing opportunities in the region for those in the outer-lying areas to Durban's CBD, without exclusivity.

Figure 25: Race profile of Respondents

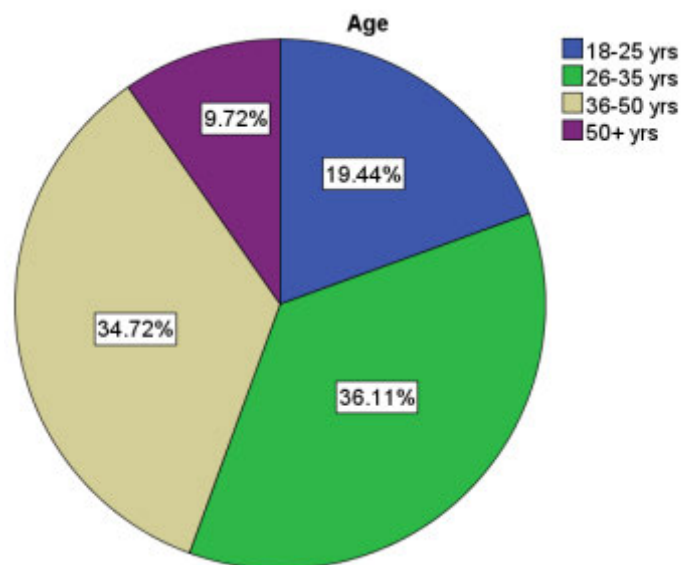


Source: Author (2007)

Age Profile

The north spatial planning region represents a young population with much of the population herein being younger than 49 years of age. eThekweni Municipality (2013/2014: 12) explains that a young population such as the one herewith presented has prioritised planning implications, stating that, "this has huge implication for service delivery, education and job creation in the municipality which has to be prioritized on account of such a young population". Figure 26, p. 114, illustrates that the study's findings mirror the NMPR's age pattern.

Figure 26: Age Profile of respondents

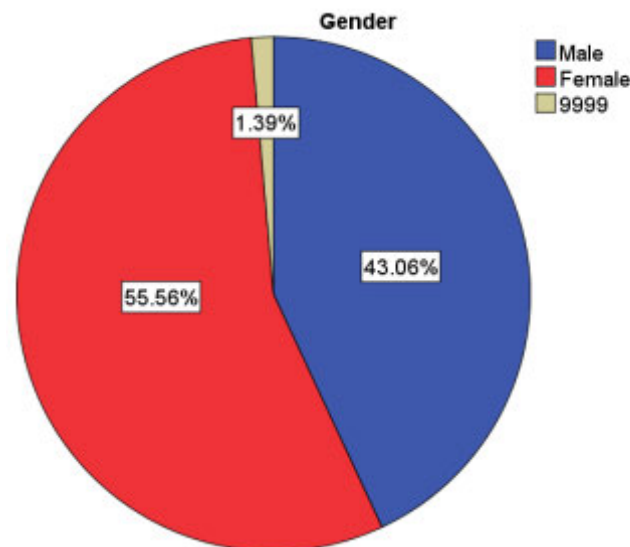


Source: Author (2017)

Gender Profile:

The gender profile in the NMPR is dominated by females, a common trend for “most other planning regions in eThekweni Municipality” (eThekweni Municipality, 2013/2014: 11). The respondents to the study questionnaire revealed the same trend, with 55.56 percent being female – refer to figure 27, p. 115.

Figure 27: Gender Profile of Respondents

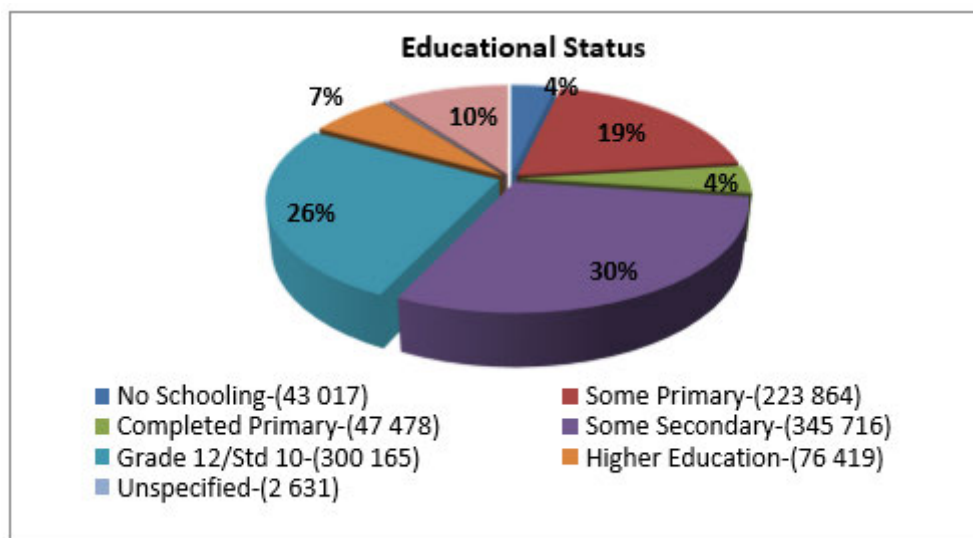


Source: Author (2017)

Education Levels

Education levels in the NMPR represent a low percentage of education from a Matric pass and higher. 26 percent of the NMPR population has a Matric pass – refer to figure 28, p. 115 – while only 7 percent have got a higher education pass (eThekweni Municipality, 2013/2014)

Figure 28: Education profile of the North Municipal Planning Region



Source: eThekweni Municipality (2013/2014: 12)

The study found that the level of qualification which all the respondents to the questionnaire represent, collectively, shows that just over half of them – 51.4 percent – have university qualifications, refer to

Table 13, p. 116. The second highest majority is represented by 34.7 percent of respondents who finished Matric, meaning that effectively 86.1 percent of all respondents are educated with a matric pass rate (51.4 percent who went on to study at university, plus the 34.7 percent who settled for a Matric pass without furthering their studies). Those who have a higher qualification such as a Master's or doctorate degree (Grad School) represent only 9.7 percent of the total sample size. Those who only have up to a primary school level academic qualification represent 1.4 percent. Those who only work in Umhlanga but do not live in Umhlanga, and have a university qualification, represent 60.5 percent of the 38 people for this category. Those in the same category with a high school pass represent 23.7 percent, while 13.2 percent – only 5 people – have got a post-graduate pass. This is indicative of the fact that the 'knowledge elite' are attracted to the levels of employment offered in Umhlanga. 2.6 percent of the sample size have only got a primary school level qualification of those who travel in to Umhlanga only for work.

Table 23: Highest Level of Qualification

		Primary	High School	University/College	Grad School	Still learning beyond Grad	9999		
Live/Work	Live and work	Count	0	8	8	2	1	1	20
		% within Live_Work	0.0%	40.0%	40.0%	10.0%	5.0%	5.0%	100.0%
	Live only	Count	0	3	3	0	0	0	6
		% within Live_Work	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	100.0%
	Work only	Count	1	9	23	5	0	0	38
		% within Live_Work	2.6%	23.7%	60.5%	13.2%	0.0%	0.0%	100.0%
Neither	Count	0	5	3	0	0	0	8	
	% within Live_Work	0.0%	62.5%	37.5%	0.0%	0.0%	0.0%	100.0%	
Total	Count	1	25	37	7	1	1	72	
	% within Live_Work	1.4%	34.7%	51.4%	9.7%	1.4%	1.4%	100.0%	

Source: Author (2017)

Although 34.7 percent of the respondents indicated they had a matric pass rate, technically all respondents who went on to further their education at tertiary institutions would have required a matric pass to do so. Thus, we can assume that 98.6 percent of respondents have in fact got a Matric qualification. This speaks volumes to the Intelligent City, as it indicates that Umhlanga does in fact attract educated individuals and has the calibre of job opportunities to accommodate such. Additionally, 51.4 percent of the respondents furthered their studies to acclaim a university pass rate; although

moderate, is still a very good representation of education levels in Umhlanga. This lines up with the Intelligent (Smart) City's consciousness about creating an environment which attracts educated individuals, or as Backhouse (2015: 3) puts it, the "knowledge elite". Additionally, it is a joint effort between private and public sector to create a development node which is socio-economically uplifting (Moreland Properties, 1999; eThekweni Municipality, 2013/2014). The evidence found alludes to the fact that there are opportunities for employment in Umhlanga which don't require one to have a high level of education; speaking to the issue of inclusivity. Domestic workers, cleaners, kitchen staff at restaurants and so on are some of the lower paying opportunities which this level of qualification might typically secure one. Those who choose to live in Umhlanga without being drawn there for employment represent a 50:50 ratio between high school qualification and University qualification. However, this only represents 6 people and so the sample size is very small and limiting to a true reflection.

Table 24: Income Bracket (Crosstabulation)

			0-R10 000	R11 000- R20 000	R21 000- R30 000	R31 000- R45 000	R45 000+	9999	
Live_Work	Live and work	Count	2	7	5	3	1	2	20
		% within Live_Work	10.0%	35.0%	25.0%	15.0%	5.0%	10.0%	100.0%
	Live only	Count	0	0	1	0	2	3	6
		% within Live_Work	0.0%	0.0%	16.7%	0.0%	33.3%	50.0%	100.0%
	Work only	Count	14	14	4	1	2	3	38
		% within Live Work	36.8%	36.8%	10.5%	2.6%	5.3%	7.9%	100.0%
Neither	Count	6	1	0	0	0	1	8	
	% within Live Work	75.0%	12.5%	0.0%	0.0%	0.0%	12.5%	100.0%	
Total	Count	22	22	10	4	5	9	72	
	% within Live Work	30.6%	30.6%	13.9%	5.6%	6.9%	12.5%	100.0%	

Source: Author (2017)

Equal percentages of 30.6 percent represent the overall percentages of those who earn between 0-R10 000, and R11 000- R20 000 – refer to Table 14, p. 117. 13.9 percent earn a higher salary of between R21 000 – R30 000; only four people earn between R31 000 – R45 000 – representing 5.6 percent; 6.9 percent earn over R45 000 (only 5 people); and over 10 percent of the total sample size didn't participate in answering this particular question – as many people feel uncomfortable sharing this kind of private information.

The biggest percentage of people who live and work in Umhlanga earn between R11 000 – R20 000 – representing 35 percent. 10 percent of this category earns only up to R10 000. This says a lot about

the affordability to live in Umhlanga on a relatively low to middle-income salary, however, it is still a small representation of the whole sample size which limits a true reflection. 25 percent of the people who responded in this category earn between R21 000 – R30 000; while only 15% earn a more comfortable salary – in the higher earning category of between R31 000 – R45 000. One person earns more than R45 000 and 2 people out of this category didn't respond. Those who only live in Umhlanga earn above R21 000, up to R45 000 – with only 50% of this category having answered this question. Those who only engage with employment in Umhlanga earn as little as between 0 – R10 000 – 36.8 percent, with the same proportion earning between R11 000 – R20 000. Only 7 people who fall within this category earn above R21 000, and up to R45 000 (2 people). 75 percent of those who neither work nor live in Umhlanga earn below R10 000 a month, with only one person earning up to R20 000. Although this is a very small representation of the overall participants, this – when compared to the earnings of those who live in and work in Umhlanga – suggests that the job opportunities and the lifestyle which Umhlanga has to offer is favourable for a higher quality of life.

5.6 Infrastructure

A Strategic Focus Area aimed at infrastructure development is outlined in eThekweni Municipality's Plan 2, of 8 (eThekweni Municipality, 2015/2016: 219), titled 'Leverage, Influence and Facilitate Key Infrastructure Development and maximise the Local Benefit'. The SFA is targeted at facilitating infrastructural development in priority areas in a bid to unlock projects which will have maximum benefits to the local area. This is said to be achieved through the provision of economic opportunities in developments carried out by public and private sectors.

Respondent 2 explains that when the development rights for the URNTC were released by the Department of Agriculture, there were two iterations for development rights: firstly, they were modelled on the transport development rights; and secondly, on infrastructure. This indicates the advantage which presented itself for the URNTC to 'leapfrog' development, as explained by Gillham (2002, in Larice & Macdonald, 2004), in terms of large-scale infrastructural investment in an area which had very little before – in this case – due to it being previously zoned for agricultural purposes. The roll-out of new infrastructure in a 'leapfrogged' fashion allows for newer advances in infrastructure to be installed, compared to those previously adopted elsewhere, in older developments. It also eliminates the issue of injecting money into upgrading old, dilapidated infrastructure in congested areas – such as the CBD – which can at times be costlier in indirect ways, such as people avoiding certain locations due to road closures and traffic restrictions which puts pressure on income-generating businesses in the vicinity. Thus, the fact that the infrastructure for the URNTC was rolled out from scratch eliminated the issue of poorly serviced and poorly maintained infrastructure – making investment in Umhlanga more favourable over Durban's dilapidating CBD. The Infrastructural Adjustment Strategy outlined in Moreland Properties' (1999: 22) Rezoning Report stipulated that 'service infrastructure' would be paid particular attention to in terms of investment, and equally as high a priority was the infrastructure required to enhance the sense of place of the town centre, those which promoted its "address value", including landscaping, sidewalks, road signage planting trees and the preparations for the 'town gardens' - now Chris Saunders Park.

Infrastructure is the 'backbone' to a city's economy and functioning. Carter (2013) makes an important distinction between the elements of infrastructure; distinguishing them as physical and non-physical infrastructure. *Physical infrastructure* refers to underlying structures that support city systems; drainage systems, sewerage systems, transport networks, bridges, energy channels and so on. *Non-physical infrastructure* has more direct relevance to Hollands' (2008, Backhouse 2015) first of three framing topics on which he bases a smart city; *infrastructure-based services*. This constitutes the invisible components of infrastructure which are holistic to cities of the information age. This infrastructural component "occurs in cyberspace and creates functional relationships between the city and humans" (Carter, 2013; 505), through systems including mobile technology and social media. Hollands' (2008; Backhouse, 2015) relates his first discourse to the topic of ICTs and their involvement in enhancing the way in which information and knowledge is disseminated amongst people and institutions to enhance city functioning and promote a higher quality of life for all citizens. This relates to the services and infrastructure components of a city which, through 'smart computing technologies', can promote efficiency and intelligence through digital interconnectivity (Backhouse, 2015). Healthcare, transportation, local government administration, education and public safety are all made more efficient and effective through such measures.

5.6.1 Physical Infrastructure

The minimum bulk of the area demarcated for the development of the Umhlanga Ridge New Town Centre (excluding Gateway) was 433 000 m² and the maximum was 633 000 m² (Moreland Properties, 1999; Respondent 2; Respondent 3) – based on water, electricity and transport requirements.

Water Reticulation:

eThekweni's bulk potable water supply is provided by Umgeni Water, majority of which is supplied by Hazelmere Dam and the Umgeni River (eThekweni, 2013/2014). The northern sector of eThekweni, under which Umhlanga's jurisdiction falls, is supplied by the Nagle and Albert Falls Dams respectively – both part of the Umgeni River system; as well as Hazelmere Dam which is part of the Umdloti River system (eThekweni Municipality, 2013/2014). There is a reservoir on Herrwood Drive within the Umgeni Water board's site which supplies the URNTC with water (Moreland Properties, 1999). Moreover, the road reserves within the town centre were planned to accommodate a water reticulation system which would be fed by a 200mm diameter water main which ran along the sugarcane tracks in the vicinity of Prestondale, into to the URNTC (Moreland Properties, 1999).

Electrical:

The Durban Corporation Electricity Service Unit is responsible for the supply, distribution and maintenance of electricity to and within the URNTC (Moreland Properties, 1999). The electrical substation is situated at the site of the main traffic circle at the interception of Umhlanga Rocks Drive and Herrwood Drive, and the relocation thereof is possible should the need arise as development in the area expands (Moreland Properties, 1999).

Waste Water:

The northern part of the municipality is serviced by 6 waste water treatment plants, one of which is in Umhlanga (eThekweni Municipality, 2013/2014). However, eThekweni's 2013/2014 north spatial development plan report explains that although the Umhlanga and Verulam treatment plants are coping with current capacities and will "suffice for the short to medium term" (eThekweni Municipality, 2013/2014), only two of the six treatment plants in the north region (Tongaat and Phoenix) have the capacity to be upgraded to regional treatment plants. The presence and functional use of Umhlanga's own waste treatment plant is significant to the area for its development potential.

