GeoJournal (2023) 88:2471–2489
https://doi.org/10.1007/s10708-022-10758-6

Can informality help create smart, sustainable cities? The vibrancy of self-organised informal settlements in Cape Town

H. S. Geyer

Accepted: 7 September 2022 / Published online: 22 September 2022

Abstract The study critically evaluates the sustainability of informal settlements in terms of smart growth principles. There is an irony that informal settlements have more of the ideal attributes of smart development, including mixed-use development, high densities, compact affordable housing, modal accessibility, and dense local employment opportunities, than sprawling, low-density single-use developments in surrounding formal developments. Yet, despite their smart characteristics, these informalised settlements are not regarded as ideal spaces to live in due to their informal nature and thus are regarded as unsustainable modes of living. This study critically investigates these assumptions, analysing how informal mixed-use spaces are produced, organised, and regulated organised outside formal planning in a customary land use management system in Cape Town, South Africa, and whether this mode of urbanism is smart, i.e., sustainable. The research results indicate that customary self-regulation of informal settlements creates very liveable, polymorphic spaces in the marginalised townships despite the severe lack of resources. Its smart characteristics are not for aesthetic reasons but to make space functional and personal for the residents. However, the unregulated nature of this new mode of urbanism also limits the accumulation of wealth within the township, and it creates dangerous and unhealthy living conditions for residents in terms of litter, noise, flooding, fire risks, environmental degradation, and anti-social behaviour, especially in public areas not adequately regulated by customary regulatory bodies.

Keywords Informality · Smart growth · Sustainable development · Customary land use management

H. S. Geyer (✉)
Department of Geography and Environmental Studies, Centre for Regional and Urban Innovation and Statistical Exploration (CRUISE), Stellenbosch University, Private Bag X1 Matieland, Stellenbosch 7602, South Africa
e-mail: hsgeyerjr@sun.ac.za

Introduction

Informal settlements cannot be romanticised the way formal neighbourhoods are, often being unsightly and decrepit spaces defined by widespread poverty and inadequate housing and services (Wacquant, 2009). However, there is an irony in that informal settlements are socially more integrated, with more diverse land uses and higher levels of economic activity than in many formal neighbourhoods patterned after smart growth principles (Edwards & Haines, 2007). Planned smart growth developments are often notoriously expensive and socially exclusive (Moos et al., 2018). They are often so stringently regulated that it undermines any flexibility or spontaneity in urban development, resulting in less diverse and functional spaces that are less resilient to socioeconomic changes. Top-down processes of smart growth often produce outcomes that are not very different

from suburban single-use development, contrary to the principles of sustainable development and smart growth (Neuman, 2005).

While smart growth is perceived to be more sustainable by adopting the natural inclination of actors toward mixed uses and new urbanist lifestyles, the primary concerns with increasing the status, stability, and security of private equity results in less sustainable outcomes. On the other hand, informal settlements produce mixed-use neighbourhoods mirroring the principles of smart growth, even though these developments do not conform to statutory regulations (Agheyisi, 2020). The paper evaluates the degree to which informality creates a resilient, vibrant, and sustainable urban and whether this type of urbanism is liveable, by analysing the social costs and benefits of this mode of urbanism, in contrast to the outcomes of formal smart growth initiatives. Of specific interest is how these principles occur organically and spontaneously in a deregulated and ad hoc manner in informal settlements.

The sustainability of informal mixed-use development in the literature

The 'sustainability' of formal smart growth initiatives?

Smart growth is not merely the outward adherence to a formal set of best-case 'smart growth' building and planning strategies, integrated urban management techniques and smart regulatory incentives (van Assche et al., 2016). More intrinsic is the idea of making space polyvalent, providing a variety of different urban functions linked to the various aspects of living, working, and playing within a walkable local neighbourhood (Niemira, 2007). This aesthetic envisions a polymorphic urban form with mixed land uses, higher population densities, a distinctive urban character, compact building designs without sprawl or leapfrog development, and more optimal use of infrastructure (Hawkins, 2014). It also prescribes a diverse range of housing opportunities, sufficient open spaces, higher levels of accessibility with integrated public and non-motorised modal choices and decentralised and democratic urban regulation mechanisms (Raman & Roy, 2019). It is predicated on practical in-fill development, urban revitalisation, mixed-use development with diverse levels of affordability, diverse urban designs, ethnic integration, and local employment (Infranca, 2019).

This aesthetic is a reaction to the perceived inefficiencies of traditional suburban landscapes, with sprawling, car-orientated low-density cookie-cutter single-family houses and segregated shopping malls, office parks, industrial estates and gated communities. It is geared to reduce the decline in the quality of public goods, minimising the sum environmental and social costs of segregated land uses (Talen, 2013). This implies a complete change in urban lifestyles, diversifying the demographics of neighbourhoods, increasing the different types of goods and services, and generating different urban experiences. It promises a dynamic urban location, proximity to jobs, culture and nightlife, a compact walkable neighbourhood and healthy living (Kusumastuti & Nicholson, 2018).

However, the need to maximise the perception of the status, stability and safety of private equity often creates incentives to water down the diversity of mixed-use activities, privatise public space, reduce social diversity, and prioritise private vehicles (Shatkin, 2018). The cost of selecting suitable infill sites, navigating the myriad of building regulations, and overcoming resistance from local politicians and residents, often make smart growth initiatives so complicated, expensive and time-consuming that the resultant properties become unaffordable (Moos et al., 2018). This significantly reduces the adaptability of land uses to changes in technology, economic shifts, and social transitions, and thus creates a city which, in certain instances, could be regarded as non-resilient (Farjama & Motlaq, 2019). Inevitably, planned smart growth developments do little to reduce urban sprawl, make housing more affordable, increase the flexibility of economic uses, increase the use of public transport, or reduce the consumption of energy (Ewing & Cervero, 2010).

