

Impact of Current Land-use Patterns on Public Transport and Human Settlements

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Abstract

There is a link between the location of human settlements and transportation. This relationship is important given that the location of housing and that of important amenities including areas of work, schools and health facilities determine the travel patterns and the viability of public transport and costs incurred by households and by the government. Key to transport and housing is the land use patterns which relates to how land is utilised and where amenities and human settlements are located. Land use planning is important especially for major South African cities given the high level of urbanization and requires municipalities to adequately plan and position themselves for future growth. The study uses a qualitative research method to achieve above-mentioned objectives including analysis of institutional arrangements, legislation and policy framework as well as funding arrangements with specific reference to the transport and human settlement sectors. The paper concludes with recommendations relating to the need for coordinated infrastructure investment plans, addressing gaps in the legislative framework, reviewing of funding for human settlements, devising strategies and incentives to promote densification and infill developments.

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1 Introduction

South Africa is still trapped in the legacy of racially segregated human-settlement policies. The apartheid government introduced legislation that preserved white supremacy, such as the Group Area Acts (No. 41 of 1950 and No. 36 of 1966), which directed population groups into specific urban spaces separated by buffer zones of open land. Whites were allocated large central areas, while blacks were displaced to townships on the periphery of cities. The apartheid system did not just segregate races; it entrenched inequality in the different forms of housing, geographical location, environmental landscape and in the distribution of facilities.² Post-1994 low-cost housing projects continue to be provided on the outskirts of cities, where land is cheaper and more accessible. Although locating human settlements at the edge of cities is a cheaper option, it is costly in the long run. The government has to provide public transport operating subsidies, and poor households spend high proportions of their disposable income on public transport.

Major cities in South Africa face a number of challenges, as urbanisation and the fragmentation of households (resulting in more, smaller households) increase pressure on urban services and infrastructure. In order to meet the enormous service-delivery demands, cities need to make efficient use of scarce resources. Land and land-use planning are key factors in effectively managing the inevitable progress of urbanisation. The future of cities and their sustainability depend on decisions that are taken now in preparation for this growth. As a result of urban growth, service delivery pressure affects different sectors within cities, especially transportation and human settlements.

The demand for transport is driven by the need for people to reach locations where activities take place, including the workplace, schools, hospitals and clinics. Therefore, effective land-use planning is vital, as it determines where major facilities and human settlements are located, how far people have to travel to access such facilities, and what households and government spend on transport.

Currently in South Africa, these two sectors (public transport and housing) and land-use patterns face various challenges. The current public transport system is expensive, inefficient, ineffective and inaccessible, while coordination is lacking between land-use patterns and transport planning. Rising urbanisation and poverty levels, which increase demand for housing, especially in the cities, are affecting human settlements. Other challenges are related to the shaping of South African urban settlements by the apartheid regime, which resulted in spatial separation of residential areas according to class and race and promoted social isolation (DoHS, 1997). In urban areas, the increased demand for houses and for suitable land on which to build housing, but well-located land is scarce, costly and in some cases not owned by the government. As a consequence, most low-cost housing projects tend to be developed in peri-urban areas, where land is cheaper, readily available and can be accessed with relative ease. Given the relative scarcity and cost of land in urban areas, cities need to make the most efficient use of this resource once it becomes available.

² Spinks, C. 2001. A New Apartheid? Urban Spatiality, (Fear of) Crime and Segregation in Cape Town, South Africa. Development Studies Institute, London School of Economics, Working paper series No. 01-20.

This paper examines the impact of the current land-use patterns and other major challenges particularly on public transportation and human settlements in South Africa. The specific objectives are:

- (1) To examine the current policy and legislative framework on land-use planning related to public transport and human settlements;
- (2) To evaluate the effect of current land-use patterns on public transport and the transaction cost for poor households;
- (3) To evaluate the challenges in the current urban-housing delivery system; and
- (4) To review the current funding and institutional arrangements and provide alternative models.

2 Literature Review

2.1 The concept of human settlements and poverty

Poverty is characterised by a lack of income, which results in multiple forms of deprivation and an inability to afford basic goods and necessities. As a consequence, people may be excluded and marginalised from participating in activities that are considered the norm within societies. Housing has been identified as an important element and tool in developing policies and programmes to alleviate poverty (see Pomeroy and Evans, 2008). Housing is just one of people's different needs in life, but also the largest expenditure in a basket of necessities. Therefore, analysts have developed the concept of housing-induced poverty,³ which can intensify due to a number of factors, such as an increase in housing costs and interest rates.

Most countries focus their attention on the immediate concerns of urbanisation, which include accommodating the poor and improving living conditions, creating employment, and improving governance and administration of increasingly complex systems (UNPF, 2007). These issues are important but shrink in comparison with the problems related to the growing urban population. Therefore, instead of simply responding, cities need to plan in advance for urban growth and its challenges.

Tackling the highly contentious issue of human settlements requires an understanding that delivering housing is more than just providing a shelter. Housing includes infrastructure and services⁴ that are necessary for housing or human settlements to be habitable (Charlton, 2004). The living experience of a residential environment is dependent upon the availability and accessibility of facilities and amenities, such as schools, clinics, police stations and sporting facilities, while central to human settlements is convenient, safe and affordable public transport to move from home to work or to other facilities (Charlton, 2004).

2.2 Importance of land-use planning

Transport enables people to participate in various activities, such as working, shopping and recreation (Van Wee, 2002). Thus, the demand for transport and travel patterns is determined by the nature and location of human settlements in relation to major amenities and areas with economic opportunities. Hence, human settlements and transport investment planning

³ The situation occurs when housing costs are so high that households cannot afford other non-housing necessities.

⁴ Such infrastructure and services include water, sanitation, energy, and access roads and footpaths.

decisions should be undertaken within the broader framework of land-use patterns. Table 1 shows land-use categories.