Parking:

The current parking situation in Umhlanga Town Centre which was observed resembles street-side parking with 'pay-and-display' parking metres in the immediate surrounding vicinity of the Gateway complex. Palm Boulevard is a prime example along which one would have to pay for metred parking. The street parking further away from the centre of the town is free of charge and is not monitored by parking metres – see *photo 18*, p. 120. Additionally, off-street parking space – in the form of business-park courtyards is provided for in the business parks – see *photo 19*, p. 121. This is one of the attractions which make doing business and engaging in leisurely activities – like retail – in URNTC all the more convenient and safe.

Photo 18: Aurora Drive, street-side parking



Source: <http://kznpr.co.za/?s=umhlanga&submit.x=0&submit.y=0>

Photo 19: Offstreet courtyard parking in Business Parks



Source: Author (2017)

Table 25: Live-Work Crosstabulation of Parking Issues Experienced

		yes	No	9999		
Live_Work	Live and work	Count	10	10	0	20
		% within Live_Work	50.0%	50.0%	0.0%	100.0%
	Live only	Count	5	0	1	6
		% within Live_Work	83.3%	0.0%	16.7%	100.0%
	Work only	Count	19	18	1	38
		% within Live_Work	50.0%	47.4%	2.6%	100.0%
	Neither	Count	3	3	2	8
		% within Live_Work	37.5%	37.5%	25.0%	100.0%
Total		Count	37	31	4	72
		% within Live_Work	51.4%	43.1%	5.6%	100.0%

Source: Author (2017)

Table 15, p. 121, presents the findings of parking issues experienced within the URNTC by the respondents. The issue of parking is felt mainly by those who only live in Umhlanga, even if a very small size of the overall sample – with 5 people representing 83.3 percent for that category. Respondents 1 & 5 both confirmed the issue of parking in the Town Centre, with Respondent 5 having explained that a lot of the employees who work at Gateway and surrounds park in the street-side parking bays to avoid paying for parking, yet it causes a problem for residents when they return home at any given time because much of the street side parking which lines the residential estates is meant for the residents. Respondent 1 explained that the Town Centre’s parking was initially designed to offer parking to outsiders in the day and residents at night, but Respondent 5 alluded to the issue which the Town Centre is experiencing being much to do with taxi’s parking at lax for long periods of time, waiting to transport employees – many of them from the surrounding call centres.

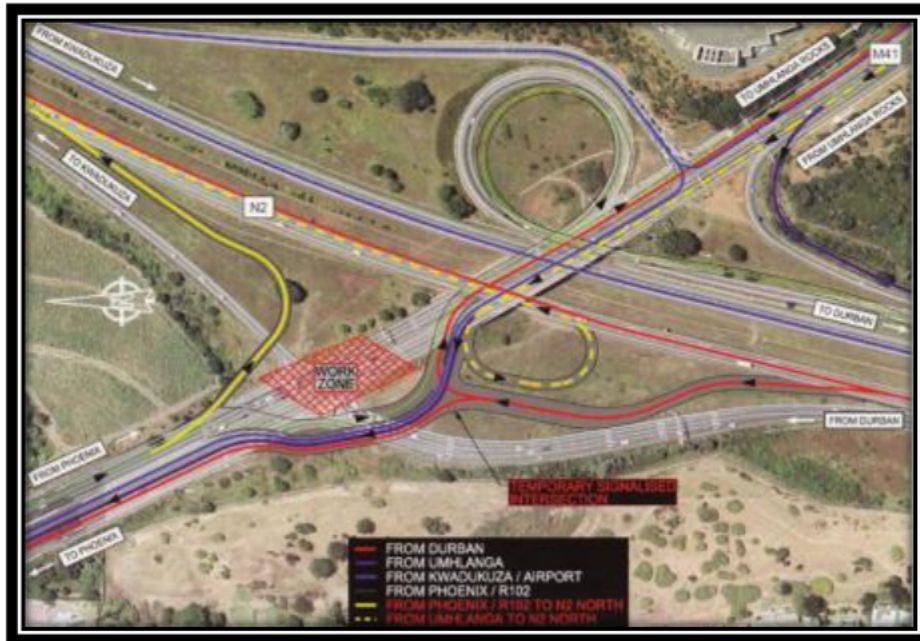
Although all parking options offered in URNTC are safe and convenient, Respondent 1 displayed some regret at the ‘metred- parking’ system which is currently in place in the URNTC, having explained that

what the developers wanted to introduce to Umhlanga – before Cape Town adopted it – was the parking metre system which is currently all over the city of Cape Town. The developers were in-the-know about its technology and were in correspondence with the parking metre providers. That particular system is based on every block in the city being monitored by a metre attendant in uniform, who operates a hand-held computer and generates a parking ticket based on one's expected time of stay (Respondent 1). The difference between this system and the system which is in place in Umhlanga – the 'pay and display' parking metres, explained Respondent 1, is that the metre attendants would act as 'Matrodee's', welcoming you to the areas and serving as an information disseminator for any questions visitors may have about the area. Ultimately, they serve as a public person who is approachable and responsive to visitors. Furthermore, the handheld computer is used to capture the car registration and gets the metre ticking. It records your parking start-time; but more effectively, it is linked up to another computer which can determine any illegalities with the relevant car; such as whether it is a stolen car. Respondent 1 explained that this is what the preferred system would have been – before Cape Town City implemented it – but Durban's local authority, eThekweni Municipality, didn't pass it. The benefit of the man-handled smart parking metres is that it deters the area of criminally-likened people because they can trace certain security information back to people. That ties in with the security, to fight crime and keep these places attractive, vibrant and minimise crime as much as possible. Respondent 1 explained that Umhlanga's free roadside parking is abused by the employees of Gateway because the parking at Gateway is not free, so the street parking which is meant for the residents and the smaller surrounding local businesses is often used by the hundreds of employees of the area. Respondent 1 suggested to metre the free parking, too, as a solution to the issues, but claimed that Council declined to assist Umhlanga Ridge Management Association in metering them.

Transport:

eThekweni Municipality's 2013/2014 North Spatial Development Plan (SDP) report outlines the Northern Coastal Residential and Recreation Corridor – the development corridor along which Umhlanga finds itself, as "a high priority public transportation corridor" (eThekweni Municipality, 2013/2014: 86). According to the North SDP report (eThekweni, 2013/2014), the pattern of traffic flow has increased over the years from the north to the south due to the concentration of development in the northern region of the metro, including Umhlanga – refer to *figure 29*, p. 123. The capacity of the four-lane N2 highway which runs north of the Umhlanga interchange is currently able to cope with the traffic volumes, whilst the N2 highway south of the said interchange has recently been expanded to 7 and 8 lanes due to the higher volume of traffic experience south of the Umhlanga interchange (eThekweni, 2013/2014) – see *figure 30*, p. 123. The northern part of the M4 which runs just above the Mdloti River has a lower volume of traffic as compared to the M4's capacity to cope with the traffic volumes in the south. In peak direction, the volumes of traffic on the southern M4 are said to be verging on an 80% capacity (eThekweni Municipality, 2013/2014).

Figure 29: N2/ M41 Interchange directional flow



Source: <http://www.skyscrapercity.com/showthread.php?t=1643866&page=2>

Figure 30: N2/ M41 Interchange at Mt. Edgecombe/Umhlanga



Source: <http://www.skyscrapercity.com/showthread.php?t=1643866&page=3>

eThekweni's 2015/2016 financial budget allocates a substantial portion of the whole to public transport infrastructure, R1.2 billion to be exact (eThekweni, 2015b). Given the unique spatial layout of the South African landscape which represents vast areas of settlement dispersion, travelling distances from the city's outer fringes and beyond, into the urbanised city nodes are long. The poor, less-advantaged populations who travel into the city-region from afar to engage in employment are most-affected by the current public transport system, spending on average "20 percent of their income on travel to and from work" (eThekweni, 2015: 2). The need for substantial investment in the metro's public transport system

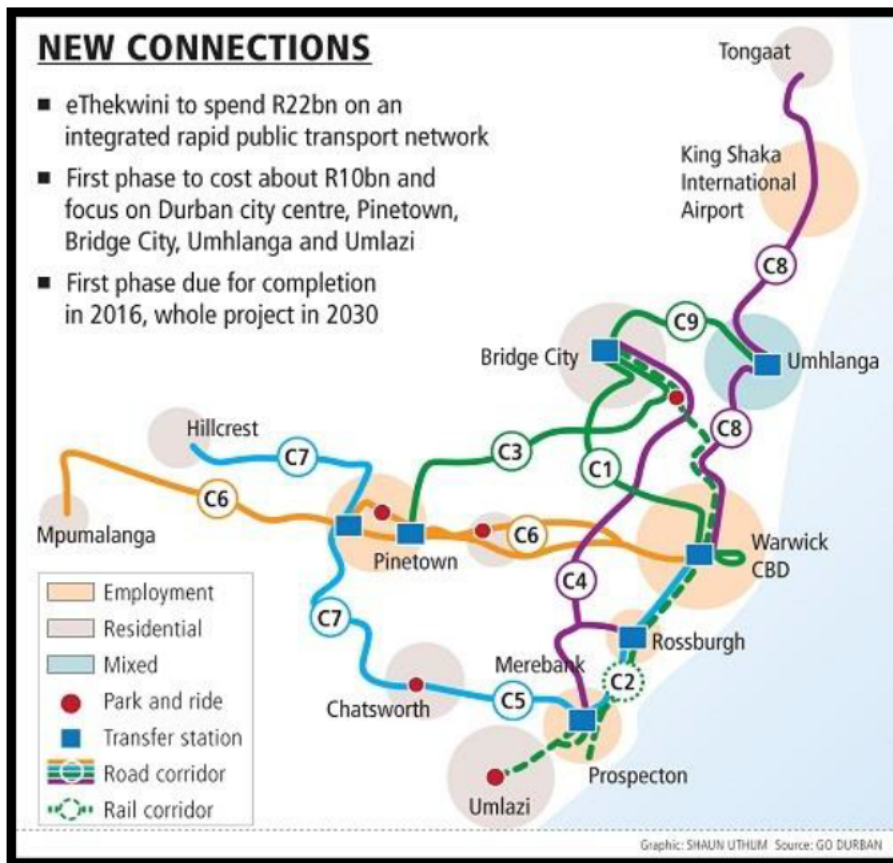
is thus strongly advocated for by eThekweni Municipality (2015b: 2), stating that “the public transport investments are significant and anticipated to change the spatial structure of the city in the long-term while creating efficient and safe public transport in the short-term”.

In terms of public transport and the issue of combating urban sprawl, mass transit systems such as the BRT line being adopted by eThekweni for the greater Durban region are popular investments by cities abroad to combat sprawl, Farahi (2015) states that “Many mid-sized cities in North America have invested in mass transit as a means of controlling urban sprawl and providing a reliable, efficient and effective transportation system to their residents”, further claiming that “shaping the city around rapid transit will help increase urban density and targeted compact growth patterns that will cut the cost of sprawl, reduce congestion and pollution, and encourage mixed-used urban neighbourhoods” (Farahi, 2015).

Moreover, the Integrated Urban Development Framework (IUDF) forms the spatial aspect of the NDP, offering the urban development context of spatial formation at a macro scale. The SIP projects are part and parcel of the IUDF, and are ‘catalytic restructuring projects’ (eThekweni IDP; p. 9) which will in essence be responsible for the alterations to the cities’ spatial formations. The Integrated Rapid Public Transport Network (IRPTN) is an example of such rollouts of SIP projects (eThekweni, 2015/16), and the development thereof is currently underway. Respondent 3 reiterated that the IRPTN network will increase the densification of Umhlanga once public transport arrives. The IRPTN line which is to feed into Umhlanga are both the C8 and C9 routes, and the development of the bridge over the N2 highway for the C9 route has already commenced, confirmed Respondents 1 and 3; refer to *figure 31*, p. 125. However, back in the late 1990s when Umhlanga was planned, environmental sustainability and issues of alternative energy and the like “were not high on the agenda” stated Respondent 1, as there was limited technology in that space – so Umhlanga was ultimately planned in a “traditional sense” which lead the sustainability of Umhlanga to be more focussed on the design and compactness thereof (Respondent 1).

Umhlanga has accommodated the Bus Rapid Transit system – or the ‘BRT’ system – refer to *figure 32*, p. 125, for an international example – along the C8 and C9 routes; the designs for the station have been approved and construction is underway on either side of the N2 highway to create the C9 BRT route from Bridge City, through Cornubia, to eventually join up to the Oval Sites in the Umhlanga Ridge Town Centre – refer to *photo 20 & figure 33*, p. 126. This line will serve to offer much greater opportunity to the greater disadvantaged society, and falls in line with eThekweni’s IDP to integrate the historically-segregated spatial arrangement of the Metro. The BRT system is advantageous over the private automobile as it uses dedicated bus-only lanes to ensure a much faster commute than the private car and associated congestion, pollution and the like.

Figure 31: IRPTN Network planned for within the eThekweni Metro



Source: www.keywordsking.com

Figure 32: The BRT system in London, Canada



Source: <http://londoninstitute.ca/the-case-for-bus-rapid-transit/>

Photo 20: The 'Cornubia Bridge' over the N2 highway, for the BRT line to URNTC



Source: <http://www.skyscrapercity.com/showthread.php?t=1775062>

Figure 33: The Oval Site within the URNTC where the BRT line will connect to



Source: Author (2017)

5.6.2 Non-Physical Infrastructure

Fibre Optics/ Telecommunications (ICTs):

Respondent 1 claimed that it is in fact “private enterprise with political patronage” which provide URNTC’s fibre backbone and not Telkom (who used to have sole-monopoly) nor Council; but in essence, it is council that gives the rights to roll out fibre optic installations, whilst private enterprises

put the fibre systems in. Respondent 4 reiterated this by explaining that “there’s a lot of private sector going in with different hotspots that comes out of VAST – a layer 2 independent agnostic wireless provider which is also part of the ‘AlwaysOn’ fold”; which basically means that any Internet Service Provider (ISP) can sell across their network, VAST put the infrastructure in and offer it to ISPs as a ‘carriage way’ for their service to be delivered to their end users. Thornton (2006: 17) quotes Newton’s Telecom Dictionary as defining telecommunications as: “The art and science of communicating over a distance by telephone Telegraph and radio. The transmission, reception and the switching of signals, such as electrical or optical, by wire, fibre, or electromagnetic (i.e. through-the-air) means”. Telecommunications is more specifically defined as per South Africa’s contextual application of its meaning, in the telecommunications act – the primary regulator of South Africa’s telecommunications industry – as follows:

“The emission, transmission or reception of a signal from one point to another by means of electricity, magnetism, radio or other electromagnetic waves, or any other agency of a like nature, whether with or without the aid of tangible conductors” (Thornton, 2006: 18).

Respondent 1 was adamant that fibre optics are crucial to achieving smart city status, stating that “the fibre thing is without a doubt the backbone of the smart city”. Respondent 4 reiterates this by stating that “what underpins the smart city is the actual infrastructure – what you really need is fibre”. eThekweni Municipality (2015/2016: 219) realises this in its SFA ‘Leverage, Influence and Facilitate Key Infrastructure Development and Maximise the Local Benefit’, and makes specific mention of its commitment to prioritising investment ‘IT connectivity’. Moreover, programme 2.8 ‘Stimulate Key Sectors that Promote Enterprise Development’ of SFA ‘Enterprise and Sector Development’ illustrates its commitment to stimulating economic growth through in various key sectors, including ICT. Fibre is a “limitless technology”, it is what Respondent 4 describes as ‘futureproof’ - in the sense that once the physical cable has been put in the ground, how it is optimised or made ‘next generation’ is based on what is put on the end of it. Traditionally copper had a limit, explained Respondent 4, because of all the “attenuation resistance and all the sort of short falls copper has” – which limited the capacity to which it could do, whereas with fibre, one can do 10GB, or 40GB on the same piece of strand. Additionally, nowadays one can also do something called ‘WDN’ where a single wavelength – as a single physical circuit – can be multiplexed multiple times and be sold 40 or 50 times at a capacity of 40 gigabytes (Gb) or 100Gb, depending on the chosen wavelength capacity (Respondent 4). Respondent 4 explained that this is what makes fibre favourable from a capacity and next generation demand requirement that fibre optic networks provide, claiming fibre to be the underpinning factor.

