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Research article

Differentiated outlook to portray secondary cities in South Africa

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Abstract: Cities are playing an increasingly important role in the development and growth of countries. A country's growth and prosperity is largely dependent on the efficient functioning of its cities. The reliance of countries on the ability of their cities to perform crucial central functions, for national growth, continues to rise. South Africa has a long-standing network of cities, towns and localities. These have developed and become hierarchised over the course of history during which population settlements and their distribution have been influenced by colonisation, segregation, industrialisation and globalisation. Since 1911, South Africa has undergone an extended phase of intense urban growth, with areas such as Johannesburg, Cape Town and eThekwini (Durban) agglomerating into dominating economic spaces. There are, however, no universally accepted, distinct criteria that constitute the general characteristics of secondary cities. The common assumption is that secondary cities are those cities that find themselves below the apex of what are considered primary cities. Furthermore, internationally, secondary cities appear to be considered as important catalysts for balanced and dispersed economic growth. In the South African context, the notion of what constitutes secondary cities is to a large extent underdeveloped. The aim of the paper is to appraise interconnected regional networks as a differentiated and novel outlook when determining secondary cities in South Africa. What is evident from the paper is that there are different potential alternatives with which to portray secondary cities.

Keywords: secondary cities; South Africa; urban system; economic profile; regional networks

1. Background

The earliest notion of a hierarchy of cities argued that a city's pre-eminence could be the result of one of three conditions: antiquity, walls or privilege [1]. In the 18th century, new ways of comparing cities began to emerge with an emphasis on population and central functionality. The modern-day idea of a hierarchy of cities is ascribed to scholars such as Christaller, Lösch, Perroux, among others and which gave rise to the central place function. The work of these scholars was and is, considered important as it introduced the characteristics of central functions which determine a city's position within the overall hierarchy of an urban system [2–4]. The outcome is an urban system comprising lower-order settlements (large in number) and higher-order settlements (few in number), each having different impacts on and contributions towards development conditions [5]. The rationale alluded to the notion that settlements of a higher order tend to offer a larger variety of functions/services and are, consequently, spaced further apart and referred to as multifunctional, thereby having a greater impact on development. Conversely, settlements of a lower order offer a smaller variety of functions/services and are usually closer to one another and referred to as monofunctional, thereby having a lesser impact on development.

In the context of the South African urban system (see section on the South African urban network), a functional index was developed by the Council for Scientific and Industrial Research (CSIR) for the delimitation of the economic catchment areas of each settlement in the country [6]. The index was subsequently used to determine nested patterns of higher- and lower-order centres in the country and was considered an appropriate proposition to classify cities as either primary or secondary. However, although the index provides for a balanced approach, John [4] asserted that due to the growing interest in the subject of metropolitan regions, that which constitutes secondary cities in the South African context is still greatly underdeveloped. The aim of the paper is to furnish a potentially unobstructed approach when identifying *secondary* cities in South Africa. To achieve this, the outline of the paper will be as follows 1) what is a secondary city? 2) the South African urban network, 3) mixed methods of profiling secondary cities in South Africa, and 4) interconnected regional networks.

2. What is a secondary city?

Secondary cities can be defined as those cities in the hierarchy of towns and cities of a country that function as cores within territorially organised sub-national regions but being subordinate to the core regions within the national spatial area [7]. Marais and Cloete [8] articulated that although the concept secondary city has become integrated as part of development parlance; there is no clear definition of what a secondary city entails. The concept insinuates that secondary cities are those cities that find themselves below the very apex occupied by primary cities. It is not clear where the notion originated from, however, according to John [4] it would appear that it originated from Friedmann [9] who applied the concepts of primary and secondary cities in a global context, which allowed for the concept to be devolved towards a national context. However, according to John [4], there is no universally accepted definition of that which constitutes a national hierarchy of cities. Many analysts simply refer to a continuum when describing hierarchies. Despite the lack of a concrete definition, it is clear that the general approach or debate focuses on primary and secondary *cities* as the apex of a hierarchy.

Hierarchies tell us something about urban systems and the role that particular urban areas play in a national or global structure. However, within a country, the criteria for defining a national hierarchy of cities may follow different approaches. For example, the concept primary city was first used by Jefferson [10] to describe cities that emerged as the most populous during a country's urbanisation process i.e. a primate city is disproportionately larger than any other city. Therefore, when considering Jefferson's notion, primate cities were seen as typically much larger than their nearest rival in the urban hierarchy. Although most definitions identify primary cities as the towns with the largest population, countries in the contemporary world would define primary and even secondary cities in different ways [4].

Brand [11] alluded to the notion that settlements or cities are classified into various functional types. According to him, these functions are generally referred to as "central functions" and the characteristics of central functions such as, the number and types of commercial, industrial and service functions, ultimately determine the city's position within the hierarchy of cities, which also determines the city's place of performance and dominance. The outcome is an urban system consisting of lower-order settlements (large in number) and higher-order settlements (few in number), each having different impacts and contributions [5]. Evident from central functions is the notion of a city and hierarchy:

1. A city is generally distinguished by its relative size in comparison to other urban areas, but also by its functions. A variety of indicators, invoking population, and population density, number of dwellings, economic function, and infrastructure are used in classifying cities. In many ways a city is easily identified as a large human settlement that serves as a centre of population, commerce and culture, however, there is a great diversity in and between cities. Cities continue to grow and cover a complex, interlinked functional area often made up of multiple towns [12].

2. A "hierarchy" refers to a system in which members (city) of an organization (country) are ranked according to relative status or authority (dominance). The importance of ranking cities yields the following: firstly, it tells us that within a system of cities, some cities will grow to be larger (population and economy) than other cities; secondly, it refutes the expectation of an optimal size city; and lastly, it establishes cities as belonging to an interrelated network where one city's growth and development affects other cities. The linking of cities not only improves the operational and economic efficiency of a city, region or country, in addition, it creates a myriad of new economic opportunities. More specifically, it creates an integrated network of systems that support the flow of goods, improved infrastructure, increased and more efficient interactions and expanded business involvement, advancing economic integration [11].

