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How Healthcare Infrastructure Contributes to the Sustainability of Future African Mega-cities

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ABSTRACT

Worldwide there has been rapid rural-urban migration in search of better economic opportunities. In developing countries, this movement has created an imbalance in the provision of services putting a lot of pressure on existing infrastructure and resources. Further, in these cities there is a lack of sustainable solutions to the challenges associated with large population densities. Among other services, healthcare and its associated infrastructure are critical in creating sustainable urban environments. Separate spatial planning practices, differences in social service provision among ethnic groups and disparities in economic conditions, among others, are all factors that illustrate the inequities experienced not only in the health sector but in other societal structures. This ignited locals to migrate to urban areas or towns looking for jobs and better social services. With high urbanization, public healthcare infrastructure development has been overstretched leading to overcrowding and heavy deterioration. According to UN-Habitat, it is estimated that, for South Africa, the urban population will be at 71% by 2030 and 80% by 2050 indicating an increased burden on the healthcare infrastructure. With this high rate of urbanization in the post-apartheid era, it has become crucial to look at alternative ways of redistributing the resources, i.e., supporting smaller towns such as Giyani, in Limpopo region where densification and organic economic growth is happening. This research examines healthcare infrastructure built during the apartheid period. It highlights disparities in quality, access, and planning, that persists as remnants of the apartheid planning policies. Findings indicated that healthcare infrastructure can be master planned to support positive economic transformation which will in turn be more attractive to healthcare workforce, who will be more willing to relocate to growing cities. And with hospitals being employers of large numbers of people, this can be a catalyst to support the growing cities to develop further sustainably.

1. Introduction

1.1 Background

Prinsloo et al [1] indicate that during apartheid in South Africa, most of the national health expenditure was allocated to building medical infrastructure that would be used by urban inhabitants and the privately insured. Marked disparities in healthcare between Blacks and Whites during apartheid have been documented. In 1981, there was one physician for every 330 Whites but only one for every 91,000 Blacks. Infant mortality was 20% in the Black population compared with 2.7% in the White population. The life expectancy was 55 years for Blacks, 58 years for Coloureds, 65 years for Asians, and 70 years for Whites. These disparities illustrate the inequities experienced not only in the health sector but in other societal structures forcing migration for better livelihood.

The concept of migration has existed for a long time. People have chosen to migrate from rural to urban areas that are more densely populated, due to economic opportunities and a better lifestyle. Other reasons may be escaping conflicts, poverty, and oppression. In developing countries, this movement has created an imbalance in the provision of services putting a lot of pressure on existing infrastructure and resources. Furthermore, in such cities there is a lack of sustainable solutions to the challenges associated with large population densities. Therefore, there is an opportunity to allow mega cities to breathe and introduce infrastructure development into rural landscapes. This paper examines how healthcare and its associated infrastructure can be a driver and catalyst to grow small towns.

1.1.1 Problem statement, Aim and Objectives

The issue of rapid urbanisation in South Africa has resulted in a strain on public infrastructure in particular healthcare. This has been exacerbated by the legacy of apartheid spatial planning practices that are still evident in unequal distribution of healthcare facilities, in relation to the population patterns.

The aim of this paper is to study and explore ways of reconstituting and transforming what the legacy of apartheid spatial planning had done by concentrating development in white areas while neglecting black areas. This will allow for distribution of infrastructure to smaller developing towns, thus deviating pressure from the current “Mega-cities”, alleviating the wealth gap between the rich and poor, and allowing for empowerment of black settlements. Further, it will give residents more reasons to reside in their settlements and not be forced to migrate and encounter further displacement. To do this, Limpopo has been selected as a province with opportunities to support the growth of a smaller city. This research investigates spatial planning in relation to healthcare infrastructure and explores how upcoming models of cities can be assisted by the proper healthcare infrastructure to develop and grow sustainably. The study looks at how and why certain spatial planning practices came to be in the South African context.

Figure 1 shows how Limpopo is a significant central node connecting South Africa, Botswana and Zimbabwe, making it a unique province to create a new city. It has a rich history of “homelands” development, apartheid spatial planning and cross migration intersection. This allows for a complex and dynamic node to revolutionise systematic concepts of oppression to further develop it as a prototype for a new city. The proposed framework will outline principles and guidelines that can be adopted into other rural landscapes to develop cities.

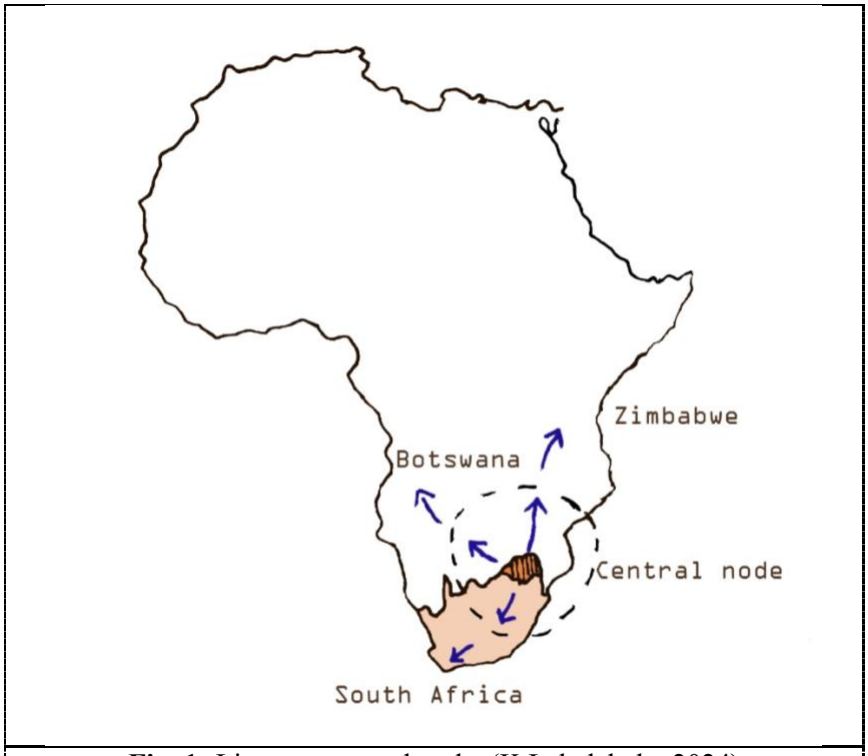

Fig. 1: Limpopo central node. (K.Lekalakala, 2024)

1.1.2 Hypothesis

Smaller towns can grow to large cities and sustain large populations as long as all the necessary parameters, particularly healthcare, to sustain such growth are optimally provided.

1.2 Literature Review

1.2.1 Apartheid spatial issues

Allocation of land use in South Africa during the apartheid era was greatly influenced by race, with the main segregation criteria being White, Coloured & Indian, and Black. Spatial planning was used as a tool to segregate the different races not only in terms of physical location but also in terms of access to different services. According to Strauss [2], in urban areas, white areas distinctively had low density layouts, and access to superior infrastructure and municipal services. This is opposite to black populations whereby shortage in housing, overcrowding, unsafe and unhealthy living conditions, and limited access to infrastructure and municipal services was the case. Brauns & Stanton [3], highlight the concept of "homelands" where black people were placed based on ethnic background and their land sold to white farmers (See Figure 2). This saw segregation between the farmlands and "homelands" in provision of infrastructure and services as highlighted for the urban areas. Coovadia et al [4] [5] note that health care in the "homelands" was mostly established by non-profit organisations and ran by missionaries. These health services were initially for the missionaries and their families but would later be extended to the African population. Later, according to Vans Rensburg & Mans [6], these rural mission hospitals were taken over by the South African state. The congested living conditions in the black areas, limited access to healthcare where some had to travel long distances to hospitals, and crowded hospitals caused high levels of morbidity of the black African population. Figure 3 and Figure 4 show how there was overcrowding in the black hospitals while the hospitals in white counterparts were more efficient.

