CHAPTER 3

Housing Land-Use Effect on Spatial Dynamics

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Abstract

This chapter’s aim is to explore the level of spatial aggregation in a quest to understand spatial behavioural changes prompted by land use for housing as a preliminary development requisite in a given spatial unit. This includes focusing on issues of spatial organisation, transport systems and connectivity, and dispersal of human activities in space in order to determine how these urban systems react to spatial and socio-economic opportunities leveraged by clustering of housing development. Perhaps more significantly, understand the processes of housing configuration emergence and agglomeration that position it as a trigger mechanism to plethora of urban land uses and its sphere of influence to contextual factors. With the goal of escalating spatial transformation in Republic of South Africa (RSA) that is reflecting mounting concern, the issue of land use for housing tranches in the streams of spatial injustices, lack of spatial coherence and spatial segregation that emanate from the historical spatial imbalances. The aspects of analysis will direct attention towards evaluating the influence and appropriateness of policies in execution of spatial transformation.

Keywords: Housing land use and clusters, transportation issues, spatial dynamic, sustainability.

1 Introduction

The processes of housing configuration emergence and agglomeration position it as a trigger mechanism to plethora of urban land uses, and its sphere of influence extends to various contextual factors to be discussed. In a train of housing land-use cause and effect, transportation land use exhibits simultaneous tendencies and supersedes the overall spatial distribution of other land uses that confirms the intensity of housing development significance. This presents a somewhat
paradoxical scenario, in that urban land use and transportation are intertwined. There is continual cross-linking that has been attributed to creating a perception similar to housing land use in the event of an eventual development framework. However, the development trajectory adapted as well as the contours of this work’s original conception pertain to land-use and housing ability to act as major stimuli of spatial aggregation of critical land uses. In this context, transportation issue represents the pinnacle of the concept of land use for housing – how it can assist with the seamless continuation of the housing effect. In essence, the discussion of land use for transportation outlined here resonates the opportunistic character transportation can pose to cultivate the linkages between housing and land use. By and large, it provides a comprehensive understanding of the nature and workings of the residential spatial dispersal. As it is fairly unfolded, it is widely claimed that it is a daunting challenge to discuss housing issues without the mention of transport. Supporting this spatial implication is the regulatory and policy framework perspective that the spatial pattern and nature of land uses in urban areas are largely influenced by housing policy and transportation policy. Thus, through these lenses, it is novel to seek to advance an understanding on how these policies (re)shape urban growth and development.

The framework presented here is grounded in the perspective that housing plays a critical role in the economy, spatial flows of people, commodities, services, capital and physical conditions. These contextual factors form a part of the plethora of factors that needs to be taken into account when applying dynamic optimisation strategies to explore and cultivate the nature of housing clustering. From a narrow point of view, this includes exploring the economic forces behind the development of new housing and merits of alternative residential choices, that is, to explore the economics of neighbourhood choice, focusing on how decisions of where to live are affected by local public goods, schools and crime. For analytical simplicity, the spatial economic fundamental that provides the primary explanation and relationship of urban land between firms and activities serves as a means to explain the relationship between urban land and housing dynamics.

The mix of these simultaneous tendencies towards housing land use translates explicitly its intrinsic value in dealing with issues such as poverty, inequality, environmental degradation and many more urban-area problems. This is another way to express this relationship – to retrofit efforts to encapsulate the agenda for today’s urban policy – sustainable development tripartite description. This being the case, in the helm of urban built environment – how are land-use policies (re)designed to exhibit principles of sustainability? In context to sustainability– what is the optimal location housing can be more strategically positioned – that it spontaneously moves towards much practical problems. This includes exploring the challenges and approaches to sustainable urban development – exploring integration issues, guidelines, policies, principles, urban services, transportation issues and spatial relationships.

The abstract conceptual framework presented earlier maximises alternative interpretations and relationships of the nature of housing clustering. Obviously, the conditions outlined will optimise empirical processes as much as possible to determine the role and influence of residential spatial classification and various
land uses. These notions, in turn, must be connected with practical strategies that are based on principles of sustainability. In the subsequent sections, this chapter offers some theoretical and some empirical selected overview of various perspectives pertaining to the role of land use and housing in producing a widely claimed integrated sustainable human settlements.

2 Land Properties and Perspectives

Land and housing are complementary goods. As simple as this relationship might seem, there are activities underpinning this reality and its operating environment. Casual observation of land and housing in reality can be much easier. However, capturing these effects empirically is rather complex. In their own right, the nature and workings of land have far-reaching implications and they draw extensively on market principles. As put by Mayer and Somerville [1], land is not like other investment goods: the long-run cost curve for land is upward sloping. Expounding further, Mayer and Somerville [1] contend that a one-time increase in demand that results in a larger city, and more construction to accommodate these additional households, also causes a permanent increase in land prices. According to the real-market principles, land operates on cash flow. Thus, McCann [2] upholds the models of household urban land allocation assumption that society is indeed comprised of distinct income groups, whose locational preferences differ primarily according to the income category within which an individual household falls. This is to say that land consistent with housing development is capital intensive. The central theme underpinned in this preceding discussion implicates that the land value is linked to the amenity appended to it. Analytically, there are so many alternative interpretations of the nature of housing land use. For example, in the rental market, the response is devoted to the principles underlying the dynamic aspects pertaining to land use and supply of family stand-alone housing. This is somehow an ambiguous effect as Ihlanfeldt [3] puts it that it appears perplexing that housing prices are higher in neighbourhoods containing more renters based on the logic that apartments signal proximity to other commercial activities, such as stores and offices that have positive impact on nearby property values. All this explains the locational effect.