If primary cities have the strongest impacts and contributions, why consider secondary cities as fundamental? According to McKinsey [13], the international spotlight turned to secondary cities as the principal drivers of global economic growth. Secondary cities are considered important catalysts for a more balanced and dispersed growth across a country and are seen as important for two basic reasons:

1. Secondary cities are seen as alternative urban centres, to relieve pressure from primary cities since migrants from rural areas normally flock to secondary cities first. This is especially important from a national context where urbanisation skewed economic space development, with most economic and demographic activities occurring in only a few cities. The South African context provides a good example considering that more than 50% of economic activities and more than 40% of population distribution occur in the Gauteng (City of Johannesburg; Tshwane and Ekurhuleni), Cape Town and Durban (eThekwini) regions alone.

2. Secondary cities will play an important catalysing role relating to their surrounding hinterland i.e. secondary cities having central place functions, in other words, secondary cities act as markets for the agricultural produce of their surrounding farmlands, as administrative and service centres for their hinterlands and as interconnected links between cities and functional regions i.e. according to Bolay and Rabinovich [14], secondary cities mediate between rural areas and the larger urban areas.

The key question is; what constitutes a secondary city? Originally Rondineli [15] made the argument that a country normally has only one primary city—the city with the largest population—and that all the other towns or cities with a population count above 100,000 are considered secondary cities. With population size as the main criterion to identify a city's position, much of the academic literature draws on demographer Kingsley Davis' definition of a population size between 100,000 and 500,000 to identify secondary cities, which in essence implies that a country can have more than one primate city. Beyond population size, more recent debates from organisations such as the World Bank (WB) [16–19], European Union (EU) [20] and major policy think-tanks have begun to look at various other characteristics that could be considered important to define secondary cities. Table 1 illustrates what is considered international characteristics of secondary cities.

Table 1. Internationally proposed characteristics of secondary cities.

Feature	Indicator
Population size	The total number of people living in the city
Population density	The number of people living within 1 square kilometre
Size and nature of city economy	The contribution the city makes to the national economy
Economic growth rate	The rate at which the city's economy is growing
Economic advantages	The competitive advantages and opportunities the city provides
Per capita income	The average income individuals earn
Regional importance of city	The administrative and regional importance the city provides
Administrative status of city	The seat of local government headquarters
Education infrastructure	The availability of universities and/or good schooling systems
Technology intensity	The presence of technology-based industries
Availability of skilled labour	The readiness of skilled or knowledgeable people
Capacity for innovation and creativity	The infrastructure and leadership to foster innovation and creativity
Multiple business-language skills	The fluency in multi-languages to conduct business
High quality of life	The access to culture and recreational opportunities
Urban governance	The performance of institutions that govern the city

Note: Source: [13,16–20].

3. The South African urban network

South Africa's cities, towns and localities have developed and became hierarchised over the course of history during which population settlements and their distribution have been influenced by colonisation, segregation, industrialisation and globalisation [21]. From 1911, South Africa has undergone an extended phase of intense urban growth with areas, such as Johannesburg, Cape Town and Durban (eThekwini), agglomerating into dominating economic spaces [6]. The end of Apartheid

in 1994 was hailed with optimism by many as South Africa became one of the most advanced countries in Africa, with thriving cities integrated into global economies [22].

The political changes after 1994 had a profound impact on population and economic distribution patterns [23]. The reason is considered against the background of colonialism and Apartheid when areas were (spatially) excluded, and this exclusion hampered economic development and growth. During the period after 1994, when Apartheid had ended, many people who had been prevented from migrating in the past, left rural areas for urban areas. This migration of people—mostly characterised by large numbers of African people and largely triggered by Todaro's [24] "bright lights syndrome" — was essentially productivism-oriented i.e. when people migrate primarily with the aim of finding employment [22,25]. The migration caused unprecedented population explosions in towns and cities of all sizes in the country. National government introduced several acts, policies and programmes aimed at redressing the spatial legacies of colonial and Apartheid rule. The government initiatives were directed at strengthening economic development, creating strategic regional, inter-regional and inter-governmental planning platforms [23,26,27].

There is a growing international awareness that location and place, which in essence refer to regions and urban areas, are important elements for growth and development. The growing international awareness has had an important influence on various development approaches promoted by organisations such as the United Nations (UN), the Organisation for Economic Co-operation and Development (OECD), the European Commission (EC) and the World Bank (WB), where extensive rethinking followed, which promoted the benefits of urbanisation as a result of the advantages cities offer for economic and social development. According to Van Huyssteen et al. [6], the CSIR developed a regional functional index as part of the National Spatial Trends Overview project commissioned by the South African City Network (SACN). Subsequently, the Presidency and the Department of Provincial and Local Government (DPLG) (and later Cooperative Governance and Traditional Affairs [CoGTA]) used the index to inform Cabinet on urban development policy aspects as well as during the process of developing a National Urban Development Framework (NUDF) (and later Integrated Urban Development Framework [IUDF]). The development of the index was based on a classification of settlement patterns considering three main functionalities [26]:

1. Size—Reflects the agglomeration of economies and population.

2. Function—Indicates an area's economic role, e.g. mining, manufacturing and tourism, and its role in terms of public and private service delivery.

3. Institutional legacy—Reflects inherited characteristics of past policies, particularly the land-use policies that fostered economic and residential segregation within cities.

Applying the functional index allowed for the delimitation of the economic catchment areas of each settlement in the country and was used, simultaneously, to determine nested patterns of higher- and lower-order centres in the country's hierarchy of central places. Functional analysis entails the characterisation of regional economic systems, in terms of dominant functions and their order of magnitude in their central places, to the actual and potential systematic linkages and relationships between economic composition and places. The importance of the index is found in the latter showing how the country can be subdivided into functional areas based on the economic catchment areas of higher-order centres, which, in turn, will determine spatial targeting: The functional index provides a mechanism to profile, identify, calculate and analyse a set of development information and trends pertaining to the range of towns and cities across South Africa. This simplifies the analysis of the network of towns and cities and their hierarchical and functional relationships in

relation to economic spaces. The index has subsequently been used in the National Development Plan [NDP] as a parameter to classify cities in South Africa [23,28].

The index provides a description of a "network of towns" as a continuous landscape, which is interrelated through complex economic, social, political and environmental forces. This means that the discrete consideration of lower-order centre development as completely distinct from higher-order centre development is, therefore, no longer valid. Instead, the index provides a balanced approach, which addresses both ends of the continuum rather than lower-order centres in isolation from higher-order centres. In summary, the index provides an inclusive development framework that complements the current and emerging economic development in South Africa. Table 2 provides a breakdown of the categories and classification criteria, defining the South African urban system and, ultimately, the distribution of economic spaces.