Informal mixed-use development as a sustainable mode of development

The irony is that unplanned and underregulated informal settlements have many of the characteristics of smart growth, resulting in more integrated, vibrant land uses with higher levels of social and economic activity (Khalil, 2010). Although informal settlements are often decried as illegitimate, unsustainable,

and unliveable, they often produce organic forms of smart, sustainable mixed-use development with a high level of functionality despite the lack of adequate resources. Despite its lack of outward aesthetic appeal, informal settlements demonstrate a mixture of tenure types and affordable housing, a wide variety of integrated mixed land uses, ethnic diversity, innovative construction techniques and compact and efficient building designs that formal smart growth initiatives strive for (Grandin, 2018). Furthermore, it has a high level of localised job creation and contains numerous small informal businesses that circulate revenues within the neighbourhood. It applies innovative and practical infill development strategies and optimally uses available infrastructure, generating a distinctive urban character and strong social cohesion as necessary conditions for a healthy neighbourhood. Its open spaces are socially vibrant and actively used by local residents within a long diurnal cycle. Furthermore, it generates walkable neighbourhoods and high levels of accessibility to a range of transportation modes (Lynch, 2017). As such, for the subaltern, informality represents a socially legitimate alternative to achieving smart, sustainable growth. These informalised spaces conform to the basic principles behind sustainable development, even though it does not conform to the top-down smart growth policies and strategies.

Informality is a meshwork of different land uses, recombining various categories of formal and informal, urban and rural, residential, commercial, industrial, and recreational, regulated and unregulated land uses together (McFarlane, 2012). Informality recombines those aspects of the urban which is recognised as contradictory by urban planning and applies it in a seemingly unregulated and organic manner, reducing the artificially created socio-spatial inequalities and segregation generated by formal cookie-cutter developments. Since there is no formal categorical distinction between workspaces and living spaces, or even recreational spaces, and since land use rights exist as layers of codified and uncodified property claims, the city becomes an open canvas to recreate space in a sustainable manner (Kudva, 2009). It turns fragmented urban spaces into transformed sustainable and socially just spaces and makes these spaces relational by linking the social, political, and material aspects of the city (Grandin et al., 2018). This also democratises and decentralises space for the ordinary user, but it also creates a complex deregulated environment in which the community self-regulates the externalities arising from high-density mixed-use development. More importantly, informality transforms the everyday practice of urbanism, based on what is pragmatically sustainable for that space at that time. All spaces become polyvalent and thus are spaces of opportunity because all spaces are a product of a series of everyday improvisations and the tacit reconfiguration of practices and relationships to spatially revise the social and economic environment to satisfy basic needs (Bartels, 2020).

Informality operates in an environment in which the existing state resources, in terms of housing, employment commodities and services, are insufficient to provide for the high numbers of urban migrants seeking these goods (Zenou, 2005). Instead, informal agents self-generate these resources affordably and efficiently in the interstices of cities. These are areas with marginal social or economic value because they are located along the periphery, in public or natural areas, in floodplains, against mountainsides, along transport servitudes, in unwanted or undeveloped brownfield development, and particularly in communal areas with an absence of private property titles (Dovey, 2015). While these spaces have an absence of functional commoditised value for the formal sector, and though they lack basic services, infrastructure or even buildings, informal actors engage in bricolage, making do with what materials are readily at hand to invent utilisable urban space out of otherwise dead spaces (McFarlane, 2012; Vasudevan, 2015). These appropriated interstitial spaces produce necessary economic and social functions that transects and integrates with that of the formal city, as envisioned in smart growth.

Much of these controversial practices in informality are because informal development is necessity-driven (Williams, 2008). As a result of deep-seated structural inefficiencies in state regulations and market forces, informal development becomes a driving force for impoverished actors to adopt strategies outside the formal market to supply working, living and recreational spaces (Agheyisi, 2020). In contrast to formal modes of smart growth, the incorporation of creative and flexible local practices generates active, hands-on urbanism without the need for intermediary socio-technical planning (Lindell, 2019). The collaboration of informal actors creates a street politic

of survival and/or exploitation, of encroachment and appropriation in certain cases, and of withdrawal and redress in other cases (Kudwa, 2009; Bartels, 2020). Aggregated, the incremental improvisation of space creates territorial unmapping, the organic laissez-faire reproduction of space through a series of encroachments in which actors actively produce the urban through everyday urbanism (Roy, 2009). It generates zones of exception: non-contiguous, alternatively regulated spaces with graduations of actor sovereignty (Ong, 2006). While these unauthorised urban developments are grey, because they have no *de jure* state recognition, contravening formal private and state property claims and planning bylaws, it becomes an essential part of the city, providing necessary housing, labour, employment, and basic services, and in turn, depends on the state and the formal private sector for resources (Yiftachel, 2009).

