The storm that rocks the boat: the systemic impact of gated communities on urban sustainability

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Abstract

This paper is concerned with the impact and implications of gated communities on urban sustainability. This is investigated making use of an overarching methodological framework based on the internationally accepted Driver-Pressure-State-Impact-Response (DPSIR) model, developed by the OECD. Additional to the simple causal flow from drivers to responses are the dynamic relationships between these five aspects. The paper discusses each of these issues and the relationships between them as they pertain to gated communities in South Africa. Gated communities, as complex systems, necessitate the consideration of a multiplicity of feedback loops with internal rates of flow that are determined by non-linear relationships. Only in this way can the full extent of their impact and implications on urban sustainability be assessed.

Full text

1Until recently, as little as ten years ago, there was very limited research being carried out and published on gated communities or fortress cities, with the notable exception of Davis (1992), Ellin (1995) (ed.) and Blakely and Snyder (1997). Since then there has been an explosion of studies on different aspects of gated communities, urban fortification, private security and the privatisation of urban space and services from a range of different disciplines. These have been presented at a number of international conferences and published in leading research journals. It also includes a growing number of postgraduate studies (masters and doctoral thesis).

2Yet, the major focus of the debate still remains on the basic elements of cause and effect; or in others words what are the motivations for these developments or trends, what are their characteristics (including different types) and what are the consequences of these types of development. While these questions are very relevant and necessary to establish a foundation for discussions, there is a need to move beyond this focus and expand the investigations and current debate. We need to move beyond a focus of understanding basic causal relationships (based on raw data and information), to understanding patterns (based on knowledge) and ultimately principles (based on wisdom) (Bellinger 2004). This will not only enrich our own understanding of cities, but also enable us to contribute more effectively to urban policy development regarding gated communities.

3This paper will attempt to do just this. It will make use of a systems approach to assess the impact of gated communities on urban sustainability. In order to do this, the paper will briefly introduce the concepts of systems thinking as well as urban sustainability. It will proceed to assess the impact of gated communities on urban

sustainability in South Africa, making use of the DPSIR model. Given this foundation, the paper will then proceed to extract the meaning of this investigation for the development of gated communities in South Africa (section 4) and globally (section 5). The baseline data used for the assessments were drawn from detailed research conducted on gated communities in South Africa (Landman 2003a; 2004; 2006) and international reviews and studies on gated communities (Landman 2003b).

4Before embarking on an assessment of gated communities, it is necessary to define a systemic approach. In order to do this, one has to start with systems. "A system is an entity which maintains its existence through the mutual interaction of its parts" (Von Bertalanffy cited in Bellinger 2004:1). Or in other words, "a system is any structure that exhibits structure and order" (Boulding 1985:7). The key lies in the interaction between the parts, over time, which structures the system1. As such, a system is different to a heap or collection. Examples of systems are particle, atom, molecule, cell, person, community, state, nation, world, solar system, galaxy and universe. In truth, there is only one system, "the Universe". All other systems are sub-systems of this larger system, depending on where one chooses to draw the boundaries (Bellinger 2004). As such, there is a hierarchy of systems and each level of hierarchy interacts with levels both above it and below it (Boulding 1985:11).

- 1 As such, the Concise Oxford Dictionary defines a "system", as "a complex whole; a set of (...)

5Associated with the idea of "system" is a principle called "emergence". From the mutual interaction of the parts of a system there arise characteristics which cannot be found as characteristics of any of the individual parts, for example in the case of water (more than just hydrogen and oxygen). 'Systems thinking' therefore goes beyond events to looking for patterns of behaviour, and to seeking underlying systemic interrelationships which are responsible for the patterns of behaviour and the events (Bellinger 2004).

6 "*Sustainability* is the condition or state that would allow the continued existence of *homo sapiens*, and it is the goal we would like to achieve" (Du Plessis and Landman 2002:9). Because of endlessly changing external and internal (societal) conditions, this is not a fixed state, but one of dynamic balance where continuous adaptation in response to changing conditions is necessary. In order to achieve this state, people will have to meet certain requirements. Foremost, there is a need to balance the needs of humans with the carrying capacity of the planet, and with the need to protect that capacity so that the needs of future generations can continue to be met. However, mere survival is not the goal. People on earth want to be able to live in an environment that provides a certain quality of life – that meets their full hierarchy of needs. The most basic requirement for this is the ability of all to live a safe, healthy and productive life in harmony with nature and local cultural and spiritual values (Du Plessis and Landman 2002). Sustainability is therefore concerned with reconciling the long-term development of human society with the finite limits of the planets (Gallopin et. al. 1997:2).

7Contrary to popular belief, *sustainable development* is not merely development that can be sustained, but rather the type of development that is necessary to pursue in order to achieve the state of sustainability. It is not the goal, but the process of

maintaining a dynamic balance between the demands of people and what is ecologically possible. Development also does not only refer to the narrow meaning of growth, expansion and acquiring knowledge, but as progress through improvement, evolution and the quest for greater wisdom (Du Plessis and Landman 2002:9-10).