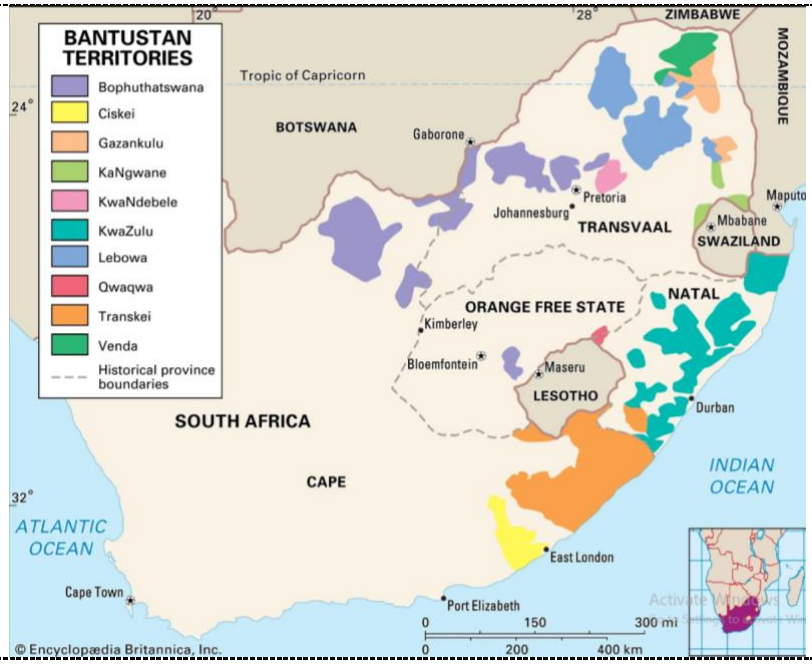

Fig. 2. Bantustan territories (also known as Black homelands or Black states) in South Africa during the apartheid era. 2024 (https://www.britannica.com/topic/Bantustan)

Fig. 3. Overcrowding in hospitals during the apartheid era. South Africa (https://www.researchgate.net/figure/Overcrowding-in-hospitals-during-the-apartheid-era_fig7_287764503)

Fig. 4. Apartheid ends in government hospitals in South Africa. (https://images.app.goo.gl/EPpBt1ViX1ytnSXKA)

The result of these planning practices is still evident to this day and can be seen in the spatial inequalities that will be highlighted later in the paper. According to Brauns & Stanton [3], though apartheid ended, the old patterns of segregation and inequality persist built upon the old hierarchies.

1.2.2 Decentralisation

Decentralisation is defined as "… the dispersion or distribution of functions and powers." According to Crook & Manor [7]; Agrawal & Ribot [8], decentralisation is usually referred to as the transfer of powers from central government to lower levels in a political-administrative and territorial hierarchy. This official power transfer can take two main forms. Administrative decentralisation, also known as deconcentration, refers to a transfer to lower-level central government authorities, or to other

local authorities who are upwardly accountable to the central government as argued by Ribot [9]. In contrast, political or democratic, decentralisation refers to the transfer of authority to representative and downwardly accountable actors, such as elected local governments".

1.2.3 The definition of future mega city in the context of a growing rural town.

The Cambridge Dictionary defines a Megacity, largely based on the size of the population in a city i.e., over 10 million e.g. New Delhi, Lagos, and Cairo. The definition could also extend to include that it is a city that harbors concentrations of human resources, trade and industry and other urban center components as defined by Lynch [10] which vitally contribute to the "mega" status given to a city/metropolis.

Seeing that there is no defined term for "Decentralized African Rural Mega-city", this paper will reimagine the idea of a Megacity in the context of densely populated areas, not necessarily reaching the conventional figure of a 10 million population density. Such a city will often have limited to no attachments to a Metropolises/Metro cities or urban cities and yet able to develop to the level of the infrastructure systems most megacities are known for.

This original idea known as a "Growth of rural town to future mega cities" imagines a sizable, densely inhabited rural area in Africa that is distinguished by a high population density, strong economic activity, and major infrastructure development. This idea can be further conceptualised to address the changes often faced by Mega Cities. According to Kwame Appiah [11], these include rapid urbanization and population growth, strains on the logistic city-to-city networks, water and sanitation infrastructure, food security as well as the need for socio-economic based services such as healthcare, recreational activities and educational institutions needing to be in close proximity.

This paper promotes the decentralization of governance functions and services, by distributing them into multiple local nodes or regions. This model aims to address the unique challenges of rural development by empowering local authorities, fostering community-based decision-making, and ensuring equitable access to resources and services for residents throughout the rural landscape. Smith, J, [12] indicates that this approach embodies the vibrancy, complexity, and developmental aspirations commonly associated with urban centers, within a rural context.

1.2.4 Sustainability

The concept of sustainability was introduced by the United Nations Conference on Human Environment in 1972 and since then it has been used in different contexts and definitions coined, specific to topics and themes. In spatial planning, sustainability plays an integral role towards enhancing development. According to Moore et al [13], sustainability ensures the continued delivery of an intervention or program in an organisation or community. This is supported by Mensah, J. [14], who indicated that sustainability means to maintain some entity, outcome, or process over time. Pascariu et al., [15] proceeds to introduce the aspect of dynamic balance that can be achieved with sustainability. They argue that sustainability is based on effective management of resources to enable stability and quality of a territorial system (region, city, community, or person).

A redefined model of sustainable development is viewing it as a whole system, comprising of three circles: economy, society and environment. The economy is found within the society and both the economy and society exist within the environment. Sustainability is the acknowledgement of various environmental and cultural diversities which could be transformed into advantages at different geographical scales; local, national or regional according to Pearce, A., [16].

1.2.5 Healthcare spatial planning considerations and objectives: The South African context

This section highlights key concepts that influence the South African healthcare system and context. The elements discussed here will later guide the structure of the case studies.

1.2.5.1 Environment

Health can be promoted by providing adequate infrastructure platforms with equipment that is updated and regularly maintained for the offering of medical services. Environs with established health centres tend to perform much better socially and economically as they sustain life in these areas through lower infant mortality, lower morbidity and overall wellbeing. Yazbeck [17]; Wilkinson and Pickett [18] contend that the health status of an area influences human capital acquisition, economic status and the inter-generational transmission of socio-economic status. Boyce & Brown [19] also note that health and well-being contribute to economic and social progress and in turn, economic security and social cohesion, as two key determinants of health.

1.2.5.2 Bed density norms in planning.

Bed density norms define the number of beds required (for each level of care) per 1,000 people. This is required to determine the potential demand for beds. The National Tertiary Health Services Plan (NTHSP), gives the following minimum standards for the application of bed density norms for South Africa in the public sector (see Table 1):

Table 1
Bed Density Norms

Level	Bed number per public sector dependant population
Level 1	0,66 beds/ 1000
Level 2	0,33 beds/1000
Level 3	0,13 beds/1000

(L1 beds – including sub-acute care – need to be about 1,5/1000). As indicated by Health Funders Association [20]. This analysis can be used to determine whether the existing usable bed capacity is sufficient to cater for the current population demand and the projected population demand in future.