The implications of this analysis are important in that they imply that supportive land use spontaneously perpetuates high land values. Shedding light from the economic intuition and cultivating land consumption properties from the residential land-use perspective, McCann’s [2] point of view is that land prices are generally determined by urban bid–rent curves with respect to the city centre. In support, much of the literature has enabled the use of the notion that proximity, accessibility and optimum location benefits translate to the most expensive land. In turn, this implies that the bid for land depends on how much consumers are willing to pay. O’Sullivan [4] reasons along the same lines that in an urban environment the willingness to pay for land depends inter alia on accessibility. The reverse logic of this notion is straightforward: The land bid rent decreases as the distance from the desirable location increases.
After deriving some properties of land consumption narrowly from the standard concepts of microeconomic and market principle, the most striking behaviour that emerges is that land is also premised on free-market principles. Ironically, it still exhibits potential popular control of space. In line with emerging reasoning, Aurand [5] assumes that the overall general market can be divided into two sub-markets, the sub-market of units that are affordable for very low-income households and the sub-market of units that are not affordable. For this special case, the pattern of land ownership and/or control appears to distress the aggregate growth of housing land use. Obviously, the condition outlined here may affect the nature of the supply of land. If one proceeds to other closely related considerations, this triggers a need to explore issues surrounding landholding and land tenure. Thus, the notion of land confined within free-market premises offers a rich research spectrum to comprehensively understand the nature and workings of land within the housing market. Under the pretence that land is dispersed and distributed as per demand devoted to principles of city growth dynamics, government interventions in land and housing markets appears to be at the helm of operational urban planning. According to Vermeulen and van Ommeren [6], government intervention has adverse effects, in the sense that the impact on the quantity and location of new residential construction is reduced, while at the same time offsetting the responsiveness of supply to market signals. In support, Ihlanfeldt [3] attests that regulations may restrict the supply of developable land, causing an increase in the land value. This reflects on issues highlighted beforehand – compounding gravity on the cause–effect of land demand–supply determinants. It verifies a degree of correspondence that, in reality, the mix of these simultaneous tendencies formally captures the relationship between aggregate market supply and local government land-use regulation. The government intervention is not limited to land-use regulation, which Mayer and Somerville [1] pinpoint as being one of the most acrimonious areas of local government activity. This is backed by Lundqvist’s [7] assertion that, indeed, cities regulate land, using land-use zoning plans to segregate different types of land use – commercial, industrial and residential – into separate residential zones for low-density housing. It supports Gyourkob et al.’s [8] assertion that local regulation can affect building in myriad ways singling out the most transparent way as a prohibiting a project.

However, municipalities’ intervention can be grounded on a number of perspectives. Putting in perspective of economic assumptions, land is allocated to the highest bidder. What does that mean to the poorest of the poor? To begin, if land is left in the hands of market forces, the poor would be handicapped to acquire land. In fact, this has been or is still the case in RSA – the apartheid government came with policies and developments of a grossly unjust nature. From the spatial planning perspective, apartheid, as it was introduced, promoted the notion of so-called separate development, which entailed a physical expression of legal and socio-economic discrimination. During the period of formal apartheid, the government legislated where people could live according to their race. Housing land use was actually used as an instrument of segregation [9]. The repeal of these laws ushered in a new era, and with it a peculiar phenomenon: the economic and market forces were utilised to split the cities in ways that still benefit the apartheid elites [10]. At that particular time, the
South African state had adopted a policy of privatisation of the supply and ownership of housing, thus putting most new housing projects out of reach of low-income groups [10]. It is correct to note that access to the cities was increasingly determined and defined in terms of income levels. It is under these conditions that robust spatial policies that are aimed to radically reshape the functions, forms and character of the cities and residential areas came into picture. Among major policy and legislation changes ushered over time in the new post-1994 democracy, the policy makers identified and acknowledged the criticalness of strategically positioning the ground framework of housing to escalate land transformation.

In the real world, municipalities own some land and the public interest is given a priority. Hence, policies are formulated to strategically acquire and utilise pieces of land for realisation of projects earmarked to be priorities, such as housing to escalate spatial transformation. The issue of optimum location has then become a problem posing serious challenges when looking at the possible elimination of absolute housing need although it has become the overriding objective of the new government. In a nutshell, the persistence and enormity of the housing backlog facing low-income earners is an indication of the depth of the housing crisis in South Africa. Consequently, there is a growing interest in developing sustainable integrated human settlements in RSA. It is, therefore, the government’s commitment and dedication to facilitate and enhance housing delivery. It reflects in the formulation of a number of programmes that – as mentioned before – have acknowledged and embraced the concept of sustainable development. Under the auspice of sustainability, the focal point in this case is optimisation of spatial planning to ensure strategic balance between provision of government-subsidised housing and local facilities. To appease the apparent problem, the present spatial solutions consider the normalisation of urban housing land use to sequentially trigger significant implications for the affordability and availability of services, infrastructure and opportunities in regional communities.

