INFRASTRUCTURE ASSESSMENT AS A MECHANISM TO ENHANCE SPATIAL AND STRATEGIC PLANNING AND DECISION MAKING IN DETERMINING DEVELOPMENT PRIORITIES WITHIN URBAN AREAS IN DEVELOPING COUNTRIES

I.M. SCHOEMAN
North-West University, Potchefstroom Campus, South Africa

ABSTRACT

The inherited spatial, land use and transportation form in developing countries represent various challenges in addressing effectiveness and efficiency in attaining resilience and sustainability goals and objectives for urban development. Addressing development and growth in spatial systems within urban areas in developing countries are too often guided and determined by political preferences of decision makers. This practice is applied notwithstanding the existence of planning instruments in developing countries to guide decision making in a technical and accountable preferred practice.

Priorities for development in such countries is thus determined subjectively notwithstanding the variety of needs to be addressed with restricted resources for development capital as well as allocation of funding for maintenance and operational practices related to infrastructure and transportation systems. Socio-economic realities complicate decision making further.

The objective of this paper is to demonstrate the use of modelling tools to guide strategic planning and decision making in determining development priorities in urban areas within developing countries. It will consider components such as spatial and land use planning and development realities; infrastructural input and needs; application of standards and a prioritisation approach towards optimal development and application of best practices.

Keywords: development assessment, modelling, needs prioritisation, Spatial and urban form, transportation

1 INTRODUCTION

Land use and transportation in developing countries are directly related to its founding spatial system development realities that are in many cases dependent on its historical colonial spatial form, linkages and external influences. In this context, the origins of urban spatial structure and transportation systems in many developing countries have been influenced by specific geographical and agricultural development forces and in many cases due to commercial exploitation of its natural and mineral resources. The resulting urban and regional form in many cases focussed on political agendas underlying regional, urban, transportation planning and development. In most cases the impact of environmental and socio-economic forces was not considered in an integrated fashion due to ad hoc decision making by political decision makers. Such decision making were mainly guided by the preferred needs of developers and not by preferences of the electorate and needs of population and communities in developing such spatial systems. With the process of de-colonialism that followed independence in some developing countries, the core planning challenge was spatial transformation through several planning instruments such as spatial development plans; land use management systems; transportation plans; infrastructure development plans underpinned by strategic planning that were introduced in many cases in an ad hoc fashion due to ongoing political agendas.

The need to align, integrate preferred spatial development orientated planning instruments may be enhanced through development of transformative spatial development modelling

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instruments to promote, guide and integrate planning and decision making in a democratic way that will result in fair and justifiable decision making that will be sustainable and resilient. Articulation of potential, needs and priorities in the case of developing countries needs to be accountable towards future generations. It will assist spatial and transportation planning and development in an endeavour to capacitate decision makers in an accountable fashion by promoting effective and efficient development decision making that is socially, economically and politically accountable towards present and future generations.

2 SPATIAL AND TRANSPORTATION MODELLING

Land use and spatial development is based on accessibility, density, location of workplaces, floor space provision, prices and related location determinants. From the work of Waddell [1] follows that theoretical integrated transportation and land use models are in practice not reliable and easy to use (i.e. also not transparent) due to a lack of staff capacity understanding such models, how it works, how to apply it and why. This statement is even more applicable to developing countries with their huge lack of specialised human capacity. Figs. 1 and 2 provide more information on land-use and transport interaction.

Schoeman [3] assess, integrate and articulate the South African transport interfaces between different spatial strategic instruments and formulates KPIs for application in strategic planning instruments guiding transportation planning in RSA. The author further in [4] links transportation targets identified in South-African's different strategic instruments to measurable and comparable annual targets applicable to the local municipality sphere of government.