Respondent 1 states that “Umhlanga has become a huge target for fibre”. Nearly two decades on from the first stages of the URNTC development, there are five fibre systems paralleling each other in the URNTC; Neotel, Vodacom, MTN, Dark Fibre Africa (DFA) and Telkom, explained Respondent 1. Telkom originally had the monopoly in communication in South Africa, until the telecommunication law changed to avoid monopolistic patterns of communication service provision so as to create competition in the market for the benefit of the economy (Thornton, 2006). At the inception of Umhlanga, Telkom

were the sole service provider, with Vodacom having – at that stage – only indicated a willingness to integrate the URNTC proposals into their future plans (Moreland, 1999).

According to Respondent 1, DFC – one of the biggest fibre optic providers currently operating in the URNTC – is a private “politically patronized” company who roll out fibre through any conduit available to pull fibre through; to the extent of pulling it through sewers. Dark Fibre refers to the fact that it is placed in conduits where no light passes through and this is the type of fibre system which runs through the whole of Umhlanga’s New Town Centre, explained Respondent 1. Remarkably, at the inception of the URNTC’s development, service ducts were installed at 18 metre intervals along the road infrastructure – not knowing then what their significance would hold today, explained Respondent 1, claiming that they were installed as empty service ducts which could be ‘tapped into’, and have served a vitally important function in the face of a rapidly expanding soft infrastructure in the Town Centre. This infrastructure allows for the use of internet via ICTs, which was seen upon observation in URNTC’s public spaces – refer to *photo 21*, p. 128.

Photo 21: People use ICT devices where fibre optics provides Wi-Fi, in URNTC



Source: Author (2017)

eThekweni metro spans a vast area so the challenge to get footprint across it is a mammoth task, therefore areas favourable for soft infrastructure rollouts such as fibre optic cabling need to be ‘cherry-picked’ (Respondent 4) to get better return on investment. Respondent 4 explained that networks are subsidized through the movement of people. How the internet of Things is going to be monitored and data on them, collected, is all down to the standard chosen – of which there are two, explained Respondent 4. The first is the ‘Lorna standard’, which is a Wi-Fi standard that uses low-powered wave infrastructure, which is also referred to as LPWAN, ‘low powered wide area network’; and then there’s another technology called NBIOT, so those are the two standard technologies which are fighting for

adoption in the market when it comes to IoT. Ultimately it is these Wi-Fi networks which are what's going to drive IoT in terms of how IoT can move forward. These are the systems which serve as data collection feedback transmitters which will be able to determine, for example, how long a person stood in a queue for, or how long a person waited for a bus for – by the Wi-Fi user tapping into the public Wi-Fi hotspots with their 'smart devices' such as smartphones, and data being collected from these digital connections.

In its bid to move towards achieving intelligent city status, eThekweni launched a trial-run smartphone application called 'Smart Community Application' which offered itself as a "responsive service delivery tool" (eThekweni Municipality, n.d) that sought to create a platform for interaction between municipality and customers, in real-time. With the click of a button, service delivery concerns could be raised instantaneously, from pot holes to blocked drains, from dysfunctional traffic lights to illegal dumping. These are the kinds of applications which rely on soft infrastructures to capacitate them as being data transmitters for the betterment of the city. These are the very kinds of smart technologies which cities need to adopt in order to connect with the people in real-time, in the pursuit of creating more liveable city habitats with increased quality of life for all.

CCTV Surveillance:

In keeping within its design framework to create a safe and convenient public environment (Moreland Properties, 1999), the URNTC has incorporated a complex CCTV surveillance system, called 'Cathexis' (Respondent 5) – see *photo 22*, p. 130 – to monitor its public spaces and ensure the safety of all who engage in them. The technology which Cathexis boasts is remarkable in terms of its technological capacities, according to Respondents 1 and 5. CCTV used to be able to do face recognition following which the face could be tracked through the technological programmes to backtrack the data on the detected face and would have spewed out a time and location of where the face will have been seen within a given period of time – and that was technologically remarkable, explained Respondent 1. Respondent 1 further explained that now with people wearing 'hoodies', faces are easily masked and so technology had to be stepped up to respond to that issue.

Photo 22: CCTV monitored public space in URNTC



Source: Author (2017)

The CCTV technology which is astronomically invested into the URNTC is without a doubt one of the fundamental technological tools which aid in keeping the Town Centre as safe and appealing as it first set out to achieve. The camera technology in Umhlanga operates in 'virtual reality' whereby virtual realities of different scenarios can be created to solve certain situations. In essence, this surveillance technology allows the operator to create "virtual wall" with the cameras, explained Respondent 1; and reiterated by Respondent 5. Respondent 1 and 5 respectively explained that the cameras can then project a virtual place that people start to penetrate. Instead of multiple TV monitors being analysed for more than ten minutes at a time by one person – which soon becomes too over-loading for one person; this Cathexis technology allows virtual alarms to be created which will ring and alert the control room operator that the virtual reality for which it has been set to ring for, has been penetrated. Respondent 1 explained this by elaborating that "the cameras project a virtual realm of how the street should be and where there is an alarm ringing, someone has walked across and goes through a boundary that we know is an impenetrable boundary". Once the alarm rings, the control room operator(s) are alerted to the monitor which is linked to the camera which raised the alarm, and the operator can then watch in real life what is happening. Respondent 1 stated that "he was alerted by virtual work; that said "this is how life should be and someone has made it how life shouldn't be".

Areas which boast well-serviced, well-maintained infrastructure and environments are highly attractive for investment. Businesses require accessible, convenient and well-serviced locations which will benefit

their turnovers, and their location plays a big part in terms of the business and customers they strive to attract. The pattern of dilapidating, congested and unsafe city-centres such as Durban's CBD have forced businesses to relocate to areas beyond the chaotic inner-city decline. Respondent 2 explained that around the year 2000, business acrimony had changed and businesses were beginning to 'reinvent themselves' and ensure their sustainability when attracting different clients. Umhlanga offered itself as this new location where business could do just that. eThekweni municipality acknowledges that investing in extensive bulk infrastructure projects is essential for key investment nodes to offer appeal to investors. The municipality has therefore allocated a substantial amount of funding to go towards infrastructure provisions in the metro region, focussing the heaviest portions of investment into roads, electricity and water and sanitation (eThekweni Municipality, 2015b). Umhlanga is well equipped with services and infrastructure; it benefits from its ideal location between the M4 and N2 highways, as well as the major transport infrastructure upgrades to the M41/N2 interchange. It is in prime location to King Shaka International Airport and Dube Trade Port – a mere 20km or-so to the north. Easy and efficient accessibility to- and from Umhlanga make this node even more attractive to investment due to the hassle-free experience which companies can offer their clients. The safe, secure office parks boast high-tech security measures – one-up on Durban's crime infested CBD; well positioned, safe off-street parking courtyards for clients and visitors at the doorsteps of office block entrances; state-of-the-art camera surveillance systems – real-time data processors. All of these factors act as pull-factors for investment into Umhlanga.

Infrastructure is key to the smart city's evolution; access to and from the city is vital to gain footprint within the city from which it can benefit, therefore investments into hard infrastructures such as transportation networks is crucial. Furthermore, the necessary basic services infrastructure needed to cope with the relative urban densities needs to be realised – such as water, sewer and electrical infrastructure. These services are necessary for businesses to function which is ultimately what contributes to economic growth; with current technological trends, much of today's business transactions are carried out in the 'non-place urban realm' – via ICTs; emails, phone calls, conference calls and so on. Thus, reliable electrical infrastructure is vital to progressively achieving 'smart city' status, for all that it contributes. Soft Infrastructures are equally as important, such as broadband and fibre optic provision. These are the very infrastructures which enable increased efficiency in business transactions in the non-place urban realm. They also provide the necessary means for real-time data capturing to be fostered for the benefit of innovative solutions to be offered to city challenges – which is precisely what the smart city is about.

5.7 Developmental Potential of Umhlanga

The rezoning report for URNTC (Moreland Properties, 1999: 40) states that: "The Umhlanga Gateway New Town Centre will become the anchor for development in the north and will consolidate and expand the already established investment focus in the region by situating itself in a unique, strategic location which will go a long way towards social, spatial, economic and functional integration of a segregated city". Lying strategically at the core of the Metro's focal development and investment region; the importance of URNTC as a focal node is exacerbated by its advantageous standpoint to leverage

opportunity off surrounding anchor developments such as the multi-million rand Gateway complex and the La Lucia Ridge Office Estate (Moreland Properties, 1999). That with-said, Moreland Properties (1999: 40) predicted that the URNTC would “consolidate and expand on the success of these flagship developments and will enable a direct linkage to be created thereby enabling the remainder of the sub-region to be developed on the solid foundations of the Office Estate and Gateway”.

Umhlanga’s development has proven hugely successful to date, and there is every evidence of its potential for future growth – refer to *photo 23*, p. 133. Umhlanga’s positioning in relation to Dube TradePort offers massive current and future development potential for the area. Private Investment is expected to inject “R730-million” into the 26 hectare area of serviceable stands which have been set aside for such by eThekwini municipality (eThekwini, 2015/2016). Dube TradePort’s ‘TradeZone’ currently consists of “7 new industrial developments” (eThekwini, 2015/2016: 54), of which the trumping portion of the investment will be dedicated to electronic manufacturing and “packaging and logistics” (eThekwini, 2015/2016: 54). The growth potential here indicates job creation and will subsequently be attracting a higher density of people into surrounding areas – including Umhlanga – for which the provision of services, amenities and housing options will need to be considered.

Moreover, Cornubia’s mixed-use development – which is located almost parallel to Umhlanga, on the opposite side of the N2 corridor – will also have a significant impact on the developmental potential of Umhlanga. Cornubia has a direct linkage to Umhlanga Ridge Town Centre via the N2 interchange, just north of Gateway. In addition, eThekwini’s IRPTN network is set to pass through this interchange as part of the GO! Durban route (eThekwini, 2015/2016), increasing the accessibility to and from the area.

Umhlanga Ridge Town Centre is said to expect an approximated “R10-billion in investment to the area and generate 65 000 construction jobs and 16 000 permanent jobs” (eThekwini, 2015/2016: 55), a clear illustration of the magnitude of possibilities it holds for present and future development. Expansions to the Gateway shopping complex have already been initiated and the administrative process to increase its bulk has already commenced, with the aim of expanding it by a further 200 000 squared metres over a period of 20 years (eThekwini, 2015/2016).

Photo 23: Developmental potential of URNTC



Source: Author (2017)

5.8 Umhlanga as an Intelligent City

The extent to which the URNTC responds to the principles of an intelligent city will be based on two of the four theories which were presented in the theoretical framework of this research paper; namely: New Urbanism and The Non-Place Urban Realm. These two theories were chosen for a more detailed analysis of this study due to the nature in which they offer responses to urban challenges – such as high urbanisation rates and urban sprawl, to name a few – which are associated with current city trends, to which Durban is no exception. Additionally, the findings of the study will be aligned with Hollands' (2008) three framing components of an intelligent city: 1. Infrastructure-based services; 2. Business-led Urban Development, and; 3. Social Inclusion, Learning and Development, to determine the extent to which the URNTC responds to this specific framework of the intelligent city. These will be unpacked, below:

5.8.1 New Urbanism

The design model upon which the URNTC is based – new urbanism – is underpinned by mixed-use development in order to create a more compact city form and increase densification therein: *“A mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation and other functions. It is pedestrian-oriented and contains elements of a live-work-play environment. It maximises space usage, has amenities and architectural expression, and tends to mitigate traffic and sprawls”* (Niemira, 2007: 54; cited in Wardner, 2014: 4).

Mixed-use developments offer a combination of benefits such as the optimisation of infrastructure and the minimisation for the need for motorised transport, thereby increasing walkability and incorporating various activities within closer proximity (Wardner, 2014) – all which tie directly in with the design principles of New Urbanism. Wardner (2014) explains that it is becoming an increasingly popular strategy by local government authorities to promote mixed-use developments to combat the rising challenges which cities of the current era are subject to, such as rapid urbanisation, disasters- both man-made and natural, and the irrefutable environmental damage caused by humans, resulting in climate change. The former runs parallel to the objectives of the intelligent (smart) city, to offer itself as a solution to such arising challenges (Nam & Pardo, 2011; Mosannenzadeh & Vettorato, 2014). This is evident in the PPP between the private sector – to model the design of the URNTC on the principles of New Urbanism; and eThekweni Municipality – by supporting the development thereof and incorporating the URNTC into the local IDP and accompanying spatial plans which highlight Umhlanga as a key investment node, with it being referred to as a “secondary CBD” (eThekweni Municipality’s (2015/2016: 218). The Strategic Focus Area (SFA) aimed at ‘Facilitating Development in Priority Nodes and Corridors’, which forms part of the focus areas aimed at achieving Plan 2 of eThekweni Municipality’s (2015/2016: 218) IDP makes explicit mention of New Urbanism being adopted to reverse the ills of the Apartheid city, “by creating all-inclusive live, work and play environments within a racially segregated municipal area”. Respondent 3 elaborated on the appointment of Umhlanga as a strategic investment node in the greater eThekweni Metro region, explaining that “generally cities in the world are poly-nuclear so you have got to create other opportunities; look to other markets to enable other investment to happen. It cannot all happen in the city centre so you create these other opportunities,” – such as the mixed-use nodal development which Umhlanga represents

Although mixed-use developments presented themselves in urban planning around the 1960s and ‘70s; it wasn’t until the 1987 Brundtland report on Environment and Development was submitted to the World Commission that the term ‘mixed-use’ gained prominence in the world of planning (Wardner, 2014). The key emergence of this report was the-then newly directed emphasis on ‘sustainable development’, which became the key driver for the move towards adopting mixed-use developments as a responsive tool to address such (Wardner, 2014). This information coupled with the visual evidence in the design of the URNTC points to deliberate attention having been paid to the sustainability agenda and the development thereof. From the attention paid to greening of the area through landscaping, to the shaded walkways and the use of the man-made dam within the Chris Saunders Park to irrigate the said vegetation, and the efforts to incorporate sustainable building measures; the URNTC presents ample evidence of ‘sustainable’ consciousness – refer to *photo 24*, p. 135.

Photo 24: A picturesque view of Chris Saunders Park, the dam, and the greenery



Source: <http://www.urtc.co.za/page.aspx?ID=7188>

Typical mixed-use developments range in height up to a maximum of eight stories in the mixed-use zones, such as can be seen within the URNTC (refer to Annexure D). These developments resemble a typical new urbanism design with the street-level floors – sometimes the second floor included – being occupied by commercial activities such as offices and shops – refer to *photo 25*, p. 135 –, while the 2nd to 3rd floor – up is occupied by residential apartments with the uppermost floor often designed for luxury pent housing. Zones which are mixed-use commercial would have all floors occupied for commercial such as hotels and spas, or office blocks – such as the Ignition Group commercial building – refer to *photo 26*, p. 136; and the Hotel Marina – refer to *figure 34*, p. 136.