The unclear property rights, lack of defined tenure, increasing diversity of land uses and unstructured community regulations operate in terms of *self-organised criticality* (Bak, 1996), creating a reflexive, emergent, polyvalent, and self-organised system in which the dynamical instabilities in the state provision of essential basic infrastructures are continually weighted by the informal provision thereof so as not to cross a critical threshold of system collapse. Although formality provides affordable and flexible housing, commerce, and transportation options, accommodates higher densities, and uses technology and resources appropriate to the level of poverty, it also results in environmental degradation and significant health and safety effects from fires, traffic, accumulated solid and toxic waste, and rising damp (Aguilar & Santos, 2011). Non-marketable merit goods such as refuse removal and sewerage are often regarded as unnecessary luxuries by the urban poor, and since property rights are vague and layered it is often impossible to clean up the social (and physical) disorder in collective waste management (Porter, 2011). For this reason, the formal sector will always recognise informality as socially, economically, and environmentally unsustainable.

How communities informally self-organise smart growth

Within the Global North, zoning is the standard formal regulatory instrument through which smart growth initiatives are coordinated (Hirt, 2012). However, in much of the developing world, the bewildering mix of land uses, high densities, social diversity, tenure diversity and innovative construction techniques in informal settlements are predominantly regulated informally through customary land management systems (CLMS) as a collaborative alternative to urban planning and urban management (Onyebueke, et al., 2020). CLMS enable informal smart development since the externalities are negotiated between primary parties based on common law principles, rather than through a polity of bylaws and policies. This generates more environmentally responsible urbanism with a greater provision of need and a greater degree of toleration of the numerous externalities associated with high-density, mixed-use developments, necessary for smart growth (Khalil, 2010). Community-directed customary processes are more responsive to technological changes and economic cycles because it is flexibly and dynamically self-organised without the costs and rigid regulatory constraints of smart growth. Moreover, the customary regulations generally function in a complementary fashion to zoning, costlessly replicating the functions of the formal zoning, but producing outcomes which are smart and sustainable in a manner that is idiosyncratic, open-ended, and organic (Hansen & Vaa, 2004).

The key element is the entrenching of processes within strong social networks (Massey, 2014). Here the community employs modes of counter-conduct, passively resisting the inconsistencies of state regulations that would reduce densities, limit infill development, mixed land uses, compact building designs, affordable housing options and modal diversity. This is not an open protest or direct confrontation, but a passive disregard for those regulations that would reduce affordability, accessibility, ethnic integration and local employment, and an active support for those top-done regulations that do serve these purposes (Rasol, 2014). Where the state cannot provide adequate housing and employment, informal actors improvise socially and economically inefficient spaces through tactical building improvisations using alternative materials and ad hoc infill strategies. Although the local state mandates sustainable modes of development through its plans and policies, the exorbitant costs and regulatory nightmare of regularising informal settlements following formulaic smart

growth procedures make it unviable. Furthermore, these procedures are increasingly becoming irrelevant since communities are proficient in practically accomplishing smart, sustainable outcomes through their own internal, albeit informal processes (Bredenoord & van Lindert, 2010).

The smart, sustainable character of informal settlements stems from their polycentric political structure. With a plurality of competing power elites and diversity of local ethnic subpopulations that access resources and entitlements by varying their allegiances to these elites, there is no central authority to implement formal regulations separating land uses (Huchzermeyer, 2014). Instead, local government uses its participatory mandate to include grass-roots community associations through existing modes of social interactions. Employing the trust and cooperation in existing social networks, the actors create an alternative system of urban management with an organising urban logic that very much represents that of smart growth (Jabareen, 2014). This very much follows the DIY logic of the socially conscious urban reformers in the North who clandestinely undermine the totalising urban power-geometries to reimagine urban space sustainably. They understand that the'right to the city' also entails a right to synergistically reappropriate space when there is an inherent imbalance in the provision of work housing and services in the city. In both these cases, functionally dead spaces created by illogical zoning regulations are revitalised through low-cost, experimental, and temporary innovations that are eventually incorporated into planning to generate the vibrant urban character appealing in smart growth developments (Finn, 2014).

However, informality still presents a particular challenge for the state in terms of zoning and regularisation. Most informal settlements have a severe undersupply of basic services like potable water, reticulation, electrification, paved roads, and adequate housing (Syagga, 2011). Although informal settlements increasingly house a large section of the urban populations in Southern cities and are functionally part of the contiguous urban footprint of the city, it often has a vague legal standing and is thus outside the scope of municipal planning and servicing (Simon et al., 2012). The extremely high densities and laissez-faire spatial structure of informal settlements do not lend to the incremental regularisation of services since regularisation requires the codification and renegotiation of innumerable individual property claims over very small parcels of land, and the wholesale resettlement of haphazardly distributed individual informal structures and boundaries within a formal street grid system (Earle, 2014). The greater challenge is, however, overcoming the Northern ideological bias that smart growth should only occur within the framework of state-directed planning processes. Informality is an invented latitude, based on preconceived biases that 'unplanned' settlements cannot be actively planned by non-state actors, that affluent settlements are necessarily more liveable, and that informality cannot be environmentally, socially, or economically efficient (Harris, 2018). In reality, informality can re-envision a smart, sustainable city due to its fluid regulations and weak bureaucratic controls. Vast swathes of shanty settlements and congested roadside trade may not be very aesthetically pleasing, but the social and economic opportunity costs of informal densification and mixed-use development may significantly outweigh the private externality costs of these developments and the privileged aesthetic sensibilities of the North (Simon et al., 2012).