Table1: Land-use categories

Built Environment	Open Space
Residential (family housing) Commercial (stores) Institutional (schools) Industrial Brownfields Transport facilities (roads and parking lots)	Agriculture Forest Underdeveloped lands

Source: Litman (2010)

According to Litman (2010), land-use patterns can be evaluated based on a number of attributes, including:

- (a) Density level: the number of people or the number of housing units within an area.
- (b) Mix of land-use types: such as the location of commercial, residential and other important amenities together or close to each other, which is also related to clustering.
- (c) Accessibility: the ability of people to be able to reach their desired activities and destinations.
- (d) Green space: the portion of land used for parks, gardens, etc.
- (e) Non-motorised accessibility: the availability and quality of walking and cycling conditions.

A city that uses land efficiently experiences compact and smart urban development, while a city with inefficient land use becomes a network city or urban sprawl. Table 2 summarises the characteristics of these two urban forms of development.

Table2: Indicators and urban development models

Indicator	Network city/urban sprawl	Compact city
Residential density	Dispersed population in low-density developments	High-density use and residential developments
Neighbourhood mix	Separated (home, shops, workplaces)	Mixed: communities benefit from education, health, commercial facilities that are conveniently located closer to residential areas
Activity centre Centeredness	Lack of well-defined activity centres	Concentration of settlements and well-defined activity centres
Transportation choice	Poor access to public transport choices, higher commuter rates and car ownership	Environmentally friendly, with public transport choices, suitable for walking and cycling
Recycling of land	New developments mainly on greenfields	Redevelopment of brownfield sites

Source: Compiled from Storch (2007)

Characterized by unplanned, uncoordinated, separated or single-use development, low-population density and automobile dependency, urban sprawl does not provide for a functional mixed use of land. Such development is usually viewed negatively because of the excessive land consumption, increased commuting and socioeconomic segregation due to its exclusionary housing markets. It is also perceived as contributing to high fiscal costs for the

provision of infrastructure and services. However, some researchers (for example Holcombe and Blast, 1999) defend urban sprawl based on a number of justifications, such as low density providing more room space and a higher standard of living.

In contrast, smart or compact cities encourage relatively high population density and mixed use of land. These features often promote an efficient public transport system and encourage walking and cycling, which in turn reduces the use of private cars (see Litman, 2010). Benefits of compact cities include less car dependency, less emissions, reduced energy consumption, better public transport services, increased accessibility and re-use of previously developed land.

2.3 Human settlements and efficient urban land use

Efficient land use is important, especially when cities experience a high level of urbanisation and pressure to accelerate housing delivery against a finite land resource. A key tool that has been identified for housing development is densification, which refers to increasing the number of units of housing per square foot of land. This requires cities to plan for housing typologies that will promote efficient land use. In general, housing types range from a single detached house, duplex, triplex, multiplex, side-attached house, stacked-row house, small apartment, low-rise apartment, mid-rise apartment, to a high-rise apartment (Litman, 2010).

The Social Housing Foundation (SHF) (2010) categorises housing typologies according to descending density:

- (a) High-rise apartments: apartments with over four storeys;
- (b) Medium-rise apartments: two, three and four-storey walk-ups;
- (c) Attached permanent/town/row houses: single or double storey, which are semi-detached;
- (d) Single rooms; and
- (e) Detached low-rise houses: freestanding houses generally in townships and suburbs.

High-rise buildings are an efficient use of land (Sev and Özygen, 2009), and high-rise and low-rise apartments are also important to achieve densification, creating the highest level of activity for public transport (for example). However, the costs of constructing high-rise buildings are believed to escalate with the number of storeys built.

2.4 Importance of infill development for efficient land use

Infill and brownfield developments can increase the efficient use of scarce urban land and help reverse urban sprawl and its associated problems. Infill development generally refers to prioritising the development of parcels of vacant, underdeveloped or underused sites within an urban area over undeveloped land outside the city. Brownfield development refers to development within an area or on land that was previously used but has become vacant or derelict. The main principle behind infill and brownfield developments is to use existing resources and services before considering extensions to outlying areas.

2.5 Constraints and incentives of infill development

Despite their benefits, infill developments are not a developer's first choice because they are associated with a number of constraints, including size, lack of basic infrastructure and environmental issues (MRSC of Washington, 1997). The Truckee Meadows Regional Planning Agency (TMRPA, 2005) classifies barriers to infill developments as financial, infrastructure, regulatory policies, land assembly and its cost, local residents' resistance, political leadership, public perceptions of increased density and unwillingness to condemn targeted sites. These challenges increase costs of infill and brownfield developments and result in delays in developing human settlements in these areas. In an attempt to direct how cities grow, some countries have developed and implemented tools (such as incentives and disincentives) to promote the development of infill, including: (MRSC, 1997)

- Implementing a parcel assembly programme and strategic land banking;
- Considering tax incentives and disincentives to promote infill housing;
- Adopting infrastructure strategies that support development in infill areas;
- Limiting the supply of land available for development in non-target areas;
- Permitting densities to ensure that infill development is feasible; and
- Assisting infill developers to obtain favourable financing terms.

For the purpose of this discussion, only the first four tools need further explanation.

Implementing a parcel assembly programme and strategic land banking

A city with a current and accessible vacant land inventory can achieve infill development (Tarnay, 2004), but some cities are stifling such developments by failing to maintain inventories of vacant properties (TMRPA, 2005). Cities have to audit the land and identify land ownership and property zoning in order to compile accurate vacant property inventories. These provide developers interested in infill development with the necessary information to be able to purchase the land. Thus, potential developers do not need to initiate the process themselves. Furthermore, land for infill development generally comprises small parcels of land under different ownership. Local authorities can assist infill development by assembling these small, individual parcels of land into larger blocks under common ownership, which can be used immediately or for future use.