1.2.5.3 Referral pathways in the South African healthcare system

In South Africa, health services are provided in a hierarchical matrix with different defined levels of care, from primary up to tertiary level. The referral system then becomes the ladder of accessing different levels of care depending on ailment and therefore ensuring appropriate utilisation of facilities and resources. Patients are meant to utilise clinics or Primary Health Centres (PHC) as first contact platforms for treatment and initial assessment before being referred to higher levels of care. Only with a referral document or appointment should one access the other levels of care as per National Department of Health [21] guidelines.

It is clear from the policy that much infrastructure establishment and resource allocation needs to be directed at primary healthcare. However, the system is not without its own challenges as some patients, especially those who stay closer to hospitals, tend to go there directly without passing through the PHC. Other patients stay in remote villages which hinders their access to the PHCs and therefore make use of any nearby hospital facility.

1.2.5.4 Access

Disparities in access to health care present a major obstacle to local development, McLaren et al., [22] note. Access to health care is particularly salient in places where policies have historically privileged certain groups over others, leaving behind large gaps in health status that current policy must take into account. These gaps depend on a complex set of linkages among demographic factors, spatial components, and institutional constraints. Haris et al [23], Coovadia et al [4] note that these factors are particularly important in South Africa because apartheid left a legacy of non-whites in remote areas, which are potentially underserved.

In post-apartheid South Africa, the government emphasized equity and made access to clinics the centre piece of primary health care as highlighted by Gilson & McIntyre [24]; Haris *et al* [23], Burger *et al* [25]. Klasen [26] also noted that travel costs in South Africa are particularly high relative to other developing countries in Africa and elsewhere, which means that small differences in distance can translate into large differences in access.

Patients are increasingly viewing healthcare with a consumer mentality, so convenience and accessibility are critical. Healthcare spatial planners are encouraged to take a retail approach to site selection and evaluate prospective sites with this in mind. Healthcare facilities that are in proximity to other social amenities such as shopping malls, revenue halls, taxi ranks etc. have greater accessibility as people tend to bundle their travel together with other activities at the same location thereby increasing facility usability.

1.2.5.5 Human resource

Health professionals are a fundamental component of health service delivery. Their numbers, distribution, and performance directly affect health outcomes. Global studies show statistically significant associations between the density of health workforce and maternal, infant, and under-five mortality rates, and vaccination coverage, Anand & Barnighausen [27]. However, there is a global struggle to attract healthcare professionals (HCPs) to rural areas and to retain them there. The paucity of HCPs therein contributes to a reduction in the quality and type of health services offered and sustains a situation in which poor quality care is on offer in these communities.

Vans Rensburg & Mans, [6] note that there is a maldistribution of health professionals between rural and urban areas within countries due an uneven distribution of resources and amenities. The disparity between urban and rural areas further widens the health equity gap between citizens. It also makes the achievement of national and international goals, such as the Millennium Development Goals, more difficult. Some of these challenges may be due to language barriers, remoteness of working environment from original home or a lack of adequate incentive or monetary allowances that will enable them to relocate. Young professionals also consider complimentary amenities such as good quality accommodation, food outlets, shopping malls, golf courses restaurants and pubs. Without such amenities, young professionals fail to relate to the assigned area leading to alienation.

HCPs are important for small rural communities where health care facilities are located as they contribute to the local economy. Amenities such as accommodation, vehicles and fuel allowances can be added to their standard remuneration to allow for travel incentivising them to these areas.

1.2.5.6 Local Economy

Kelly & McKinely, [28] noted that, how health systems use and invest their resources has an important impact on the resulting economic, social, and human benefits (see Figure 5). By utilising the resources and assets within communities, and by taking responsible approaches to employment, job creation and the production of goods and services, health systems can transform local economies so that they work for everyone, and not only the few. They further indicated that by hiring local people,

health systems can support jobs, keeping people in employment – an important social determinant of health. The availability of good jobs lies at the heart of inclusivity, sustainable growth, and elimination of poverty. Boyce & Brown, [19].

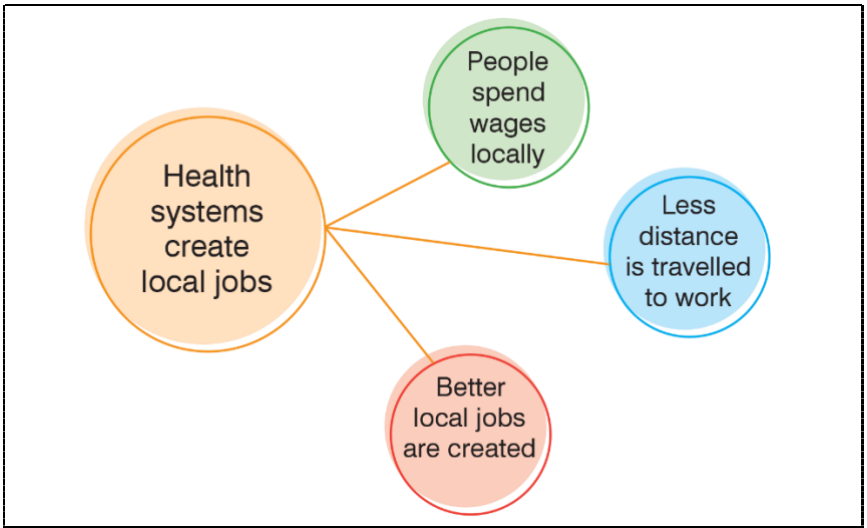

Fig. 5: Economic and social impacts and benefits of employment within health systems. *[19]*

2. Methodology

2.1 Research Methods

This paper uses a hybrid research method combining both qualitative and quantitative research methods. Qualitatively, the authors identify what the spatial planning was and currently is in South Africa, how it came to be and why. The authors examine the evolution of spatial planning, detailing its historical development and current state. An in-depth analysis was conducted on how spatial planning practices were established and how the fragments of this planning are still visible in today's physical landscape. The study then narrowed down to spatial planning in regard to healthcare, which is the main area of study in the paper.

Quantitatively, the authors conducted a gap analysis of health infrastructure using bed density norms and standards vis-à-vis population densities in the selected study areas to establish if there were any patterns and deficiencies. This would assist in determining what needs to be catered for to make the town`s health infrastructure more sustainable.

Figure 6 shows how combining the two methods seeks to align the facts to the specific observations in the different areas of study through deductive reasoning that is supported by facts, observations, and data analysis.