Research methods

The research applies an ethnomethodological design to the research. It relies on inductive processes to develop an insight into the meanings behind local practice (Anderson, 2009). This represents a discourse-analytic approach within phenomenology in which local practices and situational knowledge is analysed in contrast to, instead of subject to orthodox sociology (Lynch, 2017). The primary research study area is the adjoining townships of Lwandle, Nomzamo, Greenfields, Zola, Wag-'n-Bietjie and Chris Nissen village. These are partially informalised formal townships located between the towns of Strand and Somerset West and form part of the City of Cape Town Metropolitan Municipality, South Africa (Fig. 1). Most of the housing consists of state-built housing (RDP housing), but most houses also have several informal backyard shacks (termed hokkies, the colloquial Afrikaans term for a pen or an enclosure) rented out for additional income. Most of the population consists of

Fig. 1 The primary study areas (author's adaptation of AfriGIS data)

Xhosa-speaking residents, however, there are also many Zimbabwean residents in certain sections of the study area, with smaller distributions of Somali, Malawian and Nigerian residents. There are also a small number of Afrikaans-speaking Coloured residents in certain sections of Nomzamo, and the neighbourhood of Chris Nissen village is predominantly Coloured.

The research consisted of 50 in-depth semi-structured interviews. Multistage sampling was conducted, selecting at random from different ethnic and social groupings and selected evenly between the different sections of the study area. The random selection of residents included a random selection of RDP homeowners, tenants, hostel dwellers, registered occupiers of site and service schemes, tenants, business owners, South African and foreigners of different racial backgrounds and different home languages. Research occurred with ethical clearance and followed approved research protocols and social distancing measures. The purpose of the sampling method was to achieve a broad range of answers to the research questions from various actors.

Analysis of the social regulation of informal mixed-use development

In the study area, residents incrementally developed informal extensions to the dwelling structures, organising into a densely populated, informalised formal township housing a larger population and integrating various land use activities, often within the same residential property (Fig. 2). The typical property in the area is between 50–150 m^2, and originally consisted of a government-supplied property on an unmarked erf of land which was later transferred into a freehold title. Since the housing was developed during different periods of South Africa's history, and according to the prerogatives of different ruling political parties,

Fig. 2 An aerial view of the township layout. Note informalisation amid the formal grid layout (AfriGIS)

Fig. 3 A pre-RDP one-room house in Nomzamo with temporary hokkies. (Author's own)

private sector contractors and government agencies, there is not a uniform structure to housing in the township. Certain apartheid-era houses, particularly in Lwandle and Nomzamo consist of small 12–16 m^2 one-room bungalows (Fig. 3), whereas the newer RDP housing in Greenfields and Zola conform to the later RDP building standards of 30 m^2 four-room units (Fig. 4). Most units were originally developed as single-storey developments, but many later infill developments now consist of double-storey apartments constructed above the RDP units (Fig. 5). Most units were built on separate erven, but certain units

Fig. 4 An RDP house in Zola with permanent hokkies. (Author's own)

Fig. 5 A multi-level apartment redevelopment in Zola. (Author's own)

were built in shared spaces with a single vehicular entrance shared by 4–6 units. The growth of the township is spatially constrained by industrial developments and gated communities along its periphery. Consequently, most new residents are accommodated in informal extensions and hokkies built informally on RDP erven.

In the township, the residential properties are primarily mixed-use spaces. Only the most affluent homeowners use their homes solely for personal residential use. The house is primarily a mechanism for income security, as any unallocated spaces within the erf are often used to obtain additional income through the rental of hokkies, or as a means through which unemployed residents obtain a subsistence wage through small-scale enterprises. According to numerous sources, the spaces are easily adapted to these purposes, with the temporary structures altered to accommodate the needs of new types of enterprises or the different spatial demands of tenants, either developing small one-person hokkies or room-sized family dwellings. One responded noted: "I change [the hokkies] when the tenant asks me, they need a room, not a hokkie. I help them because they are good tenants. They can also do a business, but then they must pay more electric." Often every practically available space in the erf is used for these purposes, and where fences do not exist, small encroachments are made onto neighbouring erven, since any unfenced space is tacitly regarded as temporarily usurpable public space (Fig. 6). Another responded noted: "these young people overstep, building a big hokkie on the neighbour's land because they know they [the neighbours] are old people they won't complain. But then the children [of the old people] come, then there are problems of the [boundary] pins." If the landlord's tenants have a vehicle, space will be allocated for parking rentals if parking is not available, since the ownership of the vehicle significantly increases the income of the actor. In other cases, the free space could be converted into a commercial venue for a crèche, a shebeen or spaza shop. Thus, the erf becomes a congested space where a range of structures are developed to accommodate tenants and diversify income streams.

Along main thoroughfare routes, the entire street frontage is converted to commercial and light industrial uses (Fig. 7). Since the major form of mobility in the township is pedestrian, a wide range of goods and services must be accessible within easy walking distance and be located where most pedestrian flows occur. There are few commercial districts as such, rather the range of activities are distributed relatively equally within the townships to limit competition in any one area, although enterprises concentrate along major thoroughfares. Thus, any busy street will have, for instance, a building materials trader, next to a mobile phone dealer and repair shop, next to a restaurant and tavern, next to a second-hand goods dealer, etc. These enterprises can either rent the entire property or rent a portion of the stand to occupy

Fig. 6 A shack overstepping its boundaries. (Author's own)

Fig. 7 A typical commercial Street along a major thoroughfare route. (Author's own)

Fig. 8 A converted shipping container as a mobile store (Author's own)

a converted shipping container as a mobile store (Fig. 8) or rent small streetside hokkies or stalls for smaller enterprises.