Considering tax incentives and disincentives to promote infill housing

Other developing countries have implemented financial incentives to promote infill developments. An example of this is a property tax exemption for a given number of years as an incentive to construct on vacant and city-designated target areas within urban centres. Portland, Oregon offers a ten-year tax abatement for housing of a particular price in designated infill development areas, which has contributed to the affordability and expansion of infill housing (MRSC, 1997). San Jose gives exemptions on construction tax for infill housing within the city's Central Incentive Zone and other development areas (Wheeler, 2002). Another way to encourage infill development is by raising the tax on vacant land, while reducing tax on buildings. Unimproved land thus becomes more expensive and infill developments more attractive. Pittsburg, Pennsylvania has restructured its tax policy and increased tax on unimproved land by more than five times, which has resulted in a significant increase in the level of urban building activity. Although tax exemption may reduce revenue

collections in the short run, it also helps to shape urban growth and increase the tax base in the long run, after the exemption period has elapsed.

Adopting infrastructure strategies that support development in infill areas

Some cities have used public infrastructure investment strategies to direct their future growth by filling basic infrastructure gaps or by upgrading infrastructure where necessary. Examples include investing in basic infrastructure and amenities, such as parks, roads and libraries. This boosts investors' confidence in the potential market and stimulates infill development in the surrounding areas.

Limiting the supply of land available for development in non-target areas

Other cities, such as Washington, have set boundaries for where urban development can take place. The aim is to ensure that land within the developed areas is considered before using outlying areas.

3 Research Methodology

A qualitative approach (secondary information) is used to evaluate the impact of the current land use and other challenges in the public transport and human settlements sectors. Legislative and policy framework on land-use planning, and challenges posed by various legislations, are reviewed. Since density is one of the key factors when determining efficient land use, density levels in South African major cities are considered and compared with those in cities of other developing countries. After analysing the institutional arrangements and challenges relating to housing and transport sectors, the current funding framework for the delivery of housing within the context of human settlements is discussed, including selected grants and their ability to promote densification and efficient land use.

4 Current Challenges in Land Use and the Built Environment

4.1 Legislative and policy framework analysis on land use

Various legislation and policies in South Africa acknowledge the importance of land-use planning, its relationship with transportation planning and housing, and the need for densification. These include the Constitution of South Africa, Act No. 108 of 1996, the Development Facilitation Act (DFA), No. 67 of 1995, the Land Use Management Bill (LUMB) of 2008 later revised to be the Spatial Planning and Land Use Management Bill (SPLUMB) of 2011, and a White Paper on Spatial Planning and Land Use Management (the White paper) of 2001. Land-use management pre-1994 was used primarily to achieve the aims of the apartheid system.⁵ Post-1995 pieces of legislation aim to create integrated urban areas that will transform the segregated construction of the apartheid era.

⁵ This was to maintain spatial segregation by reserving the provision of rights and services for the white minority.

While the DFA has attempted to accelerate land development by introducing principles of equity and efficiency in spatial management, a significant obstacle is the spatial planning system, which consists of an overlay of inherited provincial legislation from the 1980s and national legislation governing informal township establishments from the early 1990s. The problem is further compounded by some provinces and municipalities not adopting the mechanisms available under the DFA and continuing development without adequate land development frameworks, which essentially implies that adherence to national norms and standards is nonexistent. LUMB⁶ seeks to rectify this situation, but its enactment has been delayed, which further exacerbates inappropriate land use and development by these provinces and municipalities. However, the Commission notes the recent development on land-use management with the Department of Rural and Land Reform's publication of a draft SPLUMB for comments (in May 2011). This Bill is intended to replace all pre-1994 legislation on land-use management and development, including the DFA.

The described legislation and policies emphasise the need to improve land-use patterns and integrated planning between land use and transport. The principle of densification and the need to improve planning and coordination are key factors identified to achieve efficiency. The problem remains the effective implementation of the policies and legislation in order to ensure that objectives are met.

4.2 Public transport and spatial form of South African cities

Transport demand and usage in South Africa

The demand for transport is driven by the need for people to reach locations where activities take place, including the workplace, schools, hospitals and clinics. Table 3 provides a breakdown of the main reasons for transport use, by settlement type.

Table3: Purpose for weekday trips, by settlement type (%) in 2003

Settlement type	Percentage of household members naming the trip purpose			
	Education	Shopping	Visiting	Work
Metro	32.8	35.8	28.3	36.6
Urban	37.1	31.5	31.0	31.0
Rural	51.0	23.4	27.0	15.9
SA	40.9	29.9	28.6	27.2

Source: Department of Transport (2003)

The main purpose for undertaking trips on weekdays in South Africa is to attend educational institutions (40.9%). Shopping is the second main reason, particularly for metros (35.8%), as a result of the traditional land-use patterns where commercial centres were separated from the areas where people are housed. However, this is changing in bigger townships, as shopping centres are being built within walking distance of housing.

⁶ The Bill covers the roles and functions of different spheres of government. The national sphere is mainly responsible for establishing norms and standards, enforcing compliance and for capacitating other levels. Through land-use tribunals, the provincial sphere of government considers and decides on all applications and appeals lodged and redirected to it in accordance with this Bill. Through municipal land-use committees, municipalities consider and decide on all applications lodged or redirected to them in terms of this Bill.

Table 4 illustrates the reasons for transport use by gender.

Table 4: Trip purpose by gender (%) in 2003

Trip purpose	Male	Female	Difference
Church	43%	57%	14
Education	51%	49%	2
Looking for work	51%	49%	2
Medical services	42%	58%	16
Other	17%	83%	66
Shops	50%	50%	0
Sport, recreation and entertainment	62%	38%	24
Visiting	50%	50%	0
Welfare offices	50%	50%	0
Work	58%	42%	16

Source: Department of Transport, 2003

Generally, the use of public transport in South Africa differs little between genders, with some exceptions as shown in table 4. Male trips dominate for work and sport, recreation and entertainment, which could be due to the traditional practice of females remaining at home and may be particularly the case in communities with low education levels. Female trips dominate for church and medical services, which could be explained by the fact that females take responsibility for children's health care. Therefore, part of female trips for medical services can be attributed to children.