3 DEVELOPMENT FOCUSES AND APPROACHES

3.1 National development is guided by policies and legislative frameworks

In South-Africa the National Development Plan (NDP) [5] identifies a set of national development priorities and targets inclusive of prosperity, equality, economic growth and employment attributes. In development the legal framework is facilitated by the Spatial Planning and Land Use Management Act (SPLUMA) [6] and the supporting policy framework contained in the Integrated Urban Development Framework (IUDF) [7]. The National Spatial Development Framework (NSDF Final Draft) [8] guides and informs decision making for land use

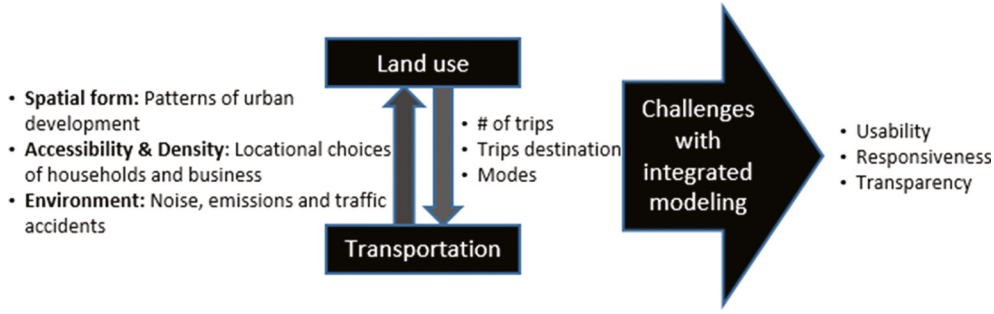

Figure 1: The interaction and challenges between spatial and transportation modelling (Source: Own construction using [1]).

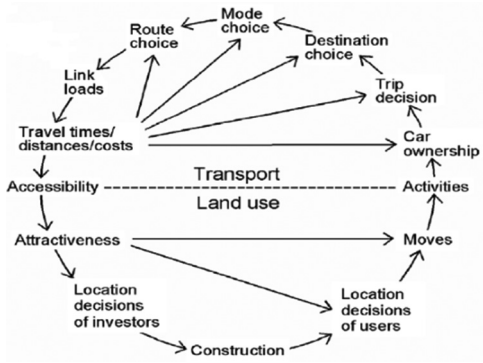

Figure 2: The spatial-transport interface cycle (Source: Wegener & Fürst [2]).

planning and development for the national as well as other spheres of government. The NSDF [8] outlines specific arrangements for prioritising, mobilising, sequencing and implementing public and private infrastructural and land development investment in identifying priority spatial restructuring areas provided for in the framework. National spatial development priorities are informed by challenges and trends, objectives and gaps in addressing spatial development, vision, objectives and the spatial status quo. The priorities direct spatial restructuring by identifying developmental interventions in national, regional and local spaces and priorities and preferences for spatial restructuring and development in facilitating accelerated spatial transformation.

The NSDF (2018) thus endeavours to direct, guide and align:

- all infrastructure investment and development spending decisions by national sector departments;
- planning, budgeting and implementation across all spheres and between sectors of government.

The NSDF ([8], p. 177) thus requires the development of a monitoring and evaluation framework which will engage all three spheres of government.

3.2 Local development

Local development is directed by the specific legislation and policies. For further information on this consider sources of Department of Planning, Monitoring and Evaluation (DPME) [9,10].

Section 26(e) in Local Government Municipal Structure Act (MSA) no. 32 of 2000 [11] state that all municipalities must compile a Spatial Development Framework (SDF) which direct and coordinate development within municipalities and prescribes that each municipality has to formulate an annual strategic municipal development plan (SMDP) to direct decisions, development programmes and budgets. Section 25 in the MSA [11] requires Integrated Development Plans (IDP) for each municipality to be formulated to achieve aligned planning with bordering municipalities (inclusive of Integrated Transport Plans and Performance Management Frameworks), organs of state as well as provincial and national legislation and policies.