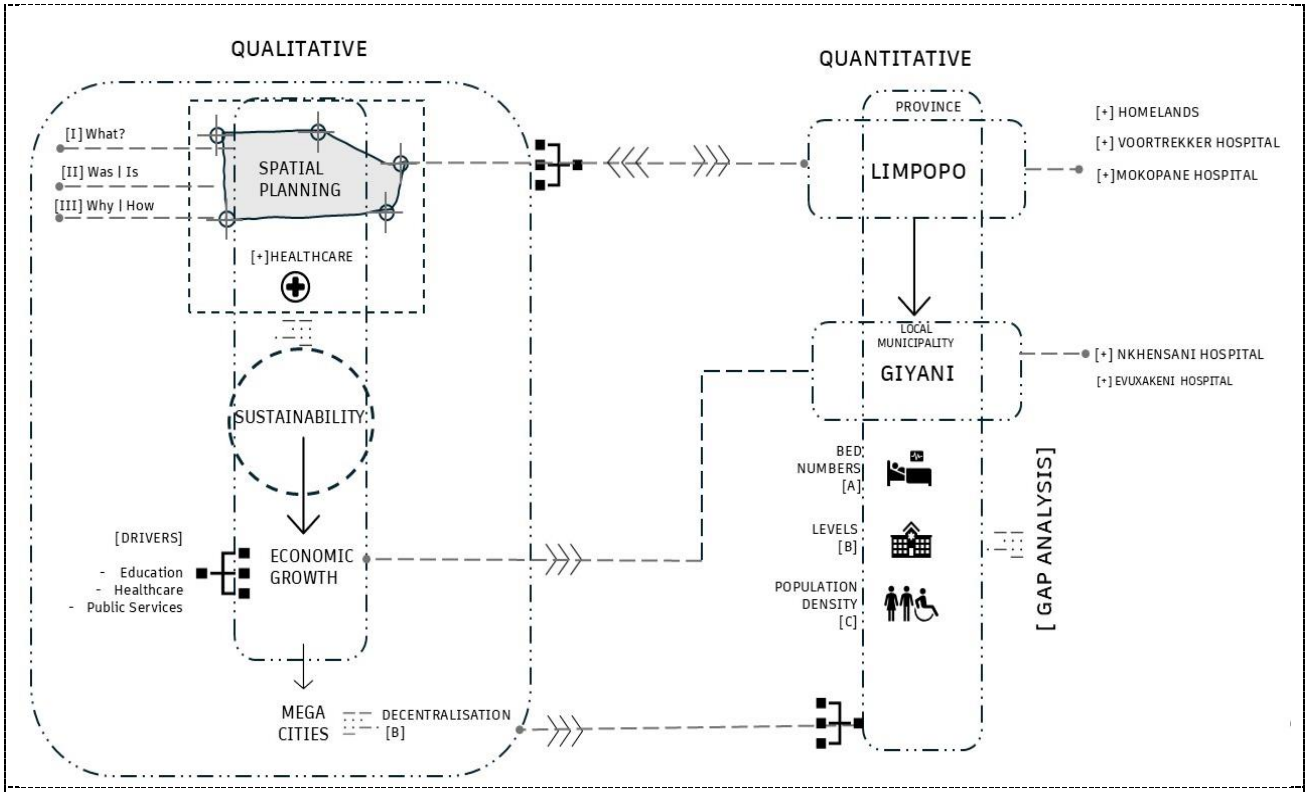

Fig. 6. Methodology: Qualitative and Quantitative. (Authors, 2024)

2.2 Sample Selection

To capture the unique nature of South Africa as a country, various study areas, each with distinct characteristics were selected. The study focuses on 2 different types of Municipalities; one is mixed urban and rural, and the other one is mostly rural. Limpopo province has been chosen because it has an extensive number of "homelands" with Giyani being formerly under the Gazankulu Bantustan. Giyani was also chosen as it is an organically growing economic node with all the parameters set for transition from a small town to a city. Some of these parameters include public infrastructure such as water, sewer, roads, and electricity infrastructure as well as a significant population density. It also has two health facilities, Nkhensani District Hospital and Evuxakeni Psychiatric Hospital.

The findings from the literature review were then compared with the findings that were collected in the field study of Limpopo province health infrastructure.

3. Results: Spatial Inequality in Healthcare Developments Before 1994

A health infrastructure assessment was conducted by the authors as part of Tectura Global in 2022-2024 in Limpopo province. The aim of the exercise was to explore and provide a maintenance, growth, and development plan for the province. A rigorous and thorough data capturing, and onsite spatial understanding of each facility allowed the report to inform the state of the infrastructure. The assessment provided in-depth solutions and direction on how healthcare infrastructure can be improved and be made sustainable.

3.1 Limpopo Province

Limpopo is a province north of South Africa with a population of 6,172,495, and 12% increase over the past 12 years. It has spatial structures which are characterised by migration networks and nodes with the additional backdrop of rural settlements that have potential active resource economies.

The province also has a landscape that shows productive spatial resources such as mines, agriculture, tourism, and natural conservation.

Halbach, A. J. [29] states that in the early 1970s homelands were created across South Africa to segregate development and the sole intention was to ensure as many black people as possible remained in their original tribal territories. This meant that black people would be displaced from the city which predominately had white people. Figure 7 shows the concept of decentralising a population which was used to disempower the black people of South Africa and displace them away from the more developing regions. The same figure shows that the homelands were concentrated in the North-west, Limpopo, KwaZulu-Natal and the Transkei regions.

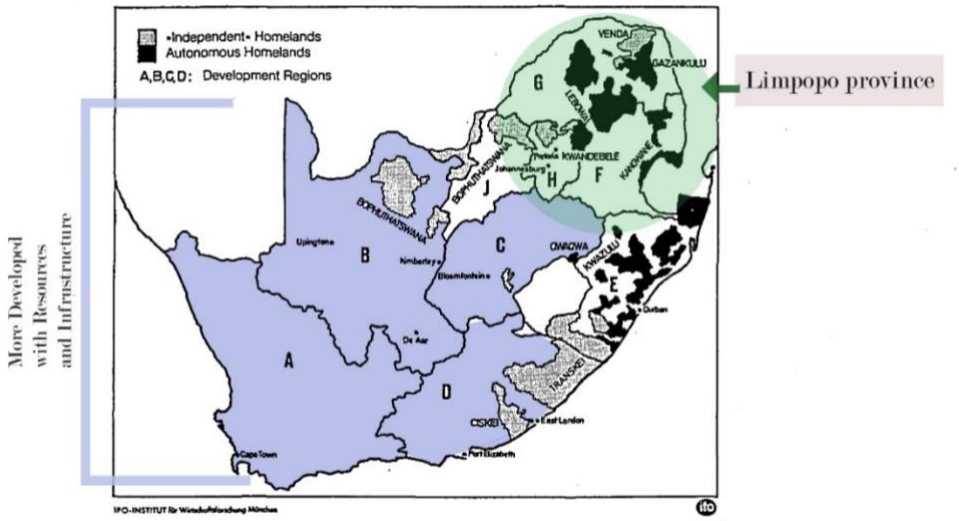

Fig. 7. Limpopo Spatial Development Framework - Spatial Analysis
Source: Halbach, A. J. (2008). The South African Homeland Policy and its Consequences: An Evaluation of Separate Development. Development Southern Africa, 508-526. doi:10.1080/03768358808439423. Edited by K. Lekalakala 2024

Limpopo Provincial Government, Republic of South Africa [41] highlights the Key national roads as corridors of interest. It was observed that there is a lot of migration that happens along the North-south corridor which creates a strategic connection of the neighboring provinces such as Gauteng, North-West, Mpumalanga, as well the other neighboring countries such as Zimbabwe and Botswana. Figure 8 shows the nodal and movement networks benchmarking Limpopo as a province that would give the opportunity to plan for more integrated regional-rural spatial planning. This allows for opportunities for spatial transformation where development is fed into rural regions.