Photo 25: Mixed-use developments with retail and residential uses



Source: Author (2017)

Photo 26: Mixed-use Commercial Activities within the URNTC



Source: Author (2017)

Figure 34: Hotel Marina Sidewalk Café, Hotel Marina, URNTC



Source: http://www.themarinaumhlanga.co.za/sidewalk_cafe.php

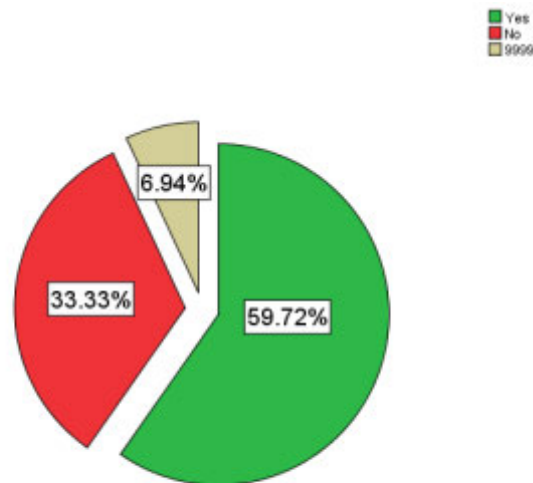
Wardner (2014: 5) states that “creating mixed-use promotes urban quality by making settlements more attractive, liveable and memorable”. By its emphasis thereto, the URNTC’s incorporation of varying activities all within walking distance from one another, the presence of alternative transport modes, its level of connectivity and accessibility, its commitment to achieving densification through its compact-city modelling, its consciousness of sustainability and the need to make it a priority in modern-living, and its attention to the elements of place-making – which all play a hand in enhancing the quality of life for its citizens – illustrates that the URNTC ticks many a box of the intelligent (smart) city agenda. This

illustrates the commitment of the South African government to address the wider national concerns, such as; enhancing integration between communities, and bettering the life of the majority of its citizens through job creation and economic growth; the development of the URNTC can be deemed an 'intelligent' city for all that it has successfully executed in terms of achieving the above-mentioned priority goals

5.8.2 The Non-Place Urban Realm

Hogan (2011) mentions that Melvin Webber's early presuppositions, rooted as far back as the early 1960s, predicted that future-communities would eventually become forged out of economic and socially connected networks, as opposed to the traditional creation of community – through physical space and proximity. He (Castells, cited in Graham, 2000; pp. 83) states that “advanced telecommunications, internet, and fast computerised transportation systems allow for simultaneous spatial concentration and decentralisation, ushering in a new technology of networks and urban nodes throughout the world, throughout countries, between and within metropolitan areas”. This shines a spotlight on the central role which ICTs play in the non-place urban realm, creating these so called 'communities without propinquity' – as Melvin Webber referred to them. As Nam and Pardo (2011) suggested, ICTs enhance the function and efficiency of cities, promoting economic growth through their ability to connect people far and wide and make instant business transactions across international borders without the need to be physically present for such to occur. This is apparent in URNTC; bordering on a 60 percent concentration of businesses within the Town Centre which engage in the global markets – refer to *figure 35*, p. 138 – which represents a considerable portion of the research sample's response; with exactly a third having indicated that their businesses do not compete in the global markets. This indicates two parallel findings with regards to the intelligent city; 1). Close to two thirds of the responses indicate global market engagement; translating to the fact that the URNTC provides the necessary infrastructure and environment for such to take place. Many businesses in the URNTC are call centres which are reliant on ICT infrastructure such as telecommunications which enable them to carry out business in a 'non-place urban realm' fashion – where business efficiency is optimised by telephonic and other telecommunicative means (Respondent 1, Respondent 4). Annexure A illustrates the existing fibre optics which have been rolled out in the URNTC (although outdated; there is continuous fibre optic provision in the URNTC, the supply of which is controlled by the business demand, explained Respondent 4), and; 2) the fact that a third of the overall response indicated negative to the posed question shows that the URNTC offers a variety of opportunities. This points to its goal of promoting inclusivity by not being exclusive to one particular calibre of business, and in as much as the smart city is one which attracts knowledge through education and skilled workforce which fosters a more desired quality of life (Nam & Pardo, 2011), it ultimately strives to offer itself as a “humane city that has multiple opportunities to exploit human potential” (Nam & Pardo, 2011: 285).

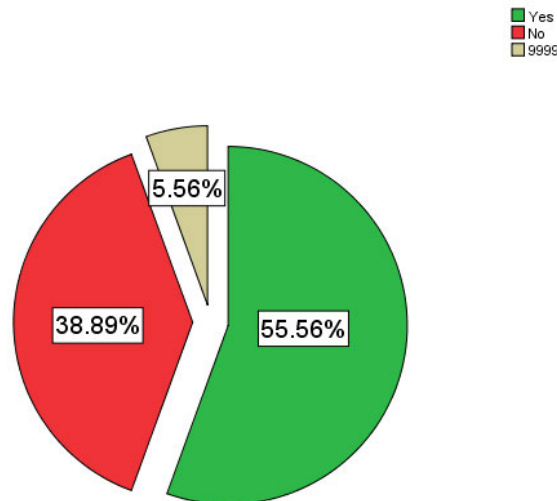
Figure 35: Respondents whose companies compete in the global market



Source: Author (2017)

Additional to the non-place urban realm is the parallel importance of face-to-face communication. Boden & Molotch (in Graham, 2000; pp. 101-102) term face-to-face communication or 'co-present interaction' as 'compulsion of proximity'. Their stance on the importance and relevance of co-present interaction lies in the fact that these types of communication exchanges which occur through human interaction in places, present a richer kind of trust and commitment than those which are forged over electronic communication. Castells (in Graham, 2000; pp. 83) reiterates the importance of the relationship between place-based communication and the non-place urban realm by claiming that "social relationships are characterised simultaneously by individuation and communalism, both processes using, at the same time, spatial patterning and online communication"; with Odendaal (2011: 2377) sharing the same sentiment of the interdependent relationship between the two, stating that: "ICT enables spatial transcendence yet encourages physical proximity". This is realised in the URNTC, and indicated by a 55.56 percent response of respondents indicating that they engage in face-to-face communicative work affairs in public places such as coffee shops and restaurants – refer to *figure 36, p. 139* –, which speaks to Umhlanga's ability to offer itself as a secure and convenient communication node with the array of facilities it offers. Observations done on some of the restaurants and coffee shops within URNTC found that many of these public eateries offer Wi-Fi – although not necessarily unlimited – offer Wi-Fi for a specific amount of time to their patrons. With today's reliance on ICTs, accessible Wi-Fi in public places becomes a drawcard for people; for work and social purposes. Warden (2014: 1) explains that the success of mixed-use developments lies in the product of the enhancement of social networks, stating that "it enhances social networks when opportunities for chance face-to-face meetings are increased".

Figure 36: Respondents who engage in work matters in places of leisure, i.e. restaurants/coffee shops



Source: Author (2017)

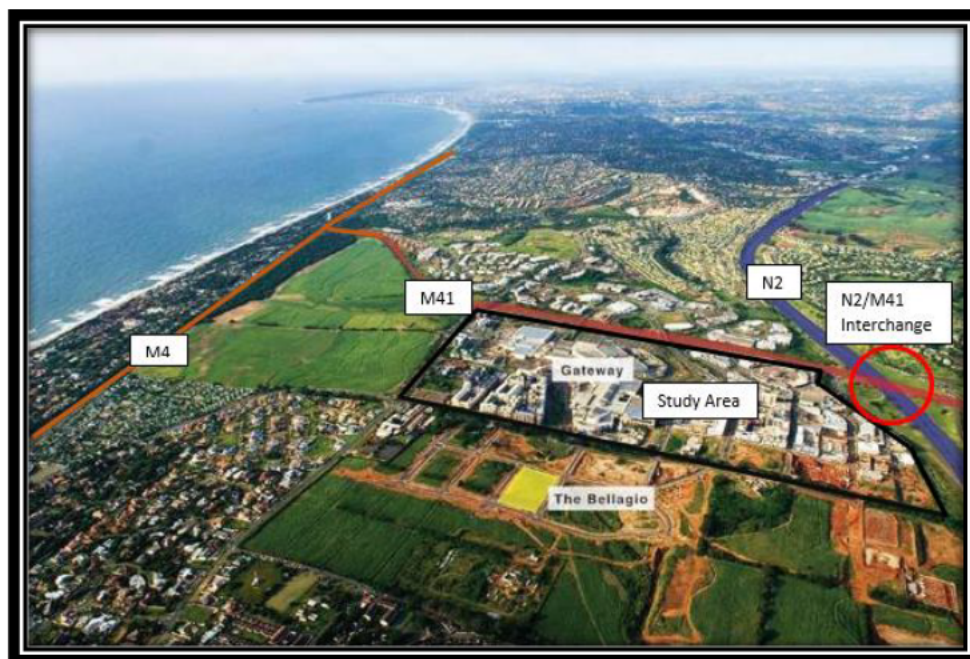
This is enhanced by the ease of access which people have to engage in such 'present' communication. Weber's emphasis on the importance of accessibility to and from the city (Teits, 2016) is realised in the case of Umhlanga; with the N2/M41 interchange being a major access route to the study area and its surrounds. Additionally, accessibility from the coastal side via the M4 corridor means that the URNTC is positioned at an optimal location which is accessible from major traffic corridors which carry heavy volumes of traffic between the northern and southern regions of the greater Durban Metro – refer to *figure 37*, p. 140. Being a mere 20km north of Durban's CBD and the same distance, south of Dube Trade Port, Umhlanga sits at optimum convenience in terms of position for those travelling in from afar via the airport, and those travelling from the CBD side looking for a safer, less congested and more convenient meeting place for face-to-face engagements. Businesses in the area boast offices deigned to welcome, warmly, people entering these spaces in person for the day-to-day, face-to-face communication which is still place-bound applicable – even with the world's technological advancements, such as the internet which make the need for these engagements less frequent. Additionally, the area has a wide variety of eateries, coffee shops and public spaces which are inviting for face-to-face communication. Umhlanga's constant buzz of people – no matter the time of day – is testament to the relevance of face-to-face communication in a technologically-orientated world.

People are consumers by nature and no matter how easy technology makes communication between people on a global scale, people rely on place-based 'bases' where the usual day-to-day routines can be carried out; the non-place urban realm – although very relevant today- is second in line to the order of these two flip-sided notions. It is human nature for people to always gather where consumables and services are conveniently located, i.e. towns and cities. Thus, face-to-face or place-based communication will forever be relevant, no matter how advanced technology grows. Place-based

communication offers a type of unspoken communication. The body language, presentation and gestures of a person offer so much more than what is missed over communication through technology.

On the other hand, how applicable is Umhlanga in terms of the non-place-urban realm and the flip-side of a person's reliability on face-to-face communication? Can one be place-based in Umhlanga, yet be part of a global network at the same time, through the use of ICTs? With fibre optics and internet accessibility, Umhlanga allows for this. Business deals can be closed over ICT devices and networks whilst sitting behind an office desk, a coffee shop table or one of the many popular restaurants in the area. This is reiterated by the types and magnitude of investment being injected into Umhlanga, the 'calibre' of business which it attracts are which are driven by networked infrastructure such as ICTs.

Figure 37: Access Routes to the Study Area



Source: <http://www.skyscrapercity.com/showthread.php?t=627033>

Table 16, p. 140, offers a summary of the study findings aligned to the two theoretical frameworks, New Urbanism and the Non-place Urban Realm:

Table 26: Summary of findings for Umhlanga as an Intelligent City

THEORY	Key Features	Case of URNTC	To What Extent
New Urbanism	<ul style="list-style-type: none"> - Compact city design; - Vertically and horizontally integrated activities; including retail, residential, civic facilities, recreation, 	<p>HEALTHCARE</p> <ul style="list-style-type: none"> - Umhlanga Pvt Hospital - Gateway Private Hospital 	Given the extent of the attention which URNTC has paid to the New Urbanism design principles, it is quite clear that in the South African

	<p>education, healthcare and workplaces</p> <ul style="list-style-type: none"> - Place-making through urban design - Promotion of safe, clean, well maintained environment - Alternative modes of transport 	<ul style="list-style-type: none"> - Medstone Medicine clinic <p>EDUCATION/TRAINING</p> <ul style="list-style-type: none"> - Microsoft Training - KIB Information Technology (IT) College - Pearson Institute of Higher Education <p>RESIDENTIAL</p> <ul style="list-style-type: none"> - Variety of choices in 'Parkside', URNTC's residential phase - 10% Inclusionary Housing <p>RECREATION/ ENTERTAINMENT</p> <ul style="list-style-type: none"> - Gateway 'Shoppertainment' Complex - Variety of restaurants and eateries - Public Open Spaces (Chris Saunders Park, Children's Park) <p>SAFETY & SECURITY:</p> <ul style="list-style-type: none"> - Umhlanga Ridge Management Association & Enforce Security provide security, street cleansing and Town Centre maintenance 	<p>context, Umhlanga Ridge New Town Centre offers itself as a solution to the localised issue of sprawl and fragmentation by its strategic position in the greater Durban Metro – aimed to stitch together less accessible, disadvantaged areas, as well as offering employment opportunities in the vicinity for all levels of qualification, but with a strong emphasis on being an 'attractive address' for the higher-skilled businesses. It offers a higher quality of life for its citizens and is evidently a big contributor to the regions overall economic growth- the over-riding objectives of the intelligent city.</p>
--	--	---	--

		<p>EMPLOYMENT</p> <ul style="list-style-type: none"> - A variety of employment options from domestic work, to highly skilled employment 	
<p>1. Non-Place Urban Realm</p>	<ul style="list-style-type: none"> - Provision of soft infrastructure – necessary for internet access - Accessibility to the said location for place-bound communication - Convenient, inviting amenities which support face-to-face meetings 	<ul style="list-style-type: none"> - Variety of internet service providers within URNTC (Neotel, Telkom, Vodacom, CellC, MTN) - Globally competitive businesses within the URNTC - Position of URNTC in relation to King Shaka Airport makes it a convenient, accessible location for those travelling from afar for face-to-face meetings - The variety of hotels, eateries, coffee shops and safe public spaces offer themselves as favourable meeting places 	<p>The URNTC offers itself as a location for place-based communication via its public open spaces – refer to <i>photo 27</i>, p. 142 – its recreational facilities, its public open spaces, and the variety of hotels for travellers; whilst its commitment to providing reliable non-physical infrastructure allows for non-place-bound transactions to take place with efficiency, via the internet – making it a non-place urban realm, too.</p>

Source: Author (2017)

Photo 27: Activities at the Chris Saunders Park, an example of place-bound communication



Source: <https://www.flickr.com/photos/northy13/5939289469>

5.8.3 Hollands three Framing Components of an intelligent city:

This study explored the applicability of Hollands' three framing components of the intelligent city in relation to the URNTC. *Figure 38, p. 143*, offers a brief recap on these framing topics, which will be explained in terms of their relevance to the URNTC thereafter.

Figure 38: Hollands' three framing components of the smart city

HOLLANDS' (2008) THREE FRAMING COMPONENTS OF A SMART CITY:	
1. INFRASTRUCTURE-BASED SERVICES	<ul style="list-style-type: none"> • <i>Soft Infrastructure</i>: this constitutes the invisible components of infrastructure which are holistic to cities of the information age, such as broadband. It relates to the relationships created between cities and their citizens, through cyberspace. • <i>Hard Infrastructure</i>: bulk infrastructure on which a city functions; transport networks, buildings, municipal services.
2. BUSINESS-LED URBAN DEVELOPMENT	The creation of attractive business environments by facilitating infrastructure investment as a draw-card to entice skills and investment into the city (Backhouse, 2015).
3. SOCIAL INCLUSION, LEARNING AND DEVELOPMENT	The element of community participation through the needs identified by the people, in a bid to create the quality of life they strive to have, through collaborations with government (Hollands, 2008 in Backhouse, 2015).

Source: Author (2017)

Hollands' (2008; Backhouse, 2015) relates his first discourse, *infrastructure-based services*, to the topic of ICTs and their involvement in enhancing the way in which information and knowledge is disseminated amongst people and institutions to enhance city functioning and promote a higher quality of life for all citizens. This relates to the services and infrastructure components of a city which, through 'smart computing technologies', can promote efficiency and intelligence through digital interconnectivity

(Backhouse, 2015). Healthcare, transportation, local government administration, education and public safety are all made more efficient and effective through such measures. The rollout of fibre optics in the URNTC, the presence of businesses occupying the non-place urban realm, and the evidence presented by observations of people using ICTs in public spaces means that the URNTC is related to Hollands' first framing discourse.

Collaboration between local government and private sector entities, such as Teraco Data Environments, Dark Fibre Africa, and the Umhlanga Ridge Management Association, to name a few, through public-private partnerships highlights Hollands' second of three discourses on smart cities; *business-led urban development*. Infrastructure investment draws in human capital in the form of skilled workers as well as investment – enticing for human intelligence to collaborate with digital intelligence to create a desirable quality of life. This is depicted in the URNTC in the level of education which the study's sample size represented. The knowledge elitists are favoured in these environments and Umhlanga prides itself on its business-oriented, first-class office parks which incorporate elite game-players in finance, corporate and service industries. Tying in with this discourse is the theoretical underpinning of neoliberalism. Neoliberalism is a planning theory which emphasises the rolling back of government's interference in the market, and down-scaled control in the form of regulatory guidelines for city stakeholders (Wright, 2013). These elements go hand-in-hand with creating these conducive business environments which are in line with fostering creating economic growth.