The DPME [9] core responsibility is monitoring planning between the plans and programmes and evaluation of planning instruments within the three spheres of government. The DPME [9]

states that the weaknesses in planning and development is due to a lack of alignment between plans and budgets; the absence of clarity on the powers and functions of the DPME and absence of prioritisation within government's plans and actions. The Municipal Finance Management Act (MFMA) no. 53 of 2003 [12] encourages the allocation of resources in line with strategic priorities. Furthermore, it also links plans and budgets in achieving sustainable and financial goals (Section 21 of the Act). The Guidelines for Infrastructure Asset Management in Local Government (2006–2009) [13] suggest annual updated Infrastructure Asset Management Plan (IAMP) for each municipality that must include information on different sectors (such as roads etc.); priorities and needs; levels of service (LOS); future demand; capital works and funding plans. Unfortunately, these annual updated IAMP and SMDP are still not a reality in 2019.

Furthermore, it is noted that cross-sector issues (in support of disadvantaged South Africans) and priorities are considered in the Comprehensive Municipal Infrastructure Plan (CMIP) which presents a complete long-term plan for the municipality's infrastructure assets (key issues and strategic options). The CMIP fund the provision of new services, the upgrading of a service lower than basic levels to a basic level of service and special (adverse geotechnical, environmental and geo-hydrological) cases.

3.2.1 Categories and functionality of municipalities

Municipalities are categorised in the Municipal Infrastructure Investment Framework (MIIF) [14] in the following categories: A = Cities or Metros (6), B1 = Secondary Cities (19) with an average municipality population of 438,540; B2 = Large Towns (26) (average municipality population of 182,786); B3 = Small Towns (101) (average municipality population of 81,701); B4 = Municipalities in rural areas (59) (average municipality population of 205,458), C1 = district municipalities that are not water services providers and generally have few service delivery functions (23), C2 = district municipalities that are water services providers and often have substantial obligations (21). District municipalities have also taken over the responsibility for supplying water and sanitation in certain municipal areas.

Stats SA [15] states that Category A municipalities accommodated 40% of South Africa's population in 2016 but were responsible for 56% of total expenditure. Category B4 municipalities accommodated 24% of the national population, but invested only 6% of the total municipal budget. Eskom provides electricity directly to 94% rural municipal areas without such municipalities' contribution to expenditure for electricity infrastructure development, distribution and maintenance in such areas.

Table 1 provides information on the different infrastructure competencies of municipalities as in 2018.

In 2014 the South African municipality's functionality (in terms of the five basics inclusive of political stability, governance, service delivery, financial & institutional management and community satisfaction) were classified by COGTA [17] into four categories: top performance 7% (performance above average, basics correct and innovative); reasonable performance 30% (basics complies but still have much to do); middle performance 32% (almost dysfunctional and need assistance to get the basics correct) and the dysfunctional municipalities with bottom performance 31% (performance unacceptable, corruption, negative audits, poor service delivery, no community engagement). Furthermore, it is concluded that dysfunctional municipalities and its continuous negative outcome and lack of service delivery were the product of corruption, councils which did not work, a lack of structured community engagement, poor financial management standards and political management of municipalities.

Table 1: The percentage of municipalities performing infrastructure functions (Source: Municipal demarcation board [16]).

	B1	B2	B3	B4	C1	C2	Total
Electricity	100%	96%	92%	44%	0%	40%	78%
Housing	83%	62%	47%	26%	–	–	47%
Municipal public transport	57%	17%	19%	35%	17%	40%	28%
Municipal roads	78%	73%	63%	67%	–	–	67%
Sanitation	95%	71%	74%	30%	0%	81%	66%
Solid waste	100%	100%	96%	91%	25%	25%	93%
Storm water management	67%	71%	73%	87%	–	–	76%
Water	100%	89%	89%	100%	25%	95%	91%

Department of Public Works [18] states that Category B municipalities do not have asset management plans, maintenance budgets, lack capacity, and their leadership does not regard maintenance to be essential.

Note that the municipality boundaries were amended in 2005, 2011 and 2016 which make it difficult to build up historical data for such municipalities.