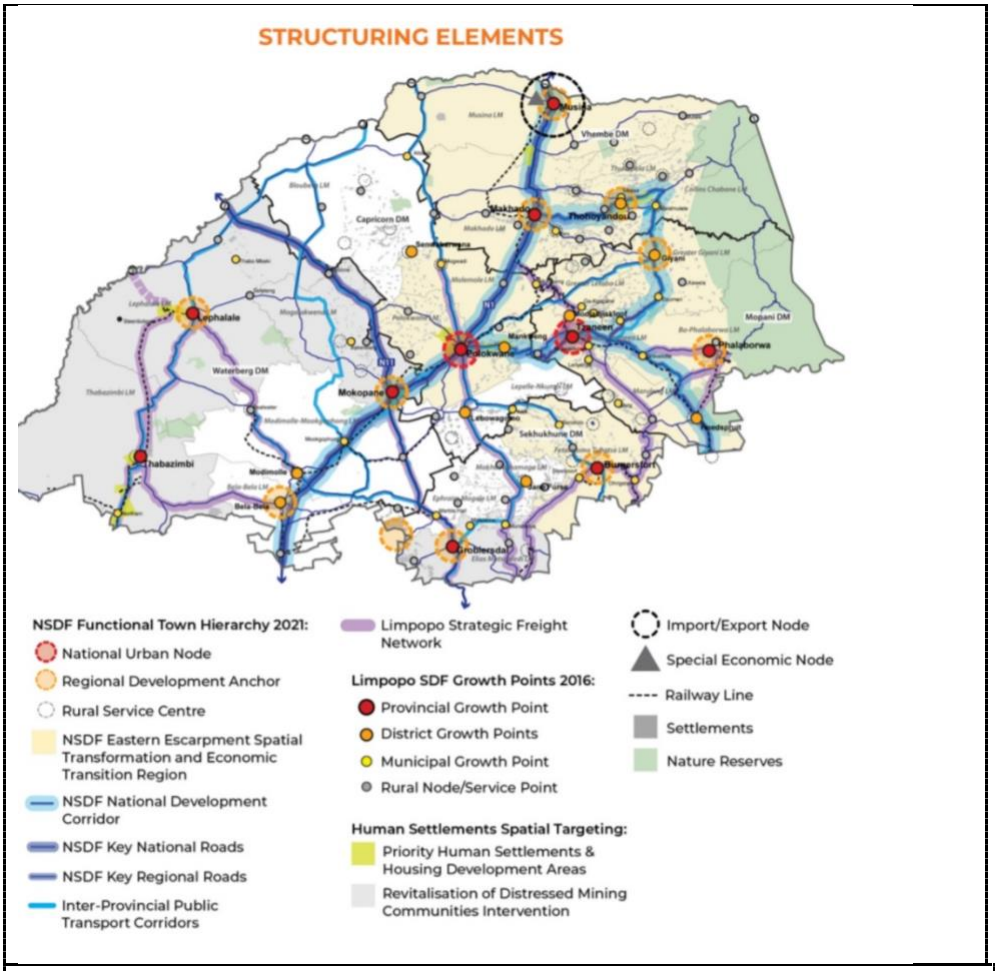

Fig. 8. Limpopo Spatial Development Framework - Spatial Analysis

3.2 Waterberg District, Limpopo Province

Mokopane, a town in the Waterberg district of Limpopo is an area of interest as it has a lot of distinct and blatant consequences of post-apartheid spatial planning. Figure 9 shows Mokopane area and the location of Voortrekker District Hospital which was a white hospital just 5km from Mokopane Regional hospital which was a black hospital. Voortrekker District Hospital has one of the best mother and child centres. This speaks to the apartheid system that tried to maintain and sustain its white population by reducing child mortality with state-of-the-art infrastructure. In contrast Mokopane Regional Hospital experiences issues of overcrowding resulting in cross infection and inadequate beds.

Fig. 9. Locations of Mokopane and Voortrekker Hospitals. Google maps. Google Maps image edited by author, 2024.

It has been noted by the researcher that Mokopane Regional Hospital now has a larger number of patients frequenting the hospital as compared to Voortrekker despite the two facilities being accessible by all. This causes congestion in Mokopane Regional Hospital and underutilization of infrastructure in Voortrekker Hospital. Moreover, the referral path system which implies that a patient should attend a lower level of care before being referred to a higher one does not work in this scenario since the greater population stays closer to the Regional Hospital and goes there directly bypassing Voortrekker which is the immediate lower level of from where they are meant to be referred from.

3.3 Mopani District, Limpopo Province

Mopani is one of five districts in Limpopo province and comprises of five local municipalities: Greater Giyani being an area of focus in this paper. The total population of Mopani District was estimated at 1,259,163 (Stats SA, 2021), which amounts to approximately 20% of the total population in Limpopo Province. Figure 10 shows the five districts in the Limpopo province and Figure 11 zooms into the district of Mopani showing its five local municipalities.

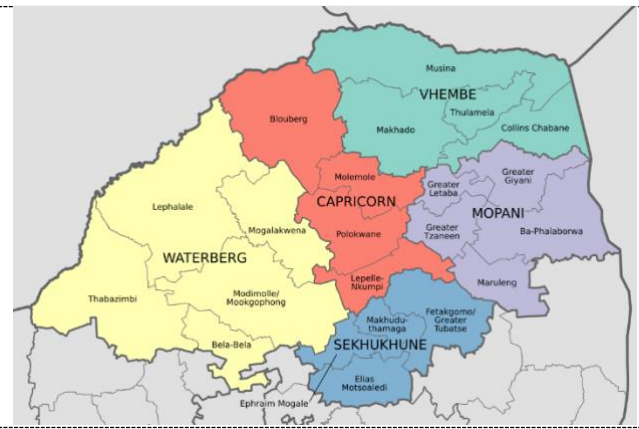

Fig. 10. Map of the different districts in Limpopo. [30]

Fig. 11. Map of Mopani District Municipality (https://municipalities.co.za/map/128/mopani-district-municipality)

3.3.1 History of Spatial Healthcare Planning: Land Ownership and Zoning

According to Ntlhe, D [31], the apartheid state from 1948 to 1993 used the colonial and apartheid laws to manipulate land use but before the apartheid system was abolished, land was deliberately zoned as "undetermined" or "agricultural" to stagnate the development of infrastructure in the new dispensation.

Bed numbers and Healthcare Infrastructure

Figure 12 shows the concentrations of the population and healthcare facilities supporting them.