Table 2. Urban system classification in South Africa

Category	Classification criteria
City regions (National Urban Regions)	*Size of population:* above one million; *Size and nature of the economy (ESI > 5):* high level of economic activity in a diversified range of sectors; *Settlement structure:* multi-nodal.
Cities (National Urban Nodes)	*Size of population:* between 500000 and one million; *Size and nature of the economy (ESI 2–5):* medium-high level of economic activity in a diversified range of sectors; *Settlement structure:* one dominant node.
Regional Service Centres (Regional Development Anchors)	*Size of population* (three subclasses): i) 300 k–500 k; ii) 100 k–300 k; iii) 100 k–40 k; *Size and nature of the economy (ESI 0.25–2):* medium level of economic activity in a diversified range of sectors.
Service, and Local and Niche towns (Rural Service Centres)	*Size of population* (two subclasses): i) 20 k and 40 k; ii) varied; *Size and nature of the economy (ESI 0.065–0.25):* medium–low level of economic activity, mostly in the service sectors; *Settlement structure/function:* the principal node of a strong, predominantly agricultural or subsistence-focused local region.
High Density/Dense and Sparse Rural Settlements (Other Smaller Towns and Settlements)	*Size of population:* (two subclasses): i) > 100 persons/km^2; ii) > 10 persons/km^2; *Size and nature of the economy (ESI < 0.065):* mostly low-level subsistence activity; *Settlement structure/function:* non-nodal areas with a significant spatial footprint; *Settlement structure/function:* i) a limited range of services to a small or sparsely populated hinterland; or ii) specific niche services (such as tourism); or iii) non-nodal areas with a significant spatial footprint.

Note: Source: [3,23,26].

According to the classification, there are five main urban systems, with City regions being the most dominant. The City regions comprise Gauteng (City of Johannesburg; Tshwane and Ekurhuleni), Cape Town, Durban (eThekwini) and Nelson Mandela Bay (Port Elizabeth)—each having the highest level of economic activities. A spatial analysis of the urban categories suggests that the City regions and cities significantly dominate the South African economic spaces. Furthermore, a sector analysis of the City regions and Cities not only identifies diverse economies that play a significant role as the core cylinder of South Africa's agglomeration economies, but also that City regions and Cities provide key linkages for comparative advantages and development opportunities [6,29].

In retrospect, city regions and cities could potentially be considered an appropriate criterion to classify primary and secondary cities. However, although the above index provides for a balanced approach addressing both ends of the continuum, John [4] asserted that the notion of what constitutes secondary cities in the South African context is hugely underdeveloped. The reason revolves around the growing interest in the subject of metropolitan regions. Currently, eight South African cities i.e. Johannesburg, Pretoria (Tshwane), Ekurhuleni, Cape Town, Durban (eThekwini), Port Elizabeth (Nelson Mandela Bay), East London (Buffalo City) and Bloemfontein (Mangaung) are governed by metropolitan regions and may therefore also be reasonably considered as South Africa's primary cities. However, this declaration has led many South African cities to question what changes or economic dynamism need to occur for a city or town to be considered an aspiring metro. Are secondary cities the same as being an aspiring metro or do the two types of apexes offer different opportunities and contribute different investments to the national space economy? To shed light on this notion, the following sections of the paper will focus on varying approaches employed to profile secondary cities in South Africa as well as a potential unobstructed or differentiated approach that sanctions a degree of objectivity.

4. Mixed methods of profiling secondary cities in South Africa

Our research methodology is based on a pragmatic paradigm, using a sequential mixed-method methodological approach. Case studies, as part of our research design, together with intervention research design form the core of our empirical analysis. In the view of Marais and Nel [30], research interest in secondary cities has steadily been growing since 2011. The interest as mentioned was triggered by the growing interest in the subject of metropolitan regions. The South African government, urged by political pressure, expanded the number of metropolitan areas from six to eight (see previous paragraph). This prompted the South African Cities Network (SACN) to initiate and fund research on secondary cities, focusing on how government should treat secondary cities differently in policy and programmes. Besides the focus of the SACN, secondary cities have also been receiving increasing policy attention, which includes renewed international attention in the New Urban Agenda [31]. John [4] alluded to the notion that due to the underdeveloped nature of what or how to approach secondary cities, there is no official list of secondary cities available in South Africa. To shed light on the dilemma of an underdeveloped nature we first undertook a comparative analysis examining a set of case studies. We focused on four distinct cases, namely 1) National Treasury (National Department) applying international characteristics as an indicator; 2) CoGTA (National Department) who developed a set of Intermediate City Municipalities (ICMs) applying weightings as an indicator; 3) integrated focusing on spatial change and the mechanisms that influence spatial change; and 4) population grid cells intersected with point data deriving selection criterion at specific population size intervals. Lastly and to promote an alternative that sanctions a greater degree of objectivity, we looked at the role central functions play as an important determining factor when establishing a city's place, by measuring the degree of interaction that exists between cities. For the paper we used the data descriptively.

4.1. National treasury

National Treasury, although considered by Marais and Cloete [8] as arbitrary, provided a quasi-official list, which forms part of Treasury's Cities Support Programme (CSP) of 22 secondary cities.

Table 3 illustrates the 22 secondary cities provided by National Treasury. National Treasury used population and the size of the economy (GVA by Region) as the key indicators to identify the 22 cities as secondary. To present a more comprehensive picture of what constitutes a potential secondary city National Treasury individually profiled each of the 22 secondary cities using indicators derived from the international characteristics provided in Table 1. The outcome suggested that only the indicators listed below are considered pertinent when elevating cities as secondary in the South African context. The indicators are:

1. The size of a city's population—displays demographic strength as an important indicator of significance when contributing towards the country's national space economy—indicated by the number of people.

2. Population density—a key legislative criterion that defines whether an urban area is evolving into a more complex urban centre—indicated by the number of people per square kilometre.

3. The size of a city's economy—displays the role and contribution a city plays towards the country's national space economy—indicated by the city's GVA by Region.

4. Economic growth rates—display which cities are on a pathway of sustained economic success due to consistently recorded strong economic growth—indicated by the economic growth rate.

5. Personal income levels (per capita income levels)—a telling indicator illustrating whether a city is evolving into a stronger urban centre—indicated by the average income per person.

6. Municipal budget—to effect significant development changes and what reasonable proportion of its own revenue is generated by the municipality—i.e. own revenue generated.