3.2.2 Financial support for local development

The different grants each municipality receives need to be consolidated. There are various development grants for which municipalities may apply for:

- Rural Roads Asset Management Grant;
- Rural Households Infrastructure Grant;
- Intermediate cities: Integrated Urban Development Grant;
- Integrated Cities Development Grant;
- Neighbourhood Development Partnership Grant;
- Integrated National Electrification Programme (municipalities);
- Municipal Water Infrastructure Grant;
- Regional Bulk Infrastructure Grant;
- Public Transport Infrastructure and Systems Grant;
- Urbans Settlements Development Grant;
- Municipal Infrastructure Grant (MIG).

The MIG (introduced in 2004) facilitates budget, planning, operational and financial management of infrastructure investment, development and modernisation. It forms part of the responsibility of the Municipal Manager as pointed out by DPLG (2006) [19]. Underspending in MIG projects leads to inefficient service delivery.

COGTA [20] concludes that this underspending is due to:

- Lack of an independent Project Management Units;
- Time frames that was not met;
- Poorly functioning intergovernmental relations (lack of alignment between national, provincial and municipal priorities);

- Procurement plans not being adhered to;
- Incompetent appointed service providers;
- Lack of community involvement;
- Lack of clear-cut MIG policies (limited legislative to prevent municipalities from changing commitments, especially in the year of implementation);
- High staff turnover rates;
- Lack of monitoring and reporting.

No MIG funds may be spent outside the framework of a municipality's pre-existing Integrated Development Plan (IDP) and approved budget. The IDP focuses on the provision of basic package services to the poor; appropriate services levels; financial sustainability and the presence of adequate organisational capacity. MIG policies are not always clear, or shielded from political influence and pressure. MIG projects are aimed at households that earn R2,400/month or less and focussing on the poor in communities.

For prioritised projects local municipalities may distribute MIG allocations as follows:

0.54 Sanitation + **0.17** (Roads and storm water) + **0.04** (Refuse removal & street lighting) + **0.15** (community facilities and centres, sport facilities, social services, emergency services, parks, open spaces and public transport) + **0.05** (new and rehabilitation of social institutions) + **0.05** (urban renewal and rural development of nodal municipalities) + (past performance constant).

3.2.3 Backlogs

Figure 3 illustrates a decline in the backlogs. In the last decade the decline in backlogs were 12% for sanitation, 10% for electricity in home, 5% for water in home, 4% for formal dwelling (i.e. structure built according to approved plans with/without running water and/or flush toilet within the dwelling) and for no formal refuse removal (i.e. refuse is not removed by the local authorities) 3%. Table 2 provides a summary of the different backlogs per municipality category in 2009. The minimum LOS recommends residential roads with all-weather access within 500m of a dwelling (COGTA [21]). Note that Fig. 3 does not contain any data on road infrastructure that is due to the fact that Stats SA does not consider road accessibility as an

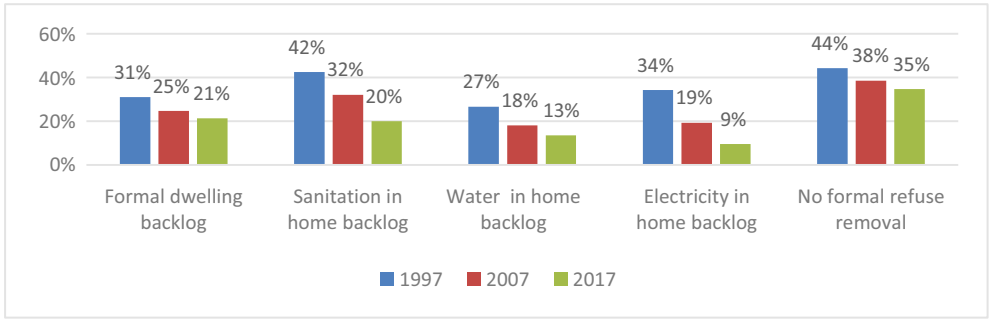

Figure 3: The backlogs as a percentage of the number of households (Source: Own construction using Stats SA data on the Regional Explorer platform [22]).

important infrastructure service, therefore it is also not included in Stats SA's Service Delivery Index or Infrastructure Quality Index.