The only exception is spaces where parking is plentiful, particularly on undeveloped land at the periphery of the urban where the land may be used temporarily for parking during the day, but not occupied during the night. In these spaces, there are several car repair shops, each specialising in various aspects of the vehicle, such as scrapyards, auto electricians, tyre repairs, exhaust repairs and windscreen repairs (Fig. 9). Contested open spaces or unallocated open spaces are often used for churches since these generally erect temporary tents occupying the entire space. There is a large degree of veneration for religious institutions, and it is considered a communal rather than private benefit of space. Furthermore, since religious activities generally only occur on

Fig. 9 An area where the vehicle repairs are made. (Author's own)

Sundays, the spaces are used for a variety of social and cultural activities during the week. There are few recreational open spaces in the township. Since every open space means fewer homes for those on the RDP waiting list, almost all space is used for residential and institutional amenities such as schools, police, etc. Most recreational spaces are situated along servitudes such as under power cables or in future road reserves where the municipality specifically prohibits the erection of all structures (Fig. 10).

The materials used in the extensions reflect both the range of legitimacies with respect to tenure, as well as grey aspects of extra-legal land use. The most preferable new extensions are permanent structures that are constructed from brick and cement (Fig. 11). These are generally employed when the owner has a secure title deed registered in his or her name so that property cannot be disenfranchised after the capital improvements are completed. The value of rentals increases with permanent structures because the thermal properties of brick and cement resist ambient heat and cold, and raised cement foundations limit the impact of flooding during the rain season. Another benefit is that these structures are more resistant to fires than shacks. Many actors maximise the rental value of

Fig. 10 Recreational spaces under powerline servitudes. (Author's own)

Fig. 11 Informal extensions using permanent materials. (Author's own)

their property by constructing up to 10 large double-storey studio apartments towering above the rest of the street (Fig. 5). It is not difficult to see that the neighbourhood could densify significantly within a brief period if developed into permanent structures.

However, most new informal extensions in the township are temporary structures constructed from timber, plastic, sink and tarpaulin (Fig. 12). The de facto tenure of landlords and tenants in these temporary structures is secured by street committees, the local informal CLMS, since other members also engage in the same illicit activities. The preponderance of these temporary structures is primarily due to cost considerations. Even informal constructions without building permission are prohibitively costly for ordinary landlords without a waged income. Furthermore, since most of these improvements occur without building control or rezoning, the improvement of these dwellings into permanent structures could attract the attention of building control, who require costly approved architectural building plans for permanent structures, the dismantling of illegal structures and rezoning procedures. In many cases, the regularisation costs of permanent extensions exceed the total value of the entire property. Thirdly, the improvement of properties could increase

Fig. 12 Informal extensions using temporary materials. (Author's own)

secondary ownership claims over the property, especially if the property were acquired without a legal deed transfer or subject to inheritance disputes. Finally, the flexibility of temporary structures enables the actor to restructure the spaces at minimal cost and time. Often a new activity is unsuccessful, and the actor may decide on another type of activity which could be more profitable, requiring the restructuring of the space. It only takes an hour or two to construct or restructure a temporary dwelling, whereas a permanent structure often takes weeks to construct.

Economically, the mixed-use character of erven contributes to the sustainability of this neighbourhood. Due to the diverse range of informalised income strategies, combining formal sector employment, state pensions, child-care grants, hokkie rentals and incomes from informal enterprises, most homeowners are comparatively financially secure, despite the high formal unemployment rate. The flexibility of the use of spaces enables the periodic reorganisation of spaces to generate higher rents and enable the trade in a diverse range of goods and services. As interpreted from various interviews, much of the income of the residents is internally redistributed through the trade of goods and services within the community to enhance neighbourly goodwill and standing, and thus the community has a far lower leakage of incomes and revenue than a traditional formal suburb. Moreover, strong social conventions regarding equitable competition produce a far more equitable distribution of wealth and the containment of enterprise within the local community. At the small scale, the equitable distribution of wealth is organised amongst micro-enterprises within the community but regionally the equitable distribution of wealth in the township is also organised amongst a broad range of traders within local business forums, generating levels of economic cooperation not evident elsewhere.

The township is scaled to that of the pedestrian so that most pedestrians can acquire the necessary everyday goods and services within a 100 m walk, or a slightly further walk for specialised goods and services. However, accessibility is also remarkably high since the spatial structure of the neighbourhood is crisscrossed by large formal roads in a grid-like structure enabling rapid movement with limited traffic congestion. The township has a very long diurnal cycle starting from nine in the morning until nine in the evening, and later over weekends. Moreover, the township has a large degree of free expression, of distinctive designs, tastes, and styles, yet it is idiosyncratically local.

Everywhere there are opportunities for accommodation, for employment and to access commodities and services. Every utility is optimally used, and every space serves some function. The neighbourhood is also smart. Besides a having polymorphic urban form with a functional-relational mix of land uses, the township also has numerous characteristics desired in new urbanist developments. It has remarkably high population densities (a current mean density of 1550p/ha, up from an original RDP design of between 200-600p/ha) with a range of housing and commercial opportunities, compact, flexible, and cost-effective building designs, a very cost-effective and efficient multi-modal transportation system with a high rate of accessibility, all cemented in an efficient and relatively equitable customary land regulatory system.

The street committees, locally elected civic representatives representing 60–100 persons along a common street front, impose non-statutory community-derived regulations and responsibilities. Land use, tenure and building control issues are negotiated by the community in weekly street meetings, and decisions are only reached with unanimous community consent and are codified in the community records. The smart nature of the community is a function of this system in which the community permits housing and commercial activities in a manner which enables agency, but strictly admonishes criminal and predatory behaviour or activities with egregious social externalities. Since the regulatory system is not a faceless bureaucratic system but an extension of a strong cohesive social network of neighbours and family members, its regulatory powers are protective, highly efficient but reasonable, given the impoverished circumstances of the community. It is also inclusive of different ethnicities, but there is a differentiation of authority based on standing, with property owners having far more authority than tenants. Furthermore, standing is increased by interaction, with those who do more trade and consumption of local goods and services having more standing than those who buy and sell elsewhere, increasing the economic viability of the community.

