

LITERATURE REVIEW

2. Urban development and transportation

2.1. Introduction

The following figure illustrates the structure of Chapter 2.

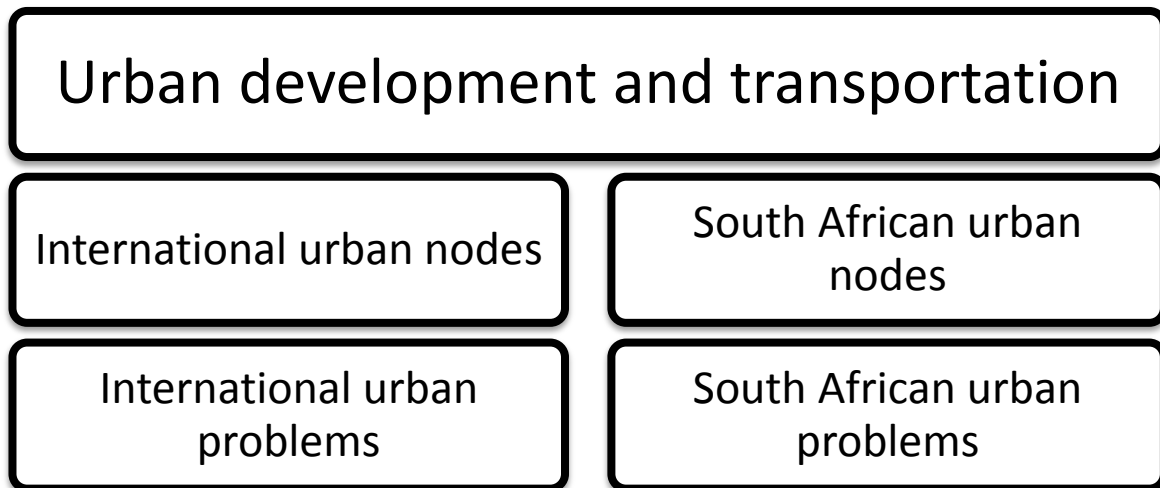


Figure 4: Chapter 2 layout

Source: Own construction (2013)

The chapter commence by providing a brief discussion of the origin of urban areas as a background to the literature to follow. Thereafter the status quo and predictions with regards to urbanisation, private vehicle ownership and population growth at an international level will be discussed. This was done in order to obtain an understanding and substantial information whether private vehicles will increase in urban areas across the world for years to come.

After future trends were established, transport-specific problems experienced in international cities were highlighted. Thereafter different trends, currently experienced in cities of developing countries, as well as cities, in developed countries were scrutinised.

The focus then shifted inwards from an international point of view, to South Africa. The national urbanisation rate, population growth and private vehicle ownership status quo and predictions were summarised and a South African-specific problem was identified. The influence of the South African specific problem was discussed, and finally urban problems relating to South African cities and towns were discussed.

2.2. International urban nodes

Limited evidence exists of the first urban areas in the world, and no definite answers to how urban areas were created, and more importantly, why urban areas had originated. According to Mumford (1961), the physical urban area was only developed at a later stage. The congregation of people came long before that, and primarily as a result of higher belief and rituals. Hence his statement that the dead was the first to have a permanent dwelling in the world (Mumford, 1961:3-7).

Every urban area is unique in its own right and originated at a certain location due to very specific factors. The origin of world cities (and other cities) can, however, be categorised as a central place or a non-central place (Geyer, 2002:5). Central places were established due to a wide distribution of people that needed services and products. On the other hand, non-central places originated due to, inter alia, military, resources or religious factors. Consequently, it is important to understand the function of each individual city (notwithstanding the fact that the city might have diversified in the course of its existence and now serves a variety of functions to its residents)(Geyer, 2002:5).

Urban areas play a major role in society and even more so since 23 May 2007, the theoretical date on which the world's population became more urban than rural (Hanlon, 2007:1). The phenomenon called urbanisation (rural to urban migration) is ever increasing with predictions that more than 50% of residents in Asia and Africa will live in urban areas by 2020 and 2035 respectively (United Nations, 2012:17). The document (World Urbanization Prospects) further elaborates by stating: "Between 2011 and 2050, the world population is expected to increase by 2.3 billion, passing from 7.0 billion to 9.3 billion. At the same time, the population living in urban areas is projected to gain 2.6 billion, passing from 3.6 billion in 2011 to 6.2 billion in 2050. Thus, the urban areas of the world are expected to absorb all the population growth expected over the next four decades, while at the same time drawing in some of the rural population." (United Nations, 2012:17).

