



cemetery

noun

an area set apart for or containing
graves, tombs, or funeral urns

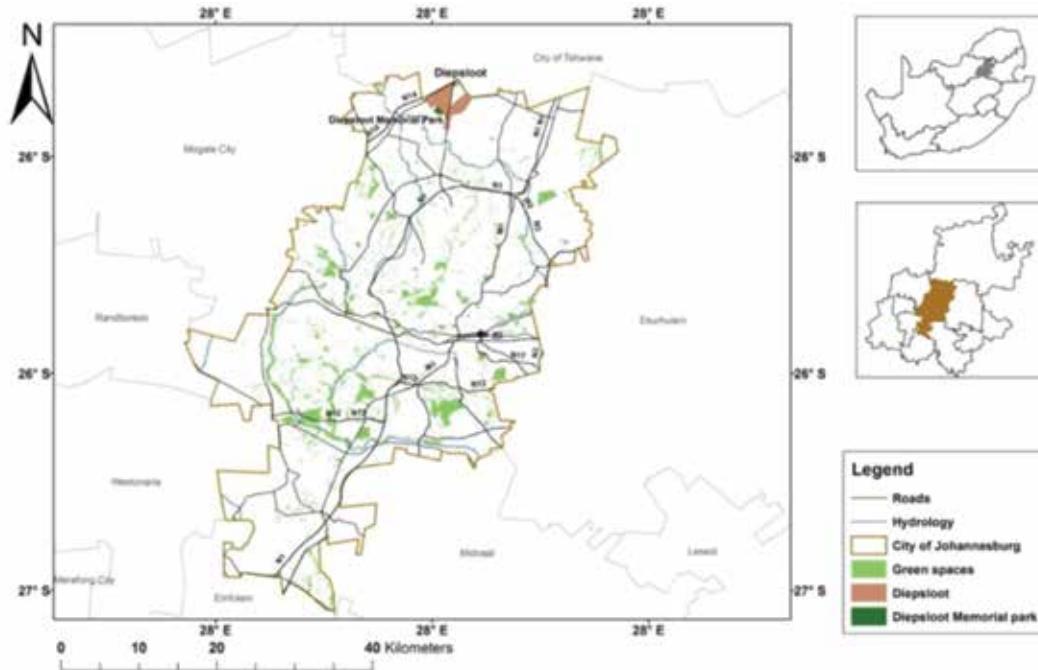
6. RETHINKING CEMETERY DESIGN AND MANAGEMENT: JOHANNESBURG AND THE DIEPSLOOT MEMORIAL PARK

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Introduction

In Johannesburg, South Africa, there has been an attempt to introduce more innovative approaches to cemetery planning. The Diepsloot Memorial Park is one of the City of Johannesburg (COJ) Metropolitan Municipality's ground-breaking cemetery developments. Its development was a response to Johannesburg's diminishing burial land. Instead of designing a conventional style cemetery that most people are used to, Johannesburg City Parks and Zoo, an entity of the COJ, proposed a development to serve as both a place for internment and as part of the city's green lung open park area to benefit the residents of Diepsloot and the surrounding areas of Johannesburg (Nelana, Pers. Comm., 2015). It was appropriately designated the Diepsloot Memorial Park and cost R17 million to develop. It opened its gates to the Diepsloot community and its surrounding areas in April 2007 (Johannesburg City Parks and Zoo, 2007). The cemetery is located in one of the COJ's seven regions, Region A in the province of Gauteng (Map 6.1 below). It was envisioned to accommodate a total of 120 000 burials not including second burials or interring the cremains, the ashes from cremation. In responding to shortage of space in for burial ceremonies, the cemetery would relieve others such as Avalon Cemetery in Soweto and serve the growing Diepsloot community.

Map 6.1: Location of Diepsloot and Diepsloot Memorial Park



Unlike other older cemeteries, from conception the Diepsloot Memorial Park was designed with a slightly different purpose. It is located in the Diepsloot Township an area facing many social ills. These include accelerating unemployment rates, crime, and youth unemployment, poor service delivery and inadequate housing. Looking from the outside, the memorial park gives the area a visual break from the congested informal structures characterising the township. When the cemetery first opened its gates, it allowed only flat plaques. Neither full-body memorials nor headstones were permitted. That changed as the cemetery has since developed a section that allows tombstones, according to Mr. Moloi (Pers. Comm., 2015), the Cemeteries and Crematoria Manager at Johannesburg City Parks and Zoo. This was the culmination of community uproars provoked by a range of socio-cultural and political influences (Nelana, Pers. Comm., 2015).

This study identified a recently completed cemetery that shows an element of innovation by recognising elements of creativity and originality. By exposing reasons that led to its development and users' perceptions, research was undertaken to assess whether its construction has had any significant impact on the area where it is located. Since the design integrates both burial and recreation functions the general public's view of this different approach for a cemetery was sought. It is against this background that the study took Diepsloot Memorial Park as a case study as it reflects a move towards an innovative design in the provision of cemeteries. After briefly discussing the background of cemeteries as a social institution, the objectives of the study are stated. The theoretical framework that grounds the theme of this research looks through the lens of Rogers' (1995) 'diffusion of innovations' theory. This chapter scrutinises the innovative practice employed in the design of Diepsloot Memorial Park. The extent to which people are open to seeing cemeteries beyond their primary role and the barriers that affect the diffusion of its adoption are identified. Assuming a shift took place, the design itself and its objectives are examined, and the challenges the final product faces are determined, as is the possibility of it merely being a replication of other international cemeteries.

A description of the methodology that addresses the objectives follows, and then the conclusions and recommendations emerging from the findings are presented. Two particular points to note are an assessment of the potential of the design of the Diepsloot Memorial Park for upscaling and adaptation in other South African cities, and how a cemetery and adapted models could potentially be used to transform the functioning of the areas in which they are located.

Background to Cemeteries

South Africa is home to a rich variety of cultural and religious belief systems, in which cemeteries play a crucial role in people's lives. This is visible on important holidays such as Easter and Christmas Day when families and friends visit cemeteries, and gather by gravesites to remember and pray for their dead. In Johannesburg, families own graves in perpetuity. This means that the Johannesburg City Parks and Zoo incurs ever-increasing demands for burial space and increasing maintenance costs.

However, due to their land-consuming nature, cemeteries occupy significant areas and thus echo the historical legacy of these areas. Cemeteries are under immense pressure from urban growth and development. Like most basic services and bulk infrastructure, they are susceptible to impacts of rapid urbanisation, increasing population growth, and environmental and climate change. Integrating some green infrastructure elements within cemeteries as the Johannesburg City Parks and Zoo is currently doing, could help them respond to urban development challenges. For instance, they could potentially provide ecosystem services such as climate regulation, carbon sequestration, water infiltration and curbing erosion. Increasing greenery within cemeteries could help reduce run-off, increase natural infiltration and can thus help to control flooding. The use of vegetation instead of impervious surfaces increases interception levels. The current climate change impacts will continue to negatively impact the built environment and further intensify urban challenges. These challenges cut across continents and will eventually require governments and insurance companies to incur greater costs for repair and to provide new infrastructure (Development Bank of South Africa, 2011).

Generally, people are uncomfortable with considering the realities of death. Any discussion concerned with the planning, design and management of cemeteries is bound to be sensitive. Hence, any proposed change could lead to resistance from the users of these spaces. However, eventually change will have to be effected, given the number of pressures facing government. These concern the diminishing availability of land suitable for burial, fiscal constraints, environmental concerns and the reluctance to move away from conventional planning practices. In most cases, the upkeep of cemeteries is depleting municipal budgets. It is clear that with many of the solutions being applied to the use or reuse of the cemeteries in South Africa, practical approaches tend to outweigh other factors (Wilkins, 2011). For these and other reasons, cities will have to be proactive and innovative, whilst cemetery users will have to eventually adapt. Religious and cultural beliefs impact strongly on the acceptability of solutions being proposed by metropolitan authorities (Wilkins, 2011) particularly regarding cemeteries.

Often a cemetery is the only relic left from early settlements and as such is a critical link with the past (Uslu, 2010). Cemeteries provide quiet places to honour and celebrate the deceased, whether it is of a most personal nature, or on a local, regional or even national scale (King et al., 2004). “By viewing cemeteries as incarnations of personal and cultural identity and history, people are motivated to be custodians of such spaces, taking action to maintain, restore, and improve their community, the landscape, and larger ecosystems” (Hester, 2006:364). Such efforts also have the potential to bring community members together for a common cause (Harker, 2012) using different platforms.

In cities, cemeteries are part of the urban system and can improve quality of life for urban dwellers through providing the aesthetic, recreational, educational, cultural and spiritual experiences in people’s daily lives. For those still living, cemeteries hold deeper meanings as they are believed to house loved ones whose memories are rarely forgotten. According to Murray (2003), cemeteries are established for the disposal of human remains but also offer solace and education to the living: “The cemetery landscape was central to the cemetery ideal’s vision, where nature and religion combined to produce a sublime environment” (Murray, 2003:130). Due to its distinctive function and sanctity, a cemetery is perceived as essential in enforcing public morals (ibid.). Moreover, they are also viewed as a space that helps uplift a community’s dignity, a state that can be observed from how these places are maintained.

Cemeteries contest with other land uses, including housing. Looking at current urban development challenges, cemeteries can be planned so that they are able to respond to some of the identifiable challenges. For instance, apart from their role as places of interment, they can provide other community benefits. The current trends in cemetery design and provision include garden sections, places of passive recreation and contemplation. Outdoor activities that have minimal environmental impact on the recreational site are most desirable, especially as they require minimal facilities and development, for instance, for walking, hiking and nature observation.

Reviving cemeteries that are already full and ensuring the adequate use of active ones is an important item in present-day town planning. A significant recent trend in European, Asian and American cemeteries that is taking on and ushering in a new era of fresh thinking is the idea of integrating interesting functions that generate revenue for their upkeep, whilst benefitting the surrounding communities.

A good example is Mandaluyong Cemetery in the Philippines, which plays an important cultural role in the life of close-by communities. Valmero (2014) illustrates photographically that at night the surrounding community enjoys congregating amid the cemetery's park-like and green features. Most North American cities have introduced different themes for their cemeteries. Cemeteries can also be used as venues for wedding ceremonies (Photograph 6.1 below), theatrical performances, music concerts, tourism and heritage tours, and arboretums. Some even have restaurants.

Photograph 6.1: Marble Cemetery in New York as venue for weddings and photo shoots



Source: Fleming (2014)

Research Objectives

Taking Diepsloot Memorial Park as a translation of innovation in a diversified cultural context, the objectives of the study were to:

- Understand the reasons that led to the development of Diepsloot Memorial Park and whether users were involved in the development process

- Establish the local community's perception of the memorial park
- Determine the general public's view of newer cemetery designs that integrate the burial and the recreational functions of this particular cemetery site.

The intent behind the formulation of these research objectives was able to show whether the design model of Diepsloot Memorial Park has the potential to be adapted for use in other South African cities and for upscaling, and whether having the idea of having different functions on a cemetery site would transform other urban areas too in some way. Before describing the methodology used in this study, the theory applied is discussed.

Theoretical Framework

The 'diffusion of innovations' theory grounded this research to inform the focus, orientation and approach to the study. In 1962, Everett Rogers made the 'diffusion of innovations' theory famous in his seminal work that synthesised prior research on diffusion. He later on published more work on diffusion, some of which incorporated and criticised past research, including his own. Although the theory was initially influenced by fields such as anthropology, education, rural, medical and industrial sociology, scholars from a range of disciplines successfully apply a diffusion perspective in their work covering diverse themes in development studies, geography, history, agriculture, marketing, public health and many other research endeavours (Sahin, 2006).

An innovation is an idea or object that is perceived as new while the diffusion of an innovation is described as the process through which an innovation is communicated over time within a social system through certain communication channels (Rogers, 1995:5). The diffusion of innovations theory has been selected as the most applicable theory for this research because it is versatile and can be tailored to the needs of multidisciplinary analysis. It cuts across different social science disciplines and can be applied in very different contexts (ibid.).

The theory focuses on a social system's awareness and knowledge of the innovation, the attitude towards the innovation and the decision making that could lead to the innovation being adopted or rejected (Rogers and Singhal, 1996). The theory also centres around how and through what media an innovation is communicated; the attributes of innovations; the decision process that leads to adoption or rejection of an innovation; and the characteristics of adopters. Roman (2003) reasons that contextual factors shape the diffusion and adoption of innovations; and that the focus of the theory is not only on economic and general infrastructure indicators but also on, for instance, local value systems, living habits, social norms and culture (ibid.:560). Drawing on Rogers (2003), five variables affect decisions to adopt an innovation: perceived attributes of the innovation (such as its compatibility with social values and norms); the properties of the social system; the type of communication used to diffuse an innovation; types of innovation adopters; and the time to diffuse an innovation.

Perceived attributes of the innovation

Rogers (1983) identified a number of attributes through which an innovation is perceived. These are relative advantage, complexity, compatibility, observability, and trialability. Among these attributes, compatibility is of particular relevance to this study although they all apply in some way or another. In applying diffusion theory to cemetery design research, the most relevant point to understand the perceived attributes of innovations, especially the compatibility attribute, is how the community perceives the new cemetery design and the new elements integrated within it. Compatibility is selected in this study as the most appropriate attribute to analyse Diepsloot Memorial Park users' perceptions of cemetery design because it assesses the degree to which an innovation is perceived to match the needs, capacity, values and social norms of prospective adopters, as Roman (2003:224) explains.

Compatibility is “the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters” (Rogers, 1995:224; 2003:240). Rogers (1995) shows that an idea can either be compatible or incompatible with socio-cultural values and beliefs, ideas that supersede it, or the user's needs for the innovation. An innovation's incompatibility with cultural values can block its adoption (ibid.). An idea that is more compatible would be less uncertain to the potential adopter, and fit more closely to the individual's needs. Dubois (1972), in fact, notes that many studies conducted showed that innovations had failed to diffuse because of incompatibility with the existing norms of the socio-cultural system.

The diffusion of innovations theory applies to this study because it makes known how and why an innovation is adopted, how social factors affect its adoption and through which channels diffusion can increase its adoption. The nature of the social system as a variable is selected to ground the argument of this study because of its emphasis on the process of social change.

Properties of the social system

The nature of the social system in which the innovation is diffusing affects both its acceptance and rate of adoption. It includes its norms and degree of network interconnectedness (Rogers, 2003:207). The diffusion of an innovation operates within the boundaries of a social system. In this study, a social system is defined as a community of Diepsloot as users of Diepsloot Memorial Park.

Lekhanya (2013:1563) too draws attention to socio-cultural beliefs playing a fundamental role in the diffusion and the adoption of an innovation. The belief that cemeteries remain spaces that facilitate ongoing relationships between the living and the dead is constantly influenced by cultural norms and values. The acceptance and adoption of new designs can be reduced if these norms and values are not taken into account in the design and development of cemeteries. Usually, individuals are influenced by others in their communities when considering acceptance of new ideas. According to Lekhanya (2013), this could shape their attitudes towards the adoption of something different.

In this research, distinct examples of cultural values and norms are the residents' strong beliefs that only one body should occupy a grave and the erection of large tombstones identifies a grave. The basic accepted belief system is that cemeteries should be used for interment only and should not be combined with any form of recreation, passive or active. By virtue of their common membership as residents of Diepsloot residents would come together as a community and share a core common understanding and many customs among which would be agreeing on a fitting design pertaining to places of burial. Planners of the Diepsloot Memorial Park should have had detailed knowledge of the community's social and cultural characteristics prior to developing a social facility for this resident community. Consideration of these is vital for successful adoption.

The diffusion of innovations theory introduces the principles of homophily and heterophily, where homophily is "the degree to which pairs of individuals who interact are similar in certain attributes, such as beliefs, education, social status, and the like" (Rogers, 1983:18). However, Rogers points out that the diffusion of innovations requires at least some degree of heterophily too. This is "the degree to which two or more individuals who interact are different in certain attributes" (Rogers, 2003:19). The most distinctive problems that arise from this theory are perceived to relate to participants having many different attributes, as communication channels will not be adequately effective (ibid.). The mere fact that diffusion occurs in a social setting is because interpersonal channels exist. It is the changing of strong personal attitudes toward an innovation that subsequently can lead to its adoption (Sahin, 2006).

Type of communication to diffuse an innovation

Rogers (1983) categorises the main information exchange methods as two distinct categories: mass media and interpersonal channels. Mass media channels are said to be more useful in generating knowledge about an innovation, while interpersonal channels are more advantageous in changing perceptions and mind-sets about a new idea (ibid.). Diffusion of innovations emphasises the fact that word of mouth is particularly effective in persuading people to accept new ideas (Rogers, 1995). Rogers (2003) and Robinson (2009) contend that word of mouth, the interpersonal, and showing by example are far more influential than mass advertising. Rogers (1995) observed that most people are not influenced by facts or results but by hearing from others who had already adopted the innovation when making a decision about an innovation.