However, on the downside, there are several basic health and safety externality factors which limit the

liveability of this mode of urbanism. Firstly, due to the shortage of public open spaces, and the lack of security therein, the only relatively secure public spaces is the local street frontage. The street is thus the public square of the neighbourhood, the play area for children, the area where people can converse and the area where businesses solicit clientele. This is usually an intimate affair because the streets are relatively narrow, often with only the obligatory 8–10 m road reserve available for public use. Whilst the street is a public space not owned by any actor, in practice, the street operates as a public servitude over private land. Public access is regulated, and security is maintained through eyes on the street. There is a right of thoroughfare for actors en route elsewhere, but only residents and their visitors have the right to loiter in the street. According to numerous sources, a non-resident person loitering will be warned, and if this person is recognised as a *skollie*, a ruffian, he/she will be accosted by local residents. One respondent stated: "Skollies? How, there are many of them here, but we call our neighbours, and we chase them. If we don't know you, we will call the neighbours and say '*Do you know this person? Who is he?*' If nobody knows them [respondent makes a slapping motion dusting her palms]." Furthermore, only local residents and their visitors may park their vehicles in the street, since on-street parking increases pedestrian congestion. There are also often informal traffic calming mechanisms erected to limit the flow of vehicles within the street. Once the street committee has identified thoroughfare traffic as a possible safety threat, they will collect an obligatory R2 ($0.12) from each resident on the Street to purchase cement to construct informal speed humps (Fig. 13).

Secondly, litter, sewerage, and household refuse to create significant safety and health problems in the neighbourhood. According to most sources, the discarding of litter is regarded as more or less inconsequential outside the private domains of the actor. It may be a widely quoted caricature, but many interviews confirm that since the municipality employs local residents for weekly waste removal and street cleaning, littering is socially considered a form of job creation. Since the street is usually a public thoroughfare, the discarding of litter in the street is generally frowned upon, but widely practised, especially outside of your street. One local official responded: "We send teams to clean the space on Monday, on Tuesday we clean the next space, but then the Monday space looks like the Wednesday space…. We are cleaning, but it does not look like we are working because the

Fig. 13 Informal traffic calming measures erected by the community. (Author's own)

Fig. 14 The dumping of household waste in open areas. (Author's own)

space is never clean." In the hidden periphery of the township, along drainage pipes and wetlands the discarding of the litter is very prevalent, even though the municipality has set very stiff fines for offenders (Fig. 14). There is a general lack of any customary regulation regarding the prevention of littering or unsightliness in these areas. The only area where littering is strictly controlled is around business premises and along taxi ranks, where the threat of admonishment from the intimidating business forums and taxi associations limits widespread littering.

Linked to problems with littering are problems of sewerage. Littering and poor reticulation creates significant challenges during the rain season. According to numerous sources, with unchecked litter clogging stormwater pipes and sewer systems, the roads regularly become flooded with rainwater, inundating the southernmost streets, erven, and informal settlements with raw sewage (Fig. 15). One respondent noted: "Before I lived in Marshland (an informal settlement south of the study area), but when it rains the water comes up, it was always wet, so I moved here." During this period, it is common for water to stand calf

Fig. 15 Sewage and litter collecting along the street after the rains. (Author's own)

height in places after a rainstorm. In these instances, actors have to create footpaths along the streets by rolling stones into the street, restricting traffic flows.

Another contentious land use issue is property fires due to the lack of open fire breaks between properties, and the use of flammable temporary construction materials (Fig. 16). There are frequent fires in certain sections of the township. The problem is that the building lines which should provide a reasonable firebrand between brick RDP homes are often filled with hokkies built back-to-back between neighbouring erven and which are mostly constructed from flame accelerating materials including plastic, tarpaulin, and timber. Adding to the problem is the fact that most of the cooking and heating occurs on open portable electric, gas, or paraffin stoves, which are notoriously dangerous. According to most sources, the challenge is that the economic value of the hokkies and other extensions vastly outweighs the risk of endangerment from fires. One interviewee repeated a statement which was verbalised in several ways: "Yes, there are too many fires, but we need a place to live." Instead, the interviews confirm that the community everywhere imposes strong disciplinary measures for what is considered dangerous cooking behaviour, such as falling asleep with a stove on when drunk. One community leader noted: "we tell the people '*Don't drink and cook,'* so that they do not start fires." The community is also very well organised in terms of firefighting, in which all the residents of various surrounding streets rapidly demolish hokkies, creating firebreaks within minutes, whilst other members fetch buckets of water and hosepipes to quench the fire. Due to the efficiency of such collective actions, large destructive fires are a rare occurrence.

