TOWARDS A THEORETICAL EXPLORATION OF THE DIFFERENTIAL URBANISATION MODEL IN SUB-SAHARAN AFRICA: THE BOTSWANA CASE

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ABSTRACT

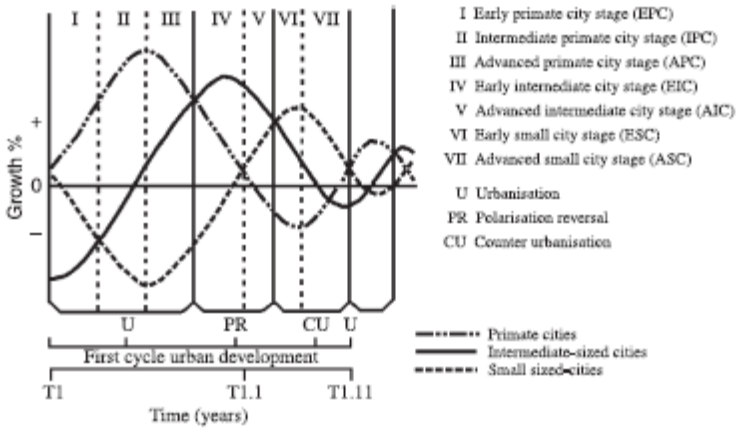
This paper investigates the extent to which the differential urbanisation model is applicable to Botswana by using empirical data obtained from periodic censuses, supportive documentary information and observations from personal on-going research on urbanisation and migration. Differential urbanisation refers to the cyclic spatio-temporal growth trends that the elements of human settlement hierarchies undergo, in response to migration. Empirical studies have verified the validity of differential urbanisation in the United States, Europe, India and South Africa. These areas, unlike Botswana, have longer histories of urbanisation, larger population sizes, denser population distributions, and higher levels of economic development. Current research interest is focused on investigating the theoretical applicability of the differential urbanisation model to those countries at the lower end of the economic development spectrum. The rationale and thrust of this paper is to therefore investigate the relevance of differential urbanisation under unique environmental, demographic and socio-economic conditions that pertain to Botswana. Evidence from the paper shows that urbanisation in Botswana has occurred in sequenced phases that, in general, resemble those suggested by the differential urbanisation model in the following ways. First, there has been concentration in the primate city due to mainstream migration. Secondly, there has been fission leading to the fast growth of the adjacent intermediate settlements, partly as a result of deglomeration economies at the primate core accompanied by substream migration. Third, the peripheral regional and rural centres appear to be now growing relatively rapidly, in response to the implementation of decentralisation policies.

Key words: Differential urbanisation, Botswana, empirical testing, advanced intermediate phase

INTRODUCTION

The urbanisation process in sub-Saharan Africa has generated the formulation of urbanisation theories on two broad fronts. First, the focus has been on urban places as discrete entities; second, urban places have been treated as components of a dynamic human landscape settlement system (Abiodun 1967; El-Shaks 1972, pp. 11–36; Obudho & El-Shaks 1979; Mabogunje 1980, pp. 199–220; Brennan & Richardson 1986, pp. 20–42; Drakakis-Smith 2000; Geyer 2003, pp. 44–59). It is the latter thrust that informs the focus of this paper since it investigates the theoretical aspects of the processes, within the evolution context of the Botswana settlement system, that have been recently articulated in the context of the differential urbanisation model (Kontuly & Geyer 2003a, b).

The paper is organised into sections. After this introduction, the main elements of Geyer's urbanisation differential model elements are



Source: Geyer (1995).

Figure 1. *Generalized differential urbanisation model in time.*

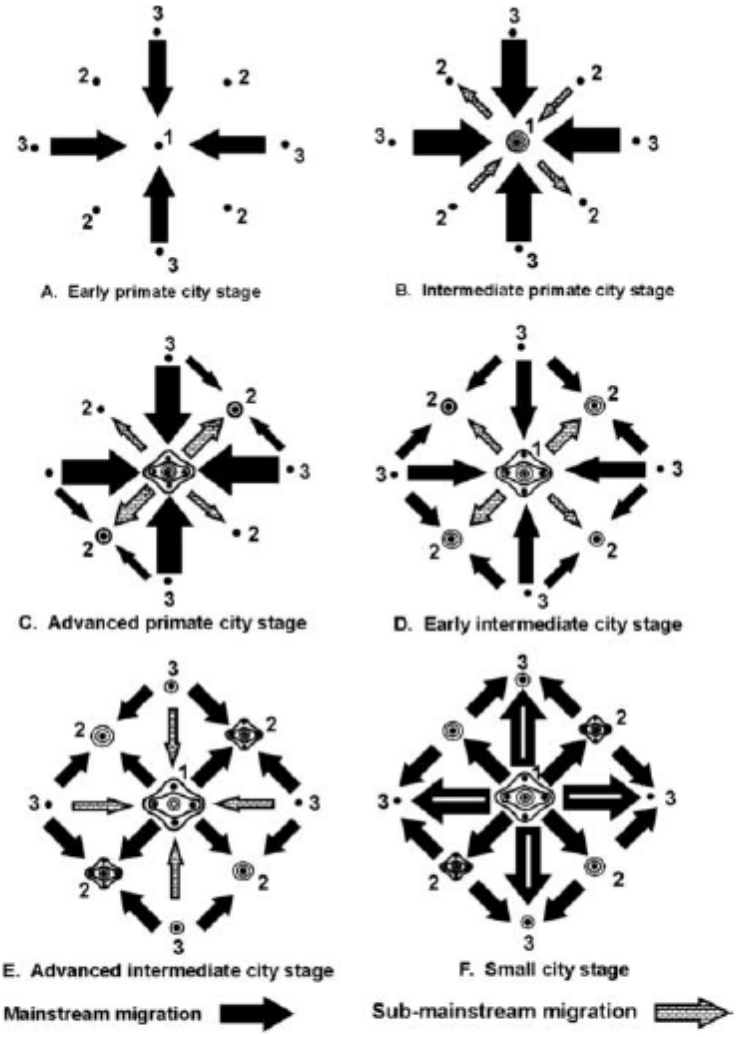
outlined in order to serve as an accurate conceptual benchmark for the paper. Next, the research problem is articulated in terms of examining whether the model can be elevated to a theory, within the settlement system of Botswana. The elements of the human settlement system are then delineated in order to provide the reader with some appreciation of the spatial backdrop against which the dynamics of differential urbanisation have manifested themselves. Then the methodological underpinnings of the study are stipulated in order to provide interested researchers with a replicable framework against which to test the model in this region. This section is followed by a detailed analysis on the evolution of the Botswana human settlement system in the light of the cautious recommendations by Pederson (1999) and Gedik (2003); and the Geyer (1995) model. A synthesis of the empirical findings is then presented before conclusions are drawn.