Figure 5 illustrates the expected growth of the urban and rural population in developed and developing regions. From this figure, and the data scrutinised, it is clear that great growth will be experienced in especially urban areas in developing regions. This growth will generate pressure on cities and their infrastructure and new challenges will arise while old ones will intensify. Urban problems form part of every city in some form and are discussed in more detail in Section 2. Urban Problems.

The figure below illustrates the immense increase expected in the urban population, especially the less developed countries (developing countries) urban population.

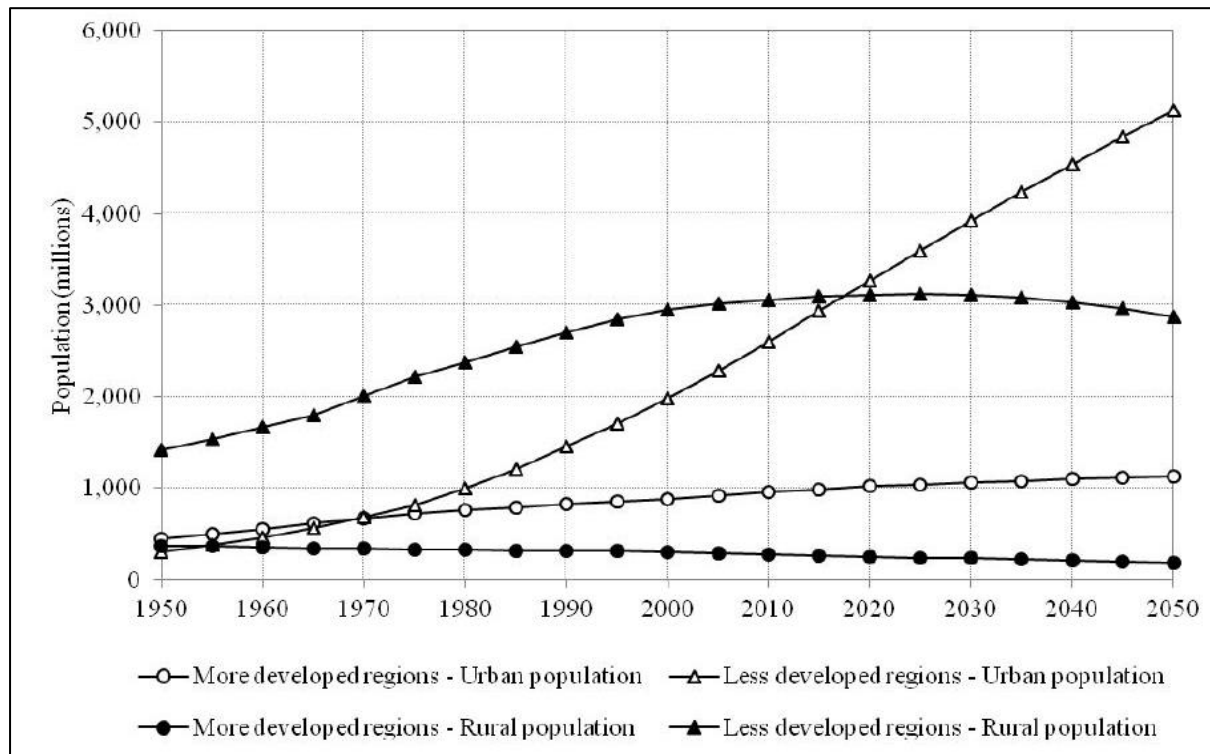


Figure 5: Urban and rural population, 1950 - 2050

Source: United Nations, Department of Economics and Social Affairs (2010)

2.2.1. International urban problems

“With rapid urbanisation and economic growth, motorisation has been accelerating especially in cities in developing countries. For example, in Asia region, the number of motor vehicles per one thousand people has more than tripled in the past thirty years. Owning a private car or a motorised two-wheeler is a major aspiration for people in these cities, particularly where public transportation service is often inadequate and unsafe.” (Pardo, 2011:3).

As residents become wealthier, and the population increases in size, extreme pressure is placed on cities’ infrastructure, especially on transportation infrastructure. Wright (2005:8) listed numerous urban problems experienced in the world today which, inter alia, include pollution, accidents, congestion, unsustainability, health and the misuse of valuable land. See Table 3 for a comprehensive list of the problems mentioned.