In the absence of regulation influencing land use and enactment of related policies, land would still be allocated solely on the basis of market forces if governments did not delve into housing their low-income citizens. In this sense, when applying dynamics of spatial planning underlying this practice, the urban settings would have remained enormously unbalanced opposed to the framework presented up to this point. In the various reviews and reflections offered, the people’s ultimate alternative would rest on the prominently present practice in South Africa and other parts of the world, like Brazil and India, of illegal means of acquiring and developing land as rapid population growth increased the demand for land. The implications of perspectives discussed here involve various spatial relationships pertaining to land use and housing under the generic conceptual umbrella of market supply and local government land-use regulation.

### 3 Intensity of Housing Land Use

One of the main challenges depending on the views taken about the nature of land use and housing appears to be the question of how clusters of household’s
housing exhibit the theoretical treatment of urban growth and proceeds to a more accurate consideration of supportive land uses. In essence, this interface goes beyond land and housing – it is the main pathway that prompts the complexity of the contemporary city. In turn, contemporary city is identified as the most challenging problem in urban development and a limitation of public participation. One explanation of this pattern is that land use for housing, as is the case in cities, consists of networks, reciprocal relationships and planning for integration and sustainability [11]. The complexity arises when the two systems meet; the inevitable articulation has to be justified. The desire of being closer to centre, opportunistic land occupation and conformity to the radial pattern collectively have resulted in a congested, relatively irregular fabric, which exasperated the formulation of fabric’s articulation [12]. Thus, Schoeman and Moroke [11] emphasise the need to understand the activities underlying the different dimensions of city functionality as these components subdivide extensively getting messier and more complex. Perhaps, this is the most appropriate first step that forms a critical point of view. The most fundamental step is to understand and predict human impact on terrestrial ecosystems – comprehensive and integrative theory of human–environment relationships, which can be applied to explain empirical observations and predict new results [13]. That is, settlements are shaped by the needs of the people who inhabit them, which means that the livelihood strategies affect the actual form and structure of, as well as the types of, facilities within settlements [14].

In support of the point that stresses land use for housing as the main backbone of the entire pattern of agglomeration and growth in a given spatial unit, the city, is discussed more or less in the same manner. The bottom line of this analysis is that a city is regarded as a settlement that consistently generates its economic growth from its own local economy [15]. In support, Berliant and Wang [16] contend that both economic growth of cities and agglomeration of economic agents are apparently endogenous. These are the spatial realities that show that the urban areas have been evolving and transforming. To put a housing scale in context, a similar phenomenon exists – the theoretical mutual interactions between urban form and spatial incidence in a local geographical order appear to be devoted to the principle of spatial interaction. That is, the spatial grouping of houses allows and/or sustains the turbulence of local/regional flows, with which it must interact in order to continue to exist. The prime factor for consideration in the case of this housing land-use assessment is to determine the overall land-use morphology in a given spatial unit. The essence of this is that land-use morphology is the overall pattern of actual land cover in a country or region at a given time, comprising the main types of land use [13]. Through this net effect pertaining to the nature, scale and intensity of land use come under scrutiny. For analytical simplicity, land-use morphology stands to provide a comprehensive understanding of the nature and workings of housing cluster potency to influence a region’s spatial activities. Having this aforesaid knowledge, it is necessary to employ the notion of land-use transition. The central contention of this notion is that, over time, patterns of residential land use change, as does the composition of neighbourhoods within that class of land use. The upsurge of interest is whether this change in land-use
morphology over time involves a different attitude to spatial organisations. For example, does it proceed to more agglomeration benefits as far as housing land use is concerned? Does it present in some respect a good opportunity for a particular socio-economic development phase?

The consumption and/or usage of urban land represent the pinnacle of residential land use. According to Akinmoladun and Oduwaye [17], most of the factors influencing urban land usage are similar everywhere, but the level and intensity of the factors vary in magnitude from one urban centre to another; they also vary from one region to another, usually based on socio-economic, cultural and infrastructural facilities, and government institutional frameworks, policies and laws. Although the patterns differ from one place to another, the contention has been that housing land use is a major common denominator responsible for geographic spread of activities. By and large, there appears to be strong theoretical support and at least some empirical evidence to suggest that residential land users occupy the largest portion of land in any urbanised area.

In the case of Nigeria, in an attempt to account for a specific land-use classification, Akinmoladun and Oduwaye [17] pull in the experience of the Lagos metropolitan, where the general structure of land-use distribution shows that residential areas occupy the single largest proportion of 9,669 hectares, which is approximately 52.1%, while commercial areas occupy 1,021 hectares, estimated to be 5.5%; industrial: 1,448 hectares, which is around 7.8%; institutional and special use: 2,784 hectares, which is 14%; transportation: 3,340 hectares, translating to 18% and open spaces: 520 hectares, making it 2.8%. These trends indicate that housing land provides some basis for stipulating policies. In a nutshell, parallels have been drawn from related and relevant contributions attributable to the urban character and/or spatial organisation. Emphasised by Spocter [18], residential land use manifests its strength from zoning designation and change of zoning.