Types of innovation adopters

Adopter categories are "classifications of members of a social system on the basis of innovativeness" (Rogers, 1995:22) and an innovation needs to be widely adopted to be self-sustaining. In his research Rogers (2003) divides the population into five categories: innovators, early adopters, early majorities, late majorities and laggards as defined in Table 6.1 below. It is understood that each group has its own attitude toward a specific innovation and that innovations are adopted when they advance to meet the needs of subsequent clusters (Robinson, 2009) to complete the sequence of adoption.

Table 6.1: Five-adopter categories

ADOPTER CATEGORIES	DESCRIPTION OF ADOPTERS
INNOVATORS	<ul style="list-style-type: none"> • Are gatekeepers bringing the innovation in from outside of the system • Are active information seekers about new ideas • Have a high degree of mass media exposure and their interpersonal networks extend over a wide area, usually reaching outside of their local system • Are able to cope with higher levels of uncertainty about an innovation than are other categories
EARLY ADOPTERS	<ul style="list-style-type: none"> • Are more likely to hold leadership roles in the social system, other members come to them to get advice or information about the innovation • Have the highest degree of opinion leadership among adopter categories • As role models, early adopters' attitudes toward innovations are more important; their subjective evaluations about the innovation reach other members of the social system through the interpersonal networks • Put their stamp of approval on a new idea by adopting it
EARLY MAJORITY	<ul style="list-style-type: none"> • Have a good interaction with other members of the social system • Seldom hold positions of opinion leadership in a system • Are deliberate in adopting an innovation and they are neither the first nor the last to adopt it
LAGGARDS	<ul style="list-style-type: none"> • Their innovation-decision period is relatively long • The last to adopt a new idea • As the most localized group of the social system, their interpersonal networks mainly consist of other members of the social system from the same category; because of the limited resources and the lack of awareness-knowledge of innovations, they first want to make sure that an innovation works before they adopt • Have the lowest social status

Source: Rogers (1962; 2003)

Two other issues important in the adoption of an innovation are change agents and opinion leaders. On the one hand, change agents are mediators between change agencies and clients. They facilitate the flow of innovations from change agencies, the resource systems, to clients who are the adopters (Rogers, 1983:313). On the other hand, Rogers (2003) notes that opinion leaders are the most influential in spreading either negative or positive information about an innovation during the evaluation stage of the innovation-decision process and on late adopters. As noted by Rogers (1983:332), the change agent can accelerate the diffusion process by concentrating communication efforts on opinion leaders in a social system. Opinion leaders are said to have greater exposure to the mass media; greater contact with change agents; more social experience and exposure generally; usually have higher socio-economic status; and are more innovative than others. According to Rogers (2003), people in elected positions in the community are recognised as opinion leaders. He comments on the fact, for whatever reason, opinion leaders are able to influence adoption decisions through informal persuasion. On the one hand, ward councillors could be viewed as opinion leaders as they hold positions of leadership, are respected members of the community, and are known to be influential in the use of Diepsloot Memorial Park. Their views about it could have influenced the community through mouth-to-mouth communication. On the other hand, the community as a whole could fall between the late majority and laggard categories as their decision to use Diepsloot Memorial Park or not depends on what they know about the experience of others who have already buried loved ones there.

The time to diffuse an innovation

Once an innovation has been completed, adopters look for elements that they perceive as important; to some it might be availability, to others it might be effectiveness, and to many, it might be cost (Robinson, 2009). Over and above these criteria, other social pressures, inadequate information about an innovation, bad timing for its introduction and a lack of political support could potentially constrain the adoption of new ideas. Although an innovation could have inherent potential to bring about positive change, adoption is not automatically guaranteed. If the innovation does not meet the social system's perceived needs, it could be rejected. This study proposes that the diffusion process will be quick when the perceived attributes of the innovation are compatible with the values and norms of the social system and vice versa. A rapid process in this case would imply a larger segment of the social system adopting the innovation with relative ease and within a short space of time.

Methodology

To address the objectives, interviews were held with key participants and users of the Diepsloot Memorial Park. The latter group comprised community members who were given information sheets, which explained the purpose of the study. To adhere to ethical considerations, anonymous questionnaires were distributed after those willing to participate had given oral consent and they were assured anonymity would be respected. Interviews were conducted with officials from the Johannesburg City Parks and Zoo as a source of the key information required and a semi-structured designed set of questions were followed. This choice of procedure guided the interviews and gave flexibility affording the opportunity to probe for further clarification.

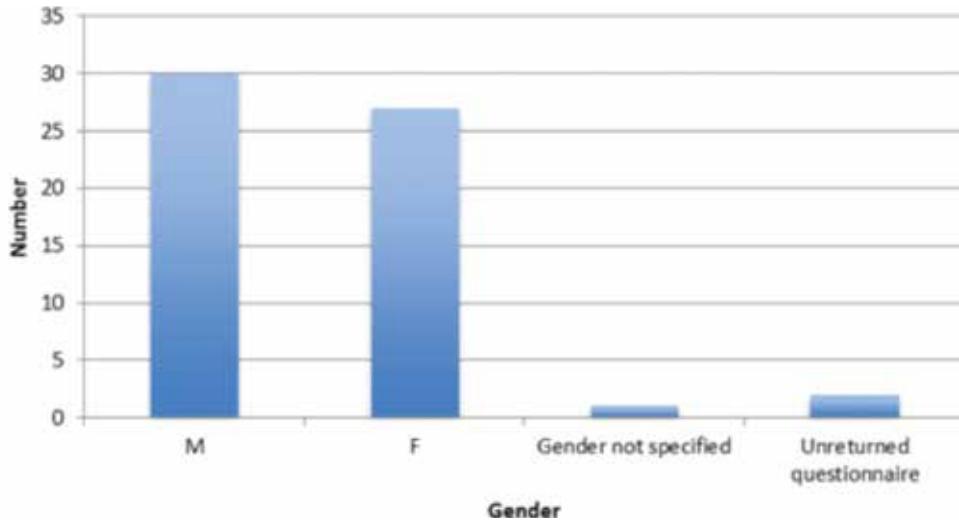
First, the interview with Mr. Moloi (Pers. Comm., 2015), an official from Johannesburg City Parks and Zoo, focused on specific issues that concerned the reasons leading to the decision to establish the Diepsloot Memorial Park; to establish if and which international cemetery had been replicated in the development of Diepsloot Memorial Park; to discover possible reasons for the community's apparent poor level of acceptance of the cemetery; and to find out the COJ's plans for the future development of cemeteries that would add to the users' well-being. Then two executive officials from the Johannesburg City Parks and Zoo, Mr. Nelana (Pers. Comm., 2015), the Managing Director, and Ms. B. Njingolo, Chief Operating Officer, were also consulted regarding the processes that led to the development of the cemetery and the city population's response to its poor uptake.

Another perspective of the research topic came from the interview conducted with Mr. M. Sibiya (Pers. Comm., 2015). He is a senior undertaker at Lalakahle Funeral Undertakers providing burial services to the township of Diepsloot and the surrounding areas. Due to the long service he had been providing families, and the level of respect he had earned in Diepsloot, Mr. Sibiya's contribution was fundamental to the study in portraying an undertaker's view. At the conception of this study the plan was to interview three undertakers for the sake of representivity and to reduce sampling bias. Several attempts were made to track down two undertakers in the township. One office was closed on days that the township was visited while the other left his phone unanswered. Although this was disappointing, due to time constraints the situation had to be accepted.

Thirty participants were approached to fill in questionnaires in Diepsloot and another thirty at four distribution points in the Johannesburg City area. Non-probability sampling was the process followed to gather a sample of respondents although not all the individuals in the population have an equal chance of being selected (Explorable, 2009). This was feasible in this densely populated case study area of Diepsloot. To increase representivity and to get a diverse mix of participants, every tenth person was approached to participate in the study. The study's objectives were explained to all the approached individuals and then they were handed a questionnaire to complete. Participants had the opportunity to ask questions of clarification as they filled it in. All questions were answered in twenty-nine questionnaires in Diepsloot.

Using non-probability sampling technique as well, thirty questionnaires were distributed across four points in Johannesburg: Bree Taxi Rank, Noord Taxi Rank, Johannesburg Park Station and Braamfontein. Due to their functionality as entrance and exit points into and from Johannesburg, these locations were selected because they offered a broad distribution of people from Johannesburg and outside. Extending the area beyond Diepsloot allowed people from further afield to complete questionnaires. Diverse backgrounds, age groups and genders could provide different perceptions of the current move toward more user-friendly cemeteries. The same process of approaching participants used in Diepsloot was followed at these four points. Of the thirty questionnaires completed outside Diepsloot, twenty-nine were successfully answered, although one of the twenty-nine did not specify a gender. Altogether, as represented in Chart 6.1, fifty-eight of the sixty distributed questionnaires were filled in; gender representation was close to even and responses came from thirty males and twenty-eight females. One questionnaire did not specify the gender.

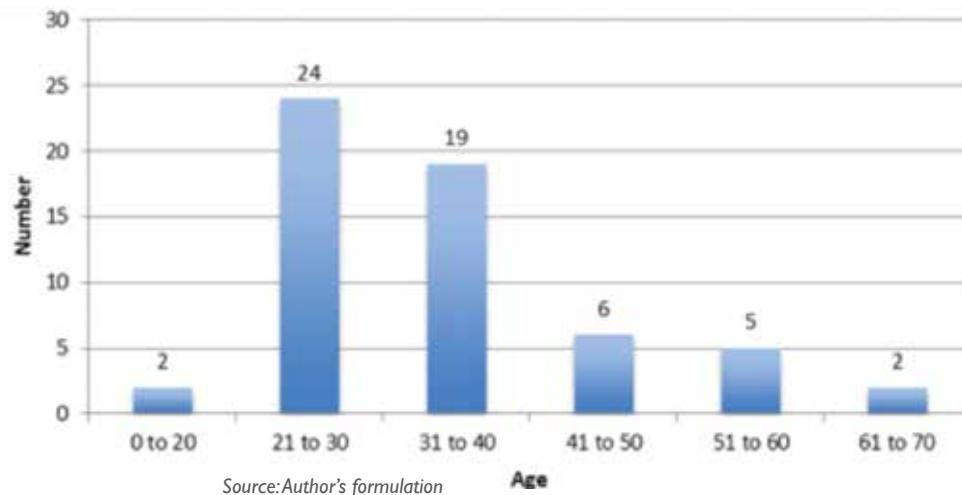
Chart 6.1: Number and gender of participants



Source: Author's formulation

The age distribution of the respondents shows predominance of young adults (Chart 6.2 below), with most of the participants being the 21-30 age group with a quarter being over the age of sixty. For the purposes of this study, this spread could be deemed satisfactory because the sample is gender representative and only 4% of the respondents did not answer the questionnaire. Although, participants filled in the questionnaires, brief discussions were held with them regarding some of the issues they raised in the questionnaires. This was a great opportunity to clarify matters

Chart 6.2: Age range of participants



Further to the interviews, two visits were made to the Diepsloot Memorial Park. Photographs were taken to capture the landscape, to explore the different sections, for the children, for full-body memorial ceremonies and for plaques. The use of the cemetery and some of the elements that were raised in the questionnaires were observed. There were no burials on both Saturdays that the cemetery was visited. Field notes were taken in Diepsloot on the day of the distribution of the questionnaires.

Challenges faced during the fieldwork

Fieldwork is hardly ever without challenges. Efforts to study all documentation that was produced prior to, during and after the development of Diepsloot Memorial Park could not be accessed nor could reports drawn from consultations with the community. Although three officials from Johannesburg City Parks and Zoo were engaged and provided information, the documentation would have been critical to tracking all processes that followed from conception to final development, and to give the overall perspective of the COJ as representing local government.

Brief account of Johannesburg cemeteries

This section offers an overview of the history and development of cemeteries in Johannesburg and how Diepsloot Memorial Park fits into the evolution and changing attitudes of cemetery development in the light of larger historical and political processes. Just like other urban green open spaces, cemeteries have the potential to contribute to the rich biodiversity and multiplicity in terms of mixed use, of urban systems that face and need a response to urban development challenges. However, the COJ is trying to move away from conventional planning processes as today some cemeteries in the Johannesburg encompass tracts of land with unsightly views of rows of headstones and lack of greenery. It is hoped that new ways of dealing with cemeteries will prevent this happening in the future.

The COJ has instituted programmes aimed at changing the old grey appearance of cemeteries through tree-planting initiatives in diverse public open spaces to improve their appearance. Although these initiatives are geared toward beautification and equality of care, it is imperative to note that cemeteries offer opportunities to increase not just a multiplicity of uses within them but diversity in respect of biodiversity, cultural groups and governance institutions as well. Despite the involvement of local residents in the design of local parks, they do not participate in the planning of cemeteries. The COJ has the opinion that the topic of cemeteries is taboo to most people and that they would not be interested in the systems and processes of cemetery formation (Moloi, Pers. Comm, 2015).

Old cemeteries in previously disadvantaged areas reflect the country's socio-political history when segregation was emphasised. While religion determined the place of burial in colonial times, where sections were divided into different religious denominations (Christopher, 1995), it was during apartheid, however, that race and ethnicity became the determining factors and each race was allocated its own cemetery (ibid.). The COJ is in the process of redressing the spatial and ecological imbalances inherited from apartheid. In this study ecological imbalances means the unequal distribution of natural and man-made green spaces between the northern and the southern areas of the city. According to Mr. Moloi (Pers. Comm, 2015), currently, cemeteries are neither established along religious nor racial lines. This is evident in one of COJ's recent establishments, the Diepsloot Memorial Park where racial desegregation is practised as the burial of all races from diverse economic backgrounds are allowed in the one setting.

Research Findings

The diffusion of innovations theory shows that for an innovation to be adopted by the critical mass, it must be considered socially acceptable and compatible with the social system's values, norms and practices. It must also supersede other ideas perceived by the population that came before it. According to Rogers (2003), some innovations require much time and persuasion before they can become socially acceptable. If the innovation is incompatible with the social system's current practices it will not be adopted (ibid.). The Diepsloot Memorial Park was introduced as a new approach to cemetery design and provision. It faces resistance mainly because it is perceived as culturally inappropriate. Although some people view it as a necessary shift from the old dominant cemetery models, the majority do not see the need to have incorporated the different design elements that distinguish Diepsloot Memorial Park from other cemeteries. According to them, the cemetery should have either looked like the old type of cemeteries, or the space should have been developed into a recreational park. The two should have not been combined.

This section reports on the research findings that cover five themes. It starts with the design and development aspects of Diepsloot Memorial Park and then proceeds to deal with creating space for the activities of people living in Diepsloot. The empirical findings from engagements with different stakeholders and the general antipathy towards the new cemetery are discussed. The section closes with some thoughts on the future of cemeteries with particular reference to the prospects of the COJ's garden cemetery and its potential for upscaling.

Design and development of Diepsloot Memorial Park

According to Mr. Moloi (Pers. Comm., 2015), the new design was influenced by several factors. The first reason was to redress the ecological imbalances left by apartheid. Second, an urgent need to provide cemeteries that are dignified, unlike the appearance of old ones that were not necessarily assessed, or even planned with future growth in mind. Today identifying and planning land for burial in previously disadvantaged areas includes identifying open space. Moreover, environmental and geotechnical assessments have to be done before burial places are chosen. Third, due to the diminishing land available for graveyards, possibilities to maximise land use while addressing the increasing demand could be to allow multiple bodies in a grave and ensure that not much land is left between graves to increase usage density.

It was important to establish whether any international model influenced the design of Diepsloot Memorial Park, and if it did, which elements were adopted. If not, how its design was conceived and brought to fruition. According to Mr. Moloi and Mr. Nelana (Pers. Comm, 2015), no particular international model influenced Diepsloot Memorial Park's design, and especially the general move towards creating greener and more beautiful cemeteries in Johannesburg. They said that besides the need to redress ecological inequalities between the northern and southern areas of Johannesburg, the design was influenced by the need for easy maintenance.

The big tombstones found in old cemeteries apparently do not facilitate easy maintenance; for example, lawn mowing around the tombstones is difficult. Although there are examples in other cemeteries that headstones facilitate quicker maintenance in comparison to the use of full-body memorials, the use of flat plaques in this memorial park would make the job even easier. Although the Johannesburg City Parks and Zoo officials could not admit to having replicated the Diepsloot Memorial Park design from any other existing cemetery elsewhere in the world, it is clear that there is a growing trend in the development of cemeteries that appeal to the general public as well. Mr. Nelana (Pers. Comm, 2015) firmly asserted that the decision to allocate space in the area for a cemetery was based solely on finding ways to enable the cemetery's efficient upkeep.