7. Money a municipality spends on each citizen—displays how much a municipality has at its disposal to improve the lives of its citizens—indicated by the per capita revenue.

It should be mentioned that the international characteristics were only applied to the 22 cities and no other cities were considered. The eight metropolitan regions governed by metropolitan regions were therefore not considered.

Table 3. National Treasury's list of secondary cities

No	Municipality	Major town/city	No	Municipality	Major town/city
1	Matjhabeng	Welkom	12	Steve Tshwete	Middelburg
2	Emfuleni	Vereeniging	13	City of Matlosana	Klerksdorp
3	Mogale City	Krugersdorp	14	Madibeng	Brits
4	Msunduzi	Pietermaritzburg	15	Mahikeng	Mahikeng
5	Newcastle	Newcastle	16	Rustenburg	Rustenburg
6	Umhlathuze	Richards Bay	17	Tlokwe	Potchefstroom
7	Lephalale	Ellisras	18	Khara Hais	Upington
8	Polokwane	Pietersburg	19	Sol Plaatje	Kimberley
9	Emalahleni	Witbank	20	Drakenstein	Paarl
10	Govan Mbeki	Secunda	21	George	George
11	Mbombela	Nelspruit	22	Stellenbosch	Stellenbosch

Note: Source: [4] and [12].

4.2. Cooperative government and traditional affairs (CoGTA)

In moving beyond the City Support Program (CSP), CoGTA decided to develop a set of ICMs, which can constitute potential secondary cities. CoGTA also, for the same reasons as National Treasury, did not consider the eight metropolitan regions.

In developing the set of ICMs, CoGTA [32] considered more than 100 potential urban areas. In considering the potential urban areas CoGTA looked at 1) the size of the population in areas greater than 1,000 people per square kilometre and 2) how these relate to economic strength using Gross Domestic Product (GDP) as the basis, whereafter the urban areas were then ranked according to GDP. Following this, the urban size rankings were compared applying the following weightings: 1. Urban population and GDP ranking—equally weighted; 2. GDP ranking—weighted as twice urban population ranking (2 to 1); 3. Urban population ranking—weighted as twice GDP ranking (2 to 1); 4. GDP to urban population—weighted 1.5 to 1; 5. Urban population to GDP—weighted 1.5 to 1.

A methodology was then used to compare the various rankings in order to identify which cities scored highest on both the urban size and GDP—generally in the top 46. The cities that scored the highest, as illustrated by Table 4, were recommended as ICM or potential secondary cities.

Table 4. Intermediate Cities (secondary cities) identified by CoGTA

No	Municipality	Major town/city	No	Municipality	Major town/city
1	Emfuleni	Vereeniging	21	Rand West	Westonaria
2	Msunduzi	Pietermaritzburg	22	Mogalakwena	Mokopane
3	Mbombela	Nelspruit	23	Drakenstein	Paarl
4	Polokwane	Pietersburg	24	Steve Tshwete	Middelburg
5	Rustenburg	Rustenburg	25	Mahikeng	Mahikeng
6	Matjhabeng	Welkom	26	KwaDukuza	Stanger
7	Emalahleni	Witbank	27	Merafong City	Carletonville
8	City of Matlosana	Klerksdorp	28	Tlokwe	Potchefstroom
9	Madibeng	Brits	29	Enoch Mgijima	Queenstown
10	Bushbuckridge	Bushbuckridge	30	Alfred Duma	Ladysmith
11	Mogale City	Krugersdorp	31	Tubatse/Fetakgomo	Burgersfort
12	Newcastle	Newcastle	32	George	George
13	Maluti a Phofung	Harrismith	33	Greater Giyani	Giyani
14	Nkomazi	Komatipoort	34	King Sabata Dalindyebo	Mthatha
15	Makhado	Louis Trichardt	35	Metsimaholo	Sasolburg
16	Govan Mbeki	Secunda	36	Ray Nkonyeni	Port Shepstone
17	Greater Tzaneen	Tzaneen	37	Ba-Phalaborwa	Phalaborwa
18	Umhlathuze	Richards Bay	38	Stellenbosch	Stellenbosch
19	Thulamela	Thohoyandou	39	Lephalale	Ellisras
20	Sol Plaatje	Kimberley			

Note: Source: [32].

4.3. Integrated approach

Marais and Nel [30] in their research, "Space and planning in secondary cities: Reflections from South Africa", focused on complexity as their theoretical foundation. Their research proposes that while there is no single definition of complexity, there is consensus on the features of complexity; the most notable being change. Complex systems are made up of many interacting elements or agents and can change and adapt over time, which aligns with Oranje, Meiklejohn and Van Huyssteen's [33] observation that the dynamic qualities of an area are developed historically and culturally over a duration of time. Complexity arises from interactions, and the interactions and their relationships determine the structure of the system, resulting in self-organisation. Self-organisation, on the other hand, enables the system to control itself, innovate, regenerate and adapt.

While CoGTA considered more than 100 potential urban areas, Marais and Nel [30] stayed with the quasi-list of 22 secondary cities provided by National Treasury. From the 22 cities, they selected 10 as part of a case study (see Table 5). For the case study, they focused largely on spatial changes and identified mechanisms that tend to influence these. For each of the 10 cities, they analysed policies (mostly Spatial Development Frameworks [SDFs]), conducted interviews (respondents from the public sector, business and civil society) and studied other relevant data (infrastructure access, housing, and population movements) on spatial change. They concluded that secondary cities are complex social and ecological systems with their own dynamic qualities, which correlates with Pumain's [34] submission that the spatial configuration of cities, their size and spacing, are the product of more or less constant processes whereby towns and cities are adapted to modifications and adjustments. Marais and Nel [30] did not develop a specific approach and yet, one can nonetheless surmise that spatial change or transformation measured against certain mechanisms or processes could be applied as potential criteria to identify secondary cities. In their case, they considered policies, the public sector, business and civil society opinions and other data such as infrastructure access, housing and population movements as key mechanisms when identifying secondary cities.

Table 5. The secondary cities selected from Treasury's list of secondary cities.

No	Municipality	Major town/city	No	Municipality	Major town/city
1	Drakenstein	Paarl	6	Msunduzi	Pietermaritzburg
2	Lephalale	Ellisras	7	Polokwane	Pietersburg
3	Mahikeng	Mahikeng	8	Rustenburg	Rustenburg
4	Matjhabeng	Welkom	9	Sol Plaatje	Kimberley
5	Mbombela	Nelspruit	10	Stellenbosch	Stellenbosch

Note: Source: [30].