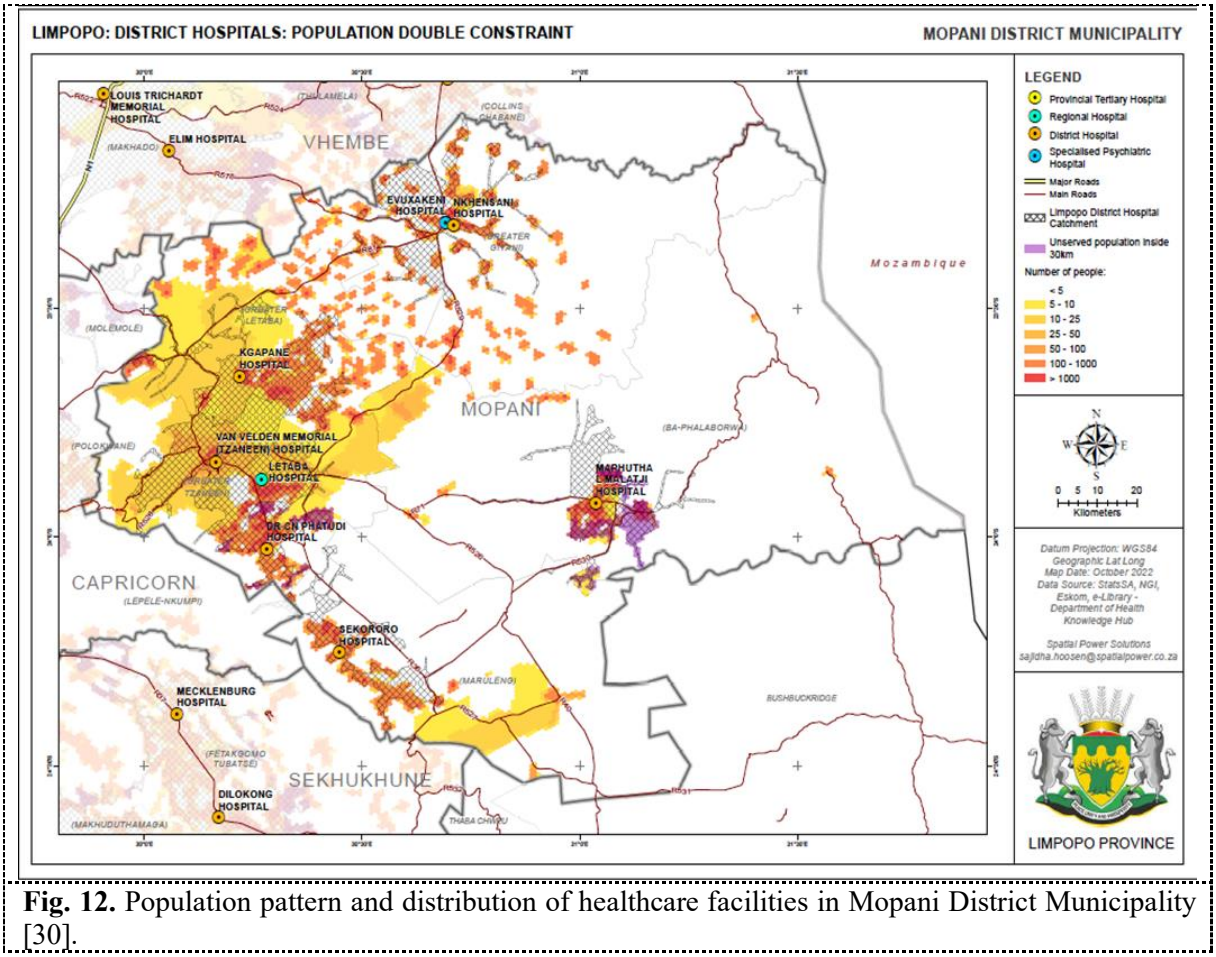

Fig. 12. Population pattern and distribution of healthcare facilities in Mopani District Municipality [30].

The below table 2 illustrates the gap analysis in terms of needed beds for the district in contrast to the population. It is envisaged that the population of Mopani district in the year 2030 will be 1,390,899 people at a growth rate of 1%.

Table 2: Projections of hospital bed numbers in Mopani District

	Bed number Current vs Projected requirement for 2030 (Current - 1,259,163; Future - 1,390,899 people) in Mopani					
Level of Health facility	Bed density requirement	Current bed numbers	Current Required Bed Numbers	Current Deficit/ Surplus	Projected Bed Numbers Required - 2030	Future Deficit/ Excess
Level 1 (L1)	0.66 beds/1000 people	1036	831	205	1153	-117
Level 2 (L2)	0.33 beds/1000 people	316	415	99	416	-100
Level 3 (L3)	0.13 beds/1000 people	0	164	-164	181	-181
TOTAL	1.12 beds/1000 people	1352	1410		1750	-398

It is evident that a total of 398 more beds will be required in 2030.

3.3.2 Economic and socio-economic factors that influence urban-rural migration.

"Urban-rural migration," though not prevalent, can happen for several reasons, and has been observed in the migration patterns in Mopani District, specifically in relation to individuals in the healthcare sector. If healthcare is to be used as a stimulus, socio-economic factors that are observed and respected within the region will become motivating factors. Firstly, cultural ways are still observed and respected. Secondly, land is very cost effective. Thirdly, there is an increase in the standard of living and rise of wealth attributed to the increase in economic opportunities for growth.

3.3.3 Greater Giyani local municipality

Figure 13 demonstrates that Giyani is situated in the north-eastern part of Limpopo Province. It was the capital of the former Gazankulu Bantustan. It was founded in the 1960s, during the time when the apartheid government imposed separate development in the country and was intended as the administrative centre for the Tsonga people.

3.3.3.1. Demography

The Greater Giyani Local Municipality, [32] reports that as of 2022, the total population was 316,841 with 31 wards grouped into five clusters. In the past few years, the population has shown a slight decline. The decline may be attributed to migration to other urban centers, such as Polokwane, Gauteng, and Tzaneen in which the migrants search for economic opportunities. Figure 13 shows the location of the town, Giyani, and its surrounding villages with the location of health facilities in the area such as Evuxakeni Hospital and Khensani Hospital.

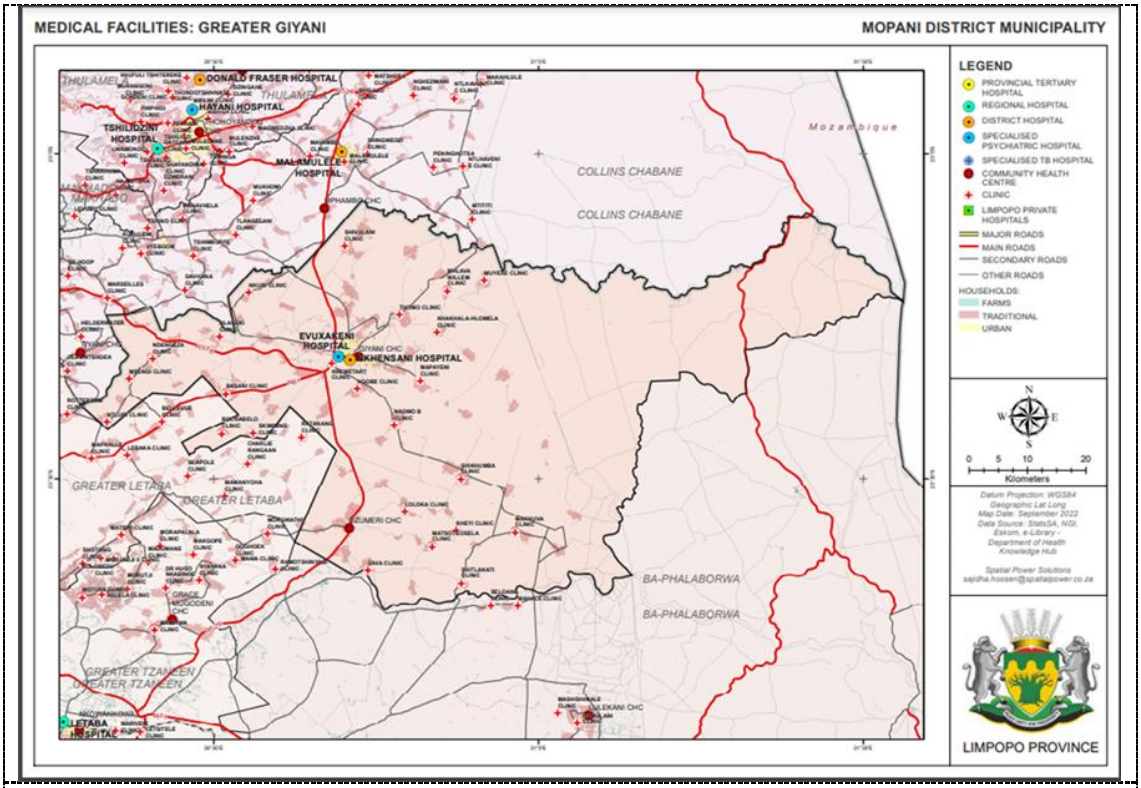

Fig.13: Medical facilities in Greater Giyani [30].