Conclusions

In contrast to the sprawling character of the surrounding formal suburbs and gated estates, the formal township informalised into a polymorphic space with

Fig. 16 Fires erupting in an informal extension. It quickly spread to the building behind. (Author's own)

many of the attributes of smart growth yet operating in relative disregard to active planning policies and zoning regulations. The informal development in the area indicates that there is a fervent desire from the community themselves to develop a neighbourhood with smart growth characteristics. The comparatively high original population densities increased three to sevenfold through the erection of temporary structures and the redevelopment of plots into apartments, despite its spatial constraints. These developments are highly heterogeneous in design, character, and function, creating a functionally polyvalent urban combining residential, commercial, and industrial uses in close proximity to each other. These settlements employ a range of appropriate building materials and innovative construction techniques, utilising all available space optimally. Externalities emanating from these seemingly incompatible land uses are transparently and democratically negotiated within the community through the CLMS Street committees. The use of a combination of different building strategists with diverse types of material means that the township developed a compact building design with the flexibility of adapting housing types to the needs of different residents at various times. Furthermore, neighbourhoods are pedestrianised, but with a wide range of accessible public transportation opportunities, and commercial areas are developed in a way that enables long diurnal periods of short-distance public activities, continual community interaction and movement, and constant visual surveillance. However, vehicular traffic is limited by community-enforced parking regulations and traffic calming measures.

Informal smart, sustainable development is organic and functional, despite the severe shortage of resources. Whilst it may not have the aesthetic appeal of formal neighbourhoods, there is a degree of social and ethnic diversity, and economic vibrance not found elsewhere in the city. This is because urban development is regulated by the community for the community. This enables the socially heterogeneous community to develop their neighbours with a distinctive urban character, a vibrant social life and a strong sense of social cohesion based on shared ideals, shared agency and shared responsibility. The result is a neighbourhood with more of the inherent characteristics and values of new urbanist form without the socio-spatial inconsistencies in planned settlements. In this highly complex environment, the rules are deregulated for self-regulation based on everyday practices and critical re-evaluations regarding what is a necessity (such as housing availability and affordability) and what is a luxury (fire safety and adequate reticulation). The end product is a bricolage of DIY urbanisms that reinvents the use of otherwise unutilisable space independent of the state and the market.

This is by no means a perfect system since the CLMS is unable to adequately regulate the social costs of certain externalities, including policing open spaces and public areas, littering, sewerage and refuse removal, fires, and environmental degradation. For this reason, the township is a far from an enviable space to live in. These factors radically reduce the quality of life in the settlements, however, the residents themselves accept these social costs as a necessary trade-off in a system which provides affordable housing, equitable accessibility and social integration, and maximal economic opportunities. Even though these settlements are not aesthetically pleasing to outsiders, they represent authentic liveable spaces for residents subsisting on exceedingly low incomes. While the informal settlements are not ideal living spaces in the traditional sense of smart growth, these settlements are relatively robust and resilient, creating vibrant and economically active communities. Thus, the research indicates that not only is smart growth a social ideal in impoverished communities in the global South but is also generated sustainably by the communities themselves through mechanisms other than the Western modes of top-down regulations and policies.

Acknowledgements The author would like to personally thank Ronnie Donaldson for his insights and guidance.

Author contribution HG solely contributed to the conception and design of the article: *Can informality help create smart, sustainable cities? The vibrancy of self-organised informal settlements in Cape Town*, contributed to the acquisition, analysis, and interpretation of the said article, drafted the manuscript and critically revised the manuscript. The author gives final approval and agrees to be accountable for all aspects of the work, ensuring the integrity and accuracy of the article.

Ethical standards All research occurred with proper informed ethical consent following the ethical research protocols of the university.

References

Agheyisi, J. E. (2020). Informal land delivery and tenure security institutions in Benin City, Nigeria. *Urban Forum, 31*, 1–20. https://doi.org/10.1007/s12132-019-09365-5

Aguilar, A. G., & Santos, C. (2011). Informal settlements needs and environmental conservation in Mexico City: An unsolved challenge for land-use policy. *Land Use Policy, 28*(4), 649–662.

Anderson, E. (2009). Toward a non-ideal, relational methodology for political philosophy: Comments on Schwartzman's Challenging Liberalism. *Hypatia, 24*(4), 130–145.

Bak, P. (1996). *How nature works: The science of self-organised criticality*. Springer.

Bartels, L. E. (2020). Peri-urbanization as "quiet encroachment" by the middle class. The case of P&T in Greater Accra. *Urban Geography, 41*(4), 524–549.

Bredenoord, J., & van Lindert, P. (2010). Pro-poor housing policies: Rethinking the potential of assisted self-help housing. *Habitat International, 34*(2), 278–287.

Dovey, K. (2015). Sustainable informal settlements? *Procedia - Social and Behavioral Sciences, 179*(1), 5–13.

Earle, L. (2014). Stepping out of the Twilight? Assessing the governance implications of land titling and regularisation programmes. *International Journal of Urban and Regional Research, 38*(2), 628–645.

Edwards, M. M., & Haines, A. (2007). Evaluating smart growth: Implications for small communities. *Journal of Planning Education and Research, 27*(1), 49–64.

Ewing, R., & Cervero, R. (2010). Travel and the built environment: A meta-analysis. *Journal of the American Planning Association, 76*(3), 265–294.

Farjama, R., & Motlaq, S. M. H. (2019). Does urban mixed use development approach explain spatial analysis of inner-city decay? *Journal of Urban Management, 8*(3), 245–260.

Finn, D. (2014). DIY urbanism: Implications for cities. *Journal of Urbanism, 7*(4), 381–398.

Grandin, J., Haarstad, H., Kjæras, K., & Bouzarovski, S. (2018). The politics of rapid urban transformation. *Current Opinion in Environmental Sustainability, 31*(1), 16–22.

Hansen, K. T., & Vaa, M. (2004). Introduction. In K. T. Hansen & M. Vaa (Eds.), *Reconsidering informality: Perspectives from urban Africa* (pp. 7–24). Nordic Africa Institute: Uppsala.