4.4. Population grid cells

Zimmer et al. [35] in their research on the dynamics of population growth in secondary cities across southern Africa, quantified the spatial distribution and temporal patterns of secondary urban areas in eight countries (Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe) across the region between 1975 and 2015. To identify secondary cities, Zimmer et al. [35] followed a two-step approach, which was originally developed by Tuholske et al. [36]. First, urban area point

locations were identified. Then grid cells with a population density of 1,500 people per km ^{2} or greater were created. Each of the grid cells was intersected with the point data to create an urban polygon. Each polygon was then augmented by adding adjacent grids that had a population density value of 300 people per km ^{2}or more. This allowed for the inclusion of adjoining suburban and peri-urban areas.

For the second step, the gridded population values within the urban areas were summed up to derive a total urban area population estimate. This was performed for each of the selected intervals between 1975 and 2015. A selection criterion on the 1975 population to include only those urban areas with populations between 500 and 100,000 was then imposed. This step eventually retained 629 urban areas that constituted secondary cities. From the 629 retained, 361 were identified as secondary cities belonging to South Africa (see Table 6).

The definition used by Zimmer et al. [35] of secondary cities is similar to those developed by Rondinelli [15] and Tuholske et al. [36]. Tuholske et al. [36] used 5,000 as a minimum population size, however, Zimmer et al. [35] consider a threshold of 500 to ensure that urban areas that by 2015 had populations larger than 5,000 are included. Furthermore, they used the maximum value of 100,000 to exclude larger urban areas, which they considered primary cities.

The above profiles perceived different prospects. National Treasury and CoGTA mainly focused on the population and economy sizes as the applied criterion. The integrated approach focused on mechanisms such as policies and interest groups' influences on spatial planning and what the intended and unintended consequences for spatial transformation are. Population grid cells focused on population density intersected with point data to create urban areas that were summed to derive a selection criterion at a specific interval that imposes urban areas with a population size across certain range values.

A potential critique would be that all four approaches worked on the assumption that cities under metropolitan management, or above a certain range value, are by default classified as a primary city, which brings forward the question raised by John [4] whether secondary cities are the same as an aspiring metro or do the two types of apexes offer different opportunities? The assumption also raises the question around the role of subjectivity, such as the role political interference plays in determining potential secondary cities, which in retrospect corroborate John's [4] notion that what constitute secondary cities in the South African context is hugely underdeveloped. The underdeveloped nature is further emphasised considering how the methods applied for each of the above profiles deviate from one another. In an effort to replace any potential consideration or method, the next section will focus on the role that interconnected regional networks can play as a potential unobstructed or differentiated approach to profile South African cities.

Table 6. Secondary cities identified through the creation of population grid cells.

No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city
1	Dr Beyers Naude	Aberdeen	91	Mbhashe	Dutywa	181	Polokwane	Laaste Hoop	271	Tsantsabane	Postmasburg
2	Bushbuckridge	Acornhoek	92	Oudtshoorn	Dysselsdorp	182	Kannaland	Ladismith	272	JB Marks	Potchefstroom
3	Sundays River Valley	Addo	93	Ngwathe	Edenville	183	Senqu	Lady Grey	273	Siyathemba	Prieska
4	Raymond Mhlaba	Adelaide	94	City of Mbombela	eGobhoza	184	Mantsopa	Ladybrand	274	Prince Albert	Prince Albert
5	Hessequa	Albertinia	95	Makhado	Elim	185	Laingsburg	Laingsburg	275	Greater Taung	Pudimoe
6	Ndlambe	Alexandria	96	Chief Albert Luthuli	eLukwatini	186	Cederberg	Lambert's Bay	276	Rand West City	Randfontein
7	Raymond Mhlaba	Alice	97	Emalahleni	Emalahleni	187	Saldanha Bay	Langebaan	277	Rustenburg	Rasimone
8	Makana	Alicedale	98	Umzimvubu	Mount Ayliff	188	Kai !Garib	Langverwag	278	City of Tshwane	Rayton
9	Walter Sisulu	Aliwal North	99	Mkhondo	Piet Retief	189	Lepele-Nkumpi	Lebowakgomo	279	Kopanong	Reddersburg
10	Matjhabeng	Allanridge	100	Abaqulusi	eMondlo	190	Madibeng	Letlhabile	280	uMhlathuze	Richards Bay
11	Fetakgomo Tubatse	Alverton	101	uMhlathuze	Empangeni	191	Ditsobotla	Lichtenburg	281	Richmond	Richmond
12	Dr Pixley Ka Isaka Seme	Amersfoort	102	Msukaligwa	Ermelo	192	Kgatelopele	Lime Acres	282	Ubuntu	Richmond
13	Mkhondo	Amsterdam	103	uMlalazi	Eshowe	193	Nketoana	Lindley	283	Madibeng	Rietgat
14	Langeberg	Ashton	104	Inkosi Langalibalele	Estcourt	194	Makhado	Louis Trichardt	284	Hessequa	Riversdale
15	City of Cape Town	Atlantis	105	Govan Mbeki	Evander	195	Ba-Phalaborwa	Lulekani	285	Theewaterskloof	Riviersonderend
16	KwaDukuza	Ballito	106	Mantsopa	Excelsior	196	Ngquza Hill	Lusikisiki	286	Langeberg	Robertson
17	uPhongolo	Bambanandi	107	Alfred Duma	Ezakheni	197	Emakhazeni	Machadodorp	287	Mohokare	Rouxville
18	Madibeng	Bapong	108	Kopanong	Fauresmith	198	Elundini	Maclear	288	Thaba Chweu	Sabie
19	City of Mbombela	Barberton	109	Setsoto	Ficksburg	199	Moses Kotane	Madikwe	289	Saldanha Bay	Saldanha
20	Senqu	Barkly East	110	Ngquza Hill	Flagstaff	200	Mogale City	Magaliesburg	290	Moses Kotane	Sandfontein
21	Dikgatlong	Barkly West	111	Raymond Mhlaba	Fort Beaufort	201	Greater Taung	Magogong	291	Rustenburg	Saron
22	Swellendam	Barrydale	112	Rustenburg	Ga-Luka	202	Maruleng	Makgaung	292	Metsimaholo	Sasolburg
23	Beaufort West	Beaufort West	113	Ga-Segonyana	Ga-Motlhware	203	Makana	Grahamstown	293	Umdoni	Scottburgh
24	Raymond Mhlaba	Bedford	114	Overstrand	Gansbaai	204	Maquassi Hills	Makwassie	294	Govan Mbeki	Secunda
25	Bela-Bela	Bela-Bela	115	Theewaterskloof	Genadendal	205	Collins Chabane	Malamulele	295	Knysna	Sedgefield