8The infinitely complex set of issues that determine sustainable development, and the realisation that these issues are interconnected and interdependent, identify sustainability as a systemic[2] concept that requires a systems approach to problem solving and planning (Du Plessis and Landman 2002). To understand the sustainability potential of a settlement, one therefore needs to study the system – that is, the interactions of all the multi-dimensional aspects of settlements described above. Studying the parts in isolation will not provide an appropriate understanding (Bellinger 2004). Analysis (the breaking up of a system into its component parts and then studying the parts) is therefore an imperfect tool with which to determine the sustainability of settlements (Du Plessis and Landman 2002). The Driver-Pressure-State-Impact-Response (DPSIR) model, developed by the OECD, offers an initial methodological framework to apply a systemic approach to the assessment of the sustainability of human settlements or sub systems within settlements, such as gated communities or neighbourhoods.

- [2] "Systemic" refers to something that is "of or relating to a system as a whole (Concise (...)

9Gated communities in South Africa, including enclosed neighbourhoods[3] and security estates[4], have grown significantly in the past five years. They occur in various forms across the country and contribute to a significant transformation of the urban landscape (Landman 2003). Recent studies also confirmed that the desire for safety and security is the main driver behind their growth, although not the only one (Landman 2004). In addition, the different types of gated communities have a number of impacts and implications for South African cities (including socio-spatial, economic and political implications), which in turn gives rise to different interpretations and responses from urban residents and institutions.

- [3] Enclosed neighbourhoods refer to existing neighbourhoods that have been fenced or walled in and (...)
- [4] Large security estates in South Africa are mostly located on the urban periphery. They offer an (...)

10Gated communities in South Africa are generally not that different to gated communities abroad and there are signs of cross-fertilisation of design ideas and planning trends. However, the impact of gated communities in this country, particularly regarding enclosed neighbourhoods, is likely to be far greater due to their extent in the larger South African cities, their nature (the closing-off of large areas of public space), their impact on spatial fragmentation and segregation in the context of moving towards urban integration, and last but by no means least their link to the apartheid city (symbolic interpretation) (Landman 2006). Within the context of this paper, the inquiry is concerned with their impact on urban sustainability. This can be assessed through the DPSIR framework.

11Within the DPSIR framework human activities and external forces (the drivers) are seen as producing pressures (on the environment and development) that can induce changes or impacts (consequences of the state of human settlements) in the state of the biophysical and socio-economic environments and thus on the state of human settlements. Society then responds to changes in pressure or state with policies and programmes intended to prevent, reduce or mitigate the pressures and their impacts. These responses in turn produce new pressures. Additional to the simple causal flow from drivers to responses are the dynamic relationships between all five of the aspects (Du Plessis and Landman 2002), as illustrated in the Figure 1.

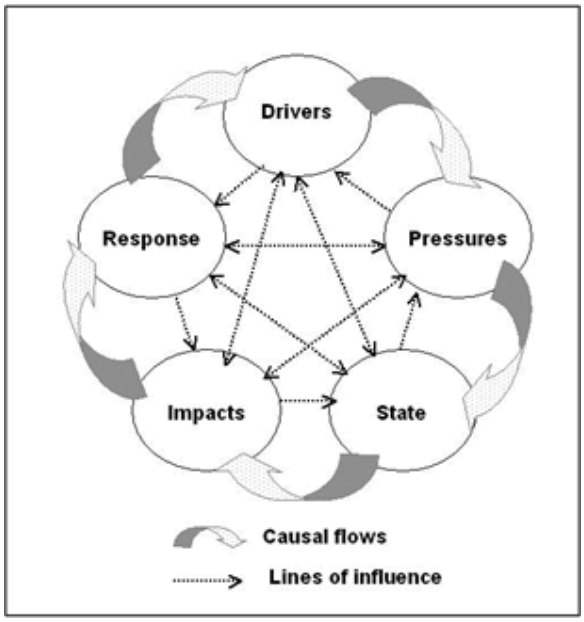


Figure 1: DPSIR model

12The main drivers producing pressures that are related to gated communities in South Africa can be divided into larger forces of change and local social and technical factors. The larger forces of change refer to macro influences (global, national, municipal), while the specific social and technical factors relate rather to the immediate needs or desires of specific communities or neighbourhoods. Global influences include aspects such as lifestyle trends (leisure communities), design ideas and Crime Prevention through Environmental Design (CPTED) responses. The national forces of change include the following drivers: crime, urban growth, equity, macro-economic growth (in South Africa) and local economic growth (in municipalities). In addition to these drivers are the social and technical factors that influence the growth of gated communities in South African cities, namely territoriality and ownership, sense of community, social values and control, financial gain (personal) and public service delivery. Together these drivers produce pressures that induce socio-spatial changes in contemporary South African cities through different types of gated communities.

13These pressures can be divided into indirect and direct pressures. There are a large number of indirect pressures that are ranging from spatial and social pressures to economic and political pressures. Although it is not always easy to categorise them

into one specific group, it does assist to understand some of the underlying motivations or areas of possible influence.