Harris, R. (2018). Modes of informal urban development: A global phenomenon. *Journal of Planning Literature, 33*(3), 267–286.

Hawkins, C. (2014). Competing interests and the political market for smart growth policy. *Urban Studies, 51*(12), 2503–2522.

Hirt, S. (2012). Mixed use by default: How the Europeans (don't) zone. *Journal of Planning Literature, 27*(4), 375–393.

Huchzermeyer, M. (2014). Use and utility of the term 'slum.' In S. Parnell & S. Oldfield (Eds.), *The Routledge handbook on cities of the global South* (pp. 86–97). Routledge.

Infranca, J. (2019). The new state zoning: Land use pre-emption amid housing crises. *Boston College Law Review, 60*(3), 823–888.

Jabareen, Y. (2014). "Do it yourself" as an informal mode of space production: Conceptualizing informality. *Journal of Urbanism, 7*(4), 414–428.

Khalil, H. A. E. E. (2010). New urbanism, smart growth and informal areas: A quest for sustainability. *Sustainable Architecture and Urban Development, 35*(1), 137–153.

Kudva, N. (2009). The everyday and the episodic: The spatial and political impacts of urban informality. *Environment and Planning A, 41*(12), 1614–1628.

Kusumastuti, D., & Nicholson, A. (2018). Mixed-use development in Christchurch, New Zealand: Do you want to live there? *Urban Studies, 55*(12), 2682–2702.

Lindell, I. (2019). Introduction: Re-spatialising urban informality: Reconsidering the spatial politics of street work in the global South. *International Development Planning Review, 41*(1), 3–21.

Lynch, K. (2017). *Rural-urban interaction in the developing world* (2nd ed.). Routledge.

Massey, R. T. (2014). Exploring counter-conduct in upgraded informal settlements: The case of women residents in Cape Town South Africa. *Habitat International, 44*(2), 290–296.

McFarlane, C. (2012). Rethinking informality: Politics, crisis, and the city. *Planning Theory and Practice, 13*(1), 89–108.

Moos, M., Vinodrai, T., Revington, N., & Seasons, M. (2018). Planning for mixed use: Affordable for whom? *Journal of the American Planning Association, 84*(1), 7–20.

Neuman, M. (2005). The compact city fallacy. *Journal of Planning Education and Research, 25*(1), 11–26.

Niemira, M. P. (2007). The concept and drivers of mixed-use development: Insights from a cross-organizational membership survey. *Research Review, 4*(1), 54–67.

Ong, A. (2006). *Neoliberalism as exception: Mutations in citizenship and sovereignty*. Durham, NC: Duke University Press.

Onyebueke, V., Walker, J., Lipietz, B., Ujah, O., & Ibezim-Ohaeri, V. (2020). Urbanisation-induced displacements in peri-urban areas: Clashes between customary tenure and statutory practices in Ugbo-Okonkwo Community in Enugu Nigeria. *Land Use Policy, 99*(1), 1–14.

Porter, L. (2011). Informality, the commons and the paradoxes for planning: Concepts and debates for informality and planning. *Planning Theory and Practice, 12*(1), 115–153.

Raman, R., & Roy, U. K. (2019). Taxonomy of urban mixed land use planning. *Land Use Policy, 88*(4), 1–9.

Rasol, M. (2014). On resistance in the post-political city: Conduct and counterconduct in Vancouver. *Space and Polity, 18*(1), 70–84.

Roy, A. (2009). Why India cannot plan its cities: Informality, insurgence, and the idiom of urbanization. *Planning Theory, 8*(1), 76–81.

Shatkin, G. (2018). The city and the bottom line: Urban megaprojects and the privatisation of planning in Southeast Asia. *Environment and Planning A, 40*(3), 383–401.

Simon, D., McGregor, D., & Thompson, D. (2012). Contemporary perspectives on the peri-urban zones of cities in developing countries. In D. McGregor & D. Simon (Eds.), *The peri-urban interface: Approaches to sustainable natural and human resource use* (pp. 26–40). Routledge.

Syagga, P. (2011). Land tenure in slum upgrading projects. *Les cahiers d'Afrique de l'Est* (pp. 103–113). IFRA: Nairobi.

Talen, E. (2013). Zoning for and against sprawl: The case for form-based codes. *Journal of Urban Design, 18*(2), 175–200.

van Assche, K., Beunen, R., & Lo, M. C. (2016). Place as layered and segmentary commodity: Place branding, smart growth and the creation of product and value. *International Planning Studies, 21*(2), 164–175.

Vasudevan, A. (2015). The makeshift city: Towards a global geography of squatting. *Progress in Human Geography, 39*(3), 338–359.

Wacquant, L. (2009). *Punishing the poor: The neoliberal government of social insecurity*. Duke University Press.

Williams, C. C. (2008). Beyond necessity-driven versus opportunity-driven entrepreneurship: A study of informal entrepreneurs in England, Russia and Ukraine. *Entrepreneurship and Innovation, 9*(3), 157–165.

Wily, L. A. (2012). The status of customary land rights in Africa today. In L. A. Wily (Ed.), *Rights to resources in crisis: Reviewing the fate of customary tenure in Africa* (pp. 4–17). Rights and Resources Initiative.

Yiftachel, O. (2009). Critical theory and 'gray space': Mobilization of the colonized. *City, 13*(2–3), 246–263.

Zenou, Y. (2005) *The Todaro paradox revisited.* Working Paper No. 652. Stockholm: The Stockholm Research Institute of Industrial Economics.