3.3.3.2. Spatial Planning and context

The Greater Giyani Local Municipality [32] notes that a significant area of land owned by the state is under the custodianship of traditional authorities. Large tracts of high potential agricultural land are being utilized for intensive and/or extensive farming activities. There is an influx of people to the Giyani town, which is perceived to offer employment opportunities and basic services. There is an informal settlement of Mozambican immigrants and South African nationals in the eastern portion of Giyani (Hluphekani), which lacks basic services (roads, water, electricity). The CBD is locked in between the Tribal Authority land. As a result, the town is growing inwards. There are visible unstructured developments which impact negatively on the image of the town. There is a need to revitalise the town and develop incentive policies to attract investment. With the current disputes between traditional leadership hampering significant development the municipality needs to intensify negotiations with the relevant traditional leaders to release land for development.

3.3.3.3. Drivers of the Giyani Local Economy

The economy of the municipality is underpinned by four economic sectors, namely: Agriculture, Tourism, Retail and Manufacturing. Table 3 shows the contribution of these sectors to the municipality`s GDP and Local Economic Development (LED) [32].

Table 3: Economic activity contribution to GDP

Economic activity	Contribution to GDP	Contribution to LED
Agriculture	17%	8%
Tourism	6%	3%
Mining	0.01%	0.1%
Trade	21%	7%

3.3.3.4 Local Economic Development Opportunities in Giyani

The municipality's LED strategy points to many growth opportunities, especially on natural resources, tourism and agriculture. The beneficiation of natural resources, which are in abundance in the municipality, has a potential of growing the local economy and creating employment. Close proximity to Kruger National Park is also an opportunity for economic growth through hospitality platforms and tourism trickle down effects.

3.3.3.5. Education

The percentage of the population with an educational level higher than Secondary school increased from 4.7% in 1996 to 7.4% in 2001 with the actual number almost doubling during this period. A factor that may contribute to the lower percentages on higher learning institutions is the capacity and the variety of qualifications offered by the local institutions. Greater Giyani Municipality, [32].

3.3.3.6. Employment Profile

The Greater Giyani Local Municipality [32] highlights that the number of unemployed people has increased from 20,534 (50.7%) in 2011 to 31,636 (60.4%) in 2016. Unemployment has a negative impact on society which might eventually result in an increase in crime, grant dependency, and non-payment of services. There are more females employed than males.

3.3.3.7. Health Infrastructure

Giyani has two main hospitals, the Nkhensani District Hospital and Evuxakeni Psychiatric Hospital. It also has several smaller healthcare facilities like the Giyani Health Centre, the Kremater Clinic, and the Dzumeri Clinic, though these are insufficient to cater for the ever-increasing population.

3.3.3.8 Bed Density Norms in the Greater Giyani Local Municipality

Table 4 shows how Giyani has L1 beds in the form of Nkhensani District Hospital. The hospital has an official capacity of 360 beds while only 246 are usable Tectura Global [33] noted. Applying the NTHSP formula for bed density norms shows that the local municipality has a deficit of 37 L1 beds. Giyani also has a specialised Psychiatric hospital with an official bed capacity of 400 while only 354 beds are usable, Tectura Global [33]. The infrastructure of these facilities is fair with some sections requiring a lot of maintenance as the fabric is now old.

Table 3: Health care facility and bed numbers

Level of Health facility	Bed density requirement	Current bed numbers in Giyani	Deficit/ Excess
Level 1 (L1)	0.66 beds/1000 people	246	-37
Level 2 (L2)	0.33 beds/1000 people	0	-
Level 3 (L3)	0.13 beds/1000 people	0	-
TOTAL	1.12 beds/1000 people	1352	-37

3.3.3.9 Referral Pathways

Direct support is provided to two Community Health Centres (CHCs) and twenty-seven Primary Health Centres (PHCs) with distances ranging from 0.1km to 47.3km. The psychiatric hospital receives referrals from 1 regional hospital, 6 district hospitals and 9 healthcare facilities. Tectura Global [33].

Nkhensani District Hospital is surrounded by township residential housing. It is 3.4km from the main junction in the CBD connected by the main road. Both Nkhensani and Evuxakeni are within 2.4 km from each other in Giyani Section A. With more villages being established further north towards the Hudson Ntsanwisi Dam, it was noted that accessibility is likely become a challenge due to increased transport costs to the facility. Figure 14 shows the locations of the CBD of Giyani, Nkhensani Hospital and Evuxakeni Psychiatric Hospital.

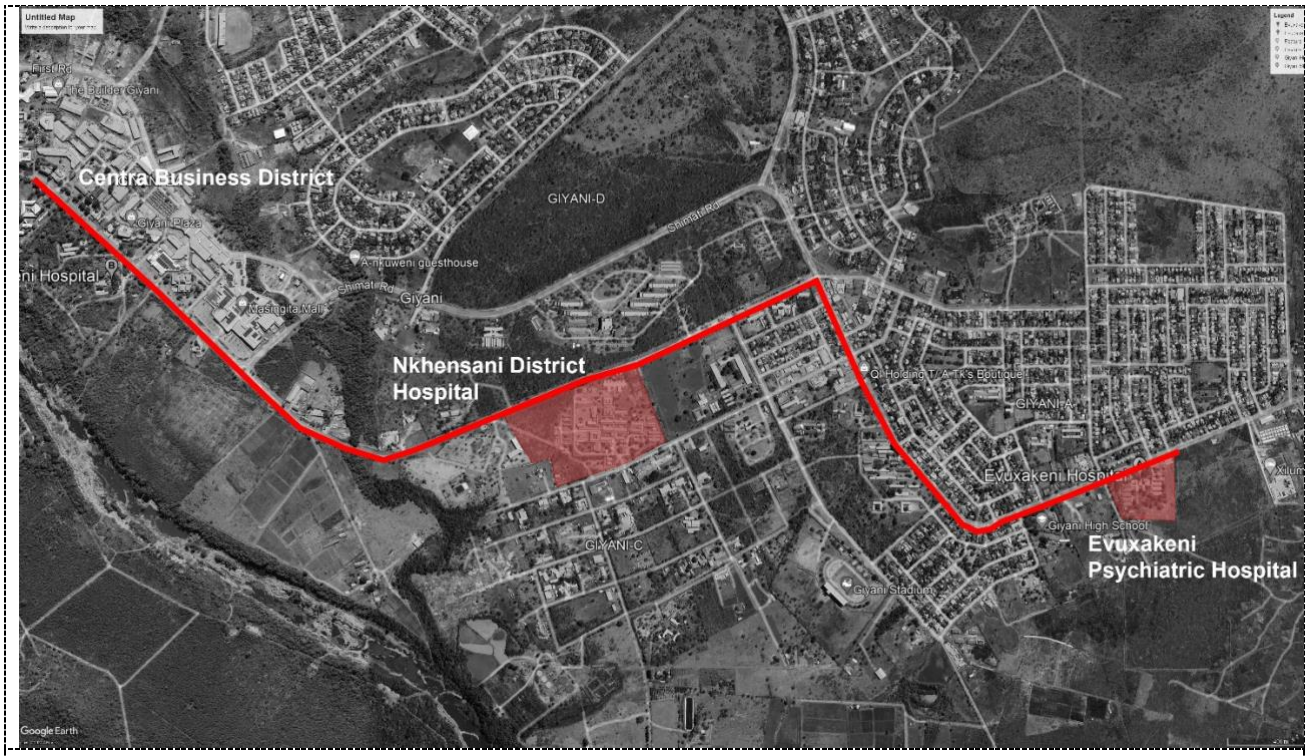

Fig.14: Map showing locations of Giyani CBD and the main health facilities in the town. Google Maps image edited by author, 2024.