The spatial pressures relates to the legacy of apartheid and consequent nature of the apartheid city, both in terms of what it has given rise to (for example particular opportunities for crime), as well as pressures to address this past structure and form. These spatial pressures include a tradition of separate development and low density sprawl (currently on the urban periphery), restructuring the apartheid city, infill development in existing suburbs, neighbourhood integration, the provision of infrastructure and maintenance for the entire city, as well as extreme target-hardening (fortification) and the privatisation of urban space.

The social pressures relate to uncertainty, fear, mistrust and disrespect in a post-apartheid era. They include gang culture and organised crime, high levels of violent and property crimes, fear of crime, mistrust between groups and communities, increased diversity and cosmopolitisation in cities, moral decline and unacceptable behaviour in public space. In the midst of these there is an opposite pressure towards greater social integration in the post-apartheid city.

The economic pressures are local economic growth and personal financial gain (through increased property prices, lower insurance premiums, etc.). All of these issues also place enormous burdens on the political and institutional structures.

Those political pressures that have an indirect influence on the development of gated communities include political transition (from an apartheid regime to a democracy), a need for greater public efficiency and productivity, as well as service delivery, and a lack of trust in local municipalities to deliver infrastructure and governance (together with poor service delivery), as well as in the SAPS to provide proper security. The direct pressures relate to the over-consumption of natural resources (water and land) and the privatisation of the natural amenities.

14Given these drivers and pressures, the current **state** of the urban environment can be described as a quilt with patches of rich texture and beauty, and patches with holes due to poor material or workmanship. The state can furthermore be described using three main determinants: quality of life, biophysical environment and governance (institutional). While the quality of life has improved for many people in South Africa due to service delivery and infrastructure and while the quality of life is generally good for those in well-developed enclaves, the above-mentioned drivers and pressures contribute to a bleak overall picture. Despite overall economic growth, poverty and unemployment has grown. There are high levels of organised crime, a proliferation of firearms and a culture of violence, together with the weakening of the family unit in many cases. This is accompanied by illegal behaviour in public places and a disregard for the law. Those who can, retreat from public spaces to ‘common’ spaces which are privatised and consequently different types of gated communities with access control grow significantly. Service delivery and governance are also gradually privatised. The fear of “others” outside these protected spaces grows and as such the levels of target-hardening and surveillance increase. The private security industry booms. Instead of greater equity, the levels of inequity increase. The state of the biophysical environment is characterised by the degradation of ‘open’ areas or public open spaces in cities. Environmental conservation is often restricted to secure estates or parks.

Access to many natural amenities, for example dams, lakes, beaches, are controlled and in many cases exclusive. There is also a disproportionate consumption of natural resources (water and land) in gated communities. Institutionally, the current state provides many challenges. The weak criminal justice system does not deter professional criminals, while institutional restructuring is contributing to delays in infrastructure development and service delivery, as well as capacity problems and low morale in public service. Many retreat from public participation, giving rise to territorial governance through micro-governments (neighbourhood associations) and strict neighbourhood rules and regulations.

15These aspects of the current state of the urban environment have both human health (well-being) and environmental consequences. The **impact** and implications can be categorised into four groups, spatial, socio-economic, environmental and institutional, similarly to the pressures, although not necessarily only due to the pressures in that category.

Spatially, the consequences are spatial fragmentation and separation (neighbourhood cells connected by rapid transit routes), decrease of ‘open’ roads contributing traffic to congestion and increased travel times, discomfort for pedestrians and cyclists and the degradation of ‘open’ spaces.

The socio-economic consequences includes an escalation of violence and conflict between neighbourhoods (even inside some) and less equity. Inside protected enclaves the quality of life generally improves; security is higher, fear less, property prices higher and insurance premiums lower. This however occurs at a cost. Outside, quality of life generally decreases; property prices drop, crime is concentrated and fear increases.

Environmentally, the impact and implications are also severe. Air and noise pollution increase along ‘open’ roads, over-consumption of water (especially in golf-course developments) contributes to water scarcity, raising the cost of water, and security estates on the periphery contribute to urban sprawl and the loss of valuable arable land.

The institutional consequences are the increased privatisation of governance and the rise of micro-governments, resulting in less civil participation in urban affairs and a demand for tax rebates (due to increased privatisation of services and governance). As a result the need for private security increases (to monitor and control protected spaces), as well as vigilantism and gangs in ‘open’ areas. This contributes to an overall decline in citizenship and establishes fertile ground for a dictatorship or new authoritarian rule to arise.

16In **response** to these issues, the South African government has developed a large number of policies and programmes to address the state of cities, aimed at changing these settlements and reducing the environmental impact. However, there is still no national policy in place on gated communities and only one province has legislation in place that refers to the establishment of enclosed neighbourhoods. A number of local authorities have developed local policies in response to the growing demand. In addition, society has also responded through the media (newspaper articles and letters), public lobby groups, etc., either in favour or against different types of gated

communities. These responses in turn create new drivers or pressures or increase the intensity of existing ones, continuing the process along the lines of causal flow as outlined by the DPSIR framework (see Figure 1).