Table 3: General vehicle-related problems experienced in world cities

Urban problems	Elaboration
Pollution	• Studies have directly linked transport-related contaminants to asthma, bronchitis, heart attacks and strokes. • Vehicles account for approximately 95% of carbon monoxide and 70% of nitrogen oxide emissions in the CBD of cities. • Air pollution in cities of developing nations are worse compared to developed nations. • Studies indicated that loud noises have a negative impact on the ability to concentrate and especially affect children. • The disposal of vehicles and vehicle parts contribute to landfill problems.
Accidents and congestion	• Road accidents were responsible for 1 194 000 deaths in 2001 (4th highest sector). • Low-income nations incur 80 times more traffic fatalities per vehicle than high-income nations. • Traffic congestions cost the U.S. economy approximately US\$63.1 billion in 2005. • In Bangkok traffic congestion reduced the gross domestic product (GDP) by 6% in 2000. • Inefficient economy due to transport problems. • Severance - roads and transport infrastructure divide cities, communities and neighbourhoods not only physically

	but psychologically. • Greenhouse gasses can be linked to global warming. • The transport sector is responsible for a large part of these greenhouse gas emissions. • Cars, roads and parking areas detract from a city's beauty.
Security (unsustainability)	• The transport system is fossil fuel dependant. Any change will result in economic and political implications.
Land use (land lost)	• Transport infrastructure occupies valuable land within cities that could serve another function for humans, fauna and flora.
Health	• Vehicle travel, along with fast-food, has almost exclusively produced a worldwide obese pandemic.

Source: Own construction based on Wright (2005).

Unfortunately, city leaders in developing countries follow the same private vehicle orientated patterns made by developed cities in the past. Ironically, many cities in the developed world are now trying to recover from a private vehicle-dominated era by halting the building of more infrastructure for private vehicles and re-allocating road space for public transportation as well as non-motorised transportation (NMT) (Pardo, 2011: 3). For this reason the lack of leadership can also be classified as a contributor to urban problems. Notwithstanding the fact that studies confirm more roads will generate more private vehicle travel (Snyder, 2011), major road and infrastructure projects are currently implemented and planned (Anon., 2013).

This statement is substantiated by data received from the Worldbank (2013). In a survey done, the developed world (represented by 4 countries on 4 continents) had a car-ownership level in 2010 of 655 cars per 1 000 residents; but a decrease in ownership of 0,8% measured between 2005 and 2010. In sharp contrast, developing nations (represented by 4 countries on 3 continents) had a car ownership level of 128 cars per 1 000 residents in 2010. However, growth in ownership between 2005 and 2010 saw an increase of 21.9%. See Table 4 for more detail.

Table 4: Motor vehicles per 1 000 people

Countries	2005	2006	2007	2008	2009	2010	Difference of vehicle numbers per 1 000 people from 2005-2010 (%)
<u>Developed Countries</u>	<u>660</u>	<u>664</u>	<u>667</u>	<u>667</u>	<u>659</u>	<u>655</u>	<u>-5 (0.8% decrease)</u>
Japan (Asia)	592	594	592	592	593	591	-1 (0.17% decrease)
New Zealand (Oceania)	714	724	729	733	718	712	-2 (0.28% decrease)
United Kingdom (Europe)	517	521	527	526	523	519	+2 (0.39 increase)
United States of America (North America)	816	818	820	815	802	797	-19 (2.33 decrease)
<u>Developing Countries</u>	<u>105</u>	<u>111</u>	<u>116</u>	<u>121</u>	<u>124</u>	<u>128</u>	<u>23 (21.9% increase)</u>
Algeria (Africa)	91	95	101	109	112	114	+23 (25.3 increase)
Chile (South America)	147	154	161	170	174	184	+37 (25.2% increase)
Sri Lanka (Asia)	40	43	45	46	47	48	+8 (20% increase)
South Africa (Africa)	142	150	158	160	162	165	+23 (16.2% increase)

Source: Own construction based on Worldbank (2013)

2.3. South African urban nodes

According to the United Nations (United Nations, 2010), the urbanisation scenario in South Africa is similar to other developing nations across the world. The level of urbanisation was 42.2% in 1950 and South Africa consisted of a more urban than rural population between 1985 and 1990. Currently (2013) the percentage of the urban population of South Africa is between 61.5% (the 2010 figure) and 63.8% (the projected figure for 2015).

The annual urban growth experienced was above 3% between 1950 and 1960 and again between 1985 and 1995, and it slowed down to the current 1.21%. However, the urban growth is expected to stay above 1% until 2025 (the end date for projections).