Similar to the use of artefacts of Iron Age cultures from archaeological digs in the vicinity of the Cradle of Humankind, South Africa's heritage site lying some 40 km directly west of Diepsloot, its memorial park has an Afrocentric theme. These represent cultural aspects of burial practices beneath circular cowsheds (Visser, 2008). Diverse heritage elements, indigenous flora and naturally occurring habitats have been integrated into the cemetery's design, thus allowing it to function as both a cemetery and a conservation area (Nelana, Pers. Comm, 2015). Apart from its circular layout, the cemetery has incorporated natural stone pillars (Photograph 6.2 below), which represent typical African designs also seen at the Zimbabwean ruins. The gabion tower, a special feature commonly used in landscaping, is a tall structure made of dry-packed stonewalls or cylinders contained within wire-mesh baskets (Cape Contours Landscape Solutions, n.d.).

Regarding the cultural significance of the memorial park, Mr. Moloi illuminates:

The design embraces Africanism and each section has its entrance and has gabions in the centre. This theme emulates the old African village in the olden days when houses of the community would surround a king's home (Moloi, Pers. Comm, 2015).

According to Johannesburg City Parks and Zoo, the idea behind the cemetery was to design a space for the use of 'living' people and not only the dead. The greening of the cemetery remains the COJ's aim for the developing of cemeteries that will remain vital components of the city's 'green lungs' for oxygen regeneration even after they have reached capacity as burial places. Over 5 000 trees were planted to change the feel of the cemetery (Moloi, Pers. Comm, 2015). The greenery, pathway nodes and pillars give the cemetery a park-like feel. The cemetery was designed around the nature conservation section. This section was not developed for burial purposes because it contains indigenous trees and flowers, and large rocks that give the cemetery a "nice feel" (Moloi, Pers. Comm, 2015). This section will therefore never be used for graves.

Photograph 6.2: Pathway leading to gabion tower



Source: Photograph by author, 2015

The focal point of the cemetery is the large gabion tower that acts as an artistic landmark for the entire site (Figure 6.1; Photograph 6.3). The tower also creates a sense of orientation surrounded by the nodal structure, which resembles an African kraal. Every visitor to the memorial park passes through this node. Stone-built pillars line some of the walkways to create avenues (Visser, 2008) (see Photograph 6.4). The aim was to use it for passive recreation purposes, hence the inclusion of relaxation sections demarcated by benches made from recycled plastic, drinking fountains, large African urns and dustbins in its design (Photograph 6.5; Photograph 6.6). The use of flat plaques upholds the eco-friendly design of the memorial park in place, since the use of headstones and full memorials were prohibited.

Figure 6.1: Design of gabion tower during planning phase



Source: Johannesburg City Parks and Zoo (2007)

Photograph 6.3: Gabion tower during development phase



Source: Johannesburg City Parks and Zoo (2007)

Photograph 6.4: Avenue to gabion tower



Source: Photograph by author, 2015

Photograph 6.5: Contemplation/relaxation sections in winter



Source: Photograph by author, 2015

Photograph 6.6: Contemplation/relaxation sections in summer



Source: Photograph by author, 2015

The overarching goal was to have an environmentally friendly cemetery with costs as low as possible and minimal maintenance requirements. In keeping with the feel of a healthy green environment, large sections of the cemetery were not paved. Concrete was not used in making paths lest they needed more burial space in the future (Moloi, Pers. Comm, 2015). Bricks that are easily removable were used instead.

Over recent years, the cemetery has won international awards for having integrated and embraced diverse African cultures, thus shifting away from the Eurocentric models with the typical square block layout, seen in old cemeteries. One of the accolades was the LivCom Awards launched in 2007 and endorsed and organised by the United Nations Environment Programme (Visser, 2008). Within the “Cities Environmental Management” category, the awards observed the objective “to improve the quality of life of individual citizens through the creation of liveable communities” (ibid.).

When asked whether it was important for the community to be part of the planning of the cemetery, Mr. Sibiyi, the undertaker, felt that, as users of the space, both the community and the undertakers had to be consulted. He acknowledged that it would be critical for undertakers particularly to be in the process as they work closely with the community and thus have first-hand knowledge of their needs. Mr. Sibiyi suggested that City Parks should consult them in future developments, as “we’ll tell them what will work and what will not work”. Using the issue of not allowing full memorials space at Diepsloot Memorial Park as an example, he would have told the COJ that although it was a new idea at the outset, it would not work, as it was not the traditional way of burying a deceased person.

As the main users of the cemetery, the community of Diepsloot strongly felt that their opinions had to be considered by the authorities who were developing new social facilities, particularly cemeteries. The community has since grown in size since the opening of Diepsloot Memorial Park and some people have moved away. It is possible that if any consultation was undertaken in the community then, it is likely that might now be outdated as opinions and needs change over time.

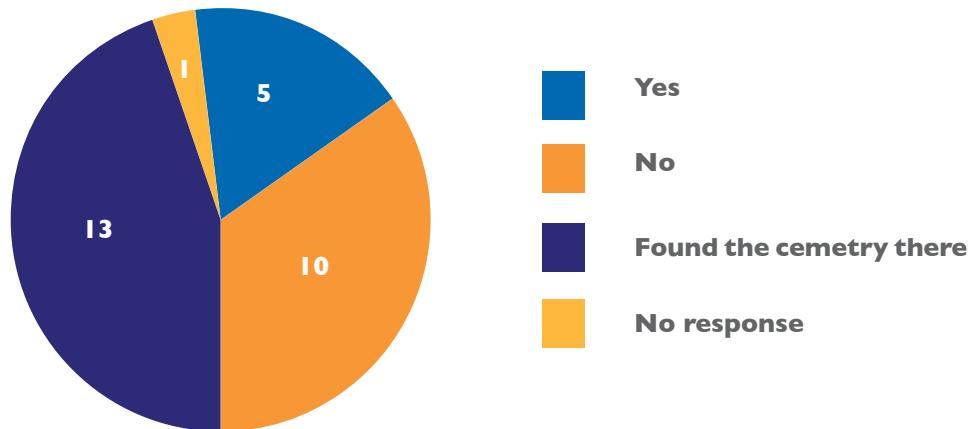
Of the twenty-nine Diepsloot community members, only five knew that a development was being planned but could not say how they found out about it (Chart 6.3 below). Ten of the participants did not know of the plans to build that a memorial park prior to development and fewer than half only found out about it when the cemetery started operating. When asked what their input would have been had they taken part in its planning stages, only eight participants indicated that they liked it the way it was and would not have changed anything. The majority intimated that the community would have ensured that gravestones were allowed, the service improved unlike in other older cemeteries, and that graves were adequately spaced to give visitors some privacy. Two other comments were:

It was supposed to be a park because it's inside the houses.

They should bury one person six feet under.

Participants would have preferred this space to be developed into a park because it is located close to houses. Further, seeing that it operates as a cemetery now, instead of interring multiple bodies, participants would rather have only one body buried in a grave.

Chart 6.3: Participants with awareness of Diepsloot Memorial Park before development



Source: Author's formulation

In conversation, some respondents did not like the integration of park features and the cemetery function. Participants clearly did not support the burial of multiple bodies in one grave but would rather have only one body in a grave.

Different responses were given regarding whether the community was engaged in the design of the cemetery or not, hence the interpretation is based on both. On the one hand, there is the likelihood that some members of the community of Diepsloot were consulted before implementation, but they might no longer reside in the area. This means that the newer residents either have to accept and adopt the current design or reject it, or set a process in motion to request a reinvention. The reinvention would be a compromise on the part of the COJ to provide a section for the erection of tombstones. Rejection would mean that most members of the community would simply choose to use other cemeteries.

On the other hand, because the township has expanded extensively in the last decade or so, most of the people who could have participated in the consultative processes conducted by City Parks could have moved into other areas opened up for new residents and thus spread out across the township. If no consultation processes were held, that would remain a challenge for the use of the cemetery, as most members of the community would not understand the reasoning behind its design and function.

Multiple channels can be used during the communication of an innovation. One network could focus on transferring information to instil awareness and knowledge about the intention of intervention, while another channel would encourage people to adopt the innovation. This would be in keeping with the first phase of diffusion of innovations model (Table 6.1). For ultimate acceptance of an innovation this is a vitally important stage. However, in the case of Diepsloot Memorial Park, communication could have been handled by the change agency, in this case, City Parks on behalf of the COJ, before the development of the cemetery. Since this step was not carried out, later on many people were strongly swayed from adopting the cemetery. In engagements with community members as participants in this survey, it was realised that rumours were spread in the early adoption phases of Diepsloot Memorial Park. These would have prevented its adoption. The rumours influenced members of the community as they were told that some of the cemetery's design elements went against the community's cultural beliefs. The issue they wanted addressed was to request sections that allowed full-body memorials. Although the foundation of these rumours was not confirmed or verified, some participants thought that local political leaders could have instigated the rumours.

Although the decision to develop a beautiful user-friendly cemetery could have been for the benefit of the community, incompatibility with users' values and norms remains the main obstacle in people having a positive attitude to the cemetery and being willing to use it. Because the cemetery is located next to houses, some participants would have preferred it to be a park. The community does not understand some of design elements integrated in the complete picture of the cemetery. In particular, the park-like features and the use of ground plaques instead of tombstones. The lack of understanding, and wrong information fed to the community, are matters to be addressed. To achieve this, communication channels between officials of the Johannesburg City

Parks and Zoo and the community as users of this cemetery have to be improved.

The people do not understand the reasons behind combining facilities that offer recreational opportunities with the allocation of space for burials that follow special traditional practices and rites. Inevitably, the consequence of local government action with regard to establishing a cemetery that negates their beliefs arouses their emotions negatively and they seek an explanation and a solution. Although not everyone will use the cemetery, other socio-ecological benefits can still be gained from its existence and the way it is designed. Two particular areas would be of benefit, protection of the natural environment and space set aside for people's enjoyment of nature with potential for educational benefit for young and old. Hence it is the responsibility of City Parks to explain to users the motivations that led to this integration and the challenges both the COJ and the community faces regarding the Diepsloot Memorial Park.

Of the twenty-nine city-wide participants, only two females between the ages of thirty-one and forty did not see the need for communities to be informed and involved in the planning and development of cemeteries. One responded that, "it would cause lots of confusion and people would make demands that would take long to implement". Twenty-seven participants thought it was important to consult communities before development of a cemetery, as the cemetery belonged to the community. They believed that engaging them in the proposed plans would help to align the community's cultural beliefs and interests with the cemetery planning processes.

As intermediaries, change agents, the COJ in this case, should know the needs of the community while also trying to facilitate national goals as is expected of them. The community knows its priority needs and could engage with change agents effectively. Taking their current practices into account in an initiative should increase the likelihood of having innovations rapidly diffused and subsequently adopted.

Creating spaces for recreation

Although the cemetery has a park-like feel, passive recreation by all members of the community would not be allowed as "it would be abused" according to Mr. Moloi (Pers. Comm, 2015). He explained, "the plan isn't to attract everyone to the cemetery, but to provide a comforting environment to those visiting their loved ones". Because most people still view cemeteries conventionally, Diepsloot Memorial Park will not be open for active recreational use by people other than those who have buried family and friends there so as to avoid attracting noise, public consumption of alcohol and unruly behaviour. Mr. Moloi indicated that because there were paved paths, children could ride their bicycles whilst their visiting parents visited graves (Photograph 6.7 below). However, the Johannesburg City Parks and Zoo would also allow the filming of local soap operas and movies, a strategy that is being used to generate revenue.

Photograph 6.7: Paths where children could ride bicycles whilst parents visit graves



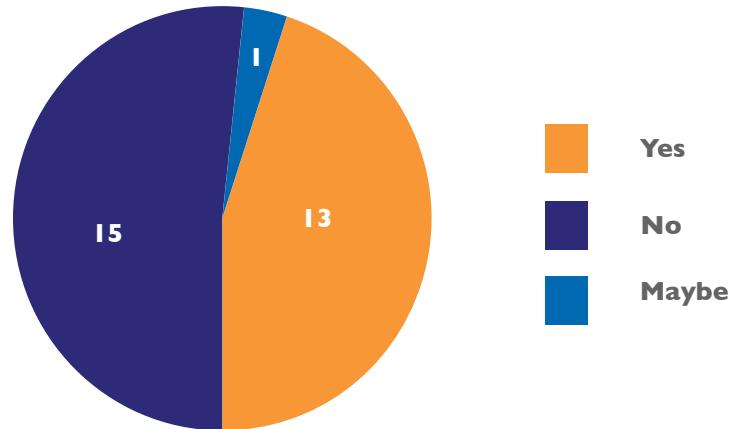
Source: Photograph by author, 2015

Another avenue the research explores was to see whether the people who live in the area are actually taking up the COJ's intentions. Although the idea was to develop a beautiful green space for those visiting the cemetery to use, City Parks would not allow people who did not have loved ones buried there to use the cemetery. The reason was to minimize any potential unmanageable behaviour. The Johannesburg City Parks and Zoo's understanding was that anyone who had loved ones buried in the cemetery would want to respect it and uplift its dignity through observing quietness whilst being there. When asked whether they would visit the cemetery for reasons other than burial, Diepsloot participants' responses were still related to the functioning of the cemetery. When the question specified clearly whether they would use the Diepsloot Memorial Park for recreational purposes, one person was not sure, thirteen showed interest whereas fifteen were not open to that idea (Chart 6.4 below). Those participants not interested in visiting Diepsloot Memorial Park said they had no need to visit the cemetery as there were no tombstones and they objected to the fact that multiple bodies were buried in a single grave. Two pertinent responses were:

- *Because of the way they are burying people, there is no way to visit loved ones.*
- *There is no one of my family buried there. We don't bury there.*

Even though the question clarified the potential use of the cemetery for recreational purposes, the first response shows that participants' wish to visit the cemetery to visit loved ones buried there, whether recreation is incorporated in the cemetery or not.

Chart 6.4: Willingness to use Diepsloot Memorial Park for recreational purposes



Source: Author's formulation

There were feelings of confusion as some of the participants felt the environment could be used beyond just for burials, however, they would be afraid to relax there. One participant replied, “to sit. It is very quiet. But I would be afraid to sit because of fear of being around the dead”. Although some people appreciated the quietness in the cemetery it posed a problem for others who highlighted that it was unsafe, especially for women. One of the two women who were concerned about security in the cemetery responded, “It’s not safe and it is hidden”. Responses of participants open to using the memorial park for recreation included:

- *Just maybe if I want to take a walk.*
- *It is a really nice place to relax.*
- *Because of the trees and the grass there.*

Although all the participants had been to Diepsloot Memorial Park, most had gone there for burial purposes. One person had been to the cemetery to fetch water, two had attended community meetings and two used the cemetery as a shortcut path.

City-wide participants were also asked whether they would visit cemeteries for reasons other than to visit to remember loved ones or to attend funerals. Out of the twenty-nine participants, only three said that they would visit cemeteries as a community service such as to clean in an effort to keep the cemetery neat, and to show others where family was buried. The remaining twenty-six would not visit a cemetery for any reason unrelated to its normal functioning. Examples of their responses were:

- *It would be very uncomfortable.*
- *Cemeteries should not be used for purposes other than burial.*
- *My religion does not allow that.*
- *I don't believe in visiting graves.*

The notion of using cemeteries beyond anything unrelated to interment is foreign to most people and it can be deemed as culturally unacceptable. Based on the fact that cemeteries are respected and the dead are feared, it could take time before people would open up to a notion other than that. Because recreation is sometimes attached to insubordinate behaviour, the thought of having cemeteries act as places of recreation might possibly offend many. The Diepsloot Memorial Park could then be understood as being inconsistent with the values and needs of present day users in this location. This incompatibility with users' values, norms and what they are presently used to implies that the cemetery will not be adopted as rapidly as a cemetery that is compatible with current beliefs.

Perceptions of cemetery users

The primary objective of this study was to investigate community members' perceptions of the Diepsloot Memorial Park. One could view the development of the Diepsloot Memorial Park as a positive shift, especially with the COJ's goal of redressing spatial and socio-ecological disparities left by apartheid. However, to the majority of those who were repressed and segregated in the past, the new design could be a sign that they are being prohibited from practising their freedom and will. In discussion with some of the Diepsloot community members who were participants in this survey, the opinion was expressed that they felt that they had been suppressed in the past and were not allowed to have access to certain opportunities. They perceived the regulation to use only flat plaques was a continuation of this suppression, however, even by a different government. The introduction of different innovative design elements was seen in the same light with socio-political and cultural implications that denied community beliefs. If the ability to decide to erect an enormous tombstone that is perceived as a current cultural practice and provides a status symbol for some families is taken away, old wounds are opened.