These characteristics are parallel to RSA patterns of urban development. However, the RSA urban structure spatial dispersal is twofold, if not more – it is endogenous city formation that exhibits standard urban structure manifestations from the technical perspective. There is also the ethical perspective that is characterised and/or is influenced by the lack of spatial norms and regulations underlying the observed spatial mismatch. This condition is widespread; like RSA, Brazilian cities are to be burdened with urban periphery neighbourhoods. According to Buyck et al. [19], they are referred to as 'neighbourhoods in crisis' due to the neglect of planning and poor management of their urban fringe. From a spatial point of view, the optimal locations are the ones in the immediate vicinity of economic activity nodes, which normally offer a variety of business/social services as well as movement corridors, which also form the main public transport routes. This type of spatial dispersal demonstrates the need for having neighbourhoods and/or residential areas of all spatial classes reinforced to further strengthen the structural and functional qualities. However, a growing body of research has emerged to acknowledge and define informal settlements and spatially segregated neighbourhoods within the urban character. The argument that these informal systems have many advantages in terms of sustainability regardless of their spatial restrictions of land may thus be deduced [20–22]. On
the other hand, the extension of urban areas generates an interesting question on early adoption of transportation planning to interlink various segments of the city emanating from this physical growth.

The implications of this scenario imply that housing land use capitalises on its physical manifestation to give effect to socio-economic, cultural, political and environmental forces shaping the use of lands in urban areas. Evidence is accumulating that housing initiatives have spatial implications and typical agglomeration effects. Therefore, urban areas of some countries appear to provide proof that spatial dispersal of cities converges to the factors pertaining to land use and housing.

In the case of RSA, the national government in RSA has set out the mandate to develop integrated sustainable urban settlements that are reinforced by legislation and policy to balance housing consumption needs – this is inclusive of supportive land uses, consequent infrastructure and services. Among outstanding projects that are rolled out and seen as a pioneering prototype for the post-1994 challenges to redress urban spatial inefficiencies in RSA are Cosmo City housing development in Johannesburg and Gauteng province and Cornubia housing development in eThekwini, Kwazulu-Natal (KZN).

Cosmo City has become a point of reference for the kind of public housing envisioned under the government’s Breaking New Ground (BNG) programme, in which the emphasis has evolved to assert the idea of subsidised homes as assets, with title deeds assisting in the development of the secondary market [23]. It is under the auspice of integrated sustainable human settlements and the central theme underpinning this work that housing development drives and attracts supportive land uses – these projects are drawn to shed light. At the time of its proposal, the project aimed to create integrated and mixed land use that embraces transport systems and connectivity in order to eradicate poverty and effectively reduce marginalisation. The intention is to achieve this through the provision of different housing tenure and price types in the same area, linked through schools, crèches, clinics, transport, parks and public spaces.

In addition, in the sense of compound gravity to the issue of housing land use conjoined to legislative and policy framework that drives land-use planning, the City of Johannesburg in 1996, in the preparation of its land development objectives, identified the need to provide housing for two large informal communities, Zevenfontein and Riverbend. These informal settlements were characterised by substandard living conditions with limited access to basic services [23]. By and large, these areas were handicapped by the lack of viable policies to attract supportive land uses in their areas of jurisdiction. As a result, the area lacked optimum location benefits, therefore, exploring the policy merits – the alternative option visible being to relocate the communities onto land that would be earmarked on the basis of access to economic opportunities and public transport in a mixed-income and mixed-use development.

In the KZN province, the municipality in 2009 engaged in a massive housing project that saw the building of low-, middle- and upper-income houses in Cornubia. This was the largest mixed-land-use development in the South African landscape. The plan stipulated that Environental Impact Assessment (EIA) would be conducted for the total site area of 1,250 hectares, of which, 766 hectares was
developable. Preliminary spatial development planning for the site indicated that 430 hectares would be dedicated to residential development, 80 hectares to industrial sites, approximately 100 hectares for commercial and mixed usage and 487 hectares to open space [24].

This project is a part of projects that RSA has enrolled and developed under the auspices of public policy BNG to address issues of sustainable human settlements, imbalances and inequality among social classes. This was in support to comply and adhere to the context of integrated approach proposed. When taking a closer look at the effects of this public policy among different settings of place, the integrity of these spatial data deems the role of housing in altering spatial settlement patterns important while simultaneously corresponding to socio-economic development. Thus, as the project progresses, the development will involve more than 6 billion rand in infrastructure investment, house more than 200,000 people and create more than 100,000 sustainable new and 96,000 short-term construction jobs. The proposed development is also expected to attract a minimum of 250 million rand annually in municipal tax revenue for the eThekwini municipality. In addition to low-, middle- and high-income housing, Cornubia will incorporate industries, business, schools, clinics, parks and other public service infrastructure [24].