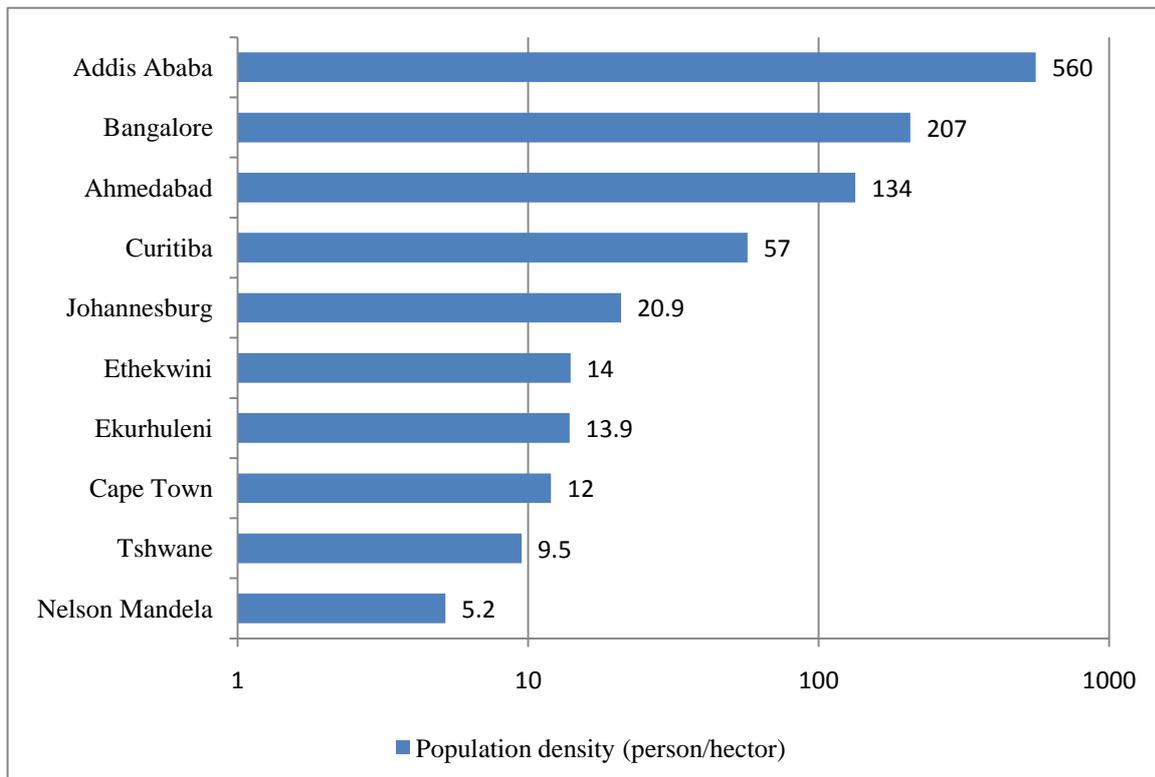
Density and transport costs in South Africa

a) Density level in South African major cities

In general, South African cities have comparatively low settlement densities,⁷ and relatively low density levels when measured in terms of the number of people per hectare. The densest city in South Africa is Johannesburg, which has a population density of 20.9 people per hectare, followed by eThekweni, with 14.0 people per hectare. As Figure 1 shows, these levels of density are relatively low when compared with other cities in the developing world, such as Addis Ababa, Bangalore, Ahmedabad and Curitiba that have density levels of 560, 207, 134 and 57 people per hectare respectively.

⁷ Density can be measured in a variety of ways, including population density (number of people per hectare), dwelling unit density (number of dwelling units per hectare) and building density (ratio of total floor area of building to the corresponding site). In this chapter people per hectare is used.

Figure1: Population density in South African major cities and other cities in developing countries



Source: Palmer Development Group, 2011

Low population density has, among other things, two disadvantages. The first one is the high consumption of land, as low density levels increase the per capita cost of land infrastructure and services and, to some extent, also limits social interaction. The second is the high demand for movement across the city and long trips undertaken by people to access important amenities, which results in loss of time and higher spending on public transport, especially for the poor. Densification in South Africa has tended to drift towards peripheral areas of the urban core and has taken place without the consideration of public transport.⁸ However, a densification strategy should be aligned with public transport plans. For example, the city Curitiba in Brazil encourages higher densification and mixed-use developments along its bus rapid transit (BRT) routes.⁹ Similarly, the government of India is making considerable investments in transport infrastructure through its National Urban Transport Policy (2006), to ensure safe, affordable, reliable and sustainable access for urban residents to their workplace and other services.

Apart from the legacy of apartheid and its policies and objectives, other reasons for the low density in cities include a lack of emphasis on redevelopment and regeneration, the continued location of low-cost housing in outlying areas, a lack of incentives for infill developments,

⁸ Settlement Planning and Dlodla Development cc. 2008. *Densification Framework: Status Quo*. Analysis and Findings Document Prepared for Ekurhuleni Metropolitan Municipality. Available online: www.ekurhuleni.gov.za. Accessed 21 May 2011. .

⁹ See Magalhães, F. 2009. Low carbon cities: Curitiba and Brasilia. Inter-American Development Bank National Urban Policies. *Urban Forum*, Vol. 20, 157-174

uncoordinated development and funding instruments that promote single-house developments.

The legislative and policy framework is clear about the direction that South African major cities need to take for efficient land use and densification. However, the current low-cost housing delivery system in South Africa reinforces the delivery of single-house and greenfields developments, which is contrary to the principle of densification. This is mainly because of the high costs associated with infill and brownfield developments (as international experience shows) and because land parcels tend not to be owned by the government. For example, although Tshwane has identified land for infill and brownfield developments in its 2010 and Beyond Spatial Development Strategy (City of Tshwane Metropolitan Municipality, 2007), the land is owned mostly by the private sector and Transnet. Other cities in South Africa, such as Ekurhuleni, have also identified areas for infill and brownfield development purposes.¹⁰ To help accelerate the development of these parcels of land, cities need to provide incentives, such as developmental charges and the Neighbourhood Development Partnership Grant (NDPG).