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No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city
26	Witzenberg	Bella Vista	116	George	George	206	Swartland	Malmesbury	296	Madibeng	Segwaelane
27	Govan Mbeki	Bethal	117	Greater Giyani	Giyani	207	Matatiele	Maluti	297	Mogalakwena	Sekgakgapeng
28	Rustenburg	Bethanie	118	Endumeni	Glencoe	208	Umhlabuyalingana	Manguzi	298	Setsoto	Senekal
29	Dihlabeng	Bethlehem	119	Buffalo City	Gonubie	209	Greater Taung	Manokwane	299	Mafikeng	Seweding
30	Kopanong	Bethulie	120	Dr Beyers Naude	Graaff-Reinet	210	Makhado	Manyii	300	Dr JS Moroka	Siyabuswa
31	Buffalo City	Bhisho	121	Cederberg	Graafwater	211	Ray Nkonyeni	Margate	301	Blue Crane Route	Somerset East
32	Mbizana	Bizana	122	Theewaterskloof	Grabouw	212	Rustenburg	Marikana	302	Nama Khoi	Springbok
33	Lekwa-Teemane	Bloemhof	123	Umvoti	Greytown	213	Setsoto	Marquard	303	Lekwa	Standerton
34	Thaba Chweu	Boromatshini	124	Siyancuma	Griekwastad	214	Thaba Chweu	Lydenburg	304	Overstrand	Stanford
35	Tokologo	Boshof	125	Elias Motsoaledi	Groblersdal	215	Matatiele	Matatiele	305	Naledi	Stella
36	Theewaterskloof	Botrivier	126	!Kheis	Groblershoop	216	City of Mbombela	Matsulu	306	Stellenbosch	Stellenbosch
37	Masilonyana	Brandfort	127	Rustenburg	Haartbeesfontein	217	Langeberg	McGregor	307	Enoch Mgijima	Sterkstroom
38	Cape Agulhas	Bredasdorp	128	Kouga	Hankey	218	City of Cape Town	Melkbosstrand	308	Moqhaka	Steynsrus
39	Madibeng	Brits	129	Emthanjeni	Hanover	219	Matjhabeng	Meloding	309	Dr Beyers Naude	Steytlerville
40	Emthanjeni	Britstown	130	uMuziwabantu	Harding	220	Inxuba Yethemba	Middelburg	310	City of Matlosana	Stilfontein
41	City of Tshwane	Bronkhorstspruit	131	Matjhabeng	Harmony	221	Steve Tshwete	Middelburg	311	City of Cape Town	Strand
42	Mangaung	Bultfontein	132	Phokwane	Hartswater	222	Bushbuckridge	Mkhulu	312	Thembelihle	Strydenburg
43	Tswelopele	Bultfontein	133	Lesedi	Heidelberg	223	Moses Kotane	Mmantserre	313	Amahlathi	Stutterheim
44	Walter Sisulu	Burgersdorp	134	Hessequa	Heidelberg	224	Modimolle-Mookgophong	Modimolle	314	Karoo Hoogland	Sutherland
45	Fetakgomo Tubatse	Burgersfort	135	Ngwathe	Heilbron	225	Molemole	Mogwadi	315	Kgetlengrivier	Swartruggens
46	Bushbuckridge	Bushbuckridge	136	Steve Tshwete	Hendrina	226	Moses Kotane	Mogwase	316	Swellendam	Swellendam
47	Mnquma	Butterworth	137	Overstrand	Hermanus	227	Enoch Mgijima	Molteno	317	Ntabankulu	Tabankulu
48	Sakhisizwe	Cala	138	Tokologo	Hertzogville	228	Rustenburg	Monnakato	318	Enoch Mgijima	Tarkastad
49	Theewaterskloof	Caledon	139	Setsoto	Clocolan	229	Langeberg	Montagu	319	Thabazimbi	Thabazimbi
50	Kannaland	Calitzdorp	140	Big Five Hlabisa	Hluhluwe	230	Nala	Monyekeng	320	Renosterberg	Thembinkosi
51	Hantam	Calvinia	141	Tswelopele	Hoopstad	231	Madibeng	Mooinooi	321	Masilonyana	Theunissen
52	Merafong City	Carletonville	142	Saldanha Bay	Hopefield	232	Mpofana	Mooirivier	322	eThekwini	Tongaat