THE DIFFERENTIAL URBANISATION MODEL

The differential urbanisation process, conceptually, links the processes of urbanisation/concentration (U), polarisation reversal (PR), and counterurbanisation (CU) across the development continuum within the developed and developing countries.

Figure 1 enables the identification of the positions of respective countries relative to one another on the same graph at different points in time, as they advance through consecutive cycles of urban development. According to the temporal dimension of the model, urban systems generally go through the concentration/urbanisation phase (U), followed by polarisation reversal (PR), the turning point between urbanisation and counterurbanisation (CU). Urbanisation is associated with continuing economic and population convergence and counterurbanisation with divergence. In the process, large, intermediate, and small-sized urban areas go through successive phases of fast and slow growth.

Figure 2 depicts the spatial aspects of the model and distinguishes between mainstream and substream migration patterns. It also illustrates how the general direction and intensity of the aspects vary, as the urban system evolves and matures over time. When it is in the primate city phase, main stream migration is mainly directed towards the primate cities. Todaro (1982) believes there is a general tendency for the low income groups to migrate from rural to urban areas during this phase, especially to large metropolitan areas. As the urban system evolves, however, and deconcentration forces set in, counterstream migration becomes more visible. Increasing industrial deconcentration from core regions to intermediate-sized centres



Source: Geyer (1995).

Figure 2. *Generalised differential urbanisation model in space.*

is the first indication of a country entering the polarisation reversal phase, followed by increasing population de-concentration later on.

In other words, when the core regions grow the fastest, the urban system is in the urbanisation phase. When they start losing momentum and intermediate-sized regional centres start attracting more migrants, the urban system enters the polarisation reversal phase. Finally, when small towns start attracting significant numbers of migrants, the urban system reaches maturity and subsequently enters the counterurbanisation phase.

The model is thus a descriptive explanation of how each urban system evolves over time; first, in terms of city-size categories and second, in terms of spatial dimensions shown in Figure 2.

Table 1. *Conclusions from recent differential urbanisation studies.*

Countries	Remarks
Finland	Finland has consecutively gone through the first cycle of urbanisation
UK, West Germany, Russia and Estonia	These have also reached the counterurbanisation stage but without following the stipulated consecutive sequence due to peculiar local political, economic, social and demographic circumstances
Italy, Turkey, India and South Africa	These are at the polarisation stage of progression

Source: Derived from Kontuly & Geyer (2003b).

By abstracting away the specific demographic, economic, spatial and sociopolitical processes influencing urbanisation, the model promises to explain the maturation of urban systems in both the developing and developed countries.

THE RESEARCH PROBLEM

The concept of differential urbanisation links the process of urbanisation, polarisation reversal and counter urbanisation across the development spectrum in the First and Third Worlds (Geyer 1995). Indications are that the differential urbanisation model holds some academic potential to bridge part of the gaps in our understanding of the maturing of urban systems in developing and developed countries (Kontuly & Geyer 2003a). Kontuly & Geyer have stressed the need to move the concept of differential urbanisation from model to theory through empirical testing in a number of developed and less developed countries.

Several studies have consequently been conducted recently to test the applicability of the model in order to facilitate the generation of a theory for explaining urbanisation at the global, national and regional scales, through comparative analysis. The results are summarised in Table 1.

Finland (Heikilla 2003) was the only country to progress through the first cycle of urbanisation and move into the second one, and the sequence of consecutive stages proposed by the model have been clearly identified there. For Italy (Bonifazi & Heins 2003), Turkey (Gedik 2003), South Africa (Geyer 1995; Kontuly & Geyer 2003a,b) and India (Mookherjee 2003), progression has occurred sequentially from the urbanisation stage to polarisation reversal. In Britain (Champion 2003), West Germany (Kontuly & Dearden 2003) and Russia (Nefedova & Treivish 2003; Tammaru 2003), the cycle of consecutive stages was observed as a general temporal progression, rather than a series of uninterrupted stages. This could be explained by severe policy interventions, significant changes in political-economic conditions, or unique local political circumstances. The French urban system's urbanisation phase ended during the early 1950s before entering the polarisation reversal phase between 1968–75, followed by the counterurbanisation phase around the 1980s (Fielding 1989).