The understanding deduced from the aforementioned undertakings verifi es that the optimum location for residential purposes supports other land uses and benefits extremely from the country’s legislative and policy framework for land-use planning. Advancement in spatial planning benefits residential spatial, social and economic relations. Thus, it is anticipated that if done well, mixed land uses would create mixed commercial and residential areas where the visual and physical dominance of the automobiles is made secondary to the pedestrian needs [25]. The growth process of urban areas is scale dependent on various elements of urban system’s concepts. For example, Cordoba [26] illustrates that cities grow as labour migrates between a fixed number of cities in direct response to city amenities, taste or productivity impacts. Regarding the subject of human factor, and exploring all parameters that yield the desired growth path of cities, much of the literature shows that human capital is a critical factor share of growth rate of the economy and spatial characteristics. This perspective can be adopted to explore the role housing land use facilitates in order to make a place economically viable. In a similar manner, it is also required to understand the spatial implication of high densities of population and built environment and how they are related. Of course, applying the standard concepts of microeconomics across urban areas can help explain different patterns of agglomeration and growth. These spatial implications are essential, and based on McCann’s [2] findings, clustering of activities in space increases competition for land. The spatial dispersal and manifestation of cities converge to the universal and holistic concept of sustainable development as the scale effect cannot cope without the existence of balanced growth. In this sense, the sustainability concept in urban areas becomes a more tangible concept as the urban-area growth footprints deem the importance of the linear relationship between urban areas to execute balanced growth.

Last but not least, an important qualification of this conceptual framework and the view taken on the nature of land use for housing rely heavily on many theories, legislature and policies that reinforce criticalness pertaining to spatial
planning as a platform to qualify a conclusion that housing in many ways needs to be regarded as the corridor for development. Hence, Spocter [18] argues that in a perfectly rational world, housing determines whether the city is growing or stagnant. A similar logic suggests that housing permits are the strategic mechanism that represents a concept in a more tangible manner as they serve as our measure of new quantity. It is through these lenses and parallels that have been drawn that the subsequent sections of this work comprise an inclination to address the consequent parallel input parameter that is supportive of land uses for housing in this light.

4 Transport Response to Housing Land Use

The land that becomes the site of consumption for housing makes it quite clear that it has some potency to shape the nature and magnitude in its area of jurisdiction. This has been attributed to creating a perception that the clustering of housing creates an opportunistic environment for other land-use activities. Emphasising this issue from economic intuition, Capello and Njikamp [27] denote that clustering of activities in space increases competition for land. Heilbrun [28] shares a parallel related view that expounds further that a competitive land market determines the pattern of urban land use through a process by which individual land users adapt to a given system of transportation. The preceding argument presents the pinnacle of this discussion at this particular point when determining the mutual connectedness of various land uses in relation to housing land use. The interesting question then is how people would respond to the level of spatial aggregation attributable to housing land use and spatial policy instruments? In order to understand the basic dimensions of housing land use and transport, the reality displays the interaction between place of residence and employment to be complementarity of the urban areas. Focusing on the issue of geographic spread of activity, in this case, the housing market attention is focused on commuting as the key location factor for households, in turn affirming employment area as the focal point for residents. That said, the spatial organisation, and unprompted natural way of people to interact with the environment in response to spatial opportunities and socio-economic progressive role in the sustainable growth of the city, has remained a part of the city urban character. This chime in a very straightforward reality: residential land use involves families comprising workers who must fulfil nature’s quest to eat to be able to sustain life. Thus, working becomes a preliminary rationale and households relate in expected ways; hence, devoting their time to working has since become a norm. From the economic perspective, the simulation forged here is grounded in the perspective that the objective of a rational individual person is to maximise utility given the choices and constraints faced by the person to sustain life. As mentioned beforehand and continually unfolding, discussing housing issues without the mention of transportation will give the discussion ambiguous and insidious effects.

In essence, the existing spatial compositions consist of an intricate network of roads, streets, aspects of economic growth and development, human activities and
transportation issues. Within the context of spatial characteristics and socio-economic point of view, human activities are spatially separated; hence there is a need to consider mobility, accessibility and movement of goods in a bid to attain balanced growth. What is important about transport is that it plays a coordination role within an individual city and between different sizes and forms of cities. Within the context of transportation planning, the easement and connectivity that in turn determine the quality of access to public transport need to be adjusted for provision of various types of transportation systems to accommodate the needs of various end-users. According to Worley [29], the wealthy, who have the greatest ability to choose their residential locations, decide to live within one or more wedge-shaped sectors of the metropolitan area. In essence, its diverse urban characteristics demonstrate factors that strongly influence people’s residential sites and commuting patterns (cost) analysed from the workplace as the model presents a city in a polycentric manner. Certainly, the contextual factors underpinning transport single out vehicular transport to have dominated physical integration developments and related substantive applications of networks. Because the automobiles usually far surpass other modes of transportation and have a major influence on land use, analysis of its role in the community is critical [30]. Based on the outlined discussion, the city mostly relies on transport to connect suburbs with the Central Business District (CBD). Despite the supremacy of the automobiles, retailers have learned that effective shopping environments have to be pedestrian oriented, whether they are in city or suburbs. Shopping malls are artificial village centres – pedestrian streets that you have to drive to [31]. However, as there is no clear-cut approach to promote physical integration in the model, the mixed development integrative perspective seems to be one approach that may act to enhance, anchor or stabilise urban areas [32].