17However, the development and growth of gated communities in South Africa cannot merely be described through simple cause and effect diagrams or through causal flows alone. It also needs to incorporate an understanding of the different internal lines of influences through a systemic approach. Systems imply something beyond cause and effect. Rather than A simply affecting B, there is an implication that B also affects A. There are only two types of interaction. The one is the reinforcing feedback loop (indicated by the letter "R"), in which the interactions are such that each action adds to the other. This refers to a situation where action produces a result which promotes more of the same action. The other type is a balancing feedback loop (indicated by the letter "B"), in which action attempts to bring two things to agreement. A desired state (goal) interacts with a current state to produce a gap. The gap adds to the action and the action adds to the current state. The current state then subtracts from the gap. As the current state (over a period of time) gets closer to the desired state the gaps becomes smaller and smaller until the current state equals the desired state and the gap is zero. As such, balancing loops seek equilibrium and stabilise systems. These feedback loops are what drive change and growth (Bellinger 2004).

18It is therefore essential to take into account that systems go beyond cause and effect. In the case of the development of gated communities, an issue which may be a pressure in one case (urban fortification due to crime), also becomes a characteristic of the current state, influencing future development patterns and giving rise to fortress cities (impact). Therefore, in order to assess the impact and implications of gated communities for urban sustainability, one needs to consider both the causal flows, as well as the internal lines of influences. It is clear from the discussion that the development of gated communities is a complex system (part of an even larger system, the city), with a multiplicity of feedback loops.

19This is illustrated by Figure 2, which consists of four balancing feedback loops and a leverage point. This is an open system because there are other factors (as discussed in the previous section) that are not taken into account in this particular sub-system. The system has two goals, desired safety, comfort and lifestyle and acceptable cost, which are mutually exclusive (ME). If some communities want greater safety and comfort it comes at a great cost. If the costs are to be reduced, they must tolerate less comfort and possible safety, unless another solution can be found. This is regulated by responses from the state and/or civic groups, producing a gap (1), which in turn lead to fortification and privatisation and consequently a change of the environment, which may address gap two between current and desired levels of comfort. However, at the same time, fortification and privatisation also increases both short and longer term costs, creating gap three, between current and desired levels of cost, both financially and to society. It may therefore turn out that the real point of intervention to address safety does not lie in addressing either levels of comfort or cost, put addressing the leverage in the system, referring to points within the system where small changes in the system can have a major impact on the system. Although not so easy to address, the real leverage in this system is the criminals and therefore to address the root causes of crime; otherwise they will just change the present *modus operandi*.

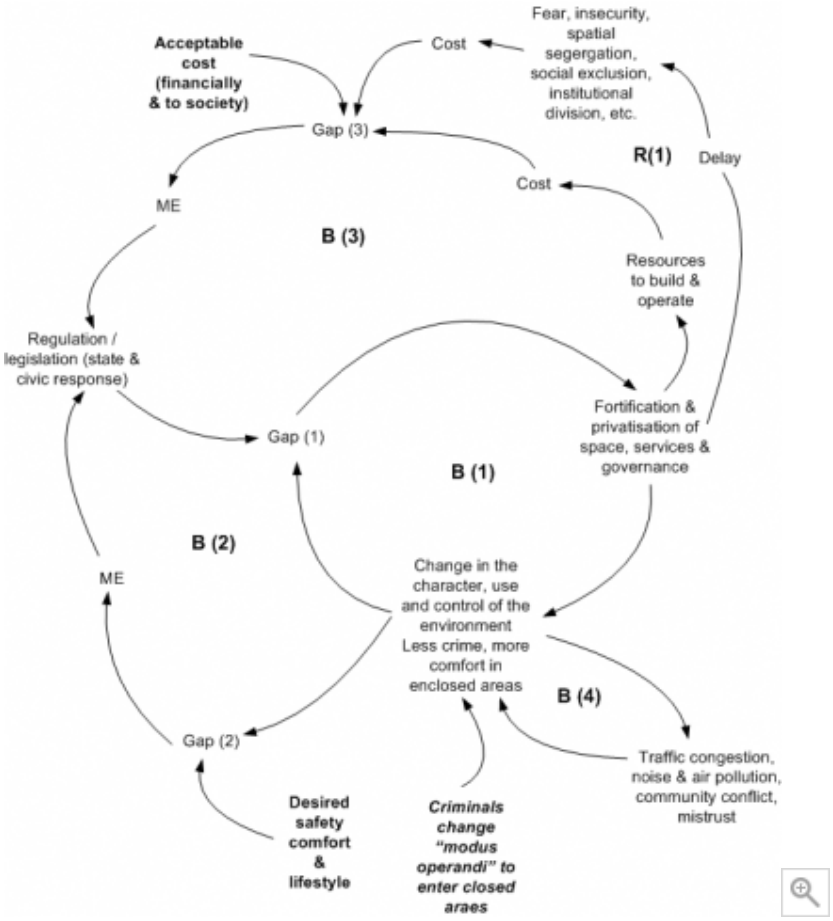


Figure 2: Addressing the desire for safety and security through fortification and privatisation

20Therefore, looking for linear cause-and-effect relationships can be very misleading, for example that crime results in urban fortification and this results in less crime and therefore cities should respond with increased fortification. Firstly, it does not take into account that one set of systems may only create a new mode of system, for example a change in the *modus operandi* to penetrate the fortification, together with side-effects (mistrust, community conflict, traffic congestion, pollution, etc). Secondly, it does not take into account the time delay, both in terms of unintended consequences, as well as the fact that the attempt to produce short-term improvement often sets the stage for long term degradation, for example that fortification increases levels of fear (both outside and overall) and insecurity over the long run, the very aspects it was meant to address. It also contributes to different forms of segregation, also one of the original challenges of the post-apartheid city. Assessing the development of gated communities therefore necessitates the consideration of a multiplicity of feedback loops.