Mr. Sibiya, the undertaker, seemed to be in favour of the memorial park, especially since “it looks like a botanical garden”. Although he viewed the cemetery as a modern form of cemetery development, he was, however, concerned that it had not maintained the standard with which it started. He said that when it first started, it was neat and beautiful. However, the standard dropped when City Parks sub-contracted a private company to attend to its maintenance and upkeep. He was of the opinion that the cemetery was not properly managed and that it lacked signage. The example he gave was, for instance, to show where visitors could find drinkable water. Walking through the entrance of the cemetery, there was a sign indicating that water was undrinkable. However, no other signs were visible in the cemetery to show where to find drinkable water. Mr. Sibiya complained that the “grass is outgrown, there is running water, sewerage from houses; the standard is now no more the good standard that it started with” (Sibiya, Pers. Comm., 2015). When asked whether he supported the shift to a modern cemetery design, Mr. Sibiya indicated, “let’s not make graveyards something for people to be scared of. Let’s move with the times; something different from what our fathers had”. He further emphasised the need for City Parks to advertise the cemetery to local communities, as people did not know of its existence. It would depend on which adopter categories it identifies as the most resisting and then apply appropriate communication channels for each segment of the population.

Several of the Diepsloot community members mentioned that Diepsloot Memorial Park was a good move towards cemeteries that catered for the inclusion of other activities in people’s everyday lives not only for ceremonies at the end of a person’s life. Concerns that the graves were not sufficiently spaced (examples in Photograph 6.8 below) and that the stacking of the bodies of the deceased was a main issue remained dominant. Thirteen people, almost half (45%) of those consulted, thought good care was taken of the cemetery and that it was well-developed. Because taxis sometimes drove through the cemetery, one participant was really unhappy as it forced him to pass through the cemetery; he felt this was disrespectful, as his religion did not allow him to frequent the cemetery for reasons other than burial. His response, when asked what his perceptions were of the cemetery, was: “I never really got to appreciate it because I just feel forced passing there”. Responses from those who do not like the memorial park expressed their perceptions of the memorial park in these ways:

- *I don’t think their design looks like a gravesite.*
- *Design is poor because there is no fence.*
- *No security and it is close to the houses.*

Photograph 6.8: Closely packed children's graves at Diepsloot Memorial Park



Source: Photograph by author, 2015

The Diepsloot Memorial Park is different from old cemeteries that are dominant in Johannesburg. Several respondents mentioned that tombstones are features that make a cemetery look like a dignified resting place for loved ones. However, interestingly, most of the old cemeteries do not have the essentials that can be found at Diepsloot Memorial Park, namely security guards and fencing. These were identified as essentials. The security guards are not situated by the cemetery's entrance and this concerns people as the cemetery is located near people's homes. Their argument is that, due to this proximity, the cemetery should have rather been developed into a park. Had this been done, everyone in the community would have access to it, unlike now when only a select few can use it for passive recreation.

Participants who seemed to support the cemetery's design had this to say:

- *Well-designed but they should allow for tombstones.*
- *The design is different and nice.*
- *It's 100% because it goes with the times.*

There could be multiple reasons why these participants were open to Diepsloot Memorial Park's innovative design. This reaction can be seen as an indication that these participants are open-minded and not really culturally rooted in their beliefs. Most of the participants who were positive about the design were females in the 31-40 age bracket. Few people had mixed feelings and concerns about the cemetery. Other expressed concerns were about the grave layout, the lack of identification of the specific features and facilities, and general access to the cemetery.

A recurring perception was that the authorities forced the burying of several bodies in a grave. Other clearly expressed perceptions were:

- *The graves are fine but I would like to see my family or friend's name rather than a number. It also looks like you abandoned a family member when you bury them there.*
- *I have an impression that when they give space to bury, someone is already buried there.*
- *I don't understand how the graves are laid out because I see numbers close to each other.*

These responses show a lack of understanding of Diepsloot Memorial Park's design elements and requirements for burying there. For instance, multiple bodies can be buried in a grave but City Parks only allows the family to make this decision. They strongly dismiss the idea that families are allocated graves already used by strangers. Because of the COJ's plans to utilise space efficiently, little space is left between graves. This does not please the participants at all, as it is sometimes difficult to follow the numbering of the graves. Participants feel that a cemetery without visible tombstones is unusual and therefore does not seem dignified enough to bury loved ones.

When asked about their perception of the cemetery's design, four participants clearly wanted the cemetery's appearance changed to what they were used to, whereas others identified specific aspects they were not happy with and named the elements they wanted to include. One participant who had difficulty accepting the cemetery lamented, "Just if it was a conventional gravesite or maybe just be turned into a park" (a 38-year-old Diepsloot female participant, 2015). Two participants suggested that the flat plaques should rather be used to identify children's graves while the graves of adults remain identifiable by the engraving on normal tombstones.

The study was also conducted to establish the general public's perception of newer cemetery designs and their implications. This was achieved through the distribution of questionnaires at different points across the city. The majority of participants felt that, to avoid resistance from the community, cemetery users should be engaged in the initiative and their cultural and religious beliefs taken into account from the outset. As the primary users of cemeteries, it would perhaps be in their best interests to know the COJ's plans associated with designing such spaces and to let their views be known. Failure to do so could run the risk of having white elephants that win awards yet fail to meet the users' basic needs.

According to Robinson (2009), the best way to attain successful adoption of an innovation would be to ensure that its users are made active partners in an ongoing restorative process. “By applying participative action research, techniques can be followed to ensure that partners participate actively in the improvement of innovations” (Robinson, 2009:2).

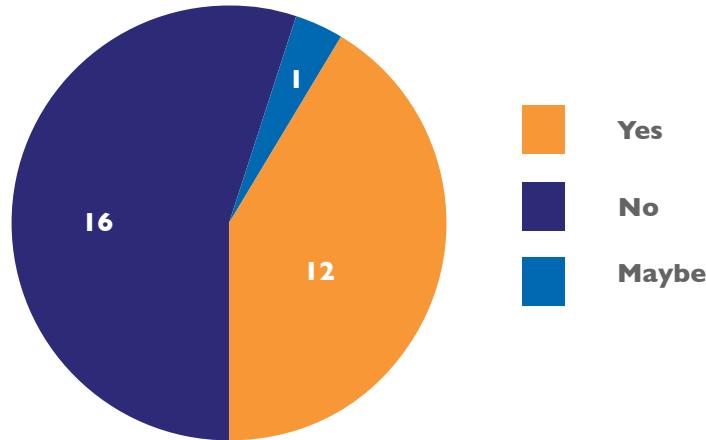
Although people may take time to adjust to the new cemetery design and approach, they could eventually accept it. As Rogers (2003:1) documents, “getting a new idea adopted, even when it has obvious advantages, is often very difficult. Many innovations require a lengthy period, often of some years, from the time when they become available to the time when they are widely adopted”. The theory endorses this contention. Based on the concepts homophily and heterophily in the theory, it could be difficult for the Diepsloot Memorial Park to be adopted without significant effort on the part the Johannesburg City Parks and Zoo as the source of the innovation. The reason is essentially because the Diepsloot community members as the receiver might share the same attributes and lack the heterophilous ties needed for effective diffusion of acceptance of the memorial park in line with the objectives formulated for its purpose.

Sahin (2006) argues that, to reduce the uncertainty of adopting the innovation, individuals should be informed about its advantages and disadvantages to make them aware of all its consequences. Some participants have requested that the cemetery be expanded. Ongoing engagements on the part of City Parks could actually increase the cemetery’s acceptance and thus chances of adoption. Once differences of opinion are settled between the provider and the receiver, as something new and modern, the Diepsloot Memorial Park could play a helpful and valuable role in the lives of all users or its well-considered structure and purpose. However, trust within the community and acknowledgement of community needs have to come together as the pattern of the diffusion of an innovation takes its course.

Burial practices at Diepsloot Memorial Park

Participants’ choice of Diepsloot Memorial Park as a burial place gives an insight into how the community perceive the issue. The argument is that one would not want to be buried in a cemetery that is viewed as inappropriate. The result (Chart 6.5) obtained from asking Diepsloot participants whether they would want to be buried at Diepsloot Memorial Park does not yield a decisive answer. Twelve of the participants were open to being buried there whilst sixteen were not. One participant could not give a definite answer and responded, “I can’t say yes or no because if you know that you are paying insurance you know where you want to be buried. If you are poor, you must be buried there. It’s up to your family or your insurance” (a 40-year-old-male participant, 2015). This is an intriguing response as the participant feels that only poor people should be buried at the cemetery, probably because they lack choices.

Chart 6.5: Choice of Diepsloot Memorial Park as a burial place



Source: Author's formulation

A few participants had conflicting feelings as they liked the cemetery but hated that they were not allowed to erect full memorials, at least so they thought. They reasoned, “if the lawn must not be planted on top of the grave. If there was a tombstone allocation” (a 67-year-old male, 2015). Those who preferred to be buried at Diepsloot Memorial Park gave the following reasons:

- *Because I am going to be near my family.*
- *Because my child is already buried there.*
- *I like the place. The place is nice that why we buried there.*
- *It's not expensive; there is no need for transport. It is close.*

It is clear that participants who have previously buried loved ones at Diepsloot Memorial Park would continue to do so for several reasons. First, the mere fact that they will be close to their family is motivation to be there too. Second, proximity plays a huge role in their decision concerning a burial place. Since it is located close to their homes, they do not incur any transport costs when visiting the cemetery. Third, due to its appearance, the cemetery gives the impression that loved ones will lie in a dignified place permanently. This consideration eases the bereavement of those remaining behind.

While six people indicated that they would be buried back home, one said that it was up to his family and that he would not have a choice. The majority of participants who did not want to be buried at the memorial park gave the following reasons:

- *We would lose track of which number belongs to who.*
- *Because someone else will be buried over me.*
- *Because it is not what we are used to. Our culture requires us to visit the tombstones and have that tombstones as remembrance for even generations to come.*
- *We always know we will get buried back home.*

Most participants seemed to share the sentiments that the cemetery's design is incompatible with their cultural beliefs. The community's concern that tombstones are not allowed supports this contention. The responses also demonstrate a lack of understanding of how the grave numbers and plaque allocation work. They do not understand that both can be used to identify a grave and that none is preferred over the other. The number allocation is obligatory. Some participants think that grave numbers are the only type of identification allowed. They do not understand that plaques contain the same information found on common tombstones and that their graves will still be identifiable. Although the Johannesburg City Parks and Zoo has since introduced a section that allows headstones and full-body memorials, most members of the community are not aware of this.

Acceptance of Diepsloot Memorial Park

In the first few years after development, local interest in the cemetery was very high (Moloi, Pers. Comm., 2015). However, this changed as the number of burials started to drop. According to Mr. Moloi, Diepsloot Memorial Park has seen slow acceptance based on cultural differences. The cultural beliefs of the population do not accept the use of ground plates. Prohibiting full-body memorials in the beginning and levelling the ground surface after burial, and disallowing heaps of soil near the grave, aggravated some community members who claimed these practices were against their culture. Declining burial numbers were the result (Moloi, Pers. Comm., 2015). Mr. Moloi and Ms. Njingolo pointed to the fact that cemeteries close by were competition for Diepsloot Memorial Park. Their appearance too differed from the old traditional style. Besides that, these cemeteries have been properly planned, they allow for full-body memorials, have a working infrastructure, are green and lush, and well-maintained. Through community protests, people showed dissatisfaction with the park-like feel of the Diepsloot cemetery in the memorial park (Moloi and Nelana, Pers. Comms., 2015). The COJ was then forced to develop a full-body memorial and headstones section.

In discussion with different participants, five reasons were identified that could have led to the poor adoption of Diepsloot Memorial Park as a community asset.

First, the memorial park is perceived as culturally unacceptable because it combines a park and a cemetery. Although the recreation part of the cemetery is meant for use by only those who have buried loved ones in it, participants believe that everyone should be able to use it for recreation. They are also adamant that using the cemetery beyond its distinct function as a cemetery goes against their culture.

Second, to respond to the diminishing burial land in Johannesburg, the COJ introduced ways of adequately utilising space within the cemetery. It encourages the burial of multiple bodies in a grave and leaves very little space between graves. Most participants do not favour either of these measures since they are against their cultural beliefs. They felt that the limited space left between graves does not offer the required privacy during the burial ceremony and visitations afterwards.

Third, another new design element introduced was the use of flat plaques instead of tombstones. Participants protested that their culture did not allow them to have flat, ground plaques instead of full memorial tablets. According to Mr. Sibiya (Pers. Comm., 2015), ward councillors supported this outcry. According to some participants, the local politicians could have potentially perpetuated this dissatisfaction and, in exchange for votes, promised to give residents the option to erect either full memorials or headstones. There was speculation in the community that the funeral undertakers endorsed the uproar as they had a great deal to lose if the decision was not rescinded. Besides this, a poor understanding of the appearance of flat plaques prevailed among community members. Most participants were not aware that the detail contained on the common tombstones would still be engraved on the plaques. Some participants thought that if tombstones were prohibited, then the only identification method used would be a grave number.

Fourth, families were deprived of maintaining their prestige in the community as is often showcased through the erection of massive tombstones; something also perceived as reflecting culture. The tombstone plays a bigger role than just as a grave identifier. It is a remnant that will link generations of past ancestors with those of the future. Although they will have not met their ancestors, the grave offers a sense of identity. Since the use of flat plaques was formally introduced, the large tombstones had to find space elsewhere. This could be another reason why families have decided to bury loved ones elsewhere, a place where they are able to display love for their deceased whilst also claiming their social standing.

Fifth, funeral undertakers drive a commercial business and most of their profit comes from the extras included in funeral and burial packages. Tombstones are part of these extras. If the COJ prohibits the erection of headstones and full-body memorials, the undertakers are bound to lose some of their profit on the service they offer. Hence they would not support the shift to the use of flat plaques (Nelana, Pers. Comm., 2015), which would be the most cost-effective choice between headstones and full-body tombstones. Interestingly though, no gravestones have been erected in the full memorial section despite it being used for burials for almost a decade. Addressing the question of whether the problem was truly a cultural one, or whether it was politically or commercially-driven, it could be speculated that there has been some motivation from influential leaders or other key players in the community that could account for this practice continuing.

According to Mr. Sibiya, a funeral undertaker in Diepsloot, there were several reasons for the community's reluctance to use the Diepsloot Memorial Park. First of all, some people chose not to bury here as they complained the cost of the grave was too high. Secondly, families who had relatives living in nearby townships, like Tembisa, preferred Waterval Cemetery because it was central. Thirdly, there was a perception that people were forced to inter multiple bodies in a single grave. However, Mr. Sibiya said that he had made a point of educating his clients explaining that only two bodies could be buried in a grave, and that it was a family's choice. He also stresses the fact that, when speaking to his clients, only family members could share a grave. After explaining this to some of his clients, they had agreed to bury at Diepsloot Memorial Park.

In addition, according to Mr. Sibiya, Diepsloot Memorial Park was located in an area that was previously a swamp, which was a causal factor for the flooding that the participants constantly complained about. City Parks, however, deny these claims, showing that geotechnical and environmental impact assessments were undertaken prior to the development and proof was given that the cemetery's physical location was suitable for burial purposes. According to Mr. Sibiya and over half the participants (55%), during the rainy season water tended to accumulate in the graves. This necessitated City Parks coming to drain the water the day before a burial. Mr. Sibiya showed that sometimes the water had to be drained on the day of the burial. This seemed to be a huge problem for the community as families had gone to the extent of burying loved ones "wearing leather jackets lined with fur on the inside so that they did not get cold from the water" (Sibiya, Pers. Comm., 2015). He asserted that the impact of this inconvenience was both cultural and emotional, as people strongly believed that the deceased had a sense of what was going on around them, hence they would freeze from the cold rain water. He alleged that the water was from underground and that City Parks could not do anything about it. When Mr. Moloi, an official at City Parks was asked whether there were high water tables, he denied that that was the case (Moloi, Pers. Comm., 2015).

Robinson (2009:2) reminds us that “[i]personal marketing methods like advertising and media stories may spread information about new innovations, but that mouth-to-mouth conversations spread adoption”. Mr. Sibiya, as an undertaker, showed that he has played and continues to play the role of educating his clients about the benefits of Diepsloot Memorial Park as burial place. He confirmed that those who had taken his advice would attest to that. His reason for educating his clients was that he did not see the point of burying family members faraway as the memorial park was located close to them should they wish to visit graves of loved ones after the ceremony and in years to come. Robinson’s remark supports the value of taking advice: “it is usually people we know and trust, and who we know have successfully adopted the innovation themselves who can give us credible reassurances that our attempts to change will not result in embarrassment, humiliation, financial loss or wasted time” (ibid.). Perhaps those who have already buried the deceased at Diepsloot Memorial Park would be in a position to persuade others into choosing to be buried there as well.

The Diepsloot Memorial Park case is a good example where the characteristics of the social system can affect the adoption process leading to the users either accepting or rejecting an innovation. According to the diffusion of innovations theory, Diepsloot Memorial Park as an innovation is not compatible with the social values and norms of the target group, the Diepsloot residents. As a result, the rate of adoption of the Diepsloot Memorial Park did not reach a critical mass, as the diffusion process had not yet become self-sustaining by the time of this survey was done, over a decade after its inception.

The change agent, Johannesburg City Parks and Zoo, could still fail to convince the resident late majority or the laggards, that the innovation would benefit them. Due to the leadership role they hold in the social system and as the opinion leaders, the local ward councillors managed to convince the community not to use the cemetery but suggested that instead they should request a section that would allow people who choose to, to bury one body per grave and to erect tombstones.