Housing typology plays a key role in efficient land use and improving density level. However, instead of considering high-rise and low-rise apartments, the government has focused on the delivery of low-cost housing mainly in the form of single, detached housing systems, with most low-cost housing projects being delivered on the outskirts of cities. To encourage infill and brownfield developments, the subsidy funding models needs to recognise that two and three-storey buildings are relatively expensive compared to normal low-cost housing and provide incentives for developers who are prepared to consider low-cost high-rise developments.

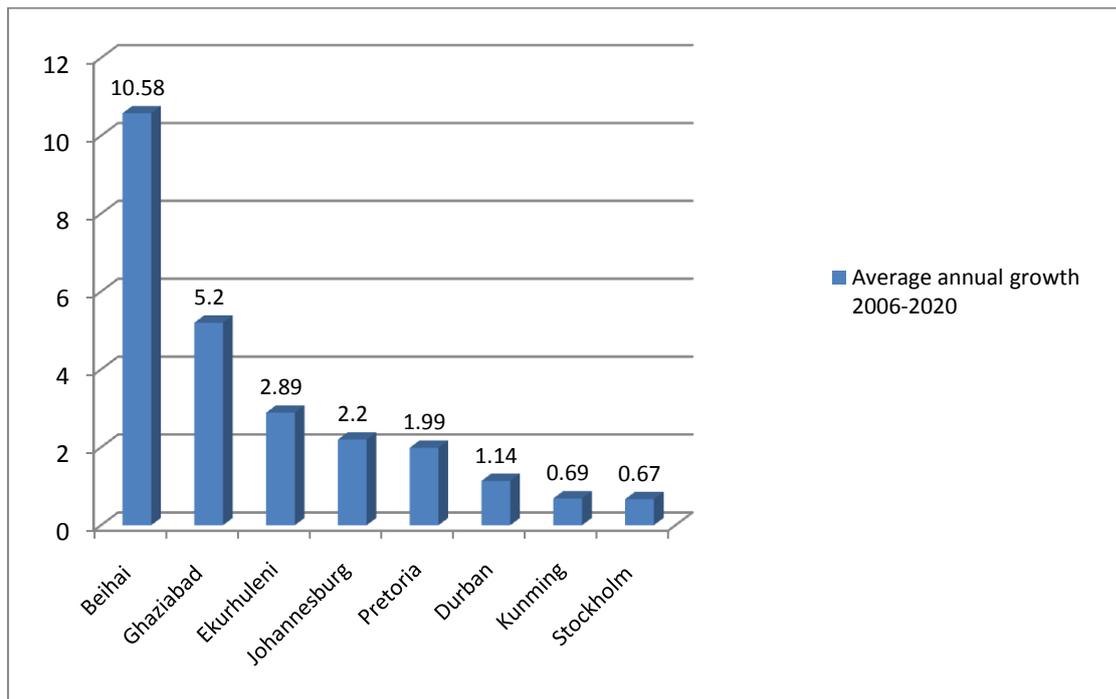
Furthermore, the manner in which infrastructure decisions, planning and investment have been undertaken by various departments and sectors (see Box 1) has contributed to low density levels. Infrastructure investment plans and decisions have been taken by different sectors aiming to achieve their own objectives, without taking into account how such decisions affect or reinforce other sectors' plans and projects.

b) Urban growth in South Africa

The low density level in South African cities should be understood and analysed within the context of urban growth and within the different areas of cities where this growth occurs. Urban growth remains a challenge in major South African cities. Municipalities have to position themselves to face this challenge and develop strategies to overcome it. If the current land-use pattern challenges are not addressed effectively, the trend will continue. This will result in further unfavourable spatial patterns and economic marginalisation of a larger part of the urban population. Figure 2 shows that South African cities are among the world cities that are experiencing high population growth, which is expected to continue until 2020 (City Mayors Foundation, 2006).

¹⁰ For example Germiston, Boksburg, Benoni and Springs CBD, as contained in Ekurhuleni 2010 Spatial Development Framework.

Figure 2: Comparison of cities' annual growth, 2006–2020 (%)



Source: The City Mayor Foundation (2006)

Beihai (China) and Ghaziabad (India) are expected to be the world's fastest-growing cities in terms of population, with average annual growths of 10.58% and 5.20% respectively between 2006 and 2020. Although not at the top of the list, South African cities are also expected to experience population growth. Ekurhuleni is ranked the 57th fastest-growing city, with an average annual growth of 2.89%, while Johannesburg, Pretoria and Durban are expected to experience population growth of 2.20%, 1.99% and 1.14% respectively. Cities expected to experience lower population growth during this period are Kunming (China) and Stockholm (Sweden), with an average growth of less than 1%.

Population growth in South African major cities is driven mainly by rural–urban migration, which occurs within and between provinces, and natural population growth. Table 5 shows migration patterns in South Africa.