Table 2 shows higher than average backlog values. It is deduced that the highest backlog values are in the category B4 and B3 municipalities. Funds will not solve the problems in these Category B4 and B3 municipalities since it is concluded that the cause of these backlogs are due to soft issues like lack of management and staff capacity [18].

4 DETERMINING DEVELOPMENT PRIORITIES

Waddell [1] states that models which predict the future dependent on uncertain input variables, therefore policy-makers must know which uncertain inputs were used in the modelling process that inform their decisions. The IUDF [7] states that one of the key challenges at local sphere of government include the assessment and monitoring of municipal performance. However, currently monitoring is unsuccessful due to inadequate analytical capacity to generate real insight into actual performance and risk management.

4.1 International Development Priorities

In 1996 the UN-Habitat developed the City Development Index [23] which assesses well-being and access to facilities by urban residents in considering the factors of infrastructure, waste, health, education and city product. It includes the following measures:

Infrastructure = 0.25 Water connection; + 0.25 Electricity; + 0.25 Sewerage; + 0.25 Telephone; Waste = 0.5 (Wastewater treated); + 0.5 (Formal solid waste disposal).

4.2 National Development priorities

Table 3 lists the 20 municipalities in South Africa with the highest backlogs (in terms of number of households) in 2017 for the different categories of infrastructure. It illustrates that Madibeng municipality has a formal housing backlog of 69,907; sanitation backlog is

Table 2: Backlogs per municipality category in 2009 (Source: Own construction from MIIF [14]).

				Road length per household per metres			Refuse removal			
Backlog	Water	Sanitation	Electricity	Paved	Paved and gravel	Paved, gravel & earth surfaced roads	Curb side removal	Own refuse dump	Communal dumping site	No rubbish disposal or other
A	2%	11%	21%	8.1%	10%	10.6%	89%	5%	2%	3%
B1	4%	20%	24%	5.4%	16.3%	23.4%	69%	23%	2%	5%
B2	10%	21%	24%	6.5%	44.1%	50.3%	63%	28%	2%	7%
B3	4%	27%	26%	4.9%	29.4%	33.7%	56%	33%	2%	8%
B4	25%	44%	42%	7.7%	57.2%	65.9%	12%	71%	1%	16%
Ave	9%	24%	27%	7%	27%	31.6%	61%	29%	2%	7%

Table 3: National backlog priorities based on 2017 data (Source: Own construction from Stats SA data on Regional eXplorer [22]).

Formal housing Backlog		Sanitation		Water infrastructure		Electricity connections		Refuse removal	
Madibeng	69,907	Bushbuckridge	98,047	King Sabata Dalindyebo	65,848	Emalahleni	45,363	City of Mbombela (incl Umjindi)	144,390
Rustenburg	57,910	Madibeng	96,507	Ingquza Hill	57,784	Rustenburg	31,087	Bushbuckridge	132,859
King Sabata Dalindyebo	52,592	City of Mbombela (incl Umjindi)	95,390	Greater Tubatse/ Fetakgomo	54,775	uMhlabuyalingana	27,185	Polokwane	130,042
Msunduzi	50,007	Polokwane	92,725	Thulamela	51,103	Jozini	23,232	Madibeng	116,272
Nyandeni	44,163	Greater Tubatse/ Fetakgomo	82,476	Nyandeni	50,156	Madibeng	23,111	Thulamela	112,016
Mbhashe	41,168	Rustenburg	66,056	Mbizana	48,878	Matatiele	22,246	Greater Tubatse/ Fetakgomo	109,987
Mnquma	36,949	Nkomazi	60,448	Greater Tzaneen	46,693	Randfontein/ Westonaria	19,670	Greater Tzaneen	103,275
Ingquza Hill	36,323	Thulamela	59,573	Bushbuckridge	45,286	Umzimvubu	19,203	Makhado	101,996
Emfuleni	35,581	Makhuduthamaga	53,318	Makhado	41,029	Mbhashe	18,972	Msunduzi	98,485
Mogale City	34,650	Greater Tzaneen	52,455	City of Mbombela (incl Umjindi)	40,436	King Sabata Dalindyebo	18,882	King Sabata Dalindyebo	90,894
Emalahleni	32,364	Makhado	51,407	Mbhashe	37,425	Mogale City	16,896	Nkomazi	86,622
uMzimkhulu	31,834	Elias Motsoaledi	47,467	Collins Chabane (Mutale)	34,593	Msinga	16,152	Thembisile Hani	80,444
Intsika Yethu	31,291	Collins Chabane (Mutale)	45,425	Umzimvubu	33,096	Mnquma	15,223	Collins Chabane (Mutale)	80,247