According to Rogers (2003), the opinion leaders’ personal judgements about the innovation reach other members of the social system through the interpersonal networks. Robinson (2009) suggests that one way of working with the late majority is to promote social norms and show that other conservative people find the innovation essential. Robinson also points out that other ways of ensuring that the general public, especially the late majority, take an idea up is to emphasise the risks involved if left behind, or the promoters can decide to reduce the cost of adopting the innovation.

The future of cemeteries

The Johannesburg City Parks and Zoo's plans will embrace the garden cemetery theme further even in future developments (Moloi, Pers. Comm., 2015). To ease in the idea and give people time to get used to it, smaller sections that would allow full-body memorials would be incorporated in future cemetery developments. Younger participants in the study believe that integrating technological advancements would be an advantage. Navigation aids to find the location of a grave on a map of the cemetery would be a possibility. A screen where people would type in details of the grave site, such as names and home addresses, would be a helpful innovative element. Eventually other advancements will be created thereby changing the cemetery's design, use and management, and perhaps attract more users.

According to Mr. Moloi (Pers. Comm., 2015) the Diepsloot Memorial Park is one of the first cemeteries in South Africa to incorporate innovative elements in the design of cemeteries in disadvantaged areas in Johannesburg. That some of the users in the community did not show any resistance to the design can be viewed as a positive sign. According to Robinson (2009), when designing a project, the change agent needs to know the percentage of those who have already adopted the innovation in a social system. Robinson specifies that it is this fraction that guides the change agent as to which part of the population to address next, and what communication channels to use. City Parks can use this approach when upscaling this facility if necessary and in other areas. Other municipalities that decide to adapt the Diepsloot Memorial Park model and contextualise it in their own areas. Change agents would have to get the buy-in of opinion leaders who are influential in a social system and who have the authority to either spread positive or negative information about an innovation.

The Diepsloot Memorial Park model can be replicated in other areas across South Africa since it responds to the burial demand while also creating healthy spaces for people in the community. Due to the country's cultural and religious diversity, different elements of the cemetery design can be adapted in different areas to make them relevant in their context. In this way, only appropriate features need to be adopted in response to each area's specific challenges. To ensure the success of future innovative cemeteries, the Johannesburg City Parks and Zoo

and other departments responsible for cemetery development and provision across South Africa, would have to involve diverse stakeholders in important decisions. Projects that have strong cultural implications require the buy-in of multiple stakeholders. This may entail involving a range of community members, funeral undertakers and diverse faith-based and cultural groupings. Listening to their concerns, which can be discussed and considered in the project implementation, is an imperative. Although change is inevitable, people will always be anxious and uneasy about what they do not know and are not used to. When introducing a new idea and solution, it is important to cover all the relevant ground issues, plan ahead to overcome possible challenges in the execution and adoption of the innovation.

Conclusion

Through its design, the Diepsloot Memorial Park can be understood as an innovative solution, albeit with a partly unsuccessful outcome. The innovation that coupled burial demand with a recreational function, which although can be enjoyed by a select few (those who have buried loved ones in the cemetery), will provide ecosystem services such as water percolation and reduced erosion and aesthetic benefits in its setting. The allocation of open spaces, designed to combine both burial and recreational functions, are also one of the latest of these innovations. The challenges to their wider adoption and sustainability can be understood within the diffusion of innovations framework Rogers (2003) specifically describes in this context. Some of the variables of the diffusion of innovations theory are considered and applied in this study, such as the nature of the social system, the compatibility attribute and communication channels used to diffuse an innovation. Going forward, it would be important to examine other variables of the general diffusion theory when examining the broader perceptions and adoption of innovative cemeteries.

Diepsloot community members share similar attributes that can be perceived as homophilous, according to the diffusion of innovations theory. Rogers (1962:19) shows that a certain degree of heterophily is required to gain knowledge of the innovation. Because homophilous individuals are said to engage in more effective communication, which could potentially lead to attitude and behaviour change, all they need is a degree of heterophily to introduce a new idea to increase the effectiveness of its diffusion. Hopefully, once the homophilous group, in this case study, the Diepsloot community, increases ties with a slightly different group, the early adopters, then more of the community members are likely to adopt the innovation, the Diepsloot Memorial Park.

According to the findings of this research, and based on the diffusion of innovations theory, Diepsloot Memorial Park might be perceived as a failed diffusion if failure refers to a diffusion that does not reach complete adoption. Although the cemetery was partially adopted in its initial stages, its diffusion remains incomplete possibly due to a lack of community involvement and participation in its development. A network of negative influences, a lack of awareness of the project, and competition from close-by cemeteries as far as appearance and cost, were identified as negative influences that retarded the diffusion process.

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Commuter

noun

a person who travels to work over an appreciable distance, usually from the suburbs to the centre of a city

7. THE CASE OF THE SAN FRANCISCO COMMUTER BENEFITS ORDINANCE: POSSIBLE REPLICABILITY IN CAPE TOWN

Julia Letang

Introduction

This chapter aims to provide a case for the use of public transport incentives for both users of and investors in public transport, to ultimately ensure that investment in public transport in South Africa is both feasible and well-utilised. The chosen instance of innovation is the San Francisco Commuter Benefits Ordinance, which allows commuters to claim public transport costs as a pre-tax expense. This case will be interrogated for its replicability in the South African context, with Cape Town used as an illustration.

The chapter begins by ascertaining the need for public transport incentives in South Africa, concluding that increased public transport ridership is necessary to ensure the sustainability of the public transport system. A brief literature review uncovers the benefits of public transport subsidies, before specifically analysing different ‘Transportation Demand Management’ (TDM) incentives that aim to stimulate demand for public transport. Thereafter, the chapter interrogates the case study in terms of five main elements: policy and governance; institutional arrangements and partnerships; and requirements for implementation, including urban form, infrastructural requirements and other supporting incentives. The purpose of this is to ascertain the criteria for success in San Francisco.

The same criteria are then applied to Cape Town to explore replicability of the San Francisco model in a South African city. While there may be some merits to the adoption of a demand-side incentive, the contextual differences between the two cities, and their public transport systems, mean that the innovative commuter benefits identified may require other supportive measures if they are to be implemented as a programme in Cape Town.

The need for public transport in South Africa

According to the 20 Year Review: South Africa 1994 to 2014, providing effective public transport systems may be the single most important intervention to support environmental, economic and social sustainability in the country (RSA, 2014). Public transport in South Africa refers to any mode that transports commuters, and includes rail, Bus and Minibus Taxis as well as pedestrian and bicycle infrastructure to support the use of public transport. The report found that transport is a major component of the budget of households, while the transport sector globally is the second largest contributor to the presence of greenhouse gases. Environmentally, the benefits of public transport on reduced energy usage and decreased carbon dioxide emissions have been well-documented. The use of public transport, as opposed to private vehicles, also decreases road congestion.

This too reduces road maintenance costs borne by the state, as well as lowering the economic costs of time spent commuting. An efficient public transport system also possibly promotes more equitable cities. According to Cass (1990:11), “one of the conditions which may exacerbate and perpetuate disadvantage is locality, living in a region (often as a result of severely restricted housing options) where access to a range of necessary education and public sector services is limited, where suitable jobs are scarce, and the potential journey to and from work long and expensive”.

Recently, in large South African cities like Cape Town and Johannesburg, large investments have been made in public transport infrastructure, such as the Bus Rapid Transport which began in Cape Town, and the Gautrain commuter railway line that links Johannesburg and Pretoria. These investments are still to continue, as R51 billion has been budgeted for commuter rail infrastructure and new rolling stock over the next three years (South Africa.info, 2014). However, despite the increase of public transport infrastructure, the percentage of car ownership in South Africa rose from 22.9% in 2003 to 32.6% in 2013 (Statistics South Africa, 2013). It is estimated that in 2013, 39.1% of workers used public transport as their main mode of travel to work, compared to 38.4% who used private transport (ibid.). These findings indicate the importance of changing current patterns of commuter behaviour to decrease private car dependence, if public transport investments are to be feasible and well-utilised.

Demographics of public transport use

In South African cities, household members earning higher incomes mostly commute via private vehicles. Private vehicles are used by only 18.8% by the poorest fifth of households, whereas 65.7% of the trips the wealthier fifth of South African households make are in private vehicles (ibid.). This suggests that policies to stimulate increased public transport use should target the middle-to-wealthier class of South African commuters, as these income groups predominantly commute by private vehicles. Policies that stimulate the use of public transport would thus not directly affect the lower income population, as this demographic group already relies heavily on public transport. Indirectly however, poorer people in cities can also gain from such policies as increased ridership would increase the revenue generated by the system as a whole, which may translate into a lower individual fare rate, making public transport more affordable for all users, and more viable overall.

Public transport subsidies

Most city authorities in the developed world substantively subsidise urban public transport. From an economic perspective, such subsidies are justified by the scale of economies, the congestion and environmental benefits, as well as the potential for redistribution (Asensio et al., 2003). The benefits of public transport subsidies are, however, hard to quantify as they are usually externalised (Serebrisky et al., 2009). To put it differently, the justification for public transport subsidies is that they ultimately compensate for externalities in other parts of the economic system. This is particularly true of private transport use.

Users of private cars do not pay the full cost they impose on society, considering infrastructure use, pollution, congestion and road safety risks (Elgar and Kennedy, 2005) are part of the care use deal. By subsidising public transport, competition between these alternative modes is placed on a level playing field and improves resource allocation (ibid.). cost of the service to final users. Studies have found that demand-side subsidies perform better than supply-side subsidies. Commonly, the supply-side subsidies often result in higher costs and inefficiencies, and thus do not always result in reduced fare prices (Serebrisky et al., 2009). Furthermore, supply-side subsidies will be less targeted than demand-side subsidies, since they are given to operators who will usually not discriminate between different types of users (ibid.).

In developing countries it is important to move away from supply-side subsidies, towards demand-side subsidies (ibid.). This is because they display greater potential for targeting a particular income group or specified area (ibid.). In these cases, the objective of transport subsidies is usually to increase the affordability of transport to the users, rather than, for instance, curbing greenhouse gas emissions, (ibid.).

Transportation Demand Management

Transportation Demand Management is a means to influence the demand of public transport through specific incentives. It is defined as any action or set of actions aimed at influencing people's travel behaviour in a way that alternative mobility options are presented and/or congestion is reduced (Meyer, 1999). It is, however, widely accepted both internationally (Burton, 2000) and in South Africa (Wilkinson, 2006) that sustainable transport is dependent on urban form and land use patterns, with low density, sprawling cities often non-viable for public transport. The relationship is multi-directional as provision for private vehicles, including freeway systems, encourages mono-functional sprawling land use development, which also results in further travelling distances. Transit-orientated development promotes more compact, mixed-use cities. These are structured around public transport in a way that synergises interventions to improve transport access, with those to support more efficient and equitable spatial form. These dense, mixed-use environments result in more people being able to access the various land uses needed to carry out daily functions and activities, without the use of private vehicles (Owens, 1992; Wilkinson, 2006). Furthermore, denser urban environments structured around public transport also provide higher volumes of potential public transport passengers. Hence they are crucial for the financial sustainability of public transport systems. From this understanding, it is evident how the sustainable finance of public transport, Transportation Demand Management and the promotion of denser urban environments cannot be dealt with in isolation. They are inherently dependent on one another.

There are many different ways to incentivise or encourage the use of public transport: increasing the desirability of the transit trip, such as trip reduction strategies and 'Non-Motorised Transport' (NMT) improvements; penalties for Single Occupancy Vehicle (SOV) trips, such as congestion charges and parking policies; and subsidies to incentivise the use of public transport. The next sub-section briefly discusses these various forms before directing attention to tax-related incentives and employer subsidies which are the focus of the particular innovation described in the case study.

Increasing desirability

Trip reduction strategies help transit vehicles, such as buses, to avoid congestion delays and make travel faster. This increases their operating efficiency, since transit vehicles can carry more passengers in a given period, making transit more competitive against automobile travel (Litman, 2015). Methods used to achieve this include prioritising managed transit lanes, traffic signal pre-emption, special intersection design and preferred loading and parking locations. Non-motorised modes, walking and cycling, are important travel modes in their own right. However, inadequate or undesirable conditions of non-motorised modes can be a major constraint to the desirability of using public transport, as walking or cycling is often necessary to connect between different modes (Litman, 2015). Improved non-motorised modes have the potential to leverage shifts to transit, and they also often account for the first and last portion of the transit journey.

Single Occupancy Vehicle penalties

Congestion charges have gained popularity over the last twenty years as both environmental and economic pressures to reduce it have intensified (Balcombe et al., 2004). While the availability of new electronic billing technologies has enabled such schemes to be implemented efficiently (ibid.), it has been seen to be particularly effective where the revenue generated from these charges is invested back into the public transport system (Oram Associates, 1995). The two types of road user charges are either route-based, which charge for the use of a single stretch of road; or zone schemes which charge users to enter a demarcated zone. London is one example of a zone scheme, where the introduction of congestion charging has proved to be effective. The number of vehicles entering the zone during charging hours dropped by 16% and bus capacity was increased to accommodate 15 000 extra passengers per day at peak periods (Litman, 2006).

Parking policy can also influence the demand for private vehicles through either increasing the price or limiting the available parking spaces in certain areas (Wang and Sharples, 1999). In 1990, a study of nine cities in the United States of America found that parking fees and restrictions were the most effective means of traffic management although strict enforcement is required to monitor such restrictions (Valleley et al., 1997).

Commuter tax incentive, employer subsidies

In both the United States of America and the United Kingdom over the last twenty years, there has been increasing efforts to restrict employer subsidisation of private transportation, such as parking subsidies, and rather move towards public transport subsidisation (Balcombe et al., 2004). Commuter financial incentives aim to incentivise commuters to use sustainable modes of transport, like public transport or cycling, through the use of tax-based incentives and other government policies (Shoup, 2005). Such incentives are usually managed through the provision of transit passes which the employer purchases on behalf of their employees. TransitChek, offered in New York and Philadelphia, allows employers to purchase the travel vouchers and offer them to employees as a tax-free benefit or a performance bonus (WageWorks, 2015). These transit voucher programmes have been found to shift 20% of recipients' commute travel from auto to transit (Oram Associates, 1995).

Case Study: San Francisco Commuter Benefits Ordinance

The goal of the San Francisco Commuter Benefits Ordinance is to reduce Single Occupancy Vehicle trips to and from San Francisco by encouraging the use of sustainable transportation modes. These include transport by bus, rail and ferry or by walking and cycling. The aim is therefore to reduce congestion and greenhouse gas emissions through incentivising greater use of public transport (San Francisco Department of Environment, 2015b). The San Francisco city council introduced the ordinance in 2009, which required that companies larger than twenty employees provide pre-tax benefits to those employees who utilise public transport to get to work. This meant that employees were able to pay for a portion of their public transport costs before their income was taxed. The purpose of the programme was to encourage the use of public transportation and car-pooling by providing significant savings on commuter costs (ibid.). The programme enables employers to save up to 9% on payroll taxes, and employees to save up to 40% on their transit costs. The benefit works like other pre-tax plans such as retirement, dependent care and medical reimbursement (Green Cities California, 2013). The programme requires employers to offer at least one or a combination of the following employee benefits:

- Pre-tax Transportation Benefits: employer sets up a deduction programme which allows employees to make monthly pre-tax deductions up to \$130 per month to purchase transit passes or vanpool rides (multiple commuters share a van and receive benefits for doing so)
- Employer-Paid Transportation Benefits: employer pays for workers' transit fares on any of the transit agencies and reimburses workers for their vanpool expenses, up to \$80 per month
- Employer Provided Transportation: a company-funded bus or van service to and from the workplace (Green Cities California, 2013)

The case of San Francisco is an important study as it demonstrates there is still scope to increase ridership through public transport incentives, even though it is a city which is well-served by many modes of public transport. These are necessary for the sustainability of the city and for the public transport system. To understand the success of the case study, and also to ascertain how it could be replicated, the commuter benefits programme in San Francisco is analysed in five categories: policy and governance; institutional arrangements and partnerships; requirements for implementation that include infrastructure requirements and urban form; and the outcomes of the programme.

Policy and governance

The San Francisco Commuter Benefits Ordinance operates in combination with similar public transport incentive programmes that are managed at different scales and by different spheres of government. The Commuter Benefits Ordinance is directed at the city scale, and targets those who commute to the City-County of San Francisco. In the United States, a City-County is a city and county that have been merged into one unified jurisdiction, comparable to a local government administrative unit in South Africa. However, there is also the regional Bay Area Commuter Benefits Programme, which is based on the San Francisco Commuter Benefits

Ordinance, but targets those who commute from the wider bay area (San Francisco Department of Environment, 2015b). Map 7.1 shows the location of the City-County of San Francisco in relation to the larger bay area. Both programmes operate in parallel and share the same goal of reducing Single Occupancy Vehicle travel within San Francisco and the wider bay area. The requirements for implementation discussed in this chapter will apply to both programmes since many elements of both programmes are implemented the same way.