Table 5: Urbanisation in South African major cities

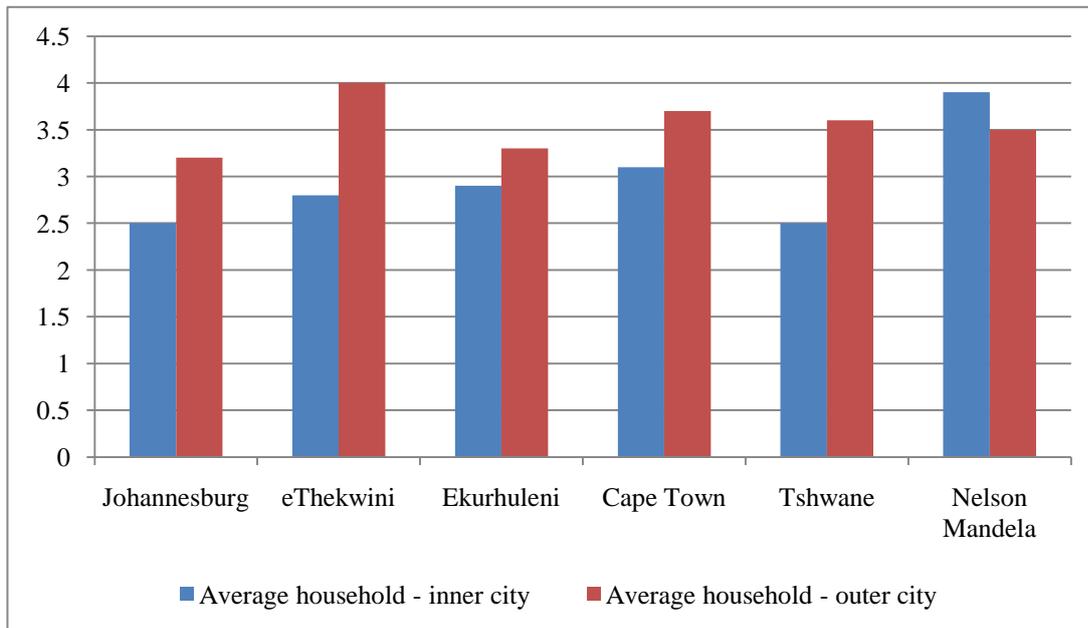
Municipality	Born within the province	From other provinces	From outside SA	Total population	Percentage from outside SA
Buffalo City	664,425	37,504	7,916	713,502	1.1
Nelson Mandela Bay	946,283	68,779	15,947	1,033,211	1.5
Mangaung	634,631	85,758	16,705	737,937	2.3
Ekurhuleni	1,584,379	974,466	136,479	2,702,149	5.1
Johannesburg	2,263,117	1,262,616	304,353	3,842,383	8.0
Tshwane	1,035,860	1,171,132	79,031	2,301,294	3.4
eThekweni	3,095,817	272,320	58,577	3,433,271	1.7
Polokwane	508,086	32,465	5,762	547,200	1.1
Cape Town	2,357,758	937,457	139,392	3,445,105	4.1

Data source: Statistics South Africa, Community Survey, 2007

The contribution to urbanisation of people coming from outside South Africa is relatively low compared with rural–urban migration within and between provinces. However, it is unclear whether the leading driver is rural–urban migration or natural population growth.

Despite the level of urbanisation, densities are surprisingly low in South African major cities. An explanation is that people migrating to urban areas in South Africa are mostly poor, and are pushed away from the city centres to the city peripheries. As a result, population densities are typically low within the central business districts (CBDs) but increase on the city outskirts, as illustrated in Figure 3. Generally, the inner-city average household size is far lower than the outer parts of the cities (the only exception is Nelson Mandela Bay municipality). This means that more people reside in the outer parts of cities, which affects the level of commuting and spending by both households and the government. However, the decreasing densities from the centre are not a true reflection of consumers' choice, but rather the result of other factors, including regulations practices and the low-cost housing delivery model. The informal settlements sector has demonstrated that densities decrease with distance, as households prefer to reside closer to the areas where they work, to reduce the burden of public transport costs. Lower densities closer to the CBDs and higher densities on the city peripheries represent the formal housing sector.

Figure 3: Variations in household size between inner and outer cities



Data source: Development Bank of Southern Africa (2007)

In South African cities, low densities have been shown to affect the viability and sustainability of public transport. However, the government has invested in BRT as a way of improving public transport in cities, which provides an opportunity to improve land-use patterns. Cities therefore need to plan efficiently how to use the land around these routes more intensively for developments of higher densities. For this, co-ordination between public transport and human settlements is crucial.

Household and government spending on transport

The current urban form in South Africa directly affects the costs of transportation and accessibility, especially for the poor. Over recent years, spending by households on transport has more than doubled, from 4% in 1995/96 to 10.6% in 2005/06 (Stats SA, 2008). The cost of public transport and the distances involved prevent the poor from taking full advantage of opportunities offered by cities, and such exclusion contributes to high unemployment rates. For those who are employed, the result is both a loss of productivity and low saving rates, as the cost of transport constitutes a form of regressive tax on earnings. The inability of low-income group households to access cities means that the current land-use pattern is partly responsible for the income gaps that exist between the poor and the middle and higher classes. If not addressed, these gaps will continue to widen. Spending on public transport is currently above the national objective, exceeding 10% of households' disposable income. Table 6 shows the percentage of household income spent on public transport in relation to monthly household income.¹¹

¹¹ The amounts denoting the different bands have increased as a result of inflation. However, the high proportion of household income spent on public transport among lower income households continues.

Table 6: Percentage of monthly household income spent on public transport, 2001

Monthly household income	Percentage of households				
	0%	1–5%	6–10%	11–20%	>20%
< R500	20.8	0.0	24.5	5.8	49.0
R501–R1,000	14.1	33.5	20.9	13.2	18.3
R1,001– R3,000	15.1	28.8	24.0	22.0	10.1
R3,001–R6,000	32.5	35.4	18.6	10.7	2.8
> R6000	68.8	23.8	5.4	1.9	0.0

Source: Department of Transport (2003)¹²

Approximately half of the lowest income band and over 18% of the second-lowest band spend in excess of 20% of their disposable income on public transport. The South African urban transport system is performing relatively poor against the overall national objective that commuting distance should not exceed 40 km and commuting time should not exceed one hour. The reasons for this include:

a) Long distances that households have to travel

The widely dispersed form and low density of South African cities have resulted in long and expensive trips. People have to commute from their residential areas to work in the cities and access other important amenities. In some cases, people reside as far as 50–100 km from their place of work, for example former KwaNdebele is located 100 km from Pretoria, while Botshabelo is 50 km from Bloemfontein. Reducing travel will save time and money for households and fiscal resources that are currently used for subsidies.