21The sustainability of human settlements in South Africa is dependant on three aspects:

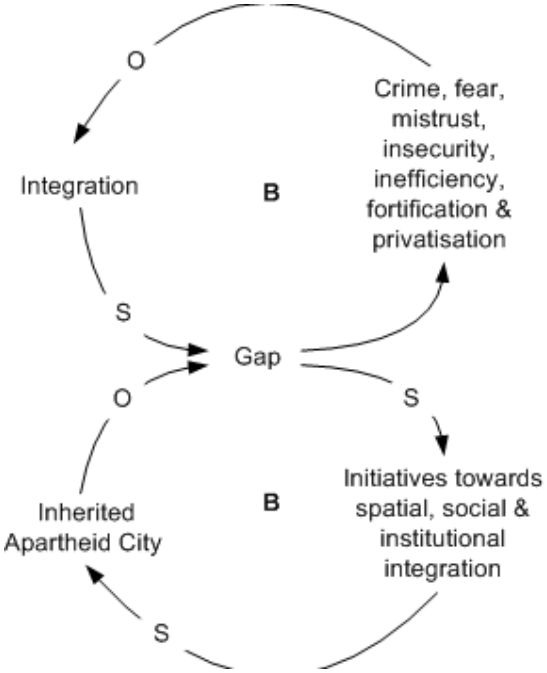
The quality of life that is offered to each member of society (in terms of health, safety, shelter, productive life, self-determination and quality of the built environment).

The interaction between the settlement and its biophysical environment and whether this interaction will continue to support an adequate quality of life (in terms of resource use, pollution and degradation and the protection of the environment).

The ability of the institutional systems responsible for creating, operating and maintaining the settlement to continue providing adequate quality of life and to do this in a manner that supports sustainability (in terms of financial capacity, institutional integration, operational efficiency, technical capacity and political will) (du Plessis and Landman 2002:26-31).

22The question is whether gated communities in South Africa are currently contributing to these aims in South Africa, and whether they will continue to do so in the future. As stated earlier, sustainability requires a systems approach to problem identification and solving. Consequently, this question will be investigated through a number of traditional systems structures (or archetypes) applied to gated communities in South Africa. These structures consist of a combination of balancing and reinforcing feedback loops that create typical actions and results. The change or influence brought about by these actions can either occur in the same direction (indicated by the letter "S") or in the opposite direction (indicated by the letter "O"). Or in other words it means that an influence either adds to ("S") or subtracts from ("O").

23The Post-Apartheid city can be described in terms of duality. While there are many initiatives and programmes towards greater integration and equity (arguably two of the most critical challenges to achieve greater sustainability), there are simultaneously huge pressures that hinder this process, creating interventions that either enhance or oppose integration and equity. This can be depicted through a systems structure in which the original goals are drifting (Figure 3).



24 **Figure 3: Drifting goals in the post-apartheid city**

25This structure is composed of two balancing loops which interact in such a way that the activity of one loop actually undermines the intended balance the other one seeks to achieve (Bellinger 2004:8). The desired state (integration) interacts with the current state (inherited apartheid city) to produce a gap. The gap influences action (initiatives towards spatial, social and institutional integration, as well as integration with nature) intended to move the current state in the direction of the desired state. At the same time as the gap influencing action it creates pressures (including high levels of crime, fear, mistrust, insecurity, poor institutional performance and fortification) that adjust the desired state. These pressures essentially act as influences that reduce the desired state. As the desired state is undermined it works to reduce the gap, lessening the influence towards action. The final result of such a structure is that it reaches and equilibrium other than what was the initial desired state, i.e. a post-apartheid city with new forms of segregated development contributing to socio-spatial fragmentation.

26‘Drifting goals’ could however also become ‘opposing goals’, where the goals supported by government and opposing groups may differ, influencing the overall outcome of initiatives to address the challenges of integration and equity. This can be demonstrated through a slightly different version of the previous diagram, in the form of an “escalation” structure, which is composed of two balancing loops which interact in such a way as to create a single reinforcing loop (Figure 4).