Map 7.1: Location of San Francisco City-County in the Bay Area



Source: California Environmental Protection Agency (Air Resources Board, 2013)

Pre-tax benefit policy

Pre-tax deductions are certain expenses that are deducted before taxes. They reduce the total amount of income that one has to pay taxes on, known as taxable income. An employer may provide commuter pre-tax benefits for public transportation that are essentially tax-free up to a certain amount. In the United States, there is a federal pre-tax benefits programme that applies country-wide, however, certain states and local areas also offer the programme (National Centre for Transit Research, 2013).

Federal pre-tax commuter benefits

Established in 1993 under the Bill Clinton administration, as part of the Federal Tax Code section 132(f), federal commuter pre-tax benefits are one of the eight types of statutory employee benefits that serve as fringe benefits which are excluded from an employee's total income (ibid.). Transportation benefits available include transit passes and vanpooling. Bicycle commuters can also be reimbursed for certain expenses. At federal level, tax-free commuter benefits are voluntary and are only available through an employer. However, it is advantageous for the employer to offer pre-tax benefits as they can reduce their payroll taxes, as they are not required to pay payroll taxes on the amount the employee designates as a deduction from their gross income (ibid.).

The City-County of San Francisco, made commuter benefits mandatory to effect the tax code's Section 132(f). Thereafter the San Francisco Bay Area followed suit. Although there is no policy governing pre-tax commuter benefits in the State of California as a whole, the Senate Bill 1339 authorises the Metropolitan Transportation Commission and the Bay Area Air Quality Management District to implement the Bay Area Commuter Benefits Programme (Metropolitan Transport Commission, 2013).

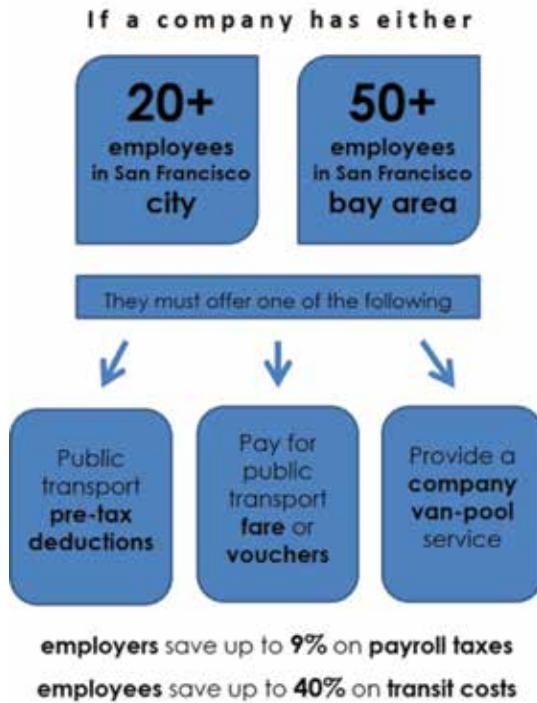
Regional pre-tax commuter benefits

The Regional Bay Area Commuter Benefits Programme started in 2014. It is governed by the Bay Area Air Quality Management District, and is based on the San Francisco Commuter Benefits Ordinance. This programme requires employers with 50 or more full-time employees in the Bay Area to provide commuter benefits to their employees. It applies to all public, private and non-profit employers within the geographic boundaries of the Bay Area Air Quality Management District (ibid.).

Regional pre-tax commuter benefits

The San Francisco Commuter Benefits Ordinance, which is the selected case study presented in this chapter, was adopted in 2009 and is governed at the City-County level by the San Francisco Department of Environment (San Francisco Department of Environment, 2015b). The ordinance requires that all employers in San Francisco that have twenty or more persons performing work for compensation on a full-time, part-time, or temporary basis, and who work an average of at least ten hours a week are to offer their employees the commuter pre-tax benefit (ibid.). Figure 7.1 below illustrates the different requirements for both programmes.

Figure 7.1: Requirements of San Francisco Commuter Benefits Ordinance



Source: Author's formulation

It can be seen that there are policies that govern pre-tax commuter benefits at different levels. Provisions for pre-tax commuter benefits are allowed according to tax policy set at the federal level country-wide; however, at this local level they are voluntary. If a local area or region is willing to take up provisions offered, federal laws are supportive and encourage transit incentives. In this case study, federal law has been effected, thus commuter benefit programmes that are on offer are compulsory both at the city and at the regional levels. Both programmes, although mutually exclusive as they target different boundaries spatially, and cater for different business sizes, work together to promote fewer Single Occupancy Vehicle trips within the region as a whole.

Institutional arrangements and partnerships

Public transport mandates

Public transport in the United States is funded by a combination of local, state and federal agencies. At federal level, the Federal Transit Administration provides financial assistance and technical assistance to state governments and local transit providers. Within the State of California, the California Department of Transportation (Caltrans) manages the state highway system and is actively involved with public transportation systems. The Metropolitan Transport Commission is responsible for regional transportation planning and financing in the San Francisco Bay Area, and administers state funding through the Transportation Development Act and various grant programmes.

Within San Francisco, there are many departments that have different transport-related mandates, which are described below (San Francisco City County Transportation Authority, 2014):

- The San Francisco Transportation Authority develops the long-range San Francisco transportation plan and congestion management programme; and undertakes policy studies focused on Transportation Demand Management and pricing, administers and oversees fund sources to support such programmes
- The San Francisco Municipal Transportation Agency is responsible for the planning, management and operation of the city's surface transportation network, including the municipal transit system, pedestrian and bicycle network, parking, traffic, taxis and paratransit
- San Francisco Department of Environment administers the city's CommuteSmart programme, which supports sustainable travel choices particularly for workers and businesses in the city through information and education, commuter benefits, rideshare and telecommute programmes, the emergency ride home programme and other services
- The Planning Department's key role in the city's existing Transportation Demand Management programmes includes implementing its general plan policies, and overseeing the implementation of its requirements in private development projects

Partnerships and departmental integration

The Metropolitan Transportation Commission awarded the San Francisco Transportation Authority a grant to coordinate the San Francisco Transportation Demand Management Partnership Project. The Partnership Project is jointly managed by the four mentioned departments. Its mandate is to coordinate Transportation Demand Management policies and programmes across the four above-listed agencies; improve the management and capacity of employer provided shuttle services; and research parking management strategies (San Francisco City County Transportation Authority, 2014).

The project also includes the formation of a Transportation Working Group, whose aim is to collaborate with employers and institutions to develop mutually beneficial Transportation Demand Management initiatives (ibid.).

The literature consulted highlights that public transport issues are best handled in the local government sphere, as it is better able to coordinate them with other municipal functions, such as urban planning. In San Francisco, the Metropolitan Transportation Commission does all the necessary regional transportation functions and the administration of state funding at the local level. Under it are at least four departments that are responsible for different public transport-related functions, from planning to Transportation Demand Management strategies. Integration between these departments goes through the joint coordination of the Transport Demand Management Partnership Project, where collaboration is envisioned not just between the different departments, but also with and between private institutions.

Requirements for implementation

An interrogation of the case study has shown that there are a number of requirements to be met for the implementation of the Commuter Benefits Ordinance. These include both hard infrastructural elements, such as those associated with public transport; and soft infrastructure, which is necessary for the technical and electronic aspects of programmes; also required is an urban form that is conducive to public transport; and the presence of other supportive programmes that help to incentivise commuters to use public transport. Discussion on these specific examples of the requirements for implementation follows.

Urban form and location

San Francisco houses a population of 852 469 people within an area of about 121 km² and has a density of 7 022 people per km² (City-Data.com, 2015). It is the second-most densely populated major city in the United States after New York City (ibid.). The city area of San Francisco and its surroundings are known as the Bay Area. The metropolitan area consists of San Francisco and four neighbouring counties (United States Census Bureau, 2015). San Francisco itself has a high urban density of almost 70 persons per hectare (ibid.), which exceeds the viable threshold for public transport and Non-Motorised Transport modes. It also has a mix of land uses.

In contrast, the wider Bay Area has a much lower population density of four persons per hectare and a distinct polycentric urban form (Cervero and Wu, 1997). The city area of San Francisco has three tiers of hierarchical employment centres encircling it (ibid.). The transport implications of this are that the lower density, outlying employment centres averaged far higher rates of drive-alone automobile commuting with insignificant levels of transit commuting (ibid.). The relative locations of the San Francisco Bay Area, San Francisco Metropolitan Statistical Area and San Francisco City-County are illustrated in Table 7.1.

Table 7.1: Location and details of San Francisco Bay, Metropolitan Statistical and City-County areas

San Francisco Bay Area	San Francisco Metropolitan Statistical area	San Francisco City-County
		
Location of the San Francisco Bay area within California	San Francisco–Oakland–Hayward Metropolitan statistical area	Location of San Francisco City-County (red) within the Metro area
Population: 7 561 755 (2014)	Population: 4 594 060 (2014)	852 469 (2014)
Area: 18 088 km ²	Area: 6 410 km ²	Area: 120 km ²
Density: 411 per km ²	Density: 705 per km ²	Density: 6 880 per km ²
4 people per hectare	7 people per hectare	69 people per hectare

Source: Author's formulation

It has been found that incentives tend to shift the commuting mode to transit and walking in urban areas, while in suburban areas it tends to shift more to ridesharing and vanpooling (Victoria Transport Policy Institute, 2014). It is therefore important that the ordinance provides options for both urban forms. It is not surprising then that the commuter benefits offered in the larger less dense region are taken up more by vanpooling. Within the city area of San Francisco, the introduction of commuter benefits saw an increase in public transport usage (San Francisco Department of Environment, 2013b).

Hard infrastructure

It is necessary to include transit ridership in the entire Bay Area, not just within the city boundary of San Francisco, as it involves those travelling to San Francisco, and not just within it. In 2013, the primary mode of commuting for those in San Francisco and the Bay Area were sustainable modes. In San Francisco itself bus, rail and ferry transport, car-pooling, walking and cycling were common (ibid. 2013a). The transit infrastructure includes two subway networks, two commuter rail agencies, eight trans-bay bridges, a ferry, local bus service, three international airports, and an extensive network of roads, tunnels and bicycle paths. Furthermore, San Francisco has a history of encouraging Non-Motorised Transport modes for public transport (Callwell, 1999). This has resulted in an urban environment that is conducive to such modes, where priority passage is often given to pedestrians and cyclists. Each public transport mode is further elaborated on next.

Rail

Rail infrastructure that serves the San Francisco Bay Area is extensive, and includes one heavy rail system, one commuter rail line and two light rail systems. There is also an Amtrak inter-city rail service which primarily supports the city area of San Francisco, but which also links to the rest of the Bay Area. Of the two light rail systems, one of them, Muni Metro, operates solely within the city area of San Francisco (San Francisco City County Transport Authority, 2014).

Bus

A series of overlapping bus agencies provide additional public transit coverage to Bay Area regions both served and not served by rail. The four largest agencies, Muni Metro, AC Transit (Alameda-Contra Costa Transit District), SamTrans (San Francisco Municipal Transportation Agency), and the VTA (Santa Clara Valley Transportation Authority) operate within the city of San Francisco itself, East Bay, the Peninsula and South Bay respectively. In addition, the four bus agencies are each independently pursuing the possibility of constructing Bus Rapid Transit systems with the accompanying separate right-of-way and traffic signalling on busy transit corridors.dfdf3

Ferry

Although certain bus agencies provide travel over or under the San Francisco bay and across the Golden Gate bridge, ferry services also operate across the bay.

Bicycles

The ferry system, along with all the major train and bus operators, allow bicycles onto their systems with no additional charge (CBS SF Bay Area, 2013). In addition, Bay Area residents may purchase a membership card from the Bay Area Bike Share programme which has bicycles available for renting 24 hours a day, seven days a week (ibid.). Dedicated cycle lanes are provided (Photograph 7.1 below).

Photograph 7.1: Prioritised bicycle lanes in San Francisco



Source: From website of San Francisco Department of Environment (2015)

Thus transportation in the San Francisco Bay Area consists of extensive multi-modal infrastructure. Such variety of modal choice is one of the factors that support increased use of public transport. Importantly, the different modes of public transit are also well-integrated: spatially the bus systems are connected to rail systems and the ferries and most facilities allow bicycles on them.

Soft infrastructure

Communication

The San Francisco Department of Environment is responsible for communicating the details of the ordinance and other related public transport incentive programmes to businesses, employees and public transport operators. It also assists companies with compliance and the implementation of the ordinance requirements by providing free consultation and tools for easy compliance (Green Cities California, 2013). Various community workshops are hosted to educate employers specifically on in this issue (ibid.). A business and employee's website was established as a hotline service.

Integrated payment system

Employers can choose the form of the benefit they decide to offer, although purchasing transit vouchers and monthly tickets for up to \$130 a month is the easiest for the employer (San Francisco Department of Environment, 2015b). However, a popular choice of most businesses is to appoint a service provider such as Clipper Direct or Commuter Check Services, to manage the transit payments. These platforms offer an all-in-one transit card on which the employer can load funds directly for the employee to use. This facility generally costs \$3 a month per employee (WageWorks, 2015).

Almost all the larger public transit agencies accept the Clipper Card, a reloadable contactless smart card, as a universal electronic payment system. The Clipper Card for example, is accepted on the Metro rail service, two out of three of the Commuter rail services, both the light rail services, all four of the bus services and the public ferry services (San Francisco Department of Environment, 2015b). There are also other payroll and benefit management companies whose business it is to assist employers with the implementation of a commuter tax benefits programme (ibid.).

Supportive programmes

Identified in the literature is the point that although financial based incentives have the greatest effect on influencing public transport ridership, the combination of many Transportation Demand Management programmes has the most success in increasing the use of sustainable transport modes. In the San Francisco case, the success of the programme is therefore also be attributed to the fact that the municipality offers the following programmes in addition to the Commuter Benefits Ordinance (San Francisco Department of Environment, 2015a)

- Emergency Ride Home provides a variety of transportation options in the case of a personal emergency for those who utilise public transport, and is successful as it takes out the perceived risk for some of the journey back home if there is an emergency. The Emergency Ride Home benefit is offered to a maximum of four times a year per commuter
- Rideshare Matching is a programme offered by the City-County and connects commuters with others in their surrounding area who also seek participation in vanpooling
- CityCycle is a programme where the municipality offers free bike share programme to all city employees for work-related trips
- The Private Employer Shuttle Partnership Programme involves developing and launching a pilot programme to minimise the impact of commuter shuttles, such as safety issues and competition with bus services, while supporting their own operations. The pilot programme involves developing a network of shared municipal bus zones, identification of shuttles through visible placards, increased law and by-law enforcement and data sharing

Outcomes

Success of the programme

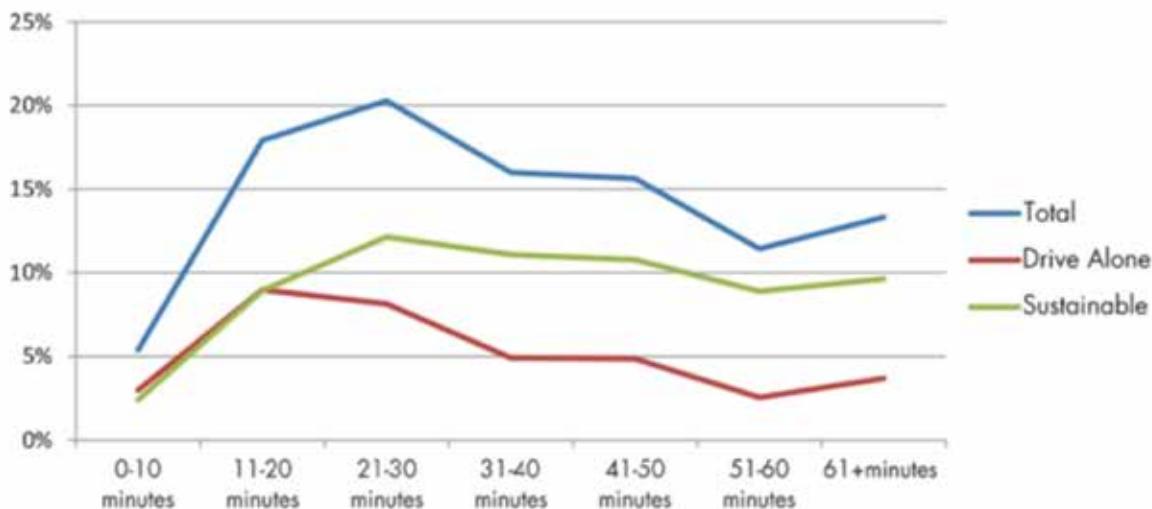
The Commuter Benefits Ordinance successfully resulted in 40 per cent of businesses reporting adoption of benefits programmes during the 2012 compliance cycle (Green Cities California, 2013). Thirty-four per cent of San Francisco employees, or more than 40 000 commuters, were using commuter benefits to save on the cost of public transport (ibid.). This is evident in the fact that the public transit and non-motorised modal split increased between 2010 and 2012 (San Francisco Department of Environment, 2013a). The San Francisco Commuter Benefits Ordinance's Second Annual Report 2012 reported that the ordinance contributed to an estimated reduction of 455 000 metric tons in carbon emissions from commuter traffic in 2011 and 2012. The Annual Report also found that employers are increasingly offering multiple benefits, such as a combination of a pre-tax deduction benefit and an employer-paid subsidy (ibid.).