In essence, the spatial disconnect and/or poor spatial relations in South Africa make public transit the first and foremost social service. This stems from the view that the majority of people in the townships do not have automobiles or it may be said that they cannot afford private vehicles. It stands to reason that they depend on public transit as their main mode of transportation. That is, to provide sufficient access to jobs, schooling, medical care and other basic necessities to sustain life, these townships depend on continued availability of public mass transit. In a physical sense, one way to determine the importance of transportation issues is that it is clear that spatial equity is non-existent – an ambiguity – in its absence. Therefore, functional connectivity appears to be a critical mechanism, and its operational impact enables streamlining spatially separated human activities by optimising transportation. Transport infrastructure, for example, is one of the drivers shaping cities and determining the urban landscape, which in turn has implications on energy use and greenhouse gas emissions [33]. In support, Makarova et al. [34] point out that the development of the city is influenced mainly by a transport network [34]. Substantiating this line of thinking, Saville [35] draws in the experience of Cyprus, whereby poor transportation investment decisions and land-use planning have been one of the central indirect effects of inefficient mobility and reinforcement of residential segregation, especially in urban areas, such as
the historic though neglected inner-city cores of the major metropolitan areas. Sharing the same sentiments, Harumain and Morimoto [36] indicate that in China, the weak enforcement of policy by the government, excessive conversion of agriculture land, long work-home commuting and the weakness in policy are some factors resulting in failure of land use and transportation planning. As put by McCann [2] individual urban metropolitan governments have a role to play in determining transportation and land-use policies within the confines of the individual city.

In summary, implicit in most of the transportation studies, if not all, the common denominator is that countries’ maturity in the field of land use and transportation is the determining factor of their economy and development growth rate. This is to say that developed countries’ advancement in land use and transportation planning technically enables them to control the world economy. Thus, Elbarkouky and Abdelazeem [37] point out that distribution and transportation are important factors in the operational life cycle of any given spatial unit. It is reasonable to assume that with a progressive effort to make land use and transportation successful, there needs to be a basic approach to achieve the goal of spatial transformation, providing equal access to social and economic opportunities by looking into the provision of equal levels of access for all people to all places.

5 Housing and Supportive Land Uses

The availability and quality of services are key determinants of the quality of life. A common understanding regarding quality of services is that it reflects on the socio-economic artery of land uses. There are utilities and facilities that should be understood as cross-cutting. These land uses include public services, retail, entertainment and professional services that are easily accessible to residents, preferably by walking or public transit [5]. In proximity to the economic cluster has a positive influence [38]. The existing literature on the growth process of urban areas, witnessed in the preceding sections of this work, has proven that there is mutual connectedness between housing and spatial incidences. In essence, houses that are grouped together casually observed fulfill an important role in economic growth – this geographic setting offers and/or attracts a large variety of goods and services. In support, Lundqvist [7] argues that urban activities are interconnected by input–output deliveries of intermediate goods and final consumption. In an economic sense, it is fairly common that households have choices and preferences, thus, tempting to uphold Abdel-Rahman’s [39] argument that the desire of households to consume a variety of non-traded differentiated services represents one of the main reasons for the existence of large cities. Therefore, pertaining to housing and land use, a similar phenomenon exists often leading to complex spatial dynamic processes that call for new tools of planning and spatial organisation – prompted by land-use transitions to accumulated new developments and mixed-use developments to mention a few.

These dynamics are widespread and have remained the character of urban areas. A strand of the literature concurs with these assertions [40, 41]. Their central contention resonates the benefits of spatial agglomeration citing that cities, just like a cluster of housing and supportive activities, exhibit a wide array of attractive
opportunities (e.g. the proximity to a wide variety of goods, services and jobs). This is to say that proximity to the cluster of activities yields benefits such as minimizing commuter and shopper transport costs. Analytically, there are so many alternative interpretations of the nature of housing clustering to emphasise its strategic position in channeling development and consequent infrastructure planning. As a public good or real-market commodity, housing supersedes all other municipal plans that guide development at the local level. It puts forward a strategic implementation approach and gives effect to various public policies that would improve the socio-economic environment. From the economic perspective, there will be a variety of local business services available to the houses, which will facilitate their growth. The research conducted in Matlosana Municipality in RSA recognised this interface and the need for interdisciplinary approach at the local level.

Taking into account relationships among different settings of place this work draws in some empirical evidence to determine how residential land use and supportive land uses contribute to build more sustainable urban agglomerations. To determine the neighbourhood level of services, the households were asked to indicate the level of satisfaction and dissatisfaction with different types of services, including local schools, housing, local-street cleaning, local policing, local health services, local public transport, parks and open space and variety of shops. The level of services is an important consideration to be factored into analysis, because both availability and accessibility could ultimately determine the level of satisfaction. These variables represent the level of services and were formulated in hypotheses with the other variables of satisfaction as follows:

\[ H_0: \text{There is no correlation between neighbourhood satisfaction and neighbourhood level of services.} \]
\[ H_a: \text{There is a correlation between neighbourhood satisfaction and neighbourhood level of services.} \]