Formal housing Backlog		Sanitation		Water infrastructure		Electricity connections		Refuse removal	
Engcobo	29,415	Moses Kotane	45,082	Ray Nkonyeni (Hibiscus Coast & Ezingoleni)	32,288	Emfuleni	15,042	Maluti-a-Phofung	77,397
Mbizana	28,910	Thembisile Hani	44,506	Mhlontlo	31,117	Polokwane	14,856	Nyandeni	67,470
Elundini	28,842	Maluti-a-Phofung	40,219	Port St Johns	28,779	Ntabankulu	14,456	Makhuduthamaga	66,706
Mhlontlo	28,607	Mogalakwena	39,955	uMzimkhulu	28,458	Greater Tubatse/ Fetakgomo	14,081	Ray Nkonyeni (Hibiscus Coast & Ezingoleni)	63,822
Matatiele	28,371	Mahikeng	36,903	Mnquma	28,349	Mbizana	12,754	Greater Giyani	62,570
Umzimvubu	27,655	Lepele-Nkumpi	33,981	Matatiele	28,215	Elundini	11,618	Ingquza Hill	60,239
Msinga	26,817	Emalahleni	32,260	Nongoma	26,138	City of Mbombela (incl Umjindi)	11,501	Mbhashe	59,065

the highest in Bushbuckridge (98,047 households); water infrastructure backlog is the highest in King Sabata Dalindyebo where 65,848 households are without water connections; the electricity connections backlog in Emalahleni is 45,363 and in City of Mbombela there are 144,389 households without refuse removal services.

Stats SA [24] identifies 17 Sustainable Development Goals (SDGs) of which only three are applicable to infrastructure development:

Goal 6: Ensure availability and sustainable management of water and sanitation for all;
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all;
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable.

It also identifies the following national 2016 baseline percentages:

- Population using safely managed drinking water services 90.2%,
- Wastewater safely treated 52%,
- Population with access to electricity 94.2%,
- Urban population living in informal dwellings 12%,
- Urban residents having access to basic services within informal dwellings:
- Electricity (79.8%), Refuse removal (64.8%), Sanitation (63.9%), Water (96.1%).

From the above data is concluded that formal housing, wastewater treated, refuse removal and sanitation services need argent attention in South Africa. Hence, the suggested national performance weights for informal neighbourhoods due to backlog percentages are as follows:

0.1232 (Informal dwellings) + 0.1047 (Electricity) + 0.3614 (Refuse removal) + 0.3706 (Sanitation) + 0.0401 (Water).

Hence, the National Development Priority list for South African municipalities with the largest **service backlog priority** in informal neighbourhoods was calculated by considering the weights as calculated in Section 4.2 in combination with the data in Table 3:

1. King Sabata Dalindyebo, 2. Greater Tubatse, 3. Bushbuckridge, 4. City of Mbombela, 5. Thulamela, 6. Mbhashe, 7. Ingquza Hill, 8. Greater Tzaneen, 9. Nyandeni, 10. Mbizana, 11. Rustenburg, 12. Makhado, 13. Umzimvubu, 14. Matatiele, 15. Emalahleni.

The development grants as discussed in Section 3.2.3 must be used in support of these municipalities.