Social inclusion, learning and development, Hollands' third framing topic is evident in the eThekweni (Durban) City Development Strategy (Sutcliffe, n.d), the facilitation of “outreach, awareness and capacity building programmes” are fostered to inform people and empower them with knowledge. Moreover, eThekweni strives to bridge the digital divide, evident in their telecommunication infrastructure extensions and the PPP with fibre optic providers in the URNTC, which reduces costs and offers these services to the masses at a reduced, more affordable cost; which again, aids in the promotion of economic growth. This aspect of city smartness is critical to social and economic empowerment.

5.9 Conclusion:

The evidence which the success of the URNTC presents in its new urbanism design is steadfast in its contrast to the function of Durban's degenerated CBD. Sutherland et al (2013:3) state that “the spatial form of Durban is economically challenging as there is a clear separation of residential uses from economic activity which means that in most areas people do not live where they work”. It is therefore clear that the mixed-use nature of activities within the URNTC – which present a notion of “live-work-play” (Wardner, 2014: 1) is the very response which speaks to the intelligent city in a localised context – a context which is specific to the issues of segregation and sprawl; a context of offering solutions such as densification to very dispersed Natalian spatial formation. Moreover, the parallel function that the URNTC has; offering itself as a geographically bound place for face-to-face communicative interactions with all the necessary and inviting amenities for such, which people – no matter the level of technological advancement they find themselves accustomed to – are still highly dependent on; and its provision of the necessary technological infrastructures which lend themselves to the non-place urban realm where

people and communities can interact in a non-physical presence; puts the URNTC on the pedestal of a localised intelligent city. Ultimately what an intelligent city is about, is how it is interpreted in the 'smartest' possible way to the challenges at hand in contextual circumstances; offering the best possible version of itself to what the city itself needs for the upliftment of itself and its people. Moreover, the URNTC offers mounds of evidence which fall in line with Hollands' three framing elements of the intelligent city, rendering it an 'intelligent city' based on such findings.

6. Chapter 6

CONCLUSION & RECOMMENDATIONS

6.1 Conclusion

Particularly in developing countries, the failure to predict, prepare and plan for the higher rate of urbanisation results in urbanisation of a socially exclusive manner (United Nations, 2016). Moreover, the patterns of urbanisation in developing areas often result in dire urban decay and a less-than-desirable quality of life – such as the current case with Durban CBD – which has a typically adverse effect on the economic growth of these countries. It is of vital importance, however, to note that poverty is not a product of urbanisation; but unplanned urbanisation results in the displacement of poverty to urban areas, more-so in developing countries than in developed countries (United Nations, 2016). A sad reality is that more than half of Africa's urban citizens contribute to the fabric of informal settlements in urban areas, which present an array of concerning, unsustainable and poor living conditions resulting from factors such as water and sanitation inadequacies, poor waste management, and environmental degradation (United Nations, 2016). It is this very pattern of urbanisation which calls for the need to move towards sustainable urbanisation; and Umhlanga's role in the greater Durban Metro's current-to-long-term development strategy offers itself as a progressive example of eThekweni's Municipality's cognisance of sustainable development, specifically within a localised context.

The key actors in the development of Umhlanga – mainly the partnership being Tongaat Hulett Developments and the local city council of eThekweni Municipality, have been successful in responding to the above-mentioned urban concerns – proving the value of; and the need for cohesive public-private partnerships in the progressive development of cities. Areas which boast well-serviced, well-maintained infrastructure and environments are highly attractive for investment. Businesses require accessible, convenient and well-serviced locations which will benefit their turnovers, and their location plays a big part in terms of the business and customers they strive to attract. The pattern of dilapidating, congested and unsafe city-centres such as Durban's CBD have forced businesses to relocate to areas beyond the chaotic inner-city decline. Respondent 2 explained that around the year 2000, business acrimony had changed and businesses were beginning to 'reinvent themselves' and ensure their sustainability when attracting different clients. Umhlanga offered itself as this new location where business could do just that. eThekweni municipality acknowledges that investing in extensive bulk infrastructure projects is essential for key investment nodes to offer appeal to investors. The municipality has therefore allocated a substantial amount of funding to go towards infrastructure provisions in the metro region, focussing the heaviest portions of investment into roads, electricity, water and sanitation (eThekweni Municipality, 2015b). Umhlanga is well equipped with services and infrastructure; it benefits from its ideal location between the M4 and N2 highways, as well as the major transport infrastructure upgrades to the M41/N2 interchange. It is in prime location to King Shaka International Airport and Dube Trade Port – a mere 20km or-so to the north. Easy and efficient accessibility to- and from Umhlanga make this node even more attractive to investment due to the hassle-free experience which companies can offer their clients. The safe, secure office parks boast high-tech security measures – one-up on Durban's crime infested CBD; well positioned, safe off-street parking courtyards for clients and visitors at the doorsteps of office block entrances; state-of-the-art camera surveillance systems – real-time data processors. All of these factors act as pull-factors for investment into Umhlanga.

The extent to which Umhlanga Ridge New Town Centre contributes towards the emergence of the intelligent city can be seen in a combination of factors. Nodal development is core to the development of Umhlanga; incorporating business, leisure, shopping, healthcare, and residential and job opportunities all within walking distance of each other; so as to decrease vehicular dependency and increase city compactness; all whilst strategically capitalising on existing development in the surrounds. New urbanism informs the urban design of this booming node, promoting the use of different convenient design systems and the provision of services all within walking distance. This demonstrates cognisance of promoting sustainable urban environments by promoting compactness, reducing carbon emissions by reduce travelling distances between places and ultimately, getting 'smart' about resource management. Ultimately, these above-mentioned factors are core to promoting a better quality of life for a city's citizens, which in itself is a fundamental goal of the smart city. Safety and security; quality education and skills development; recreation; employment; social protection; housing, water and electricity; and a clean environment (Zarenda, 2013) are all contributing elements to a higher quality of life – which Umhlanga proudly boasts. Smart cities are context specific and urban planners need to take cognisance of this when planning for the future of cities (UN, 2016). They need to consider a people-centred approach when designing infrastructure and take into consideration certain needs and difficulties of varying urban systems; harness technologies to predict certain possible outcomes and plan accordingly whilst not ignoring the associated, possible limitations. Public-private partnerships and a participatory approach to planning aid in promoting the sustainability of cities.

As a key economic node in the greater Durban region, Umhlanga's elevated level of development has placed it on the map as one of South Africa's most sought-after, higher-end value real-estate investment locations. The Umhlanga Ridge Town Centre is designed as a safe, convenient and pleasant environment for businesses and people. What Umhlanga presents is the reality that urbanisation can be beneficial if planned for accordingly, and if the right policies are adopted and implemented - demonstrating, too, that the intelligent city principles can –and- do in fact serve as a positive response to traditional city challenges in emerging economies. This clarifies that falling within a developing country does not stunt the possibilities of positive urbanization and economic growth; developed countries are no further ahead in the race to achieving intelligent city status if they do not plan and implement accordingly, through policies and participation. There is no end in sight for the Umhlanga's development possibilities; structures are continuously being erected and there is no doubt that there is an incredible demand for every inch of available land; be it for business, residence or leisure. The quality of life in Umhlanga is at the higher end of the spectrum with the town centre always abuzz with activity, no matter the time of day or night.

This study renders the Umhlanga Ridge New Town Centre an intelligent city in a localised context, based on the findings from the research guidelines. Furthering this study could have potentially positive impacts on the future planning of intelligent cities, locally.

Recommendations

There is currently a new type of cellular technology being rolled out in Durban called 'light pole installations' (LPis). Cellular networks have always worked on cellular masts, explained Respondent 1,

and every cellular network provider who erects an installation is obliged by law to share it with other network providers; an example of this is Cell C 'piggybacking' on other cellular network provider's installations as they have not installed any of their own. There are four major cellular networks in South Africa, MTN, Vodacom, Telkom and Cell C – which rides on the former three network providers' installations.

At the inception of Umhlanga's development, around the year 2000, the developers approached Vodacom and MTN to get involved in capacitating the URNTC with broadband infrastructure, but it was not until the Town Centre started to illustrate its success that service providers realised how big an opportunity the development thereof was. Once the opportunity was realised, service providers were desperate to install their infrastructures; but the developers hoped to find a solution to different service providers erecting individual aerials, in fear of the elegantly designed Town Centre morphing into what Respondent 1 described as an 'Aerial City'. Vodacom had a big hand to play in the Town Centre from the onset, whilst the others remained sceptical, but Respondent 1 explained consideration was made for MTN and CellC by allocating chambers for the respective service providers within the Vodacom installations. Telkom and 8ta came at a much later stage.

Respondent 1 pointed out his fascination with the rapid evolution in technology, which he explains is precisely what makes the smart city difficult to pin down, stating that "it is viral – it goes everywhere". The new 'Light Pole Installations' (LPI) are a prime example of the rapid evolution in technology. They are another level of Vodacom, MTN, CellC and 8ta spreading cellular technology at a more localised level, but at an incredibly high speed. They are currently not installed in Umhlanga but can be found in Johannesburg and Durban. Respondent 1 explained that the aesthetic value of the current design of these LPIs are 'elegant' enough for Umhlanga's design, stating that "if you had to draw a picture of a giraffe that has swallowed a plate, suddenly the giraffe doesn't look so elegant anymore". What the urban designers have proposed is that they will work with these service providers to come up with a more sophisticated, elegant design which will be aesthetically beautiful, "high quality urban icons" Respondent 1; following which they will be placed in areas earmarked as the most important for such. What the proposed LPIs will encompass is a combination of the network transmitters, security camera installations as well as local Wi-Fi; in essence they will serve as "transmitters and receivers" Respondent 1 explained. The developers and urban designers are currently in negotiations to roll this out in Umhlanga.

The whole purpose of these installations will be to provide "ultra-fast cellular communication, ultra-fast Wi-Fi to local traffic environments, and giving Wi-Fi to the public environment" Respondent 1. Respondent 1 claimed that by being in Umhlanga and taking advantage of these smart technologies, is 'smart', stating that "being *here* is being smart; being able to sit and do your banking online with Wi-Fi available to the public, in a safe environment with camera surveillance".

Umhlanga's New Urbanism design frame was aimed at promoting a compact variety of activities within walking distance from one another; having made ample provision of walkways – which are safely monitored by CCTV surveillance, which leaves no valid reason as to why only a fraction of the study

sample makes more use of this opportunity. Parking emanated as an issue for some; but as one drives around the Town Centre – especially as one moves away from the densified core to the outer areas where much development is still happening, there is ample, unutilised parking. Additionally, what surfaces regarding the choice of majority respondents to opt for automobile transport within the URNTC alludes to the fact that South African's are so used to having to drive long distances between places, it has almost made South Africans unwilling to change the mind-set regarding walkability. South African's are also very aware of crime and are thus conscious about the risks of walking between places in most urban centres around the country. Umhlanga is unique in that it is CCTV monitored with on-foot security; but perhaps for South Africans it is an indoctrinated fear that keeps them from being too trusting to be safe enough to walk around.

Moreover, the ease at which parking is made available in the URNTC makes one lazy. If one visited Cape Town and had to pay the exorbitant fees for inner-city parking, the mind-set would change and one would perhaps opt to walk such short distances to avoid splurging out unnecessarily on parking. There is ample free parking within the URNTC, and the paid-parking is obviously not exorbitant enough to put people off driving to the doorsteps of activities which are within a minimal radius of each other, and can easily be accessed by safe walking. A response to this issue, as a means of encouraging the use of alternate modes of transport, would be to come up with stricter parking regulations and to consider adopting the parking system which is adopted in the city of Cape Town – as the developers initially wanted to integrate into the Town Centre. People need to be discouraged from being automobile dependent and thus, areas of such discouragement such as the solution offered above, are worth exploring.

The absence of public transport has been a clear misfortune of the URNTC, but the need for it has been critically acknowledged; and although the system is still relatively non-existent – with the exception of the mini-bus taxi industry in operation – the issue of public transport is currently being addressed, and is in the process of being delivered. The IRTPN C9 linkage into the URNTC, via Cornubia from Bridge City has begun construction and is due to be complete in 2018, as part of Phase 1 (eThekweni Municipality, 2013). Although these public transport networks are more common in European cities and other cities abroad, there are few systems like it in South Africa – with Cape Town already having it in operation. The developmental success in developing countries lags behind that of developed countries, but this certainly is another 'smart' step towards the intelligent city agenda, for the URNTC.

Bibliography

- Adler, L. (2015) Monitoring Air Quality and the Impacts of Pollution. 15 May 2015. Data-Smart City Solutions [online] Available at: <http://datasmart.ash.harvard.edu/news/article/monitoring-air-quality-and-the-impacts-of-pollution-679> [9 November 2016].
- Albino, V., Berardi, U. and Dangelico, R. M. (2015) Smart Cities: Definitions, Dimensions, Performance and Initiatives. Journal of Urban Technology. Vol. 22, No. 1, 3-21. Routledge. Canada.
- Allmendinger, P. (1998) Planning Practice and the Post-modern Debate, in International Planning Studies, Vol.3, No.2, 1998
- Anthopoulos, K., Fitsilis, P. (2010) From digital to ubiquitous cities: defining a common architecture for urban development. IEEE 6th international conference on intelligent Environments, (p. 301- 306). IEEE Xplore.
- Arino, A. M. (2016) Smart City Challenges in Africa. 7 September 2016. IESE Business School, University of Navara. [online] Available at: <http://blog.iese.edu/africa/2016/09/07/smart-cities-challenges-in-africa/> [31 October 2016]
- Backhouse, J. (2015) Smart city agendas of African cities. University of the Witwatersrand, Johannesburg, South Africa.
- Blackstone, A. (2012) Survey Research: A Quantitative Technique, chapter 8 from the book Sociological Inquiry Principles: Qualitative and Quantitative Methods(v. 1.0) [online] available at: <http://2012books.lardbucket.org/books/sociological-inquiry-principles-qualitative-and-quantitative-methods/s11-survey-research-a-quantitative.html> [19 April 2016].
- Boyce, C. and Neale, P. (2006) Conducting In-Depth Interviews: A Guide for Designing and Conducting In-Depth Interviews for evaluation Input. Pathfinder International, Monitoring and Evaluation, 2.
- Brenner, N. & Theodore, N. (2002) Cities and the Geographies of “Actually Existing Neoliberalism”. Blackwell. USA.
- Bridge, G. and Watson, S. (2003) A Companion to the City. Blackwell. Australia.
- Bundesdeutscher Arbeitskreis für Umweltbewusstes Management e.V. (2013) Intelligent Cities- Routes to a sustainable, Efficient and Liveable City, A report by B.A.U.M e.V. and Accenture GmbH, January 2013. Hamburg.
- Caragliu, A., Del Bo, C. and Nijkamp, P. (2009) Smart cities in Europe. 3rd Central European Conference in Regional Science – CERS.

Carter, T. (2013) Smart Cities: The future of Urban infrastructure, 22 November 2013. BBC. [online] Available at: <http://www.bbc.com/future/story/20131122-smarter-cities-smarter-future> [29 March 2016]

Chourabi, H.; Nam, T.; Walker, S.; Gil-Garcia, J. R.; Mellouli, S.; Nahon, K.; Pardo, T. and Scholl, H. J. (2012) Understanding Smart Cities: An Integrative Framework. 45th Hawaii International Conference on System Sciences.

Cocchia (2014) Smart and Digital City: A systematic Literature Review. University of Genoa, Italy. Springer. Switzerland.

Cohen, B. (2012) What exactly is a smart city? 19 September 2012. [online] Available at: <http://www.fastcoexist.com> [22 August 2016].

Congress for the New Urbanism (2000) Charter of the New Urbanism. McGraw-Hill, New York.

Cushman & Wakefield/ Dutt, S. (2015) Five essential elements of the smart city. Cushman and Wakefield, South Asia. [Online] Available at: <http://www.cushmanwakefield.com/en-gb/news/2015/01/five-essential-elements-of-a-smart-city-1/> [25 August 2016]

Daniels, P.W. (2004) Urban Challenges: the formal and informal economies in mega-cities. Vol. 21, Issue 6, 501-511. Elsevier. Great Britain.