The correlation results clearly show that many variables (namely local schools \([p = 0.000]\), housing \([p = 0.000]\), local-street cleaning \([p = 0.000]\), local policing \([p = 0.000]\), local health services \([p = 0.000]\), parks and open space \([p = 0.001]\) and local public transport \([p = 0.042]\)) are significantly correlated with neighbourhood satisfaction, \(p < 0.05\); therefore \(H_0\) is rejected. While only the variety of shops \([p = 0.064]\) is statistically not significant, this means that \(p > 0.05\); therefore \(H_0\) is not rejected. The relationship that exists between the satisfaction of respondents and neighbourhood level of services was examined using the correlation coefficient. Table 1 presents the correlations for this analysis; all of them have a weak strength of relationship. As seen in Table 1, the correlation is as follows: local schools \([r_s = 0.241]\), housing \([r_s = 0.288]\), local-street cleaning \([r_s = 0.196]\), local policing \([r_s = 0.227]\), local health services \([r_s = 0.232]\), local public transport \([r_s = 0.080]\), parks and open space \([r_s = 0.136]\) and variety of shops \([r_s = 0.073]\). This weak positive correlation would mean that a unit/value increase in level of services is associated with negligible increase in the odds of being satisfied. This means that in Matlosana townships, one’s immediate need plays a larger role in
determining the neighbourhood in which he or she lives. In general, there is some evidence to support the hypothesis that there is a correlation between neighbourhood satisfaction and neighbourhood level of services.

Results show that a significant relationship exists between neighbourhood level of services and subjective neighbourhood satisfaction. The variable coefficients ranged from 0.073 to 0.288 determining the strength of the relationship as a weak positive correlation. For analytical purposes, the spatial economics foundation suggests that houses in proximity to a particular land use are more preferred. In an attempt to promote better understanding of the underlying driving forces of spatial agglomeration and the channels through which agglomerative activity fosters urban relations, the cause–effect for supportive land-use response reflect the level of satisfaction of that particular service in the area. As seen in Table 3.1, variety of shops had p > 0.05 supporting the null hypothesis. In essence, the effects of variety of shops and the location of major economic activities express the implication that has been drawn throughout this discussion that the variety of local business services available to the houses will facilitate their growth. The small means of the accessibility and availability entirely concur with the results making this variable a minimal effect of the neighbourhood effect. Grasping on this statistical agenda and the generally held view, from the scientific point of view, there is some empirical evidence to throw light on availability and accessibility offering a concise overview of various land uses. The empirical evidence accumulated here concur with Mulligan et al.’s [42] contention that there are basic ways in which land use can affect the desirability or ability of people to reside in a given place.

Therefore, based on the model specifications, the significant correlations are used to determine their influence in the level of service delivery. Hence, in the analysis, the study found that the household location was a good predictor of types of services the household has access to – good proxy for service delivery transposing to multiple services. For example, a neighbourhood choice also depends on information pertaining to the level of services – in the case of schools, the real-estate agents provide prospective home buyers all sorts of data about the test scores and college-attendance rates of neighbourhood schools [4]. This reflects that the spatial distribution is a central factor and a determinant of accessibility. The context of the case study conforms to these results as the spatial composition that the service type and quality show a discrepancy between informal and formal settlements. Basolo and Strong [43] affirm that these variables measure the status of a neighbourhood’s physical environment, access to places of activity and services, and socio-cultural setting. The findings of this study correlate with the latter; the households located nearer to most services and with ease of accessibility to conduct their daily activities were fairly satisfied with their neighbourhood. Housing,

Table 1: Phi coefficient correlation ($r_s$) of neighbourhood level of services.

<table>
<thead>
<tr>
<th>Value</th>
<th>p-Value</th>
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<tbody>
<tr>
<td>$r_s$</td>
<td></td>
</tr>
<tr>
<td>0.241</td>
<td>0.288</td>
</tr>
<tr>
<td>0.196</td>
<td>0.227</td>
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<tr>
<td>0.232</td>
<td>0.080</td>
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<td>0.136</td>
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<tr>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>0.042</td>
<td>0.001</td>
</tr>
<tr>
<td>0.064</td>
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N 591 652 648 640 630 642 648 646 591 652 648 640 630 642 648 646
particularly housing condition to be precise, has been found to be a critical factor in fostering neighbourhood satisfaction.

The understanding of the key public services is critical as they differ from one neighbourhood to another and specifically individual desires. Regarding these neighbourhood variables, although they vary over time (for instance, a couple with no children would not consider school as a necessity at a particular point in time), a collective view of them can assist in prioritising and improving the services and can play a critical part in enhancing livelihoods. Significance of development to them will be those that tap within the economic gains. Hence, it is logical to presume that lack of these services will retard both economic and social growth in the neighbourhoods. This conservative view is rooted from urban planning approaches that areas of urban deprivation make cities less attractive places to live, play and work. This has far-reaching implications as it will provoke a spiral of decline in all the segments.

Moreover, a mix of theoretical and empirical reactions corresponds to the overall construction activities – where infrastructure services streamline and adhere to spatial development planning due to their potential to influence economic growth by seeking attention of policy makers and investors, which directly translates to quality of life. In order to pursue a sustainable human settlement initiative, urban infrastructure development needs to be considered as the pillars of strategic planning – their spatial characteristics enable them to have the agential power to influence planning directions and trajectories in a wide-scale area. This qualifies the level of services as an important indicator of sustainability.