b) Low density to make mass transportation viable

In South African major cities, low density directly affects the volume of public transport users and the frequency and viability of mass public transport modes. It also contributes to high public transport costs and high household expenditure on public transport. When investing in mass public transport, density needs to be considered. For example, according to the National Rail Plan, passenger numbers of 20,000–30,000 per hour are required for the rail transport system to be viable.

c) Lack of choice on the modes of transport

The lack of choice is also related to the issue of viability. Low densities for bus and rail transport modes have resulted in under-served communities, and the taxi transport mode has taken advantage of this opportunity. As taxis are the only means of transportation available to serve some communities, users have no other alternative. Taxis are currently the dominant mode of public transport in South Africa, and fares are high compared with bus and rail.

d) Current design of the public transport subsidy system

Household spending on public transport is high despite the government's efforts to reduce the burden by providing subsidised bus and passenger rail services, which costs the fiscus over

¹² Department of Transport. 2003. *South African National Household Travel Survey*.

R5 billion per annum. Compounding the current design of these subsidies are the current land-use patterns and the location of low-cost housing on the urban peripheries,¹³ and so households continue to spend a high percentage of their disposable income on public transport.

4.3 Institutional challenges within transport and housing

The coordination between the spheres of government responsible for different modes of public transport is one of the institutional issues that need to be addressed. This has given rise to inefficient use of space and resources. For example, a lack of coordination has resulted in some BRT routes (managed by the cities) directly competing with passenger rail routes (managed by the Passenger Rail Agency of South Africa or PRASA), as these routes run parallel to each other.¹⁴ This challenge is associated with uncoordinated investment decisions within the public transport sector and may have negative implications on the long-term sustainability of modes of transport, especially as densities are relatively low to sustain public transport in South African major cities. If not addressed, this low density may be costly and could lead further to underutilisation of services in the bus and rail modes.

According to the Constitution, housing is clearly a concurrent function between the national and provincial governments. The Constitution also provides for the national and provincial governments to assign administration functions to municipalities when:

- (a) The function would be administered more effectively at the municipality level; and
- (b) The municipality has the capacity to administer such a function.

The Housing Act, No. 107 of 1997 also makes provision for municipalities with adequate capacity to be accredited¹⁵ with the housing function.

The outcome of all these pieces of legislation is that the housing delivery and development function rests with higher spheres of the government, while municipalities are responsible for the actual delivery of housing and other complementary services, such as water and sanitation. Municipalities are also responsible for the overall Integrated Development Plan (IDP). However, government policy has started to recognise the centrality of municipalities in the provision and management of housing. New developments in this regard include the accreditation of cities to manage the overall planning and delivery of public human settlements. Such accreditation will result in a more-integrated system of housing delivery.

¹³ Public transport subsidies are only available to users who buy weekly and monthly tickets for formal routes on both bus and rail subsidised modes. These two modes of public transport currently subsidised have a combined market share of 37%, whereas the taxi mode has a market share of 63%. The taxi mode does not receive any form of operating subsidies. This issue will be a project on its own in the next research cycle.

¹⁴ See a study by the Financial and Fiscal Commission, 2010, where, for example, the proposed PRASA rail project from the Cape Town airport to the CBD runs parallel to the BRT route.

¹⁵ Accreditation of a municipality, especially at level 3, is advantageous because it allows a municipality to administer any national housing programme within its jurisdiction. This includes receiving, evaluating and approving or disapproving applications for subsidies. Furthermore, a municipality with level 3 accreditation would be able to receive its transfer directly from national government, effectively removing the provincial sphere from the equation. This improves planning as well as implementation, and eliminates delays in the disbursement of funding.

Recent developments in the transport sector include devolving public transport function to the cities, as provided for by the National Land Transport Act (NLTA), No. 5 of 2009.

Although devolving some functions to the cities is desirable for better coordination and planning, some risks are involved, such as simply transferring existing problems at a sectoral level or within a particular sphere of government to the cities. For example, accrediting cities to undertake the overall human settlements function will not result in much improvement unless the present funding and capacity challenges within the current framework and land-issue problems are first resolved. This implies that various issues need to be resolved within the entire and fiscal intergovernmental relations in order to improve the human settlements delivery system.

The challenge of transforming the spatial form of South African cities is greater than the institutional coordination failure and legislative gap and is complicated by an urgent need to address housing and other basic services backlogs. A focus on eradicating backlogs has to some extent entrenched the apartheid city form and reflects path dependency, as the government with limited resources could choose either to channel funding to address historical backlogs or to attempt to change the spatial city form.

4.4 Funding issues

Two key challenges are highlighted in this section: the housing subsidy design and the overall funding of the built environment.

(a) The housing subsidy design

One of the major problems is the current public housing subsidy system, which focuses on direct state provision of housing. In so doing, the system fails to leverage private finance and end-user contributions for housing delivery. The focus on the mass provision of fully-subsidised housing units has also constrained consumers' choice and often leads to sub-optimal output. Furthermore, there has been a lack of focus on key issues such as resolving administrative problems associated with land release and tenure security. In most cases the trade-off has been between the larger stands in distant location, where land is cheaper, and smaller lots, which are normally of poor quality and relatively more expensive, but located closer to economic opportunities.

The location of human settlements and important amenities determines transport costs and expenditure incurred by households. The fact that poor households choose to live in informal settlements, slums and backyard dwellings is an indication that they are prepared to accept poor quality housing closer to economic opportunities. Therefore, if given a choice, they would choose for their houses to be built closer to the jobs. However, the current system does not allow such choice. The only remedy to the distortion in city shape caused by large subsidised housing programmes is to make subsidies 'portable' and to let low income households make their own trade-offs between land-use standards, transport costs and location. An example of a portable subsidy is creating a 'housing account' at an existing bank institution, to which qualifying households can also contribute, based on income level. The account would be interest-bearing and tax-free and offer the consumer a choice of when and where to use the subsidy.