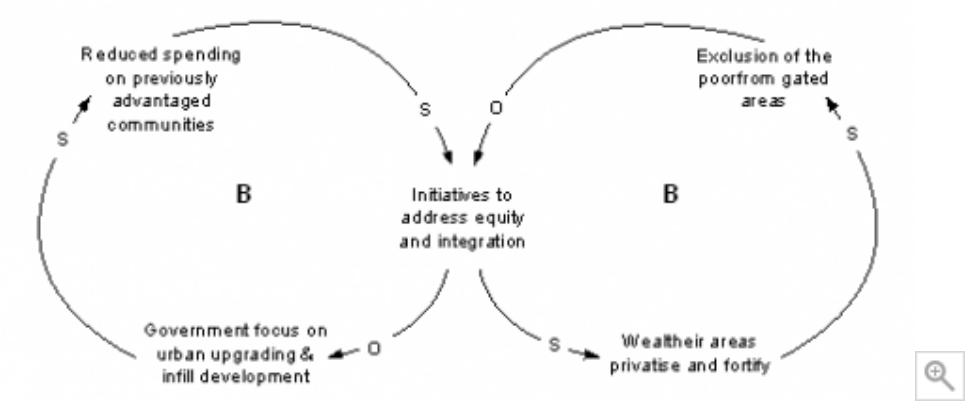


Figure 4: Opposing goals in the post-apartheid city

27An increase in the results of A relative to B (perception of the wealthy that the measures taken to address past inequity is now reducing spending on privileged communities) influences more action by B (well-off areas taking charge of their own well-being through privatisation). An increase in action by B enhances B’s result (excluding the beneficiaries of new policies from any possible benefits from their own efforts inside the gated communities). This reaction tends to influence more action by A (increased government spending in poorer areas). Additional action by A increases A’s result (reduced spending in wealthier areas). The increase in A’s results then increases the results of A relative to B, and the cycle then repeat (in the form of a reinforcing loop). Thus the more local government spend on reconstruction and upgrading in the poor areas, the bigger the argument for the well-off areas to take charge of their own well-being and exclude the beneficiaries of new policies from any possible benefits from the own efforts inside the privileged communities. The same is true with measures towards greater physical integration, as soon as low-income

housing is developed on infill sites, the walls go up around existing wealthier neighbourhoods.

28Although gated communities comprise only one complex system of a large number in cities, judging from the previous discussion, it is evident that the pressures (both original, as well as those created by the impact), are currently undermining attempts to create greater integration. In addition, due to a multiplicity of feedback loops and an "emergence" of new characteristics (including extensive fortification and privatisation) the pressures are also undermining many of the determinants of the three aspects necessary to achieve greater urban sustainability in South Africa. For example, greater diversity and polarisation leads to greater inequity, where the levels of poverty and unemployment of many (reduced quality of life) stand in stark contrast to the quality of life of those residing in protective enclaves. This contributes to the escalation of violence and conflict, which in turn necessitate greater measures of protection for those threatened. This is a good example where certain immediate responses only create further problems, as pointed out by Forrester (1989, 1994).

29At the same time, environmental resources have to be protected to ensure survival and quality of life, while 'open' areas are left to degrade even further. In addition, the institutional systems and structures fail to adequately address the challenges due to fragmentation into micro-governments, lack of citizenship and participation and operational inefficiency. The immediate, direct impacts of gated communities, such as legal action from communities, traffic congestion, pressure from anti-lobby-groups, etc, together with a *laissez-faire* stance of municipalities in many cases, only serve to worsen the situation. One therefore has to conclude that the development of many types of gated communities, due to their shorter term impact, is not conducive to greater urban sustainability in South Africa at present.

30It is very difficult to predict the future due to the unpredictability of many variables. However, based on the previous discussion one can start to point towards possible scenarios. The two important issues that arise are the unsuitability of certain types of responses to systems if the time-delay and side effects or unintended consequences are ignored. These issues are crucial to take into account when questioning the future sustainability of different types of gated communities in South Africa. Therefore, the development of a great number of gated communities in South Africa (especially the larger types) may give rise to two types of structures in the future, namely "shifting the burden" and "fixes that fail". A shifting the burden structure is composed of two balancing loops and a reinforcing loop (Figure 5). It is an annoying structure, because the two balancing loops acts as a single reinforcing loop changing the situation in the same direction as the reinforcing loop. Both structures end up moving the system in a direction other than the desired one (Bellinger 2004:6).