The IUDF [7] prioritises the 97 largest urban population municipalities and metros into nine classes. Here, the priorities were determined by considering the urban population statistics of 2011 and the urban growth rate between 2001 and 2011. Thus, Class 1 refers to the highest priority metros (need immediate intervention due to high urban population and urban growth) and Class 9 refers to the lowest priority municipalities (low urban population and low urban growth) but on the short-term priority list (refer to Table 4, Column 3 and 7 for the different priority classes). These classes were used to determine the **urban growth priority** (Column 2 and 6 in Table 4) which represents an important role to prioritise the budget ratio for infrastructure and resources of different municipalities in the same category class. The urban population and growth priority of 1 refer to the class of metros with the highest urban

Table 4: Municipality's density priorities and urban growth priorities (Source: Own construction from IUDF [7] & Schoeman [4]).

Density priority	Urban population and growth priority	Class	Municipality (M)	Density priority	Urban population and growth priority	Class	Municipality (M)
0.5	1	1	City of Tshwane Metro	0.5	0.4	7	Thaba Chweu LM
0.5	1	1	Johannesburg Metro	0.5	0.4	7	uMngeni LM
0.5	1	1	Ekurhuleni Metro	0.3	0.4	7	Kouga LM
0.3	1	1	City of Cape Town Metro	0.3	0.4	7	Khara Hais LM
0.7	0.9	2	eThekwini Metro	0.3	0.4	7	Overstrand LM
0.5	0.9	2	Msunduzi LM	0.3	0.4	7	Swartland LM
0.1	0.9	2	Nelson Mandela Metro	0.3	0.4	7	Umtshezi LM
0.1	0.9	2	Mangaung Metro	0.3	0.4	7	Lesedi LM
0.7	0.8	3	Buffalo City Metro	0.3	0.4	7	Mossel Bay LM
0.1	0.8	3	Emfuleni LM	0.3	0.4	7	Witzenberg LM
0.8	0.7	4	Polokwane LM	0.3	0.4	7	Bela-Bela LM
0.5	0.7	4	Mbombela LM	0.3	0.4	7	Thabazimbi LM
0.5	0.7	4	Rustenburg LM	0.3	0.4	7	Knysna LM
0.5	0.7	4	Madibeng LM	0.3	0.4	7	Victor Khanye LM
0.5	0.7	4	Emalahleni LM	0.3	0.4	7	Mamusa LM
0.5	0.7	4	Thembisile LM	0.3	0.4	7	Umjindi LM
0.5	0.7	4	Mogale City LM	0.3	0.4	7	LekwaTeemane LM
0.3	0.7	4	Kwadukuza LM	0.3	0.4	7	Endumeni LM
0.3	0.7	4	Govan Mbeki LM	0.9	0.3	8	Hibiscus Coast LM
0.3	0.7	4	Steve Tshwete LM	0.9	0.3	8	Elias Motsoaledi LM
0.3	0.7	4	Sol Plaatjie LM	0.9	0.3	8	Makeng LM
0.3	0.7	4	Metsimaholo LM	0.9	0.3	8	Abaqulusi LM
0.1	0.7	4	Drakenstein LM	0.9	0.3	8	BaPhalaborwa LM
0.1	0.7	4	George LM	0.9	0.3	8	Ditsobotla LM
0.1	0.7	4	Tlokwe LM	0.7	0.3	8	Lekwa LM
0.1	0.7	4	Stellenbosh LM	0.7	0.3	8	Oudtshoorn LM
0.7	0.6	5	uMhlathuze LM	0.5	0.3	8	Theewaterskloof LM
0.7	0.6	5	Matlosana LM	0.5	0.3	8	Ndlambe LM