The differential urbanisation model was not intended to be more than an idealised representation of one complete cycle of urban development as it abstracts away many of the local economic, demographic, geographic, political and social processes influencing urbanisation since it is specified at a high level of generality. Kontuly & Geyer (2003a) acknowledge the exploratory nature of the model. They stress that local circumstances and history of urban development need to be taken into account whenever and wherever the model is tested.

Pedersen (1999) has expressed the additional need for the improvement of the temporal model through explaining the earlier phases of urbanisation. According to him, the possible impact of non-urban population migration on the process of differential urbanisation is still unclear. Gedik (2003) has also recommended the inclusion of a pre-concentration stage that precedes the urbanisation stage in the differential urbanisation model. The introduction of a pre-concentration stage into the model would help

Table 2. *Growth of Population in Urban Settlements (000s) 1866–2001.*

	1866	1905	1964	1971	1981	1991	2001
Number of urban places	1	2	3	5	8	25	34
Total urban	–	–	20,989	54,300	166,400	600,100	909,800
Total population	–	–	574,094	59,900	941,000	1,326,800	1,680,900
Urban as percentage of total population	–	–	3.8	9.1	17.7	45.2	54.1
Total urban village as percentage of urban population	–	–	0.0	0.0	9.8	50.6	56.9

Source: Government of Botswana (2001).

to clarify the impact of non-urban migration on the differential urbanisation process. This paper will address these concerns.

The basic research problem is thus to move the concept of differential urbanisation from being a model to a theoretical level, through empirical testing in a number of developed and less developed countries (Richter 1985; Fulton *et al.* 1997; Kontuly & Geyer 2003b). The pertinent research question is whether the differential urbanisation model fits reality and whether modifications to the model, during the courses of empirical testing, could be incorporated at national levels through (Kontuly & Geyer 2003b):

- Detailed evaluation of the historical development of urbanisation, polarisation reversal, and/or counter-urbanisation;
- Analysis of spatial urban development through time for the entire urban system;
- Identification of functional urban systems and analysing spatial urban development processes through time for these functional urban systems;
- Discussion of the relevance and shortcomings of the differential urbanisation model as a characterisation of the actual patterns of urban spatial development observed over time.

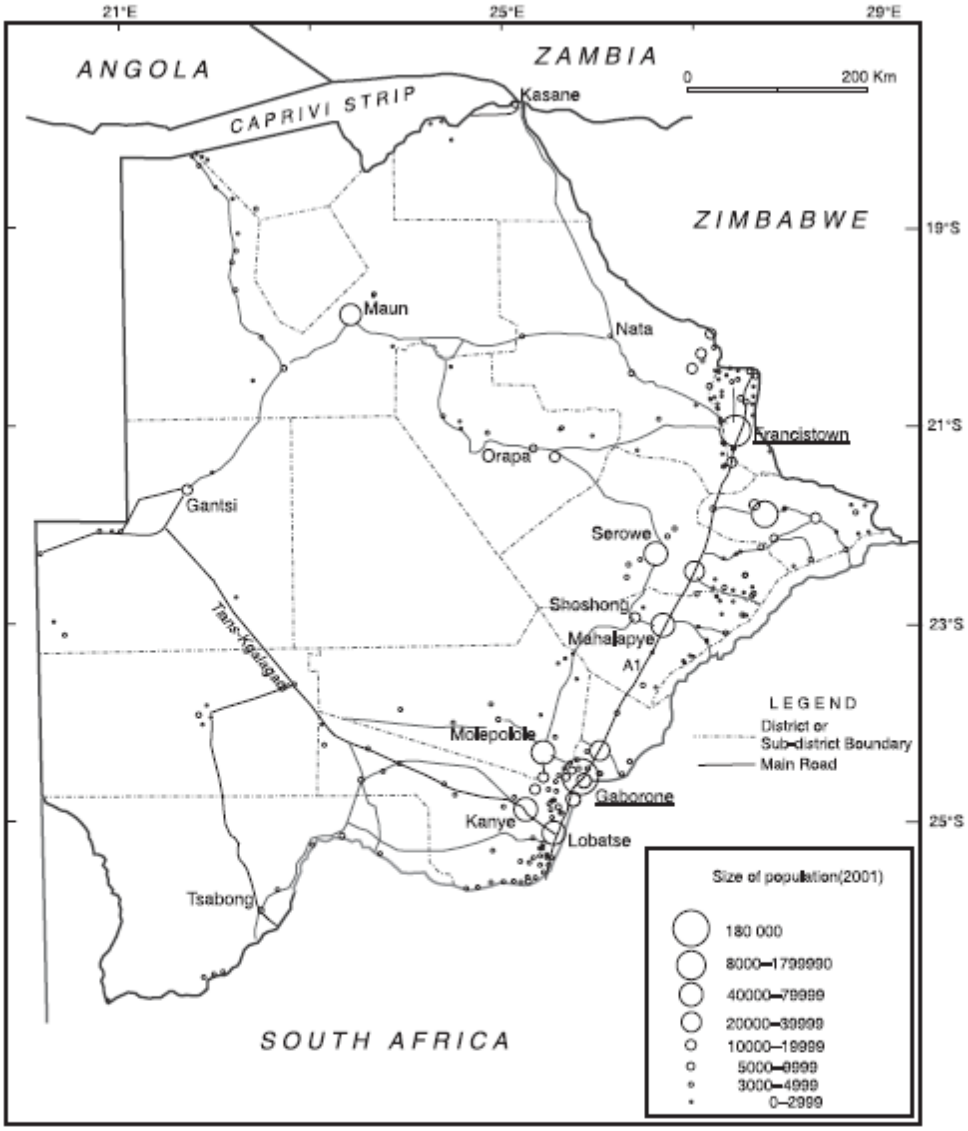
ELEMENTS OF THE BOTSWANA HUMAN SETTLEMENT LANDSCAPE

Botswana is a country with a small but fastest urbanising population in sub-Sahara Africa. Whereas the rest of the continent, excluding South Africa, has about a third of the population urban, Botswana has just over half of its population living in towns and cities as shown in Table 2.