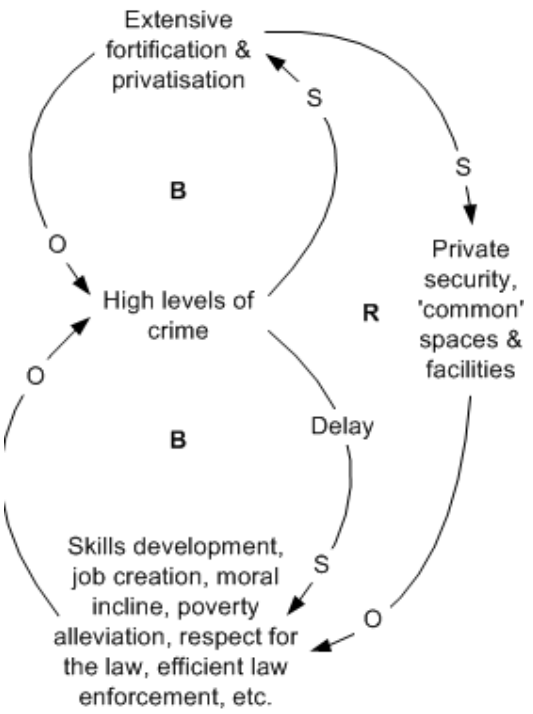


Figure 5: Shifting the burden through gated communities

31In line with Bellinger's (2004) description, in the diagram (Figure 5) the problem symptom (crime) is perceived with multiple possible courses of action. One course of action, the symptomatic solution (fortification and privatisation) has an apparent time frame advantage over the fundamental solution (skills development and job creation, moral incline, poverty alleviation, social and economic opportunities for all, respect for the law, improved law enforcement, etc) because of the associated time delay. As a result, the problem symptom influences the application of the symptomatic solution. The application of the symptomatic solution then reduces the problem system (stabilisation of crime or reduction in some areas) which dissolves the perceived necessity of pursuing the fundamental solution. A failure to implement the fundamental solution ensures that the problem symptom will return. To make matters worse, the implementation of the symptomatic solution often influences the development of unintended side effects (including private security, 'common' spaces and facilities), which is usually some sort of dependency and has its own set of implications such as reduced access to well-developed common spaces and facilities for all in the city. These side effects further dissolve the perception that there is a need to pursue the fundamental solution. The interactions of these loops to form a vicious reinforcing loop, increases the difficulty to resolve the problem. In this way gated communities contribute to the problem of urban sustainability in that they shift the burden of addressing crime and its root causes, unemployment, poverty, disrespect for the law (thus reducing the quality of life of all people due to an imbalance of the systems) and creates side-effects that will compound the difficulty of solving these problems in the future.

32The "fixes that fail" structure consists of a balancing loop and reinforcing loop (Figure 6). These two loops interact in such a way that the desired result initially

produced by the balancing loop is, after some time delay, negatively influenced by the actions of the reinforcing loop (Bellinger 2004:4).

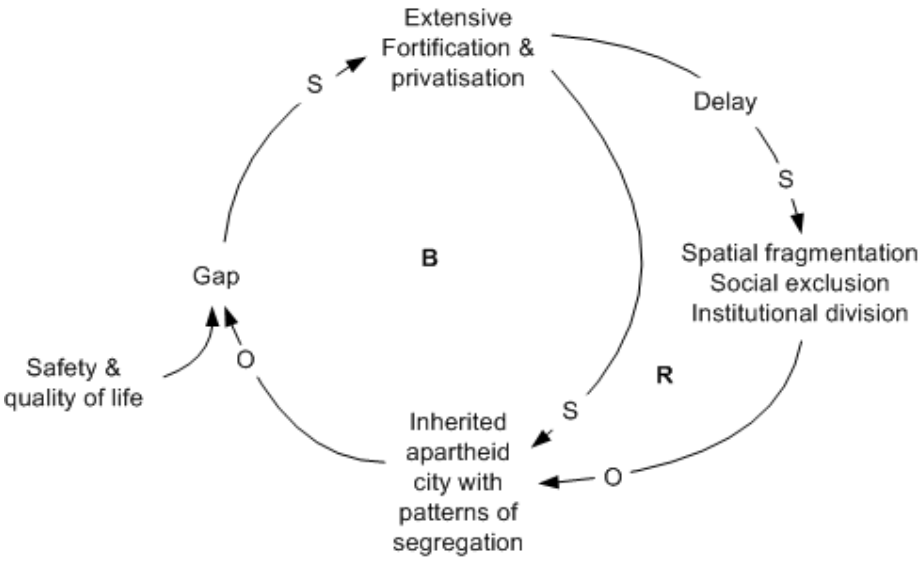


Figure 6: Setting the stage for failure through gated communities

33As Bellinger (2004) explains this type of structure, the internal balancing loop operates in the standard fashion. The action (fortification and privatisation) that influences the migration of the current state (inherited patterns of fragmentation and segregation) also influences, after some delay, some unintended consequences (additional or new forms of spatial fragmentation, social exclusion and institutional/political division). These unintended consequences subsequently impede the migration of the current state in the intended direction (towards greater sustainability, including greater quality of life and safety for all). As illustrated through these two structures, the increase of gated communities is not conducive to greater urban sustainability in the future or over the long run in South Africa. In fact, given the unintended consequences, they may even contribute to the creation of a new type or form of new-apartheid (fortress) city in the future.

34Given this argument, one's first reaction may be that these scenarios are far-fetched or if possible, then only in South Africa, due to its history of apartheid and separate development. While this history contributes to the severity of the problem and the almost 'natural' reaction to create enclaves, gated communities occur world wide, as stated earlier. This therefore raises the question of whether a more sustainable world is possible giving the growing trends of fortification and privatisation.

35Gallopin et al (1997) investigated the current situation and developed six possible scenarios that can influence future sustainability. The first group is *Conventional Worlds*, which two variants, *Reference* and *Policy Reform*, which is based on no or minimal changes. The Reference variant is based on midrange population and development projections and typical technological change or in other words 'business as usual'. The Policy Reform variant adds strong government action through proactive strategies and policies towards greater sustainability.