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No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city
53	Kareeberg	Carnarvon	143	Thembelihle	Hopetown	233	Modimolle-Mookgophong	Mookgophong	323	Breede Valley	Touws River
54	Chief Albert Luthuli	Carolina	144	City of Cape Town	Hout Bay	234	Swartland	Moorreesburg	324	Kopanong	Trompsburg
55	Matatiele	Cedarville	145	uMngeni	Howick	235	Mossel Bay	Mossel Bay	325	Mhlontlo	Tsolo
56	Witzenberg	Ceres	146	Kouga	Humansdorp	236	Ga-Segonyana	Mothibi	326	Witzenberg	Tulbagh
57	KwaDukuza	Chakaskraal	147	Madibeng	Ifafi	237	Elundini	Mount Fletcher	327	Mafube	Tweeling
58	Rustenburg	Chaneng	148	Emalahleni	Indwe	238	eThekwini	Mpumalanga	328	Mantsopa	Tweespruit
59	Lekwa-Teemane	Christiana	149	Kopanong	Jagersfontein	239	Mtubatuba	Mtubatuba	329	Greater Tzaneen	Tzaneen
60	Polokwane	Chuenespoort	150	Walter Sisulu	Jamestown	240	Musina	Musina	330	Elundini	Ugie
61	Kai !Garib	Cillie	151	Phokwane	Jan Kempdorp	241	Umzimvubu	Mount Frere	331	Nelson Mandela Bay	Uitenhage
62	Cederberg	Citrusdal	152	Dr Beyers Naude	Jansenville	242	Cape Agulhas	Napier	332	Ulundi	Ulundi
63	Cederberg	Clanwilliam	153	Kouga	Jeffreys Bay	243	Witzenberg	Nduli	333	eThekwini	Umkomaas
64	Umsobomvu	Colesberg	154	Nkomazi	Jeppe's Reef	244	Newcastle	Newcastle	334	George	Uniondale
65	Ditsobotla	Coligny	155	City of Mbombela	Jerusalem	245	Engcobo	Ngcobo	335	Modimolle-Mookgophong	Vaalwater
66	Blue Crane Route	Cookhouse	156	Mogale City	Kagiso	246	Ekurhuleni	Nigel	336	Matzikama	Vanrhynsdorp
67	Mafube	Cornelia	157	City of Mbombela	Kamagugu	247	Kouga	Noorshoek	337	Matjhabeng	Ventersburg
68	Inxuba Yethemba	Cradock	158	Nkomazi	KaMaqhekeza	248	Thabazimbi	Northam	338	JB Marks	Ventersdorp
69	Amahlathi	Cumakala	159	Kai !Garib	Kenhardt	249	Umsobomvu	Noupoort	339	Thembisile	Verena
70	Dr Pixley Ka Isaka Seme	Daggakraal	160	Ndlambe	Kenton-on-Sea	250	Nqutu	Nqutu	340	Ubuntu	Victoria West
71	Madibeng	Damonsville	161	Nala	Kgotsong	251	Matjhabeng	Odendaalsrus	341	Moqhaka	Viljoenskroon
72	Kgatelopele	Danielskuil	162	Sakhisizwe	Elliot	252	City of Matlosana	Orkney	342	Mafube	Villiers
73	Dannhauser	Dannhauser	163	City of Matlosana	Khuma	253	Oudtshoorn	Oudtshoorn	343	Theewaterskloof	Villiersdorp
74	Swartland	Darling	164	Sol Plaatje	Kimberley	254	Drakenstein	Paarl	344	Dr Pixley Ka Isaka Seme	Volksrust
75	Emthanjeni	De Aar	165	Buffalo City	King William's Town	255	Dawid Kruiper	Paballelo	345	Ngwathe	Vredefort
76	Breede Valley	De Doorns	166	Sundays River Valley	Kirkwood	256	Ngwathe	Parys	346	Saldanha Bay	Vredenburg
77	Breede Valley	De Nova	167	Matzikama	Klawer	257	Sundays River	Paterson	347	Naledi	Vryburg

Valley

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No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city	No	Municipality	Major town/city
78	Oudtshoorn	De Rust	168	Overstrand	Kleinmond	258	Blue Crane Route	Pearston	348	Abaqulusi	Vryheid
79	Tswaing	Delareyville	169	City of Matlosana	Klerksdorp	259	Nketoana	Petsana	349	Dr Pixley Ka Isaka Seme	Wakkerstroom
80	Victor Khanye	Delmas	170	Knysna	Knysna	260	Ba-Phalaborwa	Phalaborwa	350	Phumelela	Warden
81	Metsimaholo	Deneysville	171	Letsemeng	Koffiefontein	261	Rustenburg	Phatsima	351	Magareng	Warrenton
82	Fetakgomo Tubatse	Derde Gelid	172	Greater Kokstad	Kokstad	262	Kopanong	Philippolis	352	Emakhazeni	Waterval Boven
83	Mangaung	Dewetsdorp	173	Enoch Mgijima	Queenstown	263	Rustenburg	Phokeng	353	Mangaung	Wepener
84	Thaba Chweu	Didimala	174	Great Kei	Komga	264	Bergrivier	Piketberg	354	City of Mbombela	White River
85	Buffalo City	Dimbaza	175	Kgetlengrivier	Koster	265	Bitou	Plettenberg Bay	355	Karoo Hoogland	Williston
86	Mantsopa	Dipelaneng	176	Emalahleni	Kriel	266	Kh ǂói-Ma	Pofadder	356	Dr Beyers Naude	Willowmore
87	Emalahleni	Dordrecht	177	Moqhaka	Kroonstad	267	Polokwane	Polokwane	357	Masilonyana	Winburg
88	Siyancuma	Douglas	178	Ga-Segonyana	Kuruman	268	Ndlambe	Port Alfred	358	Maquassi Hills	Wolmaransstad
89	Steve Tshwete	Douglas	179	Matjhabeng	Kutlwanong	269	Ray Nkonyeni	Port Shepstone	359	Breede Valley	Worcester
90	Endumeni	Dundee	180	Thembisile	KwaMhlanga	270	Bergrivier	Porterville	360	Mohokare	Zastron
									361	Ramotshere Moiloa	Zeerust

Note: Source: [35].

5. Interconnected regional networks

Brand and Drewes [37] alluded to the notion that interconnected networks and the role that central functions play, are an important determining factor when establishing a city's place. The degree of variation between interconnected regional networks and the approaches presented above is based on the notion that cities are functional areas made up of multiple towns. This creates a spatial structure that allows for the broader inclusion of cities when establishing a city's place. Cities' proximity to one another or commuting distance establishes functionality, which allows cities classified at a lower order to be elevated into a higher order. In the development of a quantitative theory around the use of corridor development as a strategic and supporting instrument for the development of national space economies, Brand and Drewes [37] considered interconnected regional networks to measure the degree of interaction between cities. They concluded that the degree of interaction that also relates to complexity provides for a potential unobstructed approach to establish the place of a city within the overall hierarchy of cities.

Measuring the degree of interaction, as illustrated in Table 7, revolves around four key considerations. The first consideration establishes the general functional network of cities based on functional typology. It uses an Urban Function Index (UFI) as well as a city typology to determine the economic weight of urban settlements relative to one another, and to distinguish between the sizes of the commercial, service and industrial components of urban economies. In essence, it determines the relative economic dominance of cities in relation to one another. The second consideration converts, when considering synergy, the general network of cities into regional development nodes. Settlements have recently been linked to the daily and weekly urban system concepts advanced by Geyer and Geyer [38] and are used to quantify the relationships and flows (synergy) that exist between cities within a network. The outcome elevates cities, lower as well as higher order, into broader regional development nodes when consideration is given to the concept of synergy i.e. proximity—the commuting distance between cities—when establishing functionality of central places. The third consideration determines the degree of economic attraction or economic output exerted by each regional development node. The degree of economic attraction exerted by each regional development node is based on its economic weight, which is referred to as the Economic Impact Factor (EIF). The outcome elevates the status, or place, of the most dominant regional development nodes based on their degree of economic attraction exerted. The fourth consideration converts the network of regional development nodes into a functional index. The economic weight from the EIF provides for a natural break, which translates into a ranking score thereby allowing the opportunity to categorise each regional development node as either 1) mega, 2) primary, 3) secondary or 4) intermediate. The regional index in essence identifies a city's 'place' of functionality (performance) within a network.