The current funding for human settlements has also contributed to the peripheral location of low-cost housing and does not promote densification. The funding grant does not incentivise infill and brownfield developments, but is designed to provide a complete housing product on cheaper peripheral locations. It fails to recognise that the biggest challenge is access to well-located land and providing subsidy amounts sufficient to build settlements with optimum densities that will eventually offset higher land costs. Other cities have achieved higher densification through infill and brownfield developments using incentives/disincentives that the South African system lacks.

(b) Funding for the built environment

There are a number of sectoral grants within the built environment, which are currently administered by different spheres of government and departments, see Box 1 for examples.

Box 1: Conditional Grants in the Built Environment

Integrated housing and human settlements development grant. Administered by the Department of Human Settlements, its purpose is to provide funding for creating sustainable human settlements, while the urban settlements development grant (USDG) is allocated to metropolitan municipalities to supplement their capital budgets. It is intended to fund the provision of basic municipal services to new housing projects.

Municipal infrastructure grant (MIG cities/urban development grant). Administered by the Department of Cooperative Governance, its purpose is to provide specific capital finance to address basic municipal infrastructure backlogs for poor households, micro enterprises and social institutions serving poor communities.

Integrated national electrification grant. Administered by the Department of Energy, it is aimed at the provision of electrification of residential dwellings, the installation of bulk infrastructure, rehabilitation and refurbishment of electricity infrastructure in order to improve the quality of supply.

Regional bulk infrastructure grant. Administered by the Department of Water Affairs, its purpose is for the development of regional bulk infrastructure for water supply.

Public transport infrastructure and systems grant. Administered by the National Department of Transport, it is intended for accelerated planning, construction and improvement of public and non-motorised transport networks.

Neighbourhood development partnership grant. Administered by the National Treasury, its purpose is to support neighbourhood development projects that provide community infrastructure and create the platform for other public and private partnerships.

The common purpose of these grants is to provide sustainable human settlements with the necessary basic infrastructure. For example, sustainable human settlements should have water and sanitation services, and roads and electricity among other things. The challenge lies not in the funding itself (as shown by the variety of grants) but in the lack of coordination.

Some recent positive developments within the funding framework include the introduction of an urban settlements development grant (USDG),¹⁶ which supplements metropolitan

¹⁶ The USDG is the result of merging the MIG cities grant and the internal infrastructure portion of the provincial human settlements development grant.

municipalities' capital budgets for the development of sustainable human settlements, and the shifting of the sanitation function to the Department of Human Settlements (South Africa, 2010). These developments are positive for the alignment of grants and improved coordination in the delivery of human settlements. However, it is only the beginning of the process, as a number of grants still need to be aligned. Currently, there is a lack of strategic or operational relationship between infrastructure transfers, housing subsidies and other grants/subsidies including the one for public transport investment, which is an issue that the Commission highlighted in 2005 (see Box 2).

Box 2: Lack of Coordination and Alignment in the Funding for the Built Environment

The lack of coordination in funding for the built environment is not a new issue, as it was raised by the Commission in 2005. Subsequently a recommendation relating to this issue was made to consider linking new housing subsidies with the MIG. Government accepted this recommendation, although it was also noted that the MIG does not only target new housing. The FFC, however, is still of the view that this should be done, at least for new human settlements developments.

This lack of relationship is reflected in the continued fragmentation of infrastructure-related transfers across different sectors, which leads to delays in infrastructure provision. One practical example of the effect of this lack of coordination is the delay in the provision of human settlements due to unavailability of bulk infrastructure (Sexwale, 2010).

5 Recommendations

The current land-use pattern in South Africa has resulted in a number of challenges for transport and human settlements sectors. These challenges include:

- overcoming the legacy of apartheid and its policies;
- legislative gaps;
- poorly located low-cost housing and low densities, leading to extensive commuting;
- high transport costs; and
- unsustainable and inefficient public transport.

These challenges have in turn resulted in higher government spending in the form of public transport operating subsidies. The current funding framework for the built environment is highly fragmented. This results in uncoordinated infrastructure investment plans that compromise or delay service delivery. The current human settlements funding does not support density or allow beneficiaries to have choices. Although other developing countries have used fiscal and financial incentives to achieve higher levels of density, South Africa lacks such incentives.

From the above analysis, the following recommendations are made:

- a. The government should actively pursue the development of a more spatially compact urban form for South African cities by adopting appropriate policies

and financing instruments. Specific fiscal instruments that can support these objectives include wider use of development charges in financing infrastructure associated with the land development process; public transport subsidies that specifically target high-density low-income areas; and fiscal incentives for urban land development projects that occur within the existing urban form.

- b. The government should improve the alignment of other funding instruments in the built environment, specifically the Integrated Housing and Human Settlements Grant, with other conditional grants that make human settlements complete.
- c. To address the problem of uncoordinated planning and decision-making in silos, inter-sectoral infrastructure investments, planning and development projects should be coordinated to ensure an integrated service delivery. This could easily be implemented by designing institutional arrangements that would allow municipalities to fulfill their entire municipal planning and coordinating role.
- d. Municipalities working with the Housing Development Agency should develop, maintain and update land information systems and databases within their areas of jurisdiction. This information should be publicly available.
- e. The infrastructure grant should be used as a tool to guide, direct and shape future city and regional development and should prioritise designated areas. The existing Neighbourhood Development and Partnership grant can be linked to targeted infill developments in major cities.
- f. Underutilisation of land or keeping land undeveloped should be discouraged through levying higher municipal taxes. Developmental charges could be used to enforce this.
- g. Cities should be more prescriptive on density, which should be included in their spatial development plans. Density is a key issue for efficient land use, and yet cities have done little to develop specific guidelines and prescriptions on density, which public transport and various legislation and policies seek to promote.

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