0.1	0.6	5	Msukalingwa LM	0.3	0.3	8	Naledi LM
0.1	0.6	5	Randfontein LM	0.3	0.3	8	Maquassi Hills LM
0.1	0.6	5	Breede Valley LM	0.3	0.3	8	Greater Kokstad LM
0.9	0.5	6	Thulamela LM	0.3	0.3	8	Langeberg LM
0.7	0.5	6	Mogalakwena LM	0.9	0.2	9	Bushbuckridge LM
0.7	0.5	6	King Sabata Dalindyebo	0.9	0.2	9	Greater Tzaneen LM
0.7	0.5	6	Maluti-A-Phofung LM	0.9	0.2	9	Dr JS Moroka LM
0.7	0.5	6	Matjhabeng LM	0.9	0.2	9	Albert Luthuli LM
0.7	0.5	6	Newcastle LM	0.9	0.2	9	Nkokobe LM
0.7	0.5	6	Lukhanji LM	0.9	0.2	9	Mnquma LM
0.7	0.5	6	Emnambithi LM	0.7	0.2	9	Tswaing LM
0.7	0.5	6	Merafong LM	0.7	0.2	9	Pixley Ka Seme LM
0.1	0.5	6	Ngwathe LM	0.7	0.2	9	Mafube LM
0.1	0.5	6	Moqhaka LM	0.5	0.2	9	Phokwane LM
0.1	0.5	6	Westonaria LM	0.5	0.2	9	Nala LM
0.1	0.5	6	Dihlabeng LM	0.5	0.2	9	Makana LM
0.1	0.5	6	Setsoto LM	0.5	0.2	9	Masilonyana LM
0.5	0.4	7	Lephalale LM	0.5	0.2	9	Inxuba Yethemba LM
0.5	0.4	7	Saldhana Bay LM	0.5	0.2	9	Nketoana LM
0.5	0.4	7	Mkhondo LM	0.5	0.2	9	Modimolle LM
0.5	0.4	7	Midvaal LM				

population and highest urban growth and the priority of 0.2 refer to the class of municipalities with the lowest urban population and lowest urban growth.

The author in [4] applies the short-term priority list as identified in the IUDF [7] as input to determine the **urban density priority** for each municipality. The high urban density area refers to the urban area with a density greater or equal to 500 persons/km². The density priority is determined by considering the deviation between the relative density and the true density in [4]. In developing countries, the largest proportion of the households is poor therefore travelling cost is the most important accessibility variable. Population growth, higher car ownership and land cost lead to sprawling development. Burchell et al. [25] note that sprawling development refers to development of relative low density, one that may be too costly to maintain. To support public transport services O'Sullivan [26] provides guidelines for minimum density thresholds. Hence, it is important to determine the urban density priority. The density priority also fulfils an import role in the determination of the public transport

priority of municipalities in each class (Column 1 & 5 in Table 4). Here factor 1 refer to an extremely good urban sprawl control results and 0.1 refer to an extremely bad urban sprawl control results.

Primary considerations in the determination of development priorities in urban areas

- The status quo functionality of the municipality (consider [17] for classification). The management and finances of the dysfunctional municipalities (which is almost all B3 and B4 municipalities) need to be sourced out from such municipalities.
- Urban Density priority (Table 4, Columns 1 and 5).
- Urban growth priority (Table 4, Columns 2 and 6). Growth projections are a function of population growth and migration patterns (urbanisation and de-ruralisation). Note that not all municipalities face growth challenges. The greatest growth is in the metros and secondary municipalities.
- Service backlog priority.
- Budgetary and financial requirements and sources.
- Rehabilitation of ageing infrastructure that needs to be renewed (data on this issue need to be collected).
- Application of correct and applicable level of services.

Secondary core issues in the determination of development priorities in urban areas:

- The risk of delayed in infrastructure implementation\renewals\upgrades\maintenance;
- Community needs and preferences.

5 CONCLUSIONS

The infrastructure function, practices and level of services municipalities must apply and adhere to differ. Currently, the municipalities boundaries changes more or less every 5 years due to political preference; access and data on road infrastructure is consider as unimportant; there is a lack of evaluation and assessment criteria for municipalities within the same class. As a developing country, South Africa finds itself in a planning spiral formulating different plans without integration, articulation and consideration of existing plans and regulations. For efficient management and decision making within all municipalities there must be an annually updated Infrastructure Asset Management Plan (which include roads and transport), Strategic Municipal Development Plan supported by an approved Implementation, Maintenance and Budget Framework.

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