Datta, A. (2016) Three big challenges for smart cities and how to solve them. [online] Available at <http://theconversation.com/three-big-challenges-for-smart-cities-and-how-to-solve-them-59191> [6 November 2016]

Day, K. (2003) New Urbanism & the challenges of designing for diversity. Journal of Planning and education Research. Sage.

Deakin, M. & Al Waer, H. (2011) From intelligent to smart cities. School of Architecture, University of Dundee. Taylor & Francis. Scotland.

Donalson, R. (2001) A model for South African Urban Development in the 21st Century. Department of Geographical Sciences, Vista University, Silverton.

Dvir, R. (2005) Knowledge City, seen as a Collage of Human Knowledge Moments. Knowledge Cities: Approaches, Experiences, and Perspectives. [Online] Available at: <http://www.innovationecology.com/papers/knowledge%20city%20human%20moments%20dvir1.pdf> [28 May 2016]

e-Estonia (n.d) Electronic ID Card. [Online] Available at: <https://e-estonia.com/component/electronic-id-card/> [9 November 2016]

Educational Pathways International (n.d) What is a Developing Country? [Online] Available at: http://www.educationalpathwaysinternational.org/?page_id=97 [3 October 2016]

Eltis (2014) Introducing free public transport in Tallinn (Estonia). 22 October 2014. [Online] Available at: <http://www.eltis.org/discover/case-studies/introducing-free-public-transport-tallinn-estonia> [9 November 2016].

eThekwini Municipality (n.d) About eThekwini Municipality. [online] Available at: http://www.durban.gov.za/Discover_Durban/Pages/AboutEM.aspx [10 April 2016]

eThekwini Municipality (2007) Umhlanga Node- Precinct Plan, ASM Consortium, South Africa.

eThekwini Municipality (2015) Towards a framework for the classification of development nodes in Kwazulu-Natal regional: Spatial structuring for an efficient delivery of services. August 2015. South Africa.

eThekwini Municipality (2015) Economic Development & Growth in eThekwini. EDGE: Utilities & Smart Cities. 14th Issue. September 2015.

eThekwini Municipality (2015/2016) Integrated Development Plan: 2012/2013 – 2016/2017 5 Year Plan. South Africa.

Escher Group (n.d) Five ICT Essentials for Smart Cities: A white Paper for Business. [Online] Available at: https://www.eschergroup.com/files/8914/4491/8222/Smart_City_Planning.pdf [9 November 2016].

Farahi, A. (2015) OPINION: The case for bus rapid transit. 28 April 2015. London Institute. [Online] Available at: <http://londoninstitute.ca/the-case-for-bus-rapid-transit/> [29 November 2016]

Fong, M. W. L. (2009) Technology Leapfrogging for Developing Countries, Victoria University, Australia.

Ford, N. (2015) Smart cities in a smart Africa. 15 January 2015. African Business. [online] Available at: <http://africanbusinessmagazine.com/sector-reports/infrastructure/smart-cities-smart-africa/> [31 October 2015].

Gillham, O. (2002) What is Sprawl? In Larice, M. & Macdonald, E. (2004) The Urban Design Reader. Routledge. London.

Global e-Sustainability Initiative (2015) #SMARTer2030: ICT Solutions for 21st Century Challenges. Brussels. [PDF] [Online] Available at: http://unfccc.int/files/mfc2013/application/pdf/smarter2030_executive_summary.pdf [9 September 2016]

Goodchild, B. (1990) Planning and the Modern/Postmodern debate, Town Planning Review, Vol.61, No. 2, pp.119-137

Graham, S. (2004) The Cybercities Reader. Routledge. London.

- Green, J. (2011) What Is an Intelligent City?, 6 August 2011, American Society of Landscape Architects, [online] Available at: <https://dirt.asla.org/2011/06/08/what-is-an-intelligent-city/> [27 March 2016].
- Guerrini, F (2015) World's Top 7 Smart Cities Of 2015 Are Not The Ones You'd Expect, [online] available at: <http://www.forbes.com/sites/federicoguerrini/2015/01/28/worlds-top-7-smartest-cities-of-2015-are-not-the-ones-you-d-expect/> [9 April 2016]
- Gutierrez, D. (2015) The Benefits of Becoming a Smart City. 25 October 2015. [online] Available at: <http://insidebigdata.com/2015/10/25/the-benefits-of-becoming-a-smart-city/> [9 November 2016]
- Halai, A. (2006) Ethics in qualitative research: issues and challenges, EdQual Working Paper No. 4. Aka Khan University, Pakistan.
- Hall, P. (2000) Creative cities and economic development. Urban Studies, 37(4), 633–649.
- Harper, T.L. & Stein, S.M. (1995) Out of the Postmodern Abyss: Preserving the Rationale for liberal Planning, in Journal of Planning Education and Research 14:233-244
- Harrison, C., Eckman, B., Hamilton, R., Hartwick, P., Kalagnanam, J., Paraszczak, J., Williams, P. (2010) Foundations for Smarter Cities. July/August 2010. Vol. 54. No. 4. IBM.
- Harrison, P. (2001) Romance and Tragedy in (Post) Modern Planning: A Pragmatist's Perspective, in International Planning Studies, Vol.6, No.1
- Hindson, D. (nd) The Apartheid City: Construction, Decline and Reconstruction. University of Durban – Westville. South Africa. [Online] Available at: http://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers11-10/010005820.pdf [12 October 2016].
- Hogan, R. (2011) Community without propinquity: Closing Event. This is tomorrow, Contemporary Art Magazine. Milton Keynes. [Online] Available at: <http://thisistomorrow.info/articles/community-without-propinquity-closing-event> [27 August 2016]
- Hollands (2008) Will the real smart city please stand up? Intelligent, progressive or entrepreneurial? City journal, vol. 12. No. 3. Taylor & Francis.
- Honeywill, R. (n.d) What is an Intelligent City? [online] Available at: <https://rosshoneywill.com/articles/what-is-an-intelligent-city/> [27 March 2016].
- Hower, M. (2015) The problem with translating smart cities to the global South. 22 April 2015. GreenBizz. [Online] Available at: <https://www.greenbiz.com/article/translating-smart-cities-global-south> [11 November 2016].
- International Telecommunication Union (2016) Trends in Telecommunication Reform 2016. Geneva, Switzerland. [Online] Available at: http://wftp3.itu.int/pub/epub_shared/BDT/2016/2016-Trends-En/index.html#p=3 [16 September 2016].

- IOL (2015) R3.1 bn Umhlanga Development, 10 December 2015, [online] Available at: <http://www.iol.co.za/news/south-africa/kwazulu-natal/video-r31-bn-umhlanga-development-1958701#.VmrygvkrLIU> [11 April 2016].
- Janowski, T. (2016) Smart Cities for sustainable development. United Nations University [online] Available at: <http://unu.edu/projects/smart-cities-for-sustainable-development.html#outline> [3 September 2016] NOT SURE IF REF PROP
- Jang, M. & Suh, S (n.d) U-City: New Trends of Urban Planning in Korea based on Pervasive and Ubiquitous Geotechnology and Geoinformation. University of Seoul, Korea. <https://www.semanticscholar.org/paper/U-City-New-Trends-of-Urban-Planning-in-Korea-Based-Jang-Suh/e01f3ae2de42c9b8c64f884062d9fba72f5dbafa/pdf> [21 August 2016]
- Jenks, M. and Burgess, R. (2000) Compact Cities: Sustainable urban forms for developing countries. Spon Press, London.
- Jenkins, P., Smith, H. and Wang, Y. P. (2007) Planning and Housing in the Rapidly Urbanising World. Routledge, Canada.
- Kbabra, K (2014) Smart Cities in North-Africa: Morocco leads the way, 3 April 2014. <http://www.moroccoworldnews.com/2014/04/127405/smart-cities-in-north-africa-morocco-leads-the-way/>
- Kemper, T (2013) Monitoring urbanization in the 21st century. 21 January 2013. [Online] Available at: <https://earthzine.org/2013/01/21/monitoring-urbanization-in-the-21st-century/>
- Khansari, N., Mostashari, A. and Mansouri, M. (2013) Impacting Sustainable Behaviour and Planning in Smart City. International Journal of Sustainable Land Use and Urban Planning. ISSN 1927-8845] Vol. 1 No. 2, pp. 46-6.
- Khatoun, R. & Zeadally, S. (2016) Smart Cities: Concepts, Architectures, Research Opportunities. Communications of the ACM.
- Komninos, N. (2008). Intelligent cities and globalization of innovation networks. Routledge, London.
- Komninos, N. (2015) The Age of intelligent cities: Smart environments & Innovation-for-all-strategies, Routledge, London.
- Komakech, D. (2005) Achieving more intelligent cities, Vol 158, Issue 4, pp. 259-264, December 2005, [online], Available at: <http://www.icevirtuallibrary.com/doi/abs/10.1680/muen.2005.158.4.259> [16 February 2016]
- Kumar, P. (2015) What's the real meaning of 'smart city'? 1 July 2015. [online] available at: <http://www.smartcityprojects.com> [22 August 2016].
- Kumar, R. (2011) Research Methodology: a step-by-step guide for beginners, 3rd Edition. Sage, London.

- Maylam, P. (1995) Explaining the Apartheid City: 20 Years of South African Urban Historiography. Journal of Southern African Studies, Vol. 21, No. 1. March 1995. Taylor & Francis.
- Memoori, (2016) Smart cities: the evolution of the smart city: Top-down to Bottom-up. Memoori smart building research. 15 December 2015.
- Merriam-Webster (n.d) Definition of Propinquity, [online] Available at: <http://www.merriam-webster.com/dictionary/propinquity> [27 August 2016]
- Morrison, I (2011) Birth of a town, The Ridge, [online] Available at: <http://www.famouspublishing.co.za/ridge/birth-of-a-town/> [2 April 2016]
- Mosannenzadeh, F. & Vettorato, D. (2014) Defining Smart City: A conceptual framework based on keyword analysis. Journal of Land Use, Mobility & Environment. 4-6 June 2014. TeMA, Naples.
- Muente-Kunigami, A. and Mulas, V. (2015) Smart cities. [online] Available at: <http://www.worldbank.org/en/topic/ict/brief/smart-cities> [7 September 2016].
- Nam, T. & Pardo, T. (2011) Conceptualizing Smart City with Dimensions of Technology, People, and Institutions, Centre for Technology in Government, University at Albany, State University of New York, U.S.
- Nielsen, L. (2011) Classifications of Countries Based on Their Level of Development: How it is Done and How it Could be Done. IMF Working Paper. International Monetary Fund.
- NewUrbanism.org (n.d) New Urbanism, [online], Available at: <http://www.newurbanism.org/newurbanism.html> [17 April 2016].
- Odendaal, N. (2011) Splintering Urbanism or Split Agendas? Examining the Spatial Distribution of Technology Access in Relation to ICT Policy in Durban, South Africa. Urban Studies Journal Limited. August 2011. 48(11) 2375-2397.
- Odendaal, N. (2016) Smart City: Neoliberal Discourse or Urban Development Tool, January 2016. Research Gate. Cape Town, South Africa.
- OECD Observed (1999). Learning cities: the new recipe in regional development.
- Oldfield, S. and Parnell, S. (2014) The Routledge Handbook on Cities of the Global South. Routledge, New York.
- Oxford University Press (1987) What is sustainable development? World Commission on Environment and Development's (the Brundtland Commission) report Our Common Future, [online] Available at: <http://www.worldbank.org/depweb/english/sd.html> [9 April 2016]
- Preston, S. (1979) Urban Growth in Developing Countries: A Demographic reappraisal (11-31 in Gugler, J ;1988) The Urbanization of the third world. Oxford University Press. New York.

Ramsaru, R. (2011) Managing coastal development in a rapidly developing area: The Case of Umhlanga Rocks. University of Kwa-Zulu Natal, South Africa.

Regional District of Nanaimo (n.d) Nodal development: Creating Compact, Complete, Mixed-use Communities. [online] Available at: [http://www.shapingourfuture.ca/downloads/Mixed Use Centres Brochure.pdf](http://www.shapingourfuture.ca/downloads/Mixed_Use_Centres_Brochure.pdf) [14 April 2016].

Republic of South Africa (n.d) National Development Plan 2030: Our future – make it work. Executive Summary. National Planning Commission. South African Government. [Online] Available at: www.gov.za/sites/www.gov.za/files/Executive%20Summary-NDP%2030%20-%20Our%20future%20-%20make%20it%20work.pdf (IMAC reading list) [25 November 2016].

Rouse, M (2005) ICT (Information Communications Technology – or technologies), September 2005. [online] Available at: <http://searchcio.techtarget.com/definition/ICT-information-and-communications-technology-or-technologies> [1 April 2016]

Ruble, B. A. (2012) The challenges of the 21st century city. December 2012. The Wilson Centre. [online] Available at: https://www.wilsoncenter.org/sites/default/files/policy_briefthe_challenges_of_the_21st_century_city.pdf [29 March 2016].

Schensul, D. and Hellar, P. (2010) Legacies, Change, and Transformation in the Post-Apartheid City: Towards an Urban Sociological Cartography. International Journal of Urban and Regional Research. Blackwell. USA.

Schmitt, G. (2013) Zurich – Singapore – Chair of Information Architecture: Information Cities, [online] Available at: http://www.ia.arch.ethz.ch/wp-content/uploads/2013/02/iA_FS_2013_1302251.pdf [4 April 2016].

Seekings, J. (2010) Race, class and inequality in the South African City. Blackwell.

Smedley, T. (2013) Smart cities: adapting the concept for the global south. [Online] Available at: <https://www.theguardian.com/global-development-professionals-network/2013/nov/21/smart-cities-relevant-developing-world>. [18 September 2016]

St. Clair, M. (2016). The Ridge Chronical. Issue One. Umhlanga Ridge Management Associations. La Lucia Ridge, South Africa.

Sutherland, C., Robbins, G., Scott, D. and Sim, V. (2013) Durban City Report: Chance2Sustain. University of Kwa-Zulu Natal, Durban.

Theodore, N., Peck, J. and Brenner, N. (2011) Chapter 2. Neoliberal Urbanism: Cities and the Rule of Markets. Wiley-Blackwell. [Online] Available at: http://www.blackwellreference.com/public/tocnode?id=g9781405189811_chunk_g97814051898112 [26 August 2016]

The World Bank (2012) Who Needs Smart Cities for Sustainable Development? The World Bank Group. [online] Available at: <http://www.worldbank.org/en/news/feature/2012/03/20/who-needs-smart-cities-for-sustainable-development> [29 August 2016].

Thornton, L. (2006) Telecommunications Law – an Overview, in Thornton, L.; Carrim, Y.; Mtshaulana, P. and Reyburn, P. (2006) Telecommunications Law in South Africa. STE Publishers. Johannesburg, South Africa. [Online] Available at: <http://thornton.co.za/resources/Telecoms%20Law%20an%20Overview.pdf> [27 October 2016]

Todes, A. (2008) Reintegrating the Apartheid City? Urban Policy and Urban Restructuring in Durban. In *Companion to the city*. Blackwell publishers.

Tongaat Hulett (2014) Umhlanga Ridge Town Centre. [Online] Available at: <http://thdev.co.za/commercial/developed/umhlanga-ridge-town-centre> [26 November 2016]

Tongaat Hulett (n.d) Umhlanga Ridge Town Centre: The Oval Sites, [online] Available at: http://cornubia.co.za/images/Tongaat_Hulett_URTC_Oval_Sites_Brochure.pdf [26 April 2016]

Moreland Properties (1999) Umhlanga Gateway New Town Centre: Rezoning Report June 1999. South Africa.

United Nations (2014) World Urbanisation Prospects: The 2014 Revision. United Nations, New York.

United Nations University (n.d) Smart Cities for Sustainable Development, [online] available at: <http://egov.unu.edu/research/smart-cities-for-sustainable-development.html#outline> [6 April 2016].