3.3.3.10 Human resource

The Nkhensani Hospital has 481 approved vacancies and only 259 are filled representing a 46% vacancy rate. The hospital currently does not have any specialists, with surgical procedures done by medical officers. Complicated cases are referred to Letaba, Polokwane or Mankweng hospitals. Evuxakeni Psychiatric Hospital has 856 approved human resource vacancies but only 310 posts are filled presenting a vacancy rate of 64.8%. The issue of attracting specialists to the area becomes very evident. Tectura Global, [33].

3.3.3.11 Local Economy

The two health facilities are located within the township denoted as Section A. The facilities are well integrated with the local community and the majority of the staff members stay in nearby residences either as homeowners or renting. The Greater Giyani Municipality Integrated Development Plan (IDP) notes that the public sector is the biggest contributor to the local GDP of which the health facilities fall under this sector. Nkhensani Hospital has some accommodation facilities within its premises including recreational amenities such as a swimming pool and gym, but the accommodation is limited and reserved for senior staff. The majority of the workforce are forced to find accommodation in surrounding areas which is not ideal for a first-time young professional coming to take up employment in the area. Evuxakeni hospital has even fewer accommodation facilities and this

has led to fewer uptake of the available vacancies by the much-needed specialists. Homeowners in the parts of the township that are closest to these facilities therefore earn some passive income letting out their houses and rooms to people working at the hospitals.

Due to a centralised tendering system for maintenance projects and other consumables utilised at the facilities, the community does not get much in direct economic value from the facilities` recurring expenditure apart from employment. Tenders such as collection of medical waste, laundry and the supply of medical gas are centralised and awarded from the Limpopo Department of Health (LDoH) head office in Polokwane. It is recommended that local tenderers from Giyani be given priority in the adjudication and awarding of the tenders in their community. As part of beneficiation efforts, it is mandated by the Construction Industry Development Board (CiDB) employ locals for any general work in construction projects in the area. The Department of Public Works, Roads and Transport can ensure that on every tender in the area, local artisans are enrolled for training and skills development. This will play a part in economic development and overall sustainability through job creation.

3.4 Summary of findings

Mokopane

Poor spatial planning emanating from apartheid was observed resulting in inefficient referral pathways as highlighted in Mokopane and Voortrekker Hospitals. In addition, there is insufficient infrastructure where predominantly black people reside (Mokopane).

Mopani

The study found that Mopani`s health infrastructure had a shortage of 398 L1, L2 & L3 included beds as per 2030 population forecast. Urban-rural migration was observed.

Giyani

The paper found that Giyani`s health infrastructure was inadequate for the population density it serves with a shortage of 37 L1 beds. The health facilities were found to be optimally located along major road networks in township sections where a major part of the population stay improving accessibility. The referral system from primary health centres to the facilities was found to be efficient, providing a dispersed but well-coordinated form of service delivery at each level of care. The paper, however, found that the health facilities were struggling to attract the specialist human resources required to run them efficiently. This has led to some of these specialised functions being carried out by less trained personnel. Much effort is required to attract the relevant people to the town by way of incentives. It was revealed that the hospital does offer some economic benefits to the town through employment and the buying power of the labour force from the hospital. The local economy also benefits from accommodation through leasing and renting out to the hospital staff. However, it was found that other beneficiation initiatives usually linked to health facilities such as the supply of consumables and other tendered services were not directly benefiting the local economy as these were contracts awarded centrally by LDoH from their Polokwane office.

4. Conclusions

The research sought to explore ways that can be adopted to buttress the distribution of infrastructure to smaller developing towns in a bid to deviate pressure from the current "Mega-cities".

The smaller developing towns require a wide range of sustainability enablers in order to make them viable on their own, including healthcare infrastructure. In terms of healthcare infrastructure, recommendations need to be made from the macro and micro level.

4.1 Macro level recommendations

At a macro level, Giyani despite being a former "homeland" has been noted to be an organically growing economic node with all the parameters set for transition from a small town to a city. Some of these parameters include public infrastructure such as water, sewers, roads and electricity infrastructure as well as a significant population density. In terms of spatial development opportunities, Giyani as set out in the IDP, the Municipality has designated parcels of land set apart for development. These parcels of land include: Strategic Land for residential development, Private/Tribal Authority land for development, Government land suitable for development and Ideal land for industrial development.

The recommendation is that for Giyani to be able to grow sustainably, it needs to be master planned with the following considerations: Provision of the necessary infrastructure, for the right population density considering future growth, optimal location of the infrastructure, the adequate number of facilities providing the right services as per the master planning requirements.

4.2 Micro level recommendations

At a micro level, the research recommends that the status of existing facilities or the lack thereof be explored and an assessment of how best to improve or develop them conducted. Giyani has two health facilities namely Nkhensani District Hospital and Evuxakeni Psychiatric Hospital.

For Nkhesani Hospital, the research recommends the following: The 37 beds shortage as determined by this study must be satisfied through facility expansion and upgrades in proportion with any supporting infrastructure that may affect the increase. Renovation of doctors` and nurses' residential areas. Waste management structure to be upgraded. Upgrade of laundry unit. Upgrade mortuary. Renovation and maintenance of clinical spaces in the hospital. Replacement of all broken equipment, both clinical and support. In future and with a rising population, Nkhensani may be upgraded to a higher level of care from District Hospital (L1) to Regional Hospital (L2) attracting more specialists and human resources. Until then, the primary focus must be to make it a state-of -the-art facility by effecting repairs and upgrades that are required at present.

4.3 Synergy of Macro and Micro level recommendations

The hospital is strategically located near a town that has been experiencing steady and organic growth over recent years. This growth is characterized by an increasing population and expanding local businesses, which contribute to a dynamic and evolving community.

Improving the hospital's infrastructure and facilities could significantly enhance its attractiveness to healthcare specialists and professionals. A state-of-the-art hospital would not only provide better medical services but also offer advanced amenities that could draw top talent to the area. As the hospital becomes a more prominent and appealing institution, it is likely to attract additional specialists and healthcare providers, thereby increasing its capacity and reputation.

The influx of medical professionals and the subsequent expansion of hospital services would have a positive ripple effect on the town's development. Enhanced hospital infrastructure would drive the creation of new socio-economic activities and services tailored to support the growing healthcare sector. This includes opportunities for local businesses to cater to hospital employees and their families, as well as the development of new amenities and services such as housing, retail, and recreational facilities.

Moreover, improved infrastructure at the hospital would contribute to better urban planning in the town. As the town grows in response to the enhanced healthcare facilities, there will be a greater emphasis on comprehensive planning and development to accommodate the increasing population and new businesses. This forward-thinking urban planning would help to manage growth effectively, ensuring that the town remains a desirable and well-organized place to live and work.

The combined effects of these developments would create a more attractive environment for potential residents and businesses. The increased socio-economic activities and improved urban infrastructure would make the town a more appealing location, further encouraging population growth and economic investment. Consequently, this positive feedback loop would enhance the overall vitality and prosperity of the town, benefiting both the local community and the hospital's operations.

In conclusion, the paper proved the hypothesis that smaller towns can grow to large cities and sustain large populations as long as all the necessary parameters to sustain such growth are optimally provided. This paper looked into healthcare infrastructure.

4.4 Areas for further research

A look into other factors that could help make small towns attractive and develop them into future megacities, aside from healthcare planning.

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