Figure 3 shows the spatial distribution of the settlements, the main roads and district boundaries. The western part of the country is semi arid to arid and thus characterised by paucity of settlements and road infrastructure development.

The spatial cores, subcores and most transport routes are situated on the eastern hardveld of the country which is ecologically well endowed with good rainfall, soils, and well-developed physical infrastructure and socio-economic facilities. The main national core region is the capital city of Gaborone that constitutes the focus of national markets, large-scale commercial enterprises, nation-serving industries, and seedbed for new industry and innovations. The subcores are characterised by increasing investment in urban activities. Francistown, the major regional centre in the North, and the modern *urban villages* of Serowe, Palapye, Mahalapye, Mochudi, Molepoplole, Ramotswa and Kanye qualify for such characterisation. These villages were the former large *agrotowns* that have now acquired the structural and functional attributes of urban areas. Both the National Population Policy and the National Settlement Policy have targeted the subcores for vigorous economic development, outside the main core region, in order to support the decentralisation policy. They have been allocated with intermediate level commerce, administration, socio-economic services and labour-intensive small and micro-scale enterprises.

The economically depressed areas are characterised by low productivity, deteriorating natural resource bases, absolute poverty, highest mortality rates and least-life expectancy. The



Source: Government of Botswana (2001).

Figure 3. *Settlement distribution in Botswana.*

moribund copper-nickel mine at Selibe Phikwe and the isolated rural settlements, the remote and sparsely settled parts of western Botswana typify these conditions.

Resource frontiers include the western margins of livestock grazing associated with the introduction of borehole technology; the Tuli and Pandamatenga arable farming blocs; diamond

mining towns of Jwaneng, Orapa and Letlhakane; Sowa Town and centres for eco-tourism including Maun and Kasane. Along with the subcores, they are expected to perform a critical role towards the decentralisation of certain activities from core regions. Whereas this has generally been the case with the tourism centres, the mining towns have had mixed fortunes. The copper mine is on the brink of closure while diamond mining continues to experience economic ebb and flows in response to fluctuating world demand for diamonds. The livestock sector has suffered from environmental hazards in the form of periodic droughts, foot and mouth, anthrax and cattle lung diseases.

The main transport routes include the A1 north-south route and the Trans-Kalahari highway. Interactivity among the regional systems-elements of the space economy has been facilitated by rapid transferability due to the phenomenal growth in communications, transportation infrastructure and motorised transport, coupled with the rising rates of car ownership and public transport.

RESEARCH METHODOLOGY

The primary data source for each comparative international investigation on the differential urbanisation model theory has been the national census. For Africa and other developing continents, this raises the problem of data validity. First, there is paucity of census data. For example, whereas the history of systematic periodic censuses dates back to the early twentieth century for developed countries, this experience is a late twentieth-century phenomenon for most of the developing world. Second, the intrinsic quality of the available census data varies significantly from country to country. None of the precedent investigations into the differential urbanisation model has paid much attention to the quality aspects of census data. However, for future comparative analyses to be valid and meaningful, it will be imperative to signify the quality of the data being used. Botswana has held periodic decennial censuses since 1971. The quality of the data can be determined indirectly from the United Nations joint score index.

The summary of these indices for 1971, 1981, 1991 and 2001 indicates that although the general quality of the census data has been improving, the joint score for the 2001 census data, was poor as compared to the 1991 one of 18.4 (Shemi 2004). However, it was of better quality than that of the 1981 and 1971 census data. Overall, the data can still be depended upon for the present analytical purposes because the age-sex accuracy index lies within the 'accurate to moderately accurate' range, being less than 40.

The aggregate sub-populations for settlements in the hierarchy, listed in Table 3, were obtained for each census period. The annual rates of increase for each intercensal period were then computed using the exponential form:

$$r = 1/n \log_e(P_{t+n}/P_t)k$$

where

n = duration of intercensal interval.
P_t = population at the base of the review period.
P_{t+n} = population size at the end of the review period.
k = 100.

The derived annual intercensal change rates for each settlement category were then converted into graphs.

Archival sources were consulted for the conceptual and theoretical frameworks that underpin the study. Documents from the Central Statistics Office, the Department of Town and Regional Planning, the National Development Plans, District Development Plans, the Department of Surveys and Mapping, and personal observations from on-going research on urbanisation in Botswana (Gwebu 2003, 2004b, 2005), were used to interpret the results.