Urban Gateway (n.d) A future of Smart cities in Africa. [Online] Available at: <http://www.urbangateway.org/document/future-smart-cities-africa> [6 November 2016]

Walsh, B. (2012) Intelligent Cities. Time, 28 November 2012 [online] available at: http://content.time.com/time/specials/packages/article/0,28804,2026474_2026675,00.html [21 February 2016]

Wardner, P. (2014) Explaining Mixed-use Developments: A Critical Realist's Perspective. January 2014. University of the Sunshine Coast. Christchurch, New Zealand.

You, N. (2015) Unpacking 'Smart City' approaches to urban development. 9 April 2015.

Zarenda, H (2013) South Africa's National Development Plan and its implications for regional development. Tralac, Stellenbosch.

26th IUGG General Assembly (2015) List of Developing Countries. Prague Congress Centre. 22 June-2 July 2015. [Online] Available at: <http://www.iugg2015prague.com/list-of-developing-countries.htm> [2 September 2016].

APPENDICES

Appendix 1

1. Annexure A: Infrastructure Map (A)
2. Annexure B: Infrastructure Map (B)
3. Annexure C: Social Facilities Map
4. Annexure 4 (D): Observation Map (Unsurveyable sites)
5. Umhlanga Precinct Plans

Appendix 2

Questionnaire

Appendix 3

Ethical Clearance

Appendix 4

Consent to Participate Form

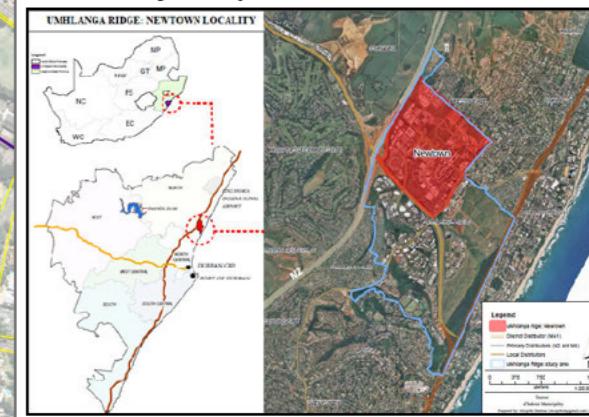
Appendix 5

Gate Keepers Letter

ANNEXURE A

Umhlanga Ridge New Town Centre INFRASTRUCTURE MAP (A)

Locality Map



Legend

- Study Boundary
- Fibre Optic Cables
- Primary Distributors
- Local Distributors
- Access Roads

NOTES:

The URNTC is easily accessible by the N2/M41 'Mount Edgecombe Interchange', as well as the M4 coastal corridor.

The URNTC is well invested in good infrastructure and emanates as a product of 'leapfrogged development'.

Fibre Optics is crucial for the business nature which the URNTC attracts, and is progressively being rolled out, within.

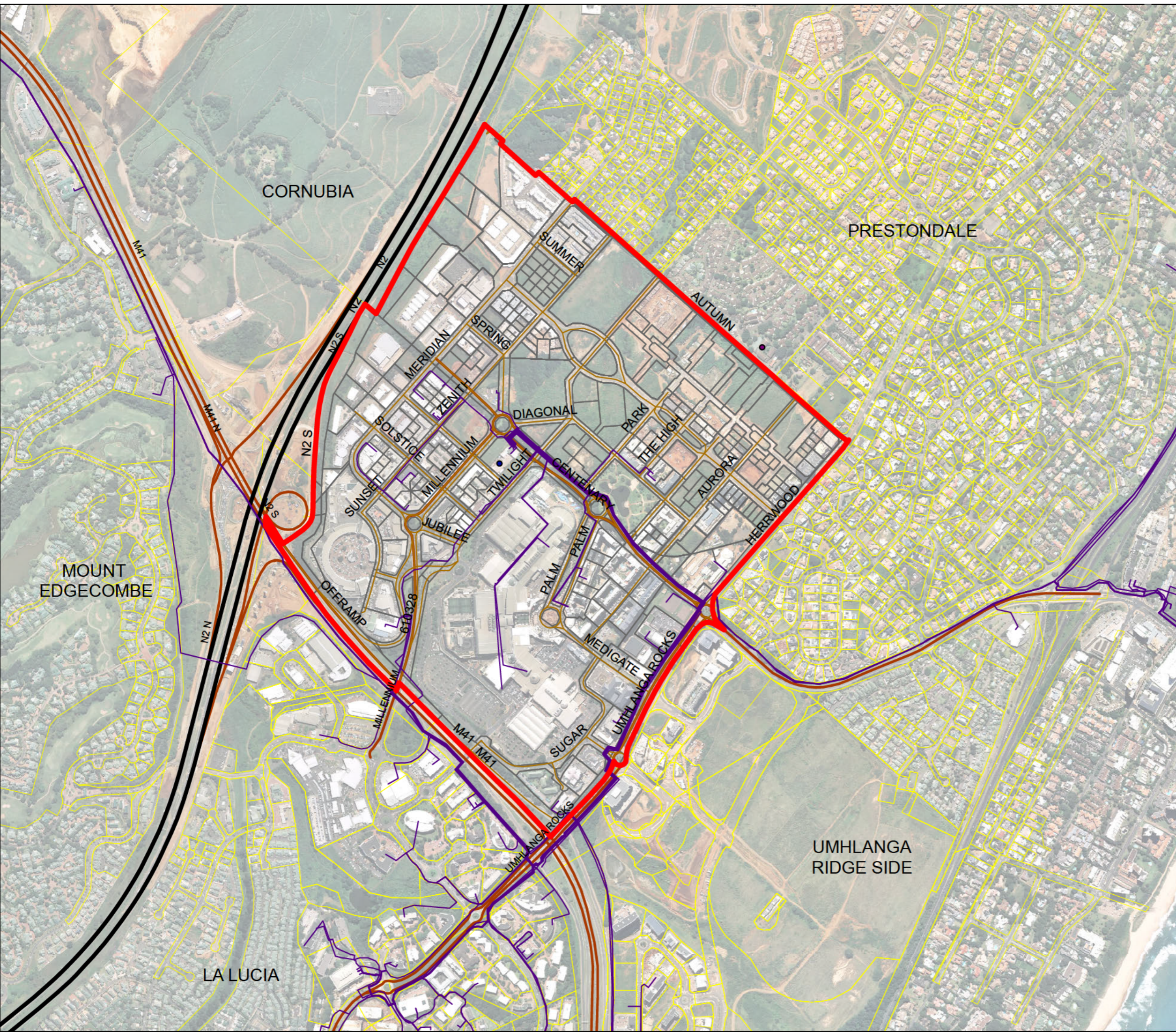
Prepared By: **Erwee, C. T.** Date: **02-02-2017**



1:10 000

University of KwaZulu-Natal
For the completion of a MA TRNP
Dissertation:

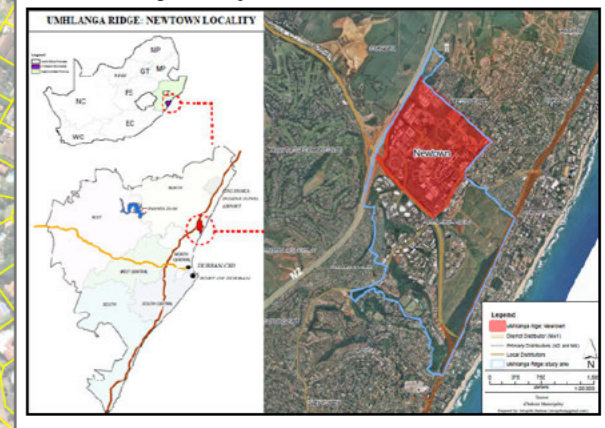
**Rebranding Umhlanga
as an Intelligent City**



ANNEXURE B

Umhlanga Ridge New Town Centre INFRASTRUCTURE MAP (B)

Locality Map



Legend

- Study Boundary
- Sewer Manholes
- Sewer Pump Stations
- Electricity
- Sewers
- Water
- Storm Water
- Primary Distributors
- Local Distributors

NOTES:
The URNTC is well invested in good infrastructure and emanates as a product of 'leapfrogged development'.

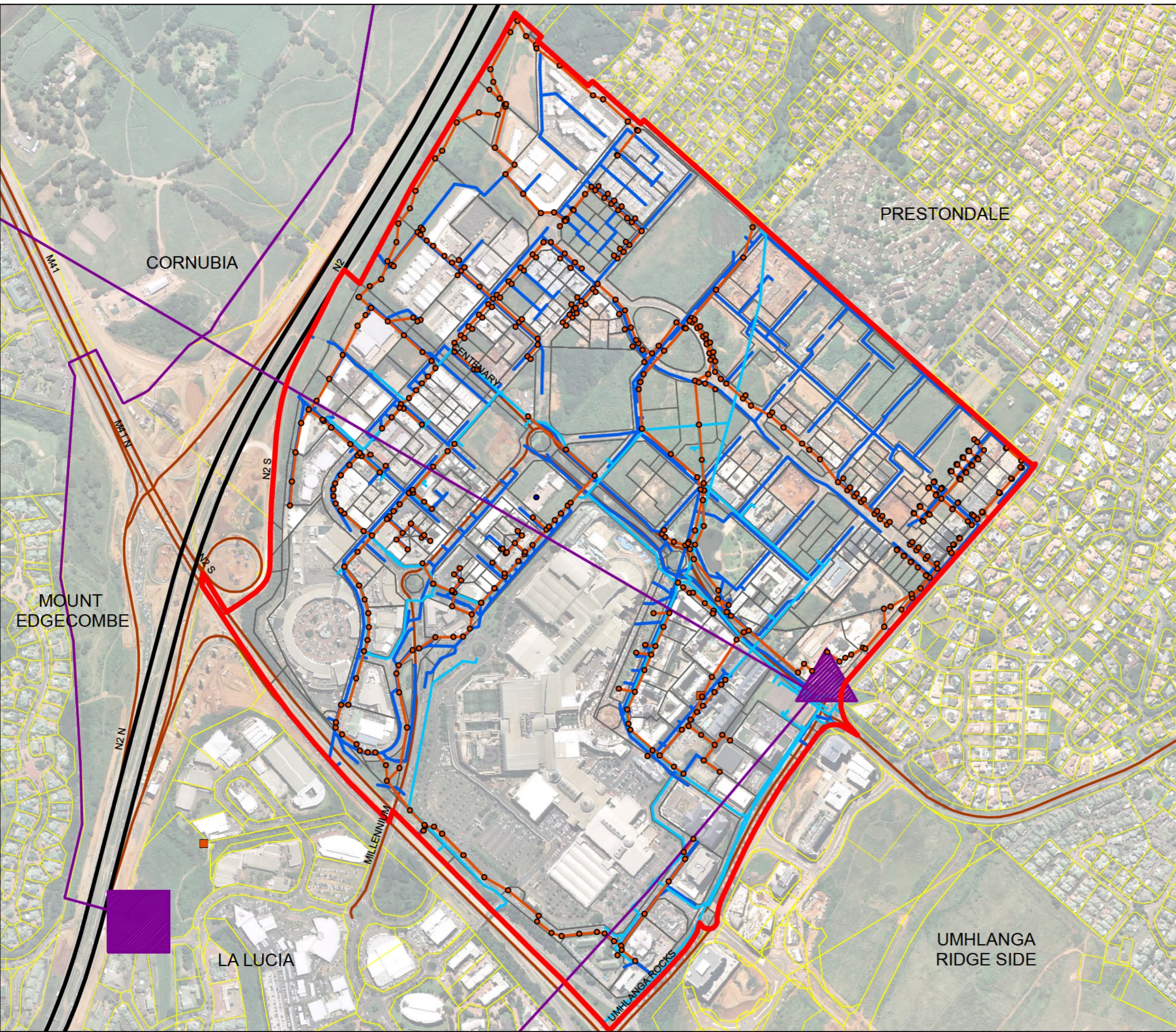
Prepared By: Erwee, C. T. Date: 02-02-2017



1:7 000

University of KwaZulu-Natal
For the completion of a MA TRNP
Dissertation:

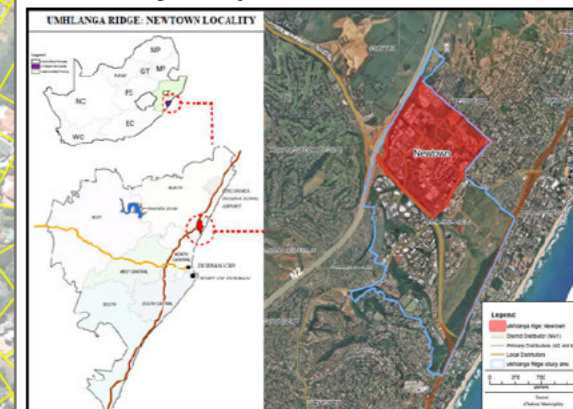
*Rebranding Umhlanga
as an Intelligent City*



ANNEXURE C

Umhlanga Ridge New Town Centre SOCIAL FACILITIES MAP

Locality Map



Legend

- Study Boundary
- Sidewalks
- SAP Station
- ▲ Municipal Offices
- Fire Station
- Hospitals
- Future Development

NOTES:

The URNTC's design is based on New Urbanism. It adopts a grid pattern and pays much attention to the incorporation of walkability through the provision of ample street-side sidewalks.

Based on the compact city notion, the higher density mixed use developments within walking distance from one another aims to discourage sprawl by providing facilities within, such as; hospitals, education institutions and a fire station - in a bid to prevent people needing to leave via automobile.

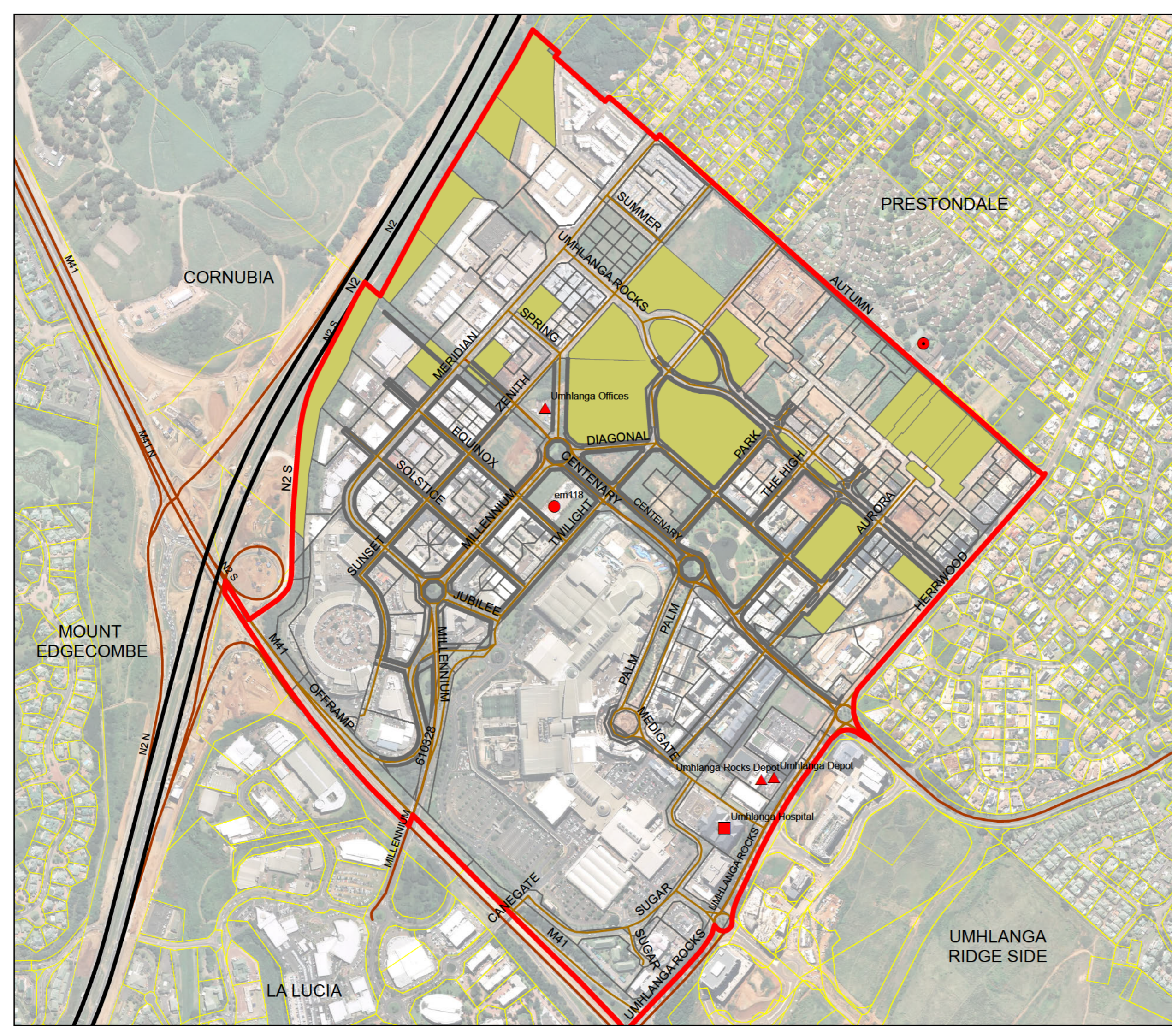
Prepared By: **Erwee, C. T.** Date: **02-02-2017**