36The second class is *Barbarisation*, which is based on the grim possibility that the social, economic and moral underpinnings of civilization deteriorate, as emerging problems overwhelm the coping capacity of both markets and policy reforms. The result is either a Fortress World or complete Breakdown. The *Fortress World* variant features an authoritarian response to the threat of societal problems and breakdown. Ensconced in protective enclaves, elites safeguard their privilege by controlling an impoverished majority through force and managing critical resources, while outside the fortress there is repression, environmental destruction, and misery. This will, however, eventually lead to a breakdown. The *Breakdown* variant leads to a complete collapse of the system, influencing everyone and everything. It is characterised by unbridled conflict, institutional disintegration and economic collapse (Gallopin et al 1997:vii).

37Fortunately the situation is not completely lost. The *Great Transitions* explore visionary solutions to the sustainability challenge, including innovative socio-economic arrangements and fundamental changes in values. In this event, the transition will be to a society that preserves natural systems, provides high levels of welfare through material sufficiency and equitable distribution, and enjoys a strong sense of social solidarity. Population levels are stabilised at acceptable levels and material flows through the economy are radically reduced through reduced consumerism and massive use of alternative and green technologies. The *Eco-communalism* variant incorporates a green vision of bio-regionalism, localism, face-to-face democracy, small technology, and economic autarky. The *New Sustainable Paradigm* share some of these goals, but would seek to change the character of the contemporary civilization to a more humane and equitable global civilization (Gallopin et al 1997:vii).

38The signs of moving to a Fortress World are very eminent. According to Gallopin et al (1997) we are now at a branching point. Unless there is significant intervention towards eco-communalism (with an increased focus on ‘open’ sustainable urban and rural villages) and eventually to a new sustainability paradigm, the planet may in fact be transformed into a Fortress World.

39This paper has shown that in order to understand the complexity of the development of gated communities, it is necessary to also consider the multiplicity of feedback loops with their internal rates of flow that are determined by the non-linear relationships in this system. It showed that a simple causal diagram (focussing only on direct cause and effect), is insufficient to capture the complexity of such a system. It therefore applied a systemic approach to identify the internal lines of influence as well as the impact of gated communities on urban sustainability. Only through such an approach can the full extent of their impact and implications on urban sustainability be assessed.

40The discussion indicated that gated communities are not conducive to greater sustainability in the post-apartheid city in South Africa and that the impact and implications of the development of great numbers of gated communities (especially larger ones) can cause many side-effects and unintended consequences over the longer term that may seriously inhibit the achievement of more sustainable cities in this country. As such, the continuous development of many types of gated communities may in fact be the storm that rocks (and threaten to sink) the

sustainability boat, both in South Africa, as well as globally. Therefore, the challenge is to avoid the creation of a total Fortress World.

41However, having identified the threat, it is then possible to address this by responding not only to the problem symptoms through symptomatic, short term solutions, but rather by addressing the challenges through fundamental solutions that avoid the side-effects and unintended consequences, potentially greater problems in the future. As pointed out earlier, the world is at a branching point. Therefore, the opportunities are available to shift "business as usual" towards more sustainable practices and lifestyles. These could include a greater focus on eco-communities or sustainable urban and rural villages, connected to larger systems (cities and regions). The meaning of this in practice should be explored further. Gated communities could provide valuable lessons in ways of managing neighbourhoods, local service delivery, how to design for greater community involvement, etc. taking into account the issues that threaten longer term greater sustainability.

42This paper provided a starting point to develop a framework to assess the impact of gated communities on urban sustainability through a systemic approach, which in turn will provide valuable information for future policy development and the identification of areas for intervention. It identified the issues (variables) involved and started to indicate possible structures and thus outcomes. However, to maximise the value of such an approach, 'systems thinking' (as applied in the paper) should be expanded to 'systems dynamics' where these variables are incorporated into a process of quantification and computer modelling, to supplement the qualitative assessment (as pointed out by Forrester 1992). Together, both these aspects could then be used for more thorough scenario planning and appropriate policy development.

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Notes

1 As such, the Concise Oxford Dictionary defines a “system”, as “a complex whole; a set of things working together as a mechanism or interconnecting network (2000:1453).

2 “Systemic” refers to something that is “of or relating to a system as a whole (Concise Oxford Dictionary 2000: 1454).

3 *Enclosed neighbourhoods* refer to existing neighbourhoods that have been fenced or walled in and where access is controlled or prohibited by means of gates or booms that have been erected across existing public roads.

4 *Large security estates* in South Africa are mostly located on the urban periphery. They offer an entire lifestyle package, including a secure environment; a range of services (garden services, refuse removal, etc.); and a variety of facilities and amenities such as golf courses, squash courts, cycle routes, hiking routes, equestrian routes and water activities. These are private developments where the entire area is

developed by a private developer. These areas/buildings are physically walled or fenced off and usually have a security gate or controlled access point, with or without a security guard.

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