6 Housing, Sustainability and Spatial Policy Interface

Globally and locally (RSA), sustainability has formed the basis of policies and programmes that guide both urban and rural development. Hence, Choguill [44] cautions that cities cannot be considered sustainable if their component parts, such as neighbourhoods, do not meet the sustainability criteria. Hence, the basic rationale is to conjoin all dimensions of sustainable development that considerably create networked environments that scale up urban areas’ growth and encourage horizontal relationship platform and equitable innovation. Sharing the same sentiments, van Geenhuisan and Nijkamp [45] add that a sustainable city is an urban area harmonising the socio-economic interest with energy-related concerns in order to ensure the continuity of change. This has highlighted sustainable development tripartite description. Putting in perspective of sustainability, housing land use also enables communities to get involved and better manage change for the good of their needs and their future, and enables local governments to invest spending on actions with multiple benefits and allows them to present a stronger business case to funders and financiers [33]. Central to much of the policies is consideration of public participation in designing more sustainable human settlements. Sustainability practices are widespread and, on the other hand, the contemporary geographical setting activities are complex clearly combining a variety of problems to be solved. To make matters worse, there are lots
of definitions that attempt to define the concept but there are no precise answers to the question of what is sustainability. Sustainability is, therefore, a concept in search of a framework for implementation, rather than a definition [46]. However, each of these principles is seen as equally important in achieving sustainable development, especially when attempting to apply the concept in a situation such as designing more sustainable cities [47]. As a result, it is clearly evident that sustainability has become an important element to be considered in the planning of urban areas [44].

The common thread in sustainable urban development is futuristic scope – likely to mean long-range planning to address specific urban situational conditions. From the disconnect of the urban settlements, diverse spatial uses and historical spatial imbalance, the focus here is on the strategic planning of the critical instrumental role in initiating, formulating, reviewing and implementing integrated urban structures that consider creation of a more sustainable legacy for the future. The perspective of the strategic planning process, which is defined as the set of human interactions, formal and informal, which take place in the course of generating a strategic plan may thus be deduced [48]. In essence, the strategic issue array acts as a critical vehicle through which strategy formulation influences strategic change [49]. This prompts a need for coordinated, consistent and harmonious decision making. From the housing land-use characteristics and the socio-economic point of view, the function of the main backbone of the entire process is to protect and improve human life and the environment. The logic implies that credible and conscious strategic planning diffuses in response to spatial opportunities and supports high employment in economy, with strengths in education, innovations, social and territorial cohesion, contribution of relevant physical interventions and the protection of human life and environment. Focusing on the issues of geographical spread of activities, strategic approach is crucial in order to inform the future spatial structuring of the municipal area and solve local housing problems, under the view of sustainability. According to Jordan and Infante [33], strategic planning ensures that a city vision gets translated into objectives, which in turn provide criteria to select win–win policies. An interesting contrast is that improper planning and urban design perpetuated environmental degradation and cities’ failures [50].

By employing urban system’s concepts, urban, city and town planning is a technical and political process concerned with the use of land and the design of the urban environment, including transportation networks, to guide and ensure the orderly development of settlements and communities [51]. In the context of housing land use, the strategic planning chimes in to apply its dynamic optimisation strategies to prioritise, mobilise, sequence and implement plans that benefit spatial development planning. According to Hanada et al. [51], it (strategic planning) concerns itself with research and analysis, strategic thinking, architecture, urban design, public consultation, policy recommendations, implementation and management. It stands to reason then that all housing dimensions – be it spatial, economic, sectoral, environmental or organisational – are more effective if they are conceived through a strategic approach. As put by Hanada et al. [51], these plans can take a variety of forms, including strategic plans, comprehensive plans,
neighbourhood plans, regulatory and incentive strategies and historic preservation plans. This makes housing land use to be conceived in a set of concepts, procedures and tools that must be tailored to whatever situation is at hand if desirable outcomes are to be achieved.

Spatial planning realities are wide and varied – of which housing is a part and parcel. According to Cilliers [52], spatial planning is subjective and related to the view and perspective of planners and planning authorities, budgets and policies. More practically, European Regional/Spatial Planning Charter of 1983 refers to spatial planning as the way in which different activities, land uses and buildings are located in relation to each other, in terms of distance among them, proximity to each other and the way in which spatial considerations influence and are influenced by economic, social, political, infrastructural and environmental considerations [53]. It must be stressed that strategic spatial planning is a deliberate and concerted effort – so much that the underlying observed spatial mismatch in South Africa did not occur spontaneously. It is probably in contexts such as this that one can make analytical statements that past spatial planning in South Africa was insufficiently underpinned. In the same way, this past spatial planning had necessary institutional framework enabling, supporting and/or prescribing the step to be followed in the course to ensure effective spatial separation. One of the diverse characteristics of spatial planning is that it is based on intended use and changes overtime. Many of its policies can become out-dated, rendering the process irrelevant and un-sustainable. However, the main bearing point is that the types of spatial planning systems that evolve in different parts of the world depend on the country’s legal system and institutional framework, the relative roles of the different actors in the development process and the extent to which a separate planning profession has emerged.

7 Conclusions

It turns out that the objectivity of housing land use should be viewed as a deterministic urban growth management tool that will make optimisation possible through long-range planning. Housing has become an important strategic planning tool for local governments in ensuring efficiency and effectiveness in policy design and implementation, including for infrastructure [33]. From its embryonic status, the main objective should be accorded to assisting decision makers and planners to identify and prioritise actions that lead to socially, economically and environmentally vibrant human settlement.

In essence, the framework that executes housing land use is grounded in the perspective of the government spatial planning policy. Perhaps, in reality, the challenges might be politically sensitive too with respect to sustainable housing land use because spatial planning is in nature political.

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