By implementing the pre-tax transportation benefit option, employers are able to reduce their payroll taxes while providing at least one benefit to their employees. It is largely for this reason that the ordinance had the backing of the San Francisco Chamber of Commerce and other business groups (Buck Consultants, 2009). Research has also shown that involving the employer has increased the success of the programme, as employees are much more likely to consider alternative transport options when an employer encourages them to do so (San Francisco Department of Environment, 2013a).

Challenges

The ordinance has not had much of an effect on short distance trips (Chart 7.1 below). Commuters still prefer to use private vehicles for trips less than twenty minutes duration. This finding suggests that increased emphasis is needed on Non-Motorised Transport facilities to facilitate a modal switch to Non-Motorised Transport modes and bicycle-sharing options for short distance trips.

Chart 7.1: Commute mode choice by commute time



Source: San Francisco Department of Environment (2013a:12)

Under current United States of America tax law, commuter benefits are only available through an employer. An employee cannot directly take advantage of these tax benefits by simply taking a tax deduction or credit on their personal individual tax return. The programme also does not address the issue of compensating people who work remotely from home as a sustainable means to reduce trips to work.

Spin-offs

The Commuter Benefit Ordinance has also created an opportunity for innovation in the private sector, through the establishment of spin-off industries that provide services that are associated with the programme. Some of the spin-offs are:

- Integrated payment systems service providers
- Benefits management companies who are responsible for managing the tax records and administering the programme
- Establishment of vanpool companies with which employers have contracts to transport employees
- SliceRides, an application and social network that facilitates trusted peer-to-peer rides between professionals on their way to work (San Francisco Bay Area Planning and Urban Research Association, 2014)
- Real-time transportation information service providers such as TransitScreen or RideScout, also through an application (ibid.)

Analysis Matrix

A synthesis of all the criteria that are necessary for the success of a public transport pre-tax benefit programme such as the Commuter Benefits Ordinance, from the analysis of the case study and the literature on public transport incentives and Transport Demand Management, is provided in Table 7.2 below. The five broad categories identified that are pertinent to the success of public transport incentives in the form of commuter benefits are identified as the policy environment; institutional arrangements; infrastructure requirements; the types of incentives; and urban form and location. It is these criteria that will be looked for when Cape Town is analysed.

Table 7.2: Analysis matrix

CATEGORY	CRITERIA
POLICY ENVIRONMENT	<ul style="list-style-type: none"> • Supportive federal/national government law for pre-tax commuter benefits • Equates to a federal or national government subsidy • Compulsory at the regional and local level • Multiple supporting public transport incentive programmes offered in conjunction with each other • Pre-tax savings benefit both employer and employee

CATEGORY	CRITERIA
INSTITUTIONAL ARRANGEMENTS	<ul style="list-style-type: none"> Public transport is a local government mandate Many different departments are integrated through a Transportation Demand Management partnership programme, including integration between transport and planning departments Partnerships are established for communication and research in Transportation Demand Management
INFRASTRUCTURE REQUIREMENTS	<ul style="list-style-type: none"> Variety of public transport modes Spatial integration between modes Integrated payment systems Transit-based investments should support all public transport initiatives
INCENTIVE TYPES	<ul style="list-style-type: none"> Financial incentives have the greatest effect Transportation Demand Management strategies are most effective when several are used together Most effective when the revenue generated is reinvested back into the system Non-Motorised Transport programmes and incentives are necessary in reducing Single Occupancy Vehicle use for short trips
URBAN FORM AND LOCATION	<ul style="list-style-type: none"> High urban densities Mixed land uses Integration between land use planning and transport planning Best applied to urban and large suburban centres that experience high traffic volumes, parking and pollution problems

Source: Author's formulation

Cape Town Analysis

From the analysis of the San Francisco case that focused on implementing public transport pre-tax benefits programmes in its city area, a number of necessary supportive elements came to light. A literature study of public transport incentives endorses the conclusion drawn. In order to consider the replicability of such a programme in South African city context, and Cape Town in particular, some comparisons must be highlighted. In San Francisco, the main objective was to decrease the use of Single Occupancy Vehicle trips to reduce resource use and greenhouse gas emissions. This section however, takes the stance of increasing public transport ridership, mainly for a redistributive effect on the existing public transport system. This second case study reflects the point that South Africa's urban poor have a need for increased access to public transport.

It is thus necessary to give a general overview of the spatial form of transport infrastructure in South African cities to illustrate this phenomenon. In the analysis of Cape Town the various identified elements are framed in the light of the objective of creating a more equitable public transport system. These relate to the policy environment, institutional arrangements, infrastructure and incentive programmes.

Public transport in South African cities

The public transport industry in South Africa consists of three main modes of transport: the traditional commuter rail system; the subsidised and unsubsidised commuter bus industry, including the Bus Rapid Transit systems; and the 16-seater minibus taxi industry. Minibus taxis are included under the umbrella of public transport modes since they transport such large numbers of commuters, although they are privately owned and receive an official subsidy. South African cities display an apartheid structure that is characterised spatially by radial patterns of transport infrastructure, rather than the more efficient and equitable grid layout. A second feature, also attributable to apartheid segregation policies, is the very low population densities in South African cities. Moreover, the highly fragmented urban form that has extremely low overall population densities, in itself often renders public transport inefficient (Dewar and Uytendogaardt, 1991). The demand for adequate public transport however, is extremely high for most South Africans for two reasons: the low density urban form means that places of employment are often located far away; and the rising prices and running costs of private vehicles makes their use for commuting too expensive.

Public transport in Cape Town

The movement patterns in Cape Town resemble a largely radial structure, where all metropolitan movement radiates inwards and outwards from the Central Business District (CBD) (Dewar and Uytendogaardt, 1991). This pattern of movement is not only highly inefficient in terms of congestion, but the lack of adequate north-south and east-west movement axes means that transportation between areas within the city often has to happen via the Central Business District. Those located on the periphery experience both higher time and monetary costs to access other parts of the city. In 2011, Cape Town had a population of 3.7 million people, of which 55% were estimated to rely on public transport only. Most importantly, within lower income groups, between 45% and 70% of their income was spent on travel and access, compared to the international standard average of between 5% and 10% (City of Cape Town [COCT], 2013a).

Cape Town, like other South African cities, has a marked duality when it comes to the use of public transport. Members of lower income households, predominantly situated in geographically peripheral townships and informal settlements, constitute the majority of public transport users across all the relevant modes or otherwise they walk (Wilkinson, 2008), whereas members of middle and higher-income households, situated in suburbs that are better located relative to the urban centre, utilise private vehicles rather than public transport (ibid.). Over half (52%) of all trips are made by car (Table 7.3 below).

Table 7.3: Daily modal split in Cape Town excluding Non-Motorised Transport

PUBLIC TRANSPORT MODE	MODAL SPLIT (%)	DAILY PASSENGERS
CAR	52	1 310 833
RAIL	25	634 837
CONTRACTED BUSES	9	240 000
MYCITI	1	21 820
MINIBUS TAXI	13	320 041
TOTAL	100	2 527 531

Source: City of Cape Town (2013a)

Policy environment

There is no national government policy that makes allowances for pre-tax deductions for public transport use. Furthermore, in South Africa, employers do not pay payroll taxes as is the case in the United States, the consequence of this will be noted. This sub-section deals with the current policy environment for public transport in South Africa, with reference to institutional mandates to better understand how such a pre-tax benefits programme would fit into it and what the challenges would be.

In post-apartheid South Africa, there has been a greater emphasis on public transport and Non-Motorised Transport use since the development of the White Paper on National Transport Policy in 1996, which included the following main policy thrusts (Bickford, 2013):

- The prioritisation of provision for public transport and Non-Motorised Transport modes, particularly walking and cycling, to address the mobility needs of the more disadvantaged sectors of the population
- The introduction of Transportation Demand Management strategies especially to promote public transport-orientated land use patterns, road space management and road pricing measures to 'dis-incentivise' private car usage (Wilkinson, 2010)

Mandates and funding

National government is mandated to assist and monitor provinces and municipalities that lack the capacity or resources to perform their land transport functions (Walters, 2008). Provincial government is to ensure planning, coordination and facilitation of these functions in the province. Local municipalities are responsible for ensuring the coordination between departments and agencies in the municipal sphere and preparing transport plans for their area.

The National Department of Transport funds the commuter rail system by transferring funds to the Passenger Rail Agency of South Africa (PRASA) (RSA, 2013). The National Passenger Rail Plan of 2004 was developed to ensure that rail services are offered where they perform best such as in high density corridors where demand is substantial. The most typical are the metropolitan areas in South Africa. However, only 9.2% of commuters in these cities actually use rail transport to get to work (Statistics South Africa, 2013).

Commuter bus services, aside from Bus Rapid Transit systems, are managed provincially and funded through a public transport operations grant from the National Department of Transport (2013). They consist of tendered services. However, no new tendered services have been allowed since 2001. Operators are also not allowed to increase their subsidised bus kilometres because of a lack of funds (Walters, 2008). This has meant that they have to resort to introducing services on their own accounts with no state assistance and this has led to financial instability (*ibid.*). There is considerable emphasis on developing Bus Rapid Transit systems in South African cities as they are seen as the backbone of the Integrated Rapid Public Transport Networks (IRPTNs) to be developed in the metropolitan municipalities (Pillay and Seedat, 2007). Currently, Cape Town has an operational Bus Rapid Transit system that is being implemented in phases.

The minibus taxi industry, mostly operating 16-seater vehicles, transports an estimated 65% of all commuters in the country, largely due to its competitive pricing and demand-responsive nature (Wilkinson, 2010). The industry has experienced a significant oversupply, suffered capital replacement problems and considerable inter-association rivalry because of a lack of a proper regulatory regime. Hence, and in line with the White Paper on National Transport Policy of 1996 and the Moving South Africa Strategy of 1998, government has implemented the Taxi Recapitalisation Programme.

This programme aims to formalise and regulate the industry by replacing existing vehicles with new vehicles that comply with specified regulations to ensure safety standards. To assist owners, a once-off scrapping allowance of R50 000 for old vehicles is provided. It is a facility that is regarded as a capital subsidy, which is implemented in phases. The particular programme also requires taxi operators to legalise their operations by registering their vehicles and routes with a provincial taxi registrar. The process requires that taxi operators convert their radius-based operating permits to route-based operating licenses. The Taxi Recapitalisation Programme also aims to expand the services the industry offers to operate on lower density, public transport routes through contracts for cooperative or joint ventures, or as subcontractors to bus operators (Walters, 2008).

Another serious concern is the financial burden that the Taxi Recapitalisation Programme places on taxi operators as additional costs are involved. These include vehicle insurance, increased minimum wages, regulated driving hours and tax compliance. Furthermore, the market that patronises the service is generally not in the position to pay higher fares to overcome these additional costs (Walters, 2008).

Fragmentation and lack of integration

The institutional structures that govern public transport can be seen to follow a modal approach, as they are generally planned independently of one another (ibid.). Furthermore, the funding framework for public transport is regarded as highly fragmented, which hinders integrated transport planning as each of the many funding streams has its own set of funding requirements and criteria (Figure 7.2). This ultimately results in a transport system that is not spatially or operationally integrated (ibid.).

Change of institutional mandates

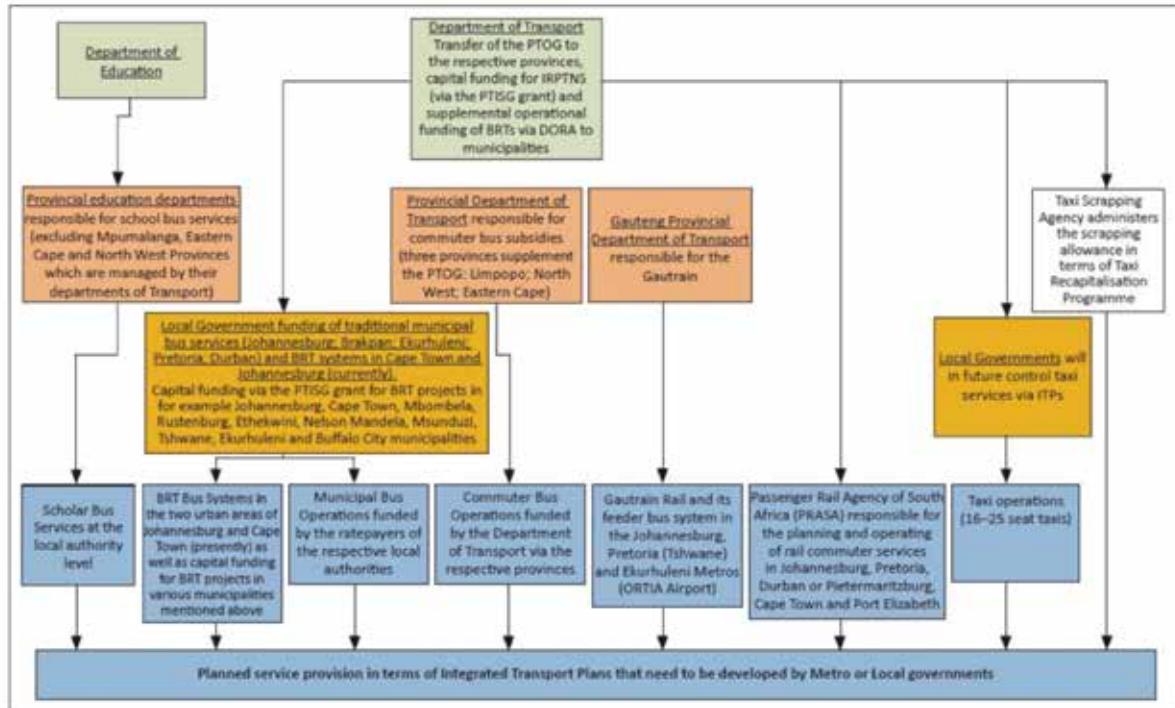
The National Land Transport Transition Act of 2000 advocates for the devolution of the management and operational transport function to the local sphere. This is because urban planning occurs at the local municipal level and transport needs are better understood in conjunction with other aspects of planning done at the local level. There has, however, been much debate as to whether local municipalities are able to afford financing and implementing the public transport function (Hetherington, 2011; Palmer, 2011). Although the Public Transport Infrastructure and Systems Grant is available for local municipalities to use as the initial investment capital, the state is concerned about the operating expenses these systems do incur.

Institutional arrangements

The institutional framework that governs the provision of road and rail-based public transport services in Cape Town at present is highly fragmented. Various bodies play a significant, and sometimes conflicting, role in the system and represent all three spheres of government. Elaboration on this issue follows as a response to the national mandate to devolve transport responsibilities to the local sphere, the trend in most metropolitan municipalities is the creation of a local government transport authority that has control and decision-making powers over all transport matters. The formation of such an authority has the potential to improve the integration of transport modes as institutional arrangements governing transport remains fractured across the three government tiers (Bickford, 2013).

Amongst other benefits, these local government transport authorities can address institutional weaknesses through ensuring coordinated planning with other agencies such as the Passenger Rail Agency of South Africa. Furthermore, local strategies can support integrated rather than silo-based modal transport planning; institutional memory can be retained; and the shortage of specialised skilled labour can be addressed by concentrated employment where needed rather than dispersing it over a range of transport sectors (Walters, 2014).

Figure 7.2: Numerous funding streams funding public transport in South Africa



Sources: Author's own creation with sources consulted – Department of Transport (DoT), 2013a, Annual Report 2012/2013, Pretoria and Department of Transport (DoT), 2013b, 'National Road Based Public Transformation Plan: A negotiated approach', presentation to the Annual General Meeting of the Southern African Bus Operators Association, University of Johannesburg, 30 May

FIGURE 2: Illustration of the numerous funding streams that are currently used to fund public transport in South Africa.

Source: Walters (2014)

Transport for Cape Town

The City of Cape Town (COCT), in response to their increased public transport functions, established a single local government transport authority in October 2012, named 'Transport for Cape Town' (TCT). Its purpose is to enable the municipality to accept full responsibility for road and rail-based transport within its boundaries (Holtzhausen and Abrahamson, 2011). It is expected to facilitate the full rollout and achievement of integrated, inter-operable and inter-modal transport across Cape Town and its functional area (COCT, 2013a). Moreover, Transport for Cape Town is responsible for planning, costing, contracting, regulating, monitoring, evaluating, communicating, managing and maintaining the Cape Town's transport infrastructure, systems, operations, facilities and network (Transport for Cape Town, 2015). Its proposed documented Comprehensive Integrated Transport Plan will be implemented over the next ten years (ibid.). An important aspect of this plan is that it not only helps to promote modal integration between the current unintegrated public transport systems, but will also integrate transport modes across administrative boundaries.