The rural annual growth rate, on the other hand, turned negative for the first time, since 1950, between 2005 and 2010. Currently the rate stands at -0.20% and is projected to be -0.78% in 2025.

The following table and figures illustrate the urban and rural scenario in South Africa.

Table 5: Urbanisation data: South Africa

	1950	2010	2025
Percentage Urban (%)	42.2	61.5	67.9
Urban annual growth rate (%)	3.35	1.21	1.05
Rural annual growth rate	1.57	-0.2	-0.78

Sources: United Nations (2010).

This figure illustrates that the gap between the urban and rural population in South Africa is widening.

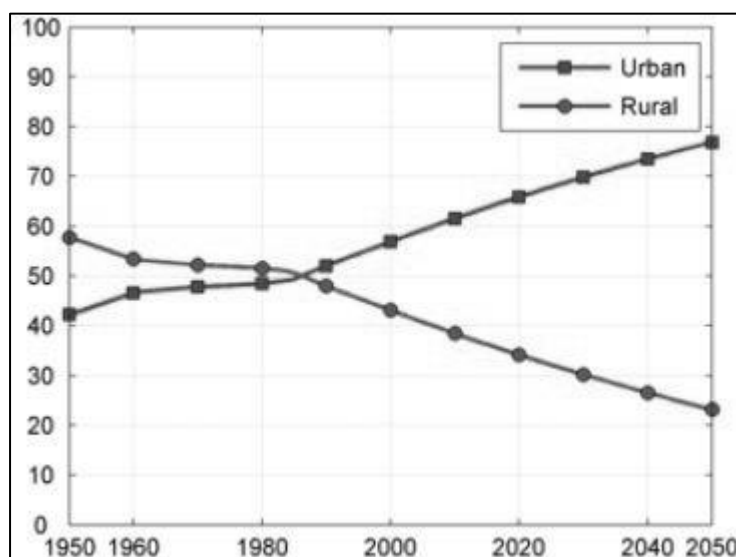


Figure 6: Percentage urban and rural South African population

Source: United Nations (2010).

The following figure indicates in millions how the gap widens. It is clear that the urban population is not only growing but the rural population is also declining.

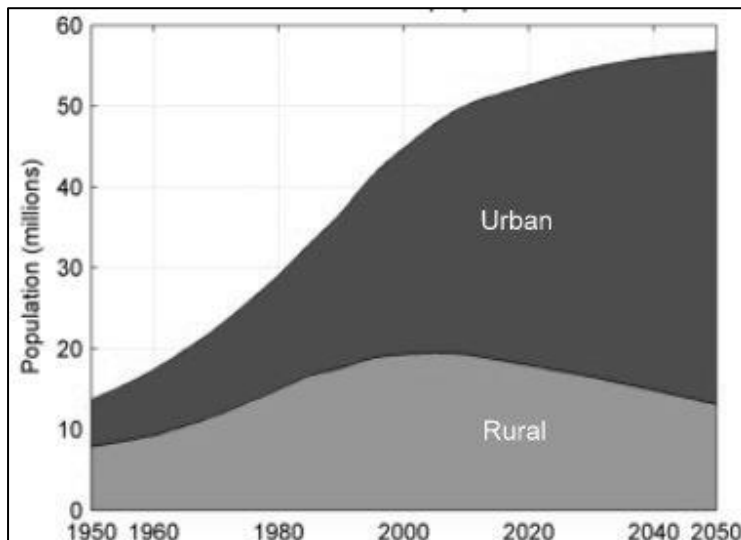


Figure 7: South Africa's urban and rural population

Source: United Nations, Department of Economics and Social Affairs (2010)

2.3.1. South African urban problems

As a result of the high rate of urbanisation in South Africa the past decades, urban problems were inevitable. Van der Merwe (1991:230) pointed out that urban problems can be ranked third of the worst problems experienced in the world, only after famine and nuclear war. The past political environment intensified the urban problems experienced. Until 1986 South Africa pursued a policy of racially based migration. The closed-city policy attempted to prevent certain ethnic groups from migrating to the city for better opportunities (Gelderblom & Kok, 1994: 12).

“Colonial and apartheid policies of racial segregation have left a daunting legacy – a fragmented urban form with unequal access to jobs, amenities and public services. The legacy has not disappeared in the aftermath of apartheid because of the durability of the built form, the power of vested interests, persistent income inequalities between races and lack of upward mobility. The dispersed built environment demands long journeys, raises carbon emissions, reduces city productivity, and undermines the financial viability of municipalities because of the high servicing costs.” (Turok, 2012: 26).