1:7 000

University of KwaZulu-Natal
For the completion of a MA TRNP
Dissertation:

***Rebranding Umhlanga
as an Intelligent City***



Umhlanga Ridge New Town Centre






ANNEXURE 4 *Observation Map: Un-surveyable Sites*



Annexure 4: Un-surveyable Sites

Legend:

-  Gateway 'Shoppertainment' Complex
-  Incomplete development
-  Undeveloped land

Prepared by: Dlamini, M. & Erwee, C.T.	Date: 02-11-2016
--	----------------------------

University of KwaZulu-Natal
For the Completion of MA TRNP Dissertation:

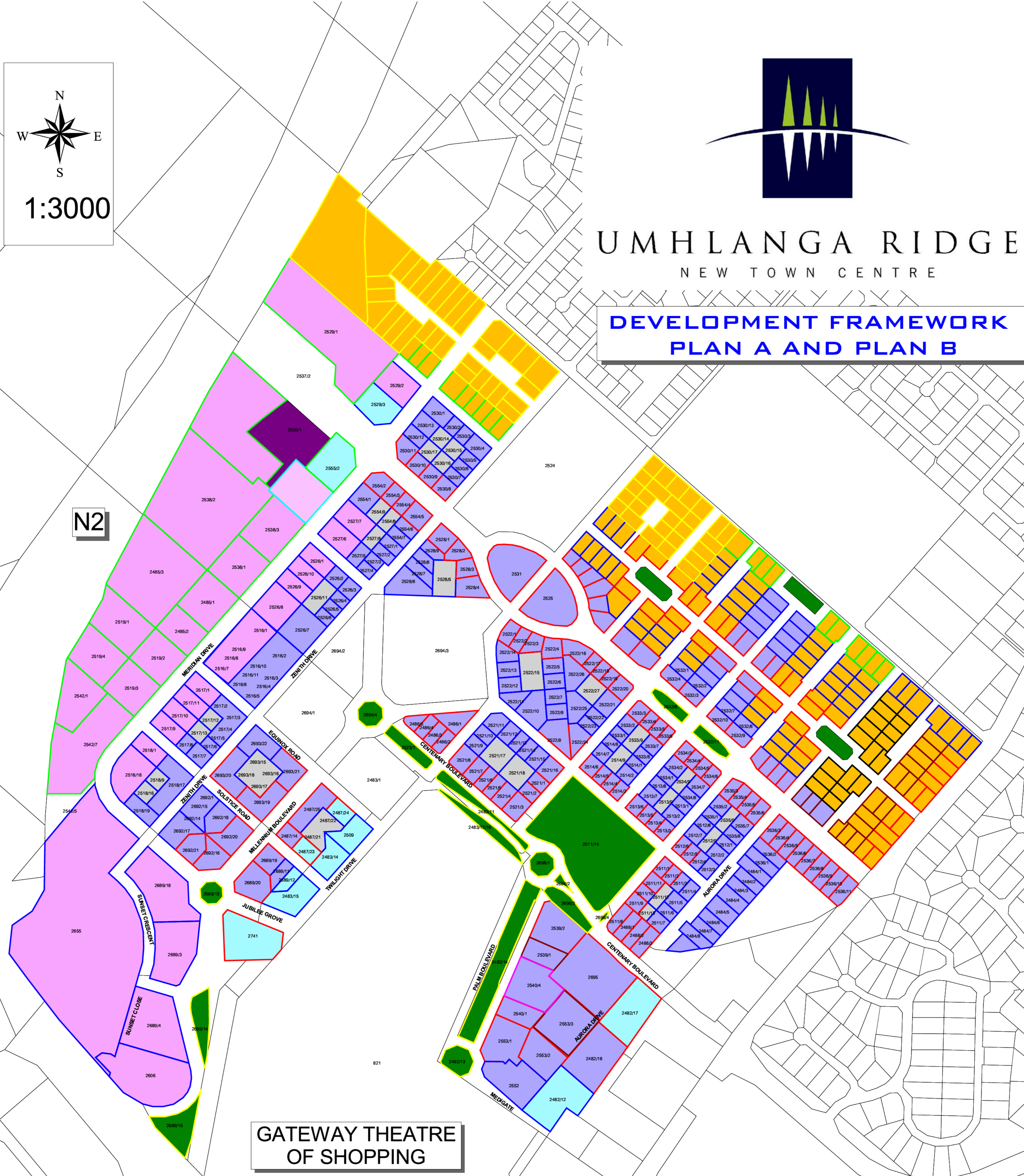
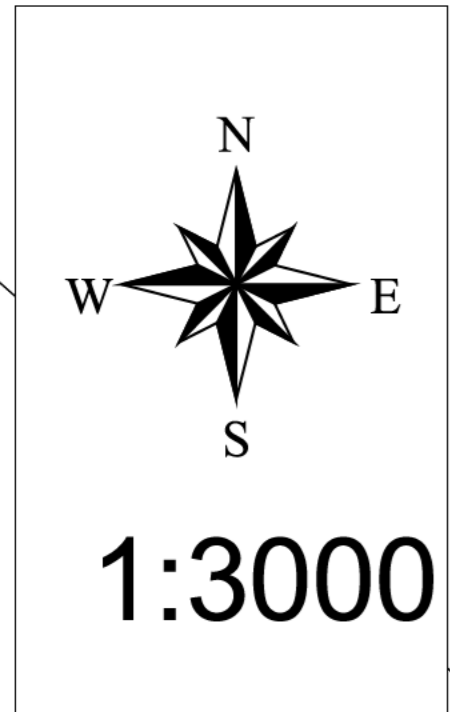
Rebranding Umhlanga as an Intelligent City



UMHLANGA RIDGE

NEW TOWN CENTRE

DEVELOPMENT FRAMEWORK PLAN A AND PLAN B



**GATEWAY THEATRE
OF SHOPPING**

FLOOR AREA RATIO - LAND USE MAXIMUMS*

- Business Park - 0.6
- Mixed Use 1 - 2.7
- Mixed Use 2 - 2.7
- Open Space/Rec - 0.15
- Parking - 0.05
- Residential - 3.5

The individual site FARs are indicated on the Precinct Plans

* Subject to change through Precinct Plan amendment with Design Review Approval

HEIGHTS (MIN and MAX) INDICATION**

- 0 - 2 Storeys *
- 1 - 3 Storeys *
- 2 - 4 Storeys *
- 3 - 6 Storeys *
- 4 - 8 Storeys *
- 8- 12 Storeys *

LAND USES WITHIN SPECIAL ZONE URNTC

- BUSINESS PARK
- MIXED USE 1
- MIXED USE 2
- PARKING FACILITY
- PRIVATE OPEN SPACE
- SUB STATION
- RESIDENTIAL

** Subject to change through Precinct Plan amendment with Design Review Approval

* Height is to be determined by metres above natural ground level with the Storeys providing a broad indication of Height. Provided the Height envelope (as provided for in the Scheme) is not exceeded the number of Storeys may be increased.

Plan Ref - URNTC/DF06ab/06 - Plan A and Plan B

For the purpose of a final year Masters dissertation.

No. _____

University of Kwa-Zulu Natal, School of the Built Environment and Development Studies

If you would prefer to return this questionnaire via email, please kindly do so to

212546254@stu.ukzn.ac.za, by Thursday 20th October.

Please **circle** all relevant answers, and print where necessary.

Demographic Details

1. Age: 18-25yrs 26-35yrs 36-50yrs 50+ yrs
2. Race: Black White Indian Coloured
Other: _____
3. Gender: Male Female
4. Marital Status: Single / Married / Separated / Divorced / Widowed
5. Do you have a child/ children? Yes No
6. How many people live in your house? _____
7. Do you live in Umhlanga? Yes No
8. Please indicate your income bracket
a. 0-R10 000 b. R11 000 – R20 000 c. R21 000 – 30 000 d. R31 000 -R45 0
e. R45 000 +
9. Do you feel that the salary you earn affords you/ would afford you a comfortable life in Umhlanga? Yes No
10. Do you have private medical aid? Yes No (Specify scheme: _____)
11. Please circle the **highest** year of education completed:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23+
(Primary) (High school) (College/University) (Graduate School)

Home

12. Do you have *wifi* access at home? Yes No (If 'yes', Specify e.g. 'xxxx uncapped'):

13. Do you have home security? Yes No
14. What types of security measures do you have at home?
Please specify **all** (e.g. CCTV cameras, burglar guards, security guard etc.):

15. Do you recycle waste? Yes No

16. How do you pay for your municipal services? (e.g: online app/ EFT/ manual payment etc.)

Please specify: Water: _____

Electricity: _____

Work

17. Do you work in Umhlanga? Yes No (If 'yes', where? _____)

18. What is your occupation? Specify: _____

19. Do you have wifi access at work? Yes No

20. Does your job rely on daily internet access? Yes No

21. Does your company compete in the global market, i.e. internationally?

Yes No

22. Do you engage with *work* in places of leisure, in Umhlanga i.e. meetings at coffee shops etc.?

Yes No

23. How many hours a week do you work?

a. ≤ 40 hrs b. 40-55 hrs c. 55-65 hrs d. > 65 hrs

24. Do you feel that your place of work encourages you to grow as an individual?

Yes No

25. Does your place of work offer skills development/ training?

Yes No

26. How far do you travel from home to work (**one way**)?

a. < 5km b. 5-10km c. 10-15km d. 15+ Km

27. What mode of transport do you use to get to and from work?

a. Private Car b. Motorbike c. Bicycle d. Walk e. Public Transport
d. Other: _____

28. What mode of transport do you use when travelling within Umhlanga?

a. Private Car b. Motorbike c. Bicycle d. Walk e. Public Transport
d. Other: _____

29. Generally speaking, do you ever experience parking issues, such as a shortage thereof, in Umhlanga? Yes No

Leisure

30. Do you engage in recreational/ leisure activities in Umhlanga, be it at coffee shops, restaurants, bars, shopping etc.? Yes No
31. Do you use Umhlanga's public open spaces? Yes (Please circle all relevant options) No
- a. Chris Saunders Park b. Children's park
32. How many hours a week do you spend doing leisurely activities (including family time)
- a. <10 hrs b. 10 -20 hrs c. 20-30 hrs d. >30 hrs
33. What attracts you most about Umhlanga? (Please select **all** relevant options)
- a. Safety b. Employment opportunities c. Aesthetic appeal
- d. Variety of activities/Convenience e. Other: _____
34. Please indicate **all** the following information technologies, which you interact with on a daily basis:
- a. Smart Phone b. Computer/ laptop c. DSTV or NETFLIX d. Radio
- e. Other: _____



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

28 June 2016

Miss Chelsea Tyler Erwee 212546254
School of Built Environment and Development Studies
Howard College Campus

Dear Miss Erwee

Protocol reference number: HSS/0799/016M
Project Title: Rebranding Umhlanga as an intelligent city

Full Approval – Expedited Application

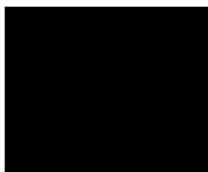
In response to your application received 03 June 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.



.....
Dr Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

Cc Supervisor: Lovemore Chipungu
Cc Academic Leader Research: Professor Oliver Mtapuri
Cc School Administrator: Ms Nolundi Mzolo

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za

Website: www.ukzn.ac.za



100 YEARS OF ACADEMIC EXCELLENCE

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

Information Sheet and Consent to participate

Date: xx June 2016

Welcome and thank you for your participation. I appreciate your time and look forward to working with you today.

My name is Chelsea Erwee and I am a student of Town and Regional Planning at the University of KwaZulu-Natal in Durban. My phone number is 072 904 4913 and my email address is chelseanerwee@yahoo.com.

You are being invited to participate in a study that involves looking at the emergence of Umhlanga as an intelligent city, in response to the urbanisation pressures of the 21st century emanating out of Durban CBD. This study will involve interviews with five initial key-informants. With a snowball sampling approach, the number of overall key informants is likely to rise with recommendation from initial key informants. Additionally, a sample target of two hundred people will be surveyed from two clusters; one being the office parks within the study area, and one being mixed-use residential communities behind Gateway, also within the study area.

In-depth interviews will be scheduled and conducted according to the key-informants' availability and convenience of location. The meeting venues are therefore likely to differ. Researcher and interviewee will engage in an unstructured interview steered by an interview guide, in a relaxed setting. It is possible that additional questions may arise from interviewee responses. The interviews will be recorded with granted consent from the interviewee. Each interview is estimated to take between 1 and 2 hours long.

It is highly unlikely that any of the questions will stir discomfort, and the research will be very useful for the report that will be written. Even though I am not paying you for your time, the information gathered can possibly influence planning for the future, with regards to planning more sustainably liveable habitats with enhanced quality of life. The study could have potentially positive impact on future planning of cities.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval Number.....).

In the event of any problems or concerns/questions you may contact the researcher at 031-7645515 or the UKZN Humanities and Social Sciences Research Ethics Committee, contact details are as follows:

Humanities and Social Sciences Research Ethics Administration
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X54001
Durban, 4000
KwaZulu-Natal, South Africa
Tel: 031-2604557 – Fax: 031-2604609
Email: HSSREC@ukzn.ac.za

Please note that participation in this research is completely voluntary and that you may leave at any time. You will not be criticised or regarded badly at all if you decide to leave or refuse to participate. Should you decide not to participate or decide to leave early we will not be able to include your opinions in the research, these will be disregarded.

All information gathered from this interview will be stored on a computer. When the report is written there will be no reference to who you are or where you live, this information is private and will be kept confidential. The information will be kept safely on computer for 5 years, after which it will be destroyed.

Consent Form:

I _____ have been informed about the study titled: 'Rebranding Umhlanga as an intelligent city', and how this might affect me; by _____

I understand the purpose and procedures of the study.

I have been offered an opportunity to ask questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any time without being penalised

If I have any further questions / concerns about the study I may contact the researcher on 072 9044 913 or chelseaerwee@yahoo.com

If I have any questions about my rights as a study participant, or if I am concerned about n aspect of the study or researchers then I can contact:

Humanities and Social Sciences Research Ethics Administration
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X54001
Durban, 4000
KwaZulu-Natal, South Africa
Tel: 031-2604557 – Fax: 031-2604609
Email: HSSREC@ukzn.ac.za

I hereby provide consent to:

Audio-record my interview / focus group discussion	YES / NO
Use of photographs for research purposes	YES / NO

Signature of participant

Date

Signature of witness
(Where applicable)

Date

Signature of translator
(Where applicable)

Date



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

DATE: 21 April 2016

To whom it may concern

Chelsea Erwee (212546254), a Masters student in the School of Built Environment and Development Studies, formally requests permission to interview staff in your department and use the data collected in her dissertation. She would like to use this data in her Masters dissertation, in completion of a Masters degree in Town and Regional Planning, titled: "*Rebranding Umhlanga as an Intelligent City*". The dissertation will acknowledge Tongaat Hulett Developments, and the information will be shared with Tongaat Hulett if requested.

Thank you and Kind regards

Chelsea Erwee

Supervisor: Dr Lovemore Chipungu
School of Built Environment and Development Studies
Email: chipungu@ukzn.ac.za
Tel. number: 031 260 3801

Permission to use data Granted by:

Name: Roey Wilkinson

Signature: 

Date: 20 June 2016



Tongaat Hulett Developments