Table 7. Interconnected regional networks.

Regional node	Municipality	City/Town	Classification	Regional node	Municipality	City/Town	Classification
1	Nelson Mandela Bay	Port Elizabeth	Secondary	18	Polokwane	Polokwane	Secondary
2	Buffalo City	East London	Secondary	19	Greater Tzaneen	Tzaneen	Below Intermediate
3	King Sabata Dalindyebo	Mthatha	Below Intermediate	20	Makhado	Makhado	Intermediate
4	Lukanji	Queenstown	Below Intermediate	21	Mogalakwena	Mokopane	Below Intermediate
5	Makana	Grahamstown	Below Intermediate	22	Mbombela	Nelspruit	Secondary
6	Mangaung	Bloemfontein	Secondary	23	Emalahleni	Witbank	Secondary
7	Matjhabeng	Welkom	Intermediate		Steve Tshwete	Middelburg	
8	Moqhaka	Kroonstad	Intermediate		Govan Mbeki	Secunda	
9	Dihlabeng	Bethlehem	Below Intermediate	24	Msukaligwa	Ermelo	Below Intermediate
10	Maluti a Phofung	Harrismith	Intermediate	25	Sol Plaatjie	Kimberley	Intermediate
11	Ngwathe	Parys	Below Intermediate	26	//Khara Hais	Upington	Below Intermediate
12	Johannesburg	Johannesburg	Mega	27	Nama Khoi	Springbok	Below Intermediate
	City of Tshwane	Tshwane		28	City of Matlosana	Klerksdorp	Secondary
	Madibeng	Brits-Hartbeespoort			Tlokwe City Council	Potchefstroom	
	Ekurhuleni	Ekurhuleni		29	Rustenburg	Rustenburg	Secondary
	Mogale City	Krugersdorp		30	Mafikeng	Mafikeng	Intermediate
	Emfuleni	Vereeniging/Vanderbijlpark			Ditsobotla	Mmabatho	
	Metsimaholo	Sasolburg		31	City of Cape Town	Cape Town	Primary
	Midvaal	Meyerton			Drakenstein	Drakenstein	
	Merafong	Carletonville			Stellenbosch	Stellenbosch	
13	eThekwini	Durban	Primary		Breede Valley	Worcester	
	Umdoni	Scottburgh-Umkomaas			Overstrand	Hermanus	
	KwaDukuza	Stanger		32	George	George	Secondary
	The Msunduzi	Pietermaritzburg			Mossel Bay	Mossel Bay	
14	uMhlathuze	Richardsbay	Secondary		Knysna	Knysna	
	Ntambanana	Empangeni			Oudtshoorn	Oudtshoorn	
15	Newcastle	Newcastle	Intermediate		Bitou	Plettenberg Bay	
16	Emnambithi/Ladysmith	Ladysmith	Below Intermediate	33	Saldanha Bay	Saldanha Bay	Intermediate
17	Abaqulusi	Vryheid	Below Intermediate				

Note: Source: [37].

Interconnected regional networks place a substantial focus on synergy, taking into account 1) proximity—the commuting distance between cities—when establishing functionality of nodes and 2) the degree of economic attraction or economic output levels exerted by regional nodes to elevate the status of a city. One can surmise that the main focus from a regional's perspective revolves around

the association of cities in close proximity to one another when assessing their status, or place, from a *synergetic* apex (mega, primary, secondary or intermediate) i.e. individual cities at a lower order are elevated into a higher order when consideration is given to the concept of synergy. The key question is what permits the interconnected regional networks approach as a notable proxy for an unobstructed approach? Capello and Rietveld [39] analysed the concept of synergy and arrived at two distinct meanings, namely synergy is positive when two or more cities interact, or synergy is externally caused by individual cities that voluntarily, or non-voluntarily, form part of a group of cities. Therefore, as conceptualised by Meijers [40], the assumption is that cities in close proximity to one another relate to each other in a synergetic way making the whole network of cities more than the sum of its parts. The interconnected regional networks approach allows, through the concept of synergy, for the broader inclusion of cities, meaning it broadens the scope of individual cities to be classified as potential aspiring primate cities or aspiring secondary cities, which alludes to John's [4] question of whether secondary cities are the same as an aspiring metro or do they offer different opportunities?

6. Conclusions

Although no specific criteria to distinguish the main characteristics of secondary cities exist it is evident that, irrespective of approach, population size and economic conditions are notably the main characteristics of central functions to determine a city's place within the overall hierarchy of an urban system. Delineating a city's role is important because it will enable government to fully exploit the development potential of a city, thus allowing government to target investment opportunities and structure economic conditions more strategically. Furthermore, the development of a national hierarchy of cities that defines each city's central function within the apex of hierarchies is critical. It can potentially create a realistic spatial perspective on long-term settlement patterns that can be used to transform socio-economic conditions at both primary and secondary level. It can also allow cities to identify opportunities that align with their circumstances, i.e. cities classified as secondary may respond proactively and innovatively to rapid change; realise their economic potential as a consumer, producer, landowner and investor to develop and promote themselves as an aspiring metro or aspiring primate city. Crucial in this context, however, is spatial development policy that supports the aspiring secondary city through relevant incentives. One of the primary reasons secondary cities are identified, is based on the principle that developing countries cannot develop all non-metropolitan towns and cities simultaneously. Accordingly, appropriate policy measures must be considered in support of this delineation process.

Lastly, the key question is which of the above-mentioned representations are considered most fitting when identifying the secondary status, or place, of a city? One can argue that all of the representations are a favourable option to consider, however, it should be emphasised that only the CoGTA and interconnected regional networks approaches considered a ranking score index to classify the secondary status of a city, which allows for a greater degree of objectivity. The main differences, however, allude to the notion that from all the potential approaches discussed, only the interconnected regional network approach allows, through the concept of synergy, for the broader inclusion of cities, which in essence broadens the scope and potential of individual cities as either mega, primary, secondary or intermediate. Lastly, the interconnected regional networks approach

also diminishes the notion that metropolitan regions governed by metropolitan regions are by default considered primary cities.

Conflict of interest

The authors declare no conflict of interest.

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