Infrastructure requirements in Cape Town

This section outlines the presence of the elements required for the implementation of a pre-tax public transport benefit programme and their current limitations. Most of the infrastructure required is currently available within Cape Town city's public transport services.

Rail

The rail network in Cape Town consists of 610 km of rail line and 118 rail stations, comprising both passenger and freight rail lines, operated by the Passenger Rail Agency of South Africa and Transnet Freight Rail respectively. The stations are typically fed by minibus taxis, buses, private cars and walking, although some bicycle activity does exist. Land adjacent to the stations is generally privately owned and the often poorly maintained quality of the station areas discourages some users from utilising rail as a mode of transport (COCT, 2013a). In the poorer areas of the city the passenger rail is often highly under-capacitated, for example, the Nolungile rail station in the Cape Flats in Cape Town is one of the busiest in Cape Town and has an average of 14 566 boarding passengers per day, yet in 2009 the demand for rail service in that area was estimated to exceed capacity by an average of 67% (ibid.).

Bus Rapid Transport

MyCiti is a Bus Rapid Transit system which is to be rolled out in four phases, for completion within 15 to 20 years (ibid.). Phase 1 focuses on the central city and the Blaauwberg corridor to the north towards Table View/Du Noon, as far as Atlantis and Mamre. Phase 2 is currently intended to address the substantial public transport needs of the Metro South East to include Khayelitsha and Mitchells Plain. Phases 3 and 4 will serve the Durbanville and Delft/Helderberg areas respectively (ibid.).

Commuter bus services

Golden Arrow and Sibanye commuter bus companies both provide direct metropolitan-wide origin-destination type services that are predominantly operated by subsidised contract services. Their contracts are currently being extended on a monthly basis, which could explain why most of the vehicles are in bad condition (Walters, 2008). The combined fleet size is 1 134 buses, of various capacities. The services are provided in accordance with timetables and some 240 000 passenger trips are made each day (ibid.).

Minibus taxis

Minibus taxis provide services in an unscheduled manner, either on a specific route or within a particular radius, without a timetable and where passengers are charged fares individually. Minibus taxis operate roughly 565 routes across the Cape Town metropolitan area. The majority (55%) of their services are considered to be line haul services which, in effect, means they compete with services offered by buses and trains (Western Cape Provincial Government, 2011).

The minibus taxi operators are organised into 102 different taxi associations, some of which are affiliated to two mother bodies. The COCT intends to utilise the benefits of the Taxi Recapitalisation Programme in the implementation of an Integrated Public Transport Network (IPTN) throughout the city as long as taxi routes do not compete with the Integrated Public Transport Network or rail implementation phase. The Transportation Reporting System database has a total of 6 035 unique registrations that were observed at the various taxi ranks in Cape Town between January and March 2013 (COCT, 2013d). Although it is known that there are a number of illegal minibus taxis that operate in the area, it is very difficult to accurately establish which and how many there are. However, in 2007 it was estimated that 46% of taxis operating were illegal (COCT, 2007, p. 37).

Non-Motorised Transport

Cape Town has an extensive Non-Motorised Transport network, and since 2010, the COCT has allocated a number of projects for the construction of roughly 435 km of walkways and cycleways. These include the Klipfontein Corridor Non-Motorised Transport project that was initiated under the city-wide Non-Motorised Transport programme, as well as the cycle lane along the R27 Integrated Rapid Transit (IRT) system route (COCT, 2013a). However, Non-Motorised Transport facilities in the Metro South East are generally lacking (ibid.).

Bicycle lanes are provided as a part of the infrastructure of the Integrated Rapid Transit system as far as possible. There is, however, a general frustration from cyclists who complain that it is Metrorail policy not to allow bicycles on trains. However, Metrorail explains that during peak commuter periods the passenger demand exceeds train capacity and space for bicycles is problematic.

Universal payment system

Cape Town already uses an electronic card payment system on the MyCiti service, the MyConnect card, and has plans to integrate the electronic card payment system across all modes, along with an integrated timetable within the next five years (ibid.).

Incentive programmes in Cape Town

This section outlines incentive programmes available in Cape Town that could ultimately support a public transport pre-tax benefit programme, making public transport more desirable. Up until recently, public transport incentives have tended to revolve more around land use mechanisms than around the user. However, the concept of Transportation Demand Management is not new in Cape Town as such a strategy was developed in 2006. It proposed interventions to diminish car-orientated behaviour, and piloted several programmes in support. The Comprehensive Integrated Transport Plan for 2013 to 2018 (COCT, 2013e) builds on the existing Transportation Demand Management strategies. Only programmes that would support pre-tax public transport benefits are described in this section.

Land use incentives and Public Transport Zones

Cape Town's urban form and low urban densities do not adequately provide the thresholds for public transport use. However, the COCT has begun the rollout of its Bus Rapid Transit system, which thus means that land use mechanisms need to retroactively support public transport investment through incentivising and supporting higher urban densities and mixed land uses.

The COCT's densification policy (2013b), targeting increased development in already-developed areas to maximise land use potential, aims to ensure the optimal and efficient use of infrastructure, services, facilities and land; as well as to support the development of a viable public transport system. One tool for the implementation of the densification policy is the reduction of minimum parking requirements in designated Public Transport Zones, which is provided for in the Zoning schemes. Despite the positive contribution to behavioural change in favour of public transport, the private sector often pursues the practice of parking reduction to reduce construction costs. The reduction of parking space thus frees up valuable urban space and thereby contributing to higher urban densities. These kinds of zones are allocated around public transport interchanges and corridors.

Travel Demand Management strategies

Parking management programme

There are eight managed parking areas within the Cape Town where priced on street parking and time limits have been introduced: all major Central Business Districts in Cape Town central, Bellville, Claremont and recreational areas such as Gordons Bay. Priced parking improves the turnover and availability of parking bays more equally in cases where demand exceeds supply. Priced parking areas are currently managed through official municipal contracts that are procured via tenders. They are regarded as important tools for transport demand development (COCT, 2013c).

Bus lanes and priorities

The MyCiti service has dedicated bus lanes on certain routes, areas and intersections within the city to increase the operational speed of public transport during peak hours. Dedicated Bus and Minibus Taxi (BMT) lanes are provided on major roads, such as the N2 highway, and although this service is not seen as car-competitive, the lanes are still important in retaining existing users. Aside from the dedicated MyCiti lanes and the N2 bus priority lane, the other Bus and Minibus Taxi lanes within the city are generally not enforced (COCT, 2013a). Traffic signal settings are also implemented in certain areas to give priority to bus and taxi services.

Park-and-ride facilities

Most of the park-and-ride facilities in Cape Town are located close to residential areas and function mainly to facilitate an increase in public transport use to the Central Business District. The programme also focuses on improving park-and-ride facilities and increasing the safety and convenience of the rail station precincts. The project relies on the rail system to provide the necessary capacity for the additional commuters who want to use park-and-ride facilities. Non-Motorised Transport infrastructure and feeder routes also assist (COCT, 2013c).

Bicycle-sharing programmes

Transport for Cape Town piloted a bicycle-sharing programme within the Cape Town Central Business District which is currently only available to employees of the COCT. However, the intention is to rollout the project to the public in the near future (Transport for Cape Town, 2015). The facilities are envisaged to be available within the surrounding suburbs too and will be integrated with other modes of transport, like being placed near railway stations (ibid.). A feasibility study will also consider whether a smart card payment system, such as the MyConnect card currently in operation on the MyCiti buses, could be used for this project. This kind of electronic payment system would allow the COCT to monitor the use of the bicycles and consider improvements to enhance the system in the future (COCT, 2013a).

Travel Smart programme

After beginning as a project to reduce the number of trips the COCT municipal employees make to work, the Travel Smart programme was expanded to a number of large employers within the Central Business District as a campaign to promote awareness of sustainable modes of transport. The programme also developed an online platform that integrates information about all the public transport modes, routes and departure times. Its 24-hour call centre also provides information on all the bus services. The Travel Smart programme has a facility to match commuters to a lift club in their area, where multiple commuters can travel to work in one person's vehicle (COCT, 2015).

Replicability for Cape Town

In this chapter's final section, the possibility of replicating the Commuter Benefits Ordinance used in San Francisco as a pre-tax public transport incentive in Cape Town is considered. First, it presents the challenges and highlights the aspects that need to be changed to do this. It then discusses the criteria needed to support such a programme and identifies which are already in place in Cape Town. After justifying the need for pre-tax benefits for using public transport, the last section offers suggestions on how such a programme should be implemented and the tools required.

Challenges

The devolution of public transport functions to the local level has raised major concerns about the financial sustainability of municipalities, and is therefore something that needs to be addressed in parallel with any further public transport initiatives or programmes. Currently in Cape Town, as in many South African cities, the multiple institutional role players that govern different modes of transport, as well as the fragmentation that exists regarding funding each mode, means that modes of public transport are not well-integrated, neither operationally nor spatially. Bus, minibus and rail routes compete with each other rather than supporting each other. This lack of integration decreases the ease of multi-modal transport which, in turn, makes the change from using private vehicles to other more sustainable modes less desirable for users.

For all commuters within Cape Town to benefit from pre-tax public transport benefits, effective regulation of the minibus taxi industry would have to be in place. In 2007, 46% of the minibus taxis in Cape Town were believed to be illegal (COCT, 2007:37). Regulation is necessary, not only to integrate these routes into the larger public transport system, but also to create a more desirable mode of transport. Especially important is the fact that commuters are able to produce a record of payment so that they and their employers can claim the pre-tax expenses with proof. Although the Taxi Recapitalisation Programme is in place to regulate the industry, there are concerns that the cost of legalising the service will be transferred to the user, the one most generally unable to afford higher transport costs. Furthermore, if an integrated payment system is to be implemented, similar to the TransitCheck system in San Francisco, a number of challenges would arise when implementing it in the minibus taxi industry.

Lastly, the barriers to entry for new users need to be addressed. For some middle-class users, the undesirability of the service may outweigh the pre-tax savings. Although the COCT has plans to upgrade Non-Motorised Transport facilities, the integration between them and other modes has to be efficiently implemented if people are going to change to public transport facilities. For example, that bicycles are not permitted on Metrorail lines during peak hours greatly hinders the user's ease of movement. The environment around the rail stations is all too often not pleasant for pedestrians, and will deter many people from utilising rail transport.

Criteria that would support the programme

The establishment of a transport authority in Cape Town, namely Transport for Cape Town, can assist in the implementation of a public transport tax incentive effectively. It has the authority to manage and coordinate different modes of public transport within the boundaries of Cape Town and can thus align the schedules of different services and ensure the spatial integration of different modes. Achieving this will make commuting by public transport more desirable for the user, as the speed and ease between modal changes will be reduced. In addition, the users will be able to take up the option of pre-tax commuting benefits. Since the Comprehensive Integrated Transport Plan oversees transport in the entire Cape Town functional region, if a pre-tax public transport benefit is introduced, it will be in the best position to also target those who commute to the COCT even from outside its borders as well.

Cape Town is relatively well-served by a range of public transport options. Implementing the final phases of the MyCiti Bus Rapid Transit system and increasing the efforts to improve non-motorised modes of public transport should serve to further increase desirability of commuting by public transport. This is important as non-motorised modes often account for a significant portion of the public transit journey. Furthermore, if the Taxi Recapitalisation Programme is successfully rolled out, it will mean that the minibus taxi routes will move from a radius-based area of operation, to being route-based. This will promote the integration of minibus taxis as feeder routes in the public transport system. However, for bus and minibus modes to compete against the use of cars, greater enforcement of the right use of minibus taxi dedicated lanes will be required on urban roads. Furthermore, the plan to rollout an integrated payment system will not only increase the desirability of commuting due to ease of payment, but is also a necessary requirement in the operation of a commuter benefits programme. That electronic payments can be electronically captured and monitored and will supply a record of payment is an important benefit for efficient operation.

The current Transportation Demand Management initiatives in Cape Town are mainly incentives, and relate to land use and strategies to increase the desirability of public transport. Cape Town can be seen to have supportive densification policies that encourage not only the use of public transport, but also the required densities to support it, which is necessary for the success of such a programme. However, there is little in the way of financial incentives, other than parking pricing, which rather disincentives private car usage. There is therefore room for the introduction of a financial based incentive within the system, such as pre-tax commuter benefits.

The COCT has a number of Transportation Demand Management strategies to increase the desirability of public transport and the environment in which it functions. Furthermore, it has also been noted that Transport for Cape Town seems open to innovation and piloting new projects. The introduction of suitable programmes aligns with the Comprehensive Integrated Transport Plan's outlook that financial incentives that generate tax revenue could subsidise public transport. The promotion of tax rebates should incentivise public transit use.

Justification for pre-tax public transport benefit

There have been many concerns regarding the ability of local governments to cover costs associated with the devolution of public transport functions. The implementation of a pre-tax public transport incentive programme can be seen as a way to increase the revenue generated for public transport. This can happen through increased ridership and thus an increase in the fares collected. If the COCT is to become the custodian of all public transport functions within the city, it would thus profit from this increased revenue. This may help to cover some of the associated costs that the devolution of functions requires.

The prolific minibus taxi represents a significant contextual difference between Cape Town as compared to San Francisco that would require attention in the implementation of such a programme. Its services would need to be properly integrated into the public transport system, if the objective of increasing equitable access of all users to public transport is to be met. However, since the regulation of the industry represents increased costs, ultimately the end user will have to bear these costs. Increased fare prices should balance out with such costs in the implementation of the programme. There is also the question of public transport users within the informal economy of the city, such as domestic or casual workers. These users would not directly benefit from the incentive as they often do not pay tax, but will benefit from the overall improvement of the public transport system.

It is however expected that, in the middle-class suburban areas, the introduction of such a programme will shift commuters from private vehicle use to vanpool trips, rather than to the established public transport services. The overall objective of the benefits programme is to increase public transit ridership with the emphasis on improving the quality and desirability of the public transit services. Hence vanpooling would be viewed at the last option. However, the establishment of vanpool providers also presents an opportunity for the regulated taxi industry to diversify its service.

Implementation

One of the reasons for the success of the programme in San Francisco was due to the fact that not only employees saved money through a reduction of taxes, but employers saved on payroll taxes. However, South African tax requirements do not include employer payroll taxes.

Therefore, if a similar programme was to be implemented in the South African context, only employees would receive a financial benefit. It is therefore suggested that in order for such a programme to be successful in a South African city, incentives are needed that benefit the employer as well as the employee. This last section thus recommends that for such a programme to be implemented, specific tools would be needed to incentive employers, similar to Urban Development Zone (UDZ) incentives, which would also aid in the spatial targeting of the programme, as explained below.

Urban Development Zones and spatial targeting

The objective of the Urban Development Zone tax incentive is to promote urban renewal in South African Central Business Districts through private sector investment in the construction or improvement of commercial and residential buildings. The incentive is in the form of an accelerated depreciation allowance for the investing company, which represents a before-profit tax reduction (South African Revenue Service, 2009). Municipalities have delimited the area, known as the Urban Development Zone, where the incentive applies for approval by the national treasury. The money the private sector saves serves as a reduced tax expenditure. However it does not equate to increased costs to the local municipality, as the incentive is regulated at the national level. Thus, theoretically, it is national government that forfeits the loss of tax revenue (South African Revenue Services, 2009). The incentive, if taken up by developers, can benefit local municipalities as the application of such an incentive encourages increased investment in property, which may increase in value, which eventually will increase the local authority's rates base (ibid.). However, municipalities could lobby the national treasury to reconceptualise the Urban Development Zone incentive as a national initiative supporting local municipality investment in public transport initiatives in selected spatial areas, and not only in the Central Business Districts.

For the implementation of pre-tax public transport incentives, it is suggested that such incentives could use the same tax framework that supports Urban Development Zone areas and have these apply to businesses in a zone demarcated by the local municipality, such as the Central Business District or urban regeneration zones. This benefit from a tax reduction could encourage their employees to utilise public transport. It is recommended that in these zones, a programme similar to the San Francisco Commuter Benefits Ordinance be implemented. The mandate would be that employers with more than twenty employees in such zones have to offer their employees pre-tax public transport benefits. It is further recommended that the requirements of the Bay Area Regional programme be implemented within the entire Cape Town Metropolitan Municipality. In this case, any company with 50 employees or more who work within the boundary of Cape Town municipality, has to offer their employees the same benefits.

Conclusion

A feasible and well-utilised public transport system in South Africa is vital in terms of both decreasing the reliance on cars, and increasing the investment in public transport to support an initiative to extend the demand for public transport amongst all income groups. Ridership would increase and ultimately, the sustainability of public transport would follow. Moreover, such a public transport system would facilitate that all residents have sufficient access to the opportunities of the