THE PRE-INDUSTRIAL AND CONTEMPORARY URBANISATION TRENDS IN BOTSWANA

The pre-industrial city phase – Pederson (1999) and Gedik (2003) have underscored the need for paying greater attention to the pre-urbanisation phase when investigating the applicability of the differential urbanisation model to human settlement hierarchies. Their observations are relevant to the Botswana settlement system which was, up to the early 1960s, characterised by what Sjoberg terms as pre-industrial cities (Sjoberg 1960). Because of their historical significance to the urbanisation history of Botswana, those settlements merit closer attention in order to

Table 3. *Settlement hierarchy.*

Centres	Description	1971	1981	1991	2001
Gaborone	Primate core	17,700	59,700	133,500	186,000
Tlokweng, Mogoditshane	Subcores within 10 km radius of primate core	5,253	9,825	26,700	57,400
Mochudi, Molepolole, Ramotswa, Lobatse, Gabane, Kanye, Moshupa, Thamaga, Kopong	Satellite dormitory suburbs within 75km radius of primate core	56,912	108,841	171,997	232,600
Francistown, Palapye, Serowe, Mahalapye, Maun, Letlhakane, Kasane, Ghanzi, Bobonong, Tonota, Tutume	Peripheral major regional centres over 200km radius from primate core	76,610	125,111	215,000	308,700
Selebi Phikwe, Orapa, Jwaneng, Sowa	Mining towns	6,100	40,300	62,000	77,100
Letlhakeng, Lerala, Shoshong, Mmadinare, Maitengwe, Gumare, Tsabong	Rural service centres	12,425	21,178	32,397	48,000

Source: Derived from Central Statistics Office Census Data 1971–2001.

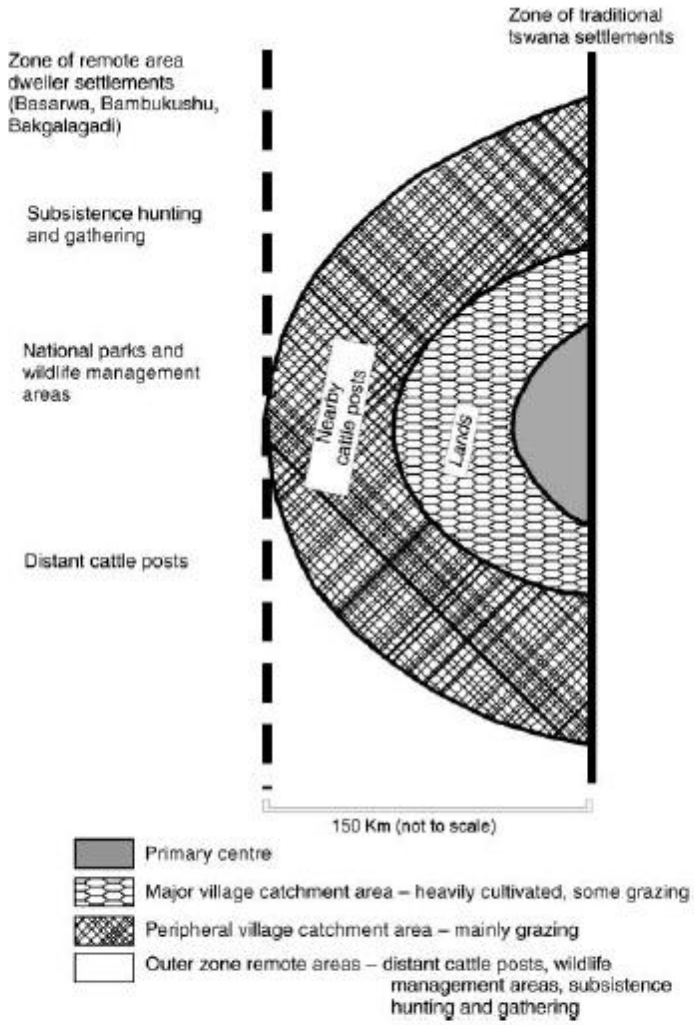
address the theoretical concerns of Pederson (1999) and Gedik (2003) in their critical assessment of the differential urbanisation model. The primary centres were spontaneous *agrotowns* or traditional metropolitan capitals that constituted an important element of the settlement landscape each with the village (*motse*) as its functional core, immediately surrounded by arable lands (*masimo*), with the cattleposts (*meraka*) being located at the periphery. See Figure 4.

These nucleated settlements grew spatially, partly by in-migration and accretion, whereby weaker tribes sought refuge at their perimeters, but mainly through natural increase. Absolute authority by chiefs ensured that they remained intact, in spite of temporary movements by their residents to the cattleposts, and transhumance to the lands during the ploughing season. Schapera quoting one such chief wrote:

> I have found the system of people living together in big main villages advantageous in all respects, for the sake of administration and the people themselves … people who leave the main villages and live at the lands or catteposts soon become lawless, they have no pride in home, and they lose interest in tribal and political matters. Batswana … cannot be expected to break up their villages and live singly as families or in very small groups besides their lands and cattleposts. I, as a chief, greatly discourage this idea among my people. It is easier for me to call them together to a big *kgotla* meeting to discuss all tribal matters … (Schapera 1943, pp. 271–272).

Three important factors however led to substantial permanent out-migration from the agrotowns to the lands and cattleposts. First, post-independence constitutional changes considerably whittled the chiefly administrative, socio-political and sociocultural authority, through the District Council Law and the Tribal Land Acts. Individuals could thereafter relocate out of the main village without having to consult the chief. Second, agricultural modernisation policies were being instituted.

The late President of Botswana, Sir Seretse Khama said:



Source: Author.

Figure 4. *The rural settlement landscape.*

> One change that must gradually come about is a move away from our large traditional villages … Most of the inhabitants of our large villages depend for their livelihood on farming … To farm properly, people must live on or near their farms so they can work at farming all the year round (Khama 1970, p. 5).

Third, when some of the population responded positively to this call, the Government Accelerated Rural Development Programme was launched to provide the out-migrants with supportive infrastructure, in the form of potable water, commercial facilities educational and healthcare services within the new peripheral localities.

INCIPIENT MODERN URBAN-INDUSTRIALISATION

The defining hallmark of urban development includes trade, commerce and industry. For Botswana , these urban attributes are associated with the two earliest towns of Francistown and Lobatse which were established in 1866 and 1905, respectively. As in the other parts of colonial Eastern, Central and Southern Africa, the rate of urbanward migration, from the rural hinterlands of Francistown and Lobatse, was strongly regulated along ethnic, marital and gender lines. Only single African males and unaccompanied married men could enter towns to procure temporary employment to pay taxes. Because of these restrictive regulations, these colonial towns derived their growth from natural increase and immigration from Britain and South Africa until independence (Gwebu 1987).

Contemporary urbanisation phase and differential urbanisation – The contemporary urbanisation phase in Botswana began with the coming of independence, from the early 1960s. This time marked the relocation of the nation's administrative capital from Mafikeng in South Africa to Gaborone in Botswana, an expansion of commercial, industrial and administrative functions in the existing towns, and the opening of new mining towns. These activities attracted substantial and unrestricted movement of the local rural population to the urban areas (Gwebu 1987, 2004a, b).

1963/1971 The Early/intermediate primate city phase – This stage coincides with phases I and II in Figure 1. The new capital city of Gaborone was established in 1963 (Gwebu 1987). From an almost zero population base its population had expanded to 17,700 in 1971. Because of limited employment opportunities in the rural areas, in the face of a growing labour force, there was massive mainstream migration from the rural areas to Gaborone.

The Advanced primate to advanced intermediate phase (1971–2001) – Table 4 shows the annual intercensal growth rates for the various settlement types within the hierarchy from 1971 to 2001. Table 5 rank orders the settlements according to their magnitudes of annual intercensal growth rates over the phase. Figure 5 further depicts the evolution of the settlement system in Botswana, shown in Table 4, on the basis of the differential urbanisation model, graphically.

1971/81 The Advanced primate/early intermediate phase – Being the first decade of the discovery and initial exploitation of mineral resources in Botswana, the mining centres attracted a lot of population from their rural and peripheral regional hinterlands. The primate city also experienced an exceptional average growth rate percentage over the intercensal period. This high rate was attributable to two main factors. First, the administrative capital of the new Republic had just been relocated from Mafikeng in South Africa (Gwebu 2004c, 2005). Thus, there was a boom in the construction and service sectors. Second, some labour intensive construction work was still on-going towards the completion of the new nearby dam which had been established to serve the new capital city. Cumulative multiplier effects, agglomeration and other scale economies encouraged economic and population convergence to the primate

Table 4. *Annual intercensal growth rates.*

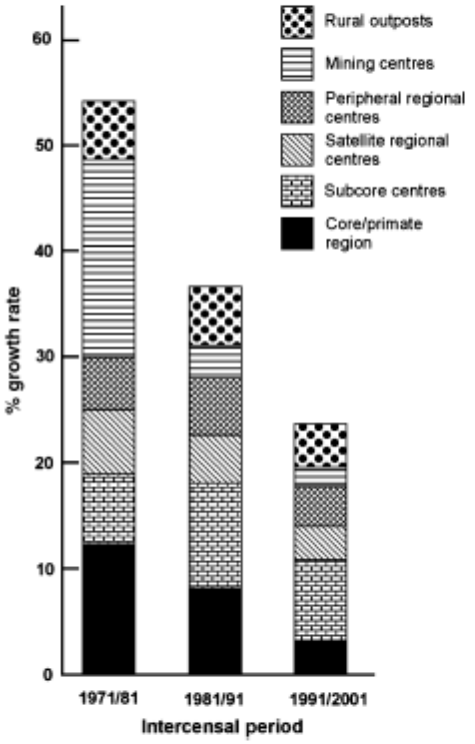
Settlement type	1971–81	1981–91	1991–2001
Primate core	12.2	8.1	3.3
Subcores	6.3	10.0	7.7
Satellite dormitory suburbs	6.5	4.6	3.0
Peripheral regional centres	4.9	5.4	3.6
Mining towns	18.9	4.3	2.2
Rural service centres	5.3	5.0	3.9

Source: Derived from Central Statistics Office Census Data 1971–2001.

Table 5. *Rank order of annual intercensal settlement population change.*

Rank	1971/81	1981/91	1991/2001
1	Mining centres	Subcore centres	Subcore centres
2	Primate core	Primate core	Rural outposts
3	Satellite centres	Peripheral regional centres	Peripheral regional centres
4	Subcore centres	Rural/mining centres	Primate core
5	Rural outposts	Rural/mining centres	Satellite centres
6	Peripheral regional centres	Satellite centres	Mining centres

Source: Derived from Central Statistics Office Census Data 1971–1981.



Source: Derived from Central Statistics Office data 1971–2001.

Figure 5. *Cumulative annual growth of settlement types over time.*

core. Some of the residents from the adjacent subcores, rural settlements and peripheral regional centres must have relocated to Gaborone to be within easy access of their places of work. Such mainstream rural-urban migration is associated with the *productionism* phase of the differential urbanisation model, when improved job opportunities, income and education become more important to individuals than their living conditions. The emergence of the Old Naledi squatter settlement at that time confirms this (Gwebu 2003). Under such circumstances, the environmental surroundings became readily traded off for available work, cash and social services . This stage coincided with the early and intermediate primate phases of the model presented in Figures 1 and 2.

The satellite dormitory suburbs of the capital experienced as much growth as the sub-core. Growth in the peripheral regional centres did occur, but at a subdued rate. Such growth could have been due to stepwise migration from the rural areas which were experiencing slow growth due to their loss of population to higher order centres (Gwebu 2004b).

1981/91 The Early intermediate/advanced city phase – Table 4 lists the subcores, the primate core and the peripheral regional centres as having the highest annual growth rates, respectively, during this phase. The subcores must have started to benefit from the commercial and industrial spillover 'wave' effects and other agglomeration diseconomies, from the primate city such as congestion, shortage of housing, rising land values, soaring labour costs and above average rates of increase in the cost of living Vernon 1960 (Zelinsky 1975; Gordon 1979; Gwebu 2003). Economic conditions had started to emerge at the subcores that facilitated dispersion from the core. These included lower input costs, diffusion of technical knowledge from the core, improvement of communication,

expanding markets and build up of infrastructure. The impact of *environmentalism* had also become evident with the establishment of exclusive residential areas such as Mokolodi and Phakalane just outside the primate core (Gwebu 2004e). Environmentalism had to do with seeking amenity. The need to improve individual actual living environmental conditions became as important as earning a living. Under such conditions, individuals were willing to trade income for pleasant surroundings. Commuting to work places at the primate core was made possible by good road transport connectivity, high per capita private vehicle ownership and good public transport. Mainstream migration from the rural areas and satellite centres continued to the subcore and core areas. With the closure of the major copper mine becoming more and more imminent, the retrenched former mine workers had to seek employment at the subcores, the cores and the peripheral regional centres (Gwebu 2004d).

The slow growth in the diamond mines could have been due to restricted permissible access to the mines and the inherently low absorptive capacity of the mining industry because of its high capital-labour ratios. The peripheral subregional centres/urban villages recorded growth rates that were only second to those experienced by the primate core. This could have been due to the Central Government Major Village Infrastructure Upgrading Programme that was being implemented in the newly reclassified urban villages, coupled with the decentralisation of investment and services to local district authorities (Gwebu 2004d, e). This upgrading of infrastructure attracted government and private sector enterprises to the urban villages. This, with decentralisation created many employment opportunities at the district level capitals. This same effect was generated with the establishment of subregional centres at rural outposts.

These population movement patterns associated with these developments characterise strong polarisation reversal as the peripheral regional centres assumed an important role in replicating the industrial, commercial, and administrative role of the core. (Gwebu 2004b). This growth may also have been accelerated by severe drought during this phase as environmental refugees were forced to abandon the smallest isolated settlements by moving to larger settlements where they were assured of food rations, work, reliable water and dependable social services. These patterns characterise the advanced primate and early intermediate city stages of the differential urbanisation model.

1991/2001 The Advanced intermediate/early small city phase – From Tables 4, 5 and Figure 5, the settlements that experienced the highest intercensal growth rates were subcore centres, rural outposts and peripheral regional centres. The relative growth rate at the core continued to shrink whereas that at the subcores remained comparatively robust. This is because a substantial number of industrial and commercial enterprises and their related employment opportunities had relocated from the core to the subcores. Employment opportunities attracted population to the subcore from satellite communities and other settlements within the settlement hierarchy. Decentralisation of investment and services from the core to the regional peripheral centres and conferment of subregional administrative status to the rural outposts helped to generate employment locally and attracted immigrants to the lower order centres. All these developments signalled the onset of the advanced intermediate stage of the differential urbanisation model (Geyer 1995, Gwebu 2004b, d).

The mining towns recorded the least growth. This reflected the effects of the ongoing closure of the copper-mining town at Selebi Phikwe and the slump in demand for diamonds which was closely linked to the periodic world economic recessions of the late 1990s.

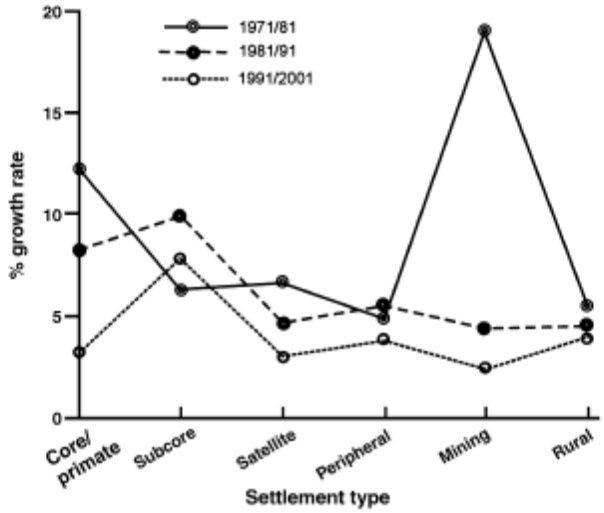
SUMMARY AND CONCLUSIONS

Table 6 summarises, in a phased and descriptive format, the types of movements on the national settlement landscape, since the mid-nineteenth century. These have been dealt with in detail in the preceding text. It incorporates the pre-urban phase (Pederson 1999, Gedik 2003) in order to present a complete overview of how the spatial mobility trends have responded to the evolving settlement system. Figure 6 provides a graphic summary of the level to which the relevance of the differential urbanisation model to Botswana can be inferred from available census data.

Table 6. *Phases of urbanisation in Botswana.*

Period	Differential urbanisation phase	Dominant settlement type	Dominant mobility patterns
Prior to 1866	Pre-urban 0% urban	Agrotowns, lands and cattleposts	Seasonal circulation to/from agrotowns to lands and cattleposts, ecological population pressure, sociocultural marital, religious moves, socio-political migration of refugee minorities.
1866–1906	Pre-urban/ early primate <1.0% urban	Agrotowns, lands, cattleposts, towns	Seasonal circulation, ecologically induced moves, sociocultural moves, ethnically-restricted internal rural-urban migration, international migration to Francistown gold mine and Lobatse town.
1906–1964	Pre-urban/ early primate <1.0% urban	Agrotowns, lands, cattleposts, towns	Seasonal circulation, sociocultural moves, international migration, incipient local rural-urban migration, nationalist winds of change from mid-1950s.
1964–1971	Early primate <1.0–3.8% urban	Agrotowns, lands, cattleposts, city, towns	Seasonal circulation, rural-urban long-term circulation & migration, ethnically unrestricted migration to towns and cities.
1971–1981	Early/intermediate primate 9.1–17.7% urban	Urban villages, city, conventional towns, mining towns	Rural to-urban mobility, migration to urban villages.
1981–1991	Advanced primate/ early intermediate 17.7–45.2%	Urban villages, city, towns Establishment of new mining towns Decentralisation of administration and investment to urban villages	Rural-urban migration
1991–2001	Advanced intermediate/ early small city 45.2–54.1% urban	Urban villages, city, towns, rural centres Consolidation of urban villages, establishment of sub-regional administrative centres and tourist colonisation frontiers	Rural-urban and rural-rural migration

Source: Author.



Source: Derived from Central Statistics Office Data 1971–2001.

Figure 6. *Comparative settlement annual growth rates over time.*

The annual intercensal growth rate of the primate core has continued to decline from the 1971/81, through the 1981/91 to the 1991/2001 period. The subcore experienced the nadir of its growth rate in 1971/81 when apparently the primate core grew at its expense. Its zenith was in 1981/91 when it grew at the expense of all the other settlements. This marked the initial onset of the 'wave effect' and polarisation reversal. The dominance of the subcore over all the other settlements has continued to the present.

The satellite regional centres have experienced a systematic decline in their growth trends from 1971/81 to 1991/2001. At their growth-peak, they served as intervening opportunities to mainstream migrants to the core and mining areas. However by 1981/91, they must have been significant sources of outmigration to the subcores, the primate core and peripheral regional centres. Today the destinations of their outmigrants include the subcore centres, rural outposts and peripheral regional centres.

The peripheral regional centres experienced their highest annual growth rates during the 1981/91 intercensal period by apparently drawing populations from satellite, mining and isolated rural centres. This spatial pattern persisted during the 1991/2001 period, except that their growth rates were becoming exceeded by those of the rural outposts.

The annual growth rate of mining centres declined from a peak during the 1971/81 intercensal period, when they had mainstream migration from the rest of the space economy. They have since experienced a regular decline due to the impending closure of the copper mine. Mining is also characterised by low capital/labour ratios. Moreover the periodic global recessions have disrupted its growth. The apparent destinations of the migrants from this sector were the subcore centres, peripheral regional centres and the rural outposts.

The rural areas experienced their highest annual growth rate in the 1971/81 period. This could have been due to low mortality and high fertility rates. Compared to the other centres, they were however among the three bottom-listed set of settlements, implying that even if they recorded high natural growth rates, they were net senders of migrants to the other higher order centres. A similar pattern persisted in 1981/91. However, although they experienced their lowest annual growth rate in 1991/2001, their position relative to all the other settlements

outside the subcore, suggested that there were experiencing net immigration from the centres growing least.

In conclusion, concentration started with the primate city. Subsequently, the ripple effect has spread outwards, first to the nearby intermediate centres and then to those farthest out, before reaching the smallest ones. 'Growth does not appear everywhere at the same time; it becomes manifest at points or poles of growth, with variable intensity; it spreads through different channels, with variable terminal effects within the whole economy' (Perroux 1970).

Variations in settlement growth have reflected an interplay of political and economic factors. There is coalescence of those settlements adjacent to the core. Settlements at various levels of the hierarchy have experienced economic-cum-population growth and decline at different times. Initial government investment patterns were reinforced by those of the private sector. Agglomeration and other scale economies sustained cumulative multiplier causation effects and saw capital, labour and other factors of production moving towards and concentrating in the capital. Zelinsky (1971) has referred to this phase of mobility as the early transition stage. Kontuly & Geyer (2003a, b) call it the concentration phase. The saturation limit of this phase has been reached and is clearly defined by symptoms of agglomeration diseconomies and over-urbanisation. These have led to centrifugal sub-stream migration and 'wave effects' from the primate city, in search of lower input costs, cheaper land, accommodation and the environmental amenity offered by the intermediate and nearby centres. Government-led investment in physical infrastructure and social services has also attracted both the private sector and population from the lower order centres to these intermediate centres.

Demographic growth of these centres and that of the capital has generated concomitant spatial fission/sprawl. This growth-pattern of intermediate centres, near the capital city, has been replicated in those farther afield. Such growth has marked polarisation reversal. Data from the latest census suggest that the smallest resource frontier settlements have begun to experience a steady growth over the past decade. Such growth involves skilled personnel moving from the higher order centres, complemented by the relocation of the unskilled and semiskilled migrants and environmental refugees, due to frequent droughts, from their hinterlands. This could signal the start of the final phase in the first cycle of urbanisation, as envisioned by Geyer, in Botswana.

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