The differences with regard to urban form, due to segregation in South African cities compared to other cities are summarised in the table below.

Table 6: Ordinary city vs. Apartheid city

Characteristic	Ordinary city	Apartheid city
Main built-up area of the city	Broadly contiguous	Fragmented
Variation in density levels across the city	Gradual gradient	Sharp variations
Low-density neighbourhoods in inner locations	Unusual	Common
High-density neighbourhoods in outer locations	Unusual	Common
Tendency to separate or mix land-uses	Mixed land-uses	Separation of land-uses
Distances between poor residential areas and main economic centres	Typically short	Mostly long

Source: Turok (2012).

Urban problems experienced in South African cities were intensified mainly as a result of two factors; the high urbanisation rate and the termination of the influx control policy on 1 July 1986 (Gelderblom & Kok, 1994: 12). Van der Merwe (1991) and Turok (2012) identified urban problems experienced due to urbanisation and segregation (close city policy) in South African cities as captured in the following table.

Table 7: Transport related urban problems in South African cities

Urban Problems	Elaboration
Social	• Inequality in cities (the minority of residents own vehicles, whilst vehicle infrastructure and travel are prioritised in urban areas).
Health	• Sickness due to pollution (vehicles are a major contributor to urban pollution).
Economic	• Economic insufficiency (traffic congestion is a contributor).
Transportation	• Too many private road users. • Heavy traffic congestion. • Poor public transport infrastructure and services. • Poor land use planning. • The private motor threatens effective functioning of the city and

	burdens the community with unnecessary social costs. • Accidents. • Parking problems. • Inaccessible city areas. • Low-density planning due to transport infrastructure increases service provision and travel time.
Land use	• Uncontrollable urban sprawl (vehicles are a contributor). • Low-density and ineffective planning (vehicles are a contributor). • Sprawl and transport (vehicles) infrastructure waste agricultural land. • Due to the size of the city, secondary business centres are needed resulting in urban decay, especially the CBD (vehicles are a contributor).
Management	• The city becomes unmanageable due to the immense growth and domino effect of urban problems (vehicles are a contributor).

Source: Own construction based on Van der Merwe (1991) and Turok (2012).

From the information above it is evident that South Africa not only needs to address past segregation planning infrastructure, but also the general urban problems experienced worldwide due to urbanisation.

In South Africa, as in other developing nations, the growth of private vehicle ownership is high. In 2005 there were 142 vehicles for every 1000 residents, this figure increased to 165 in 2010, growth of 16.2% (Worldbank, 2013). If the South African population growth is ignored and only the average private vehicle ownership per developed nation of 655 private vehicles per 1000 people is made relevant to the South African context, the country will need to accommodate roughly 33 million vehicles with the current population at 50 586 757 (Trading Economics, 2013) (see Table 6). This is compared to the roughly 8 million vehicles currently in the country, a difference of approximately 25 million vehicles. With cities already struggling to accommodate the current private vehicles in the country, it is evident that this problem will intensify if trends continue (Alfreds, 2013).

Alternative transport modes for South African residents are also limited. A major problem for the public transportation sector of the country is that it is heavily dependent on the mini-bus taxi. Passenger numbers with regard to bus and rail transit have declined since the 1980s and fell as much as 30% in the 1990s; this as a result of passengers preferring the mini-bus taxi as their first mode choice (South Africa, 2011: 202).

2.4. Conclusion

The following can be concluded from the literature captured in this chapter:

- Vehicles are the cause of numerous detrimental effects within urban areas (Wright, 2005:8).
- If trends continue, there will be more vehicles in urban areas in 2050 compared to 2005 (United Nations, 2012:17).
- Developed countries are moving gradually away from the private-vehicle orientated transportation system, whilst developing countries are becoming more dependent on private vehicles daily.
- South African cities are experiencing like the rest of the world numerous problems, a great quantity can be attributed to vehicles (Pardo, 2011:3).
- South African cities have a unique problem to correct, namely segregated cities. This phenomenon created additional urban problems and/or worsened general problems experienced worldwide (Turok, 2012:26).
- South African cities and towns experience the same trends (population growth, urbanisation and increases in private vehicle ownership) as international and other developing countries. There will therefore be more vehicles in 2050 in South African cities compared to 2005 if trends continue (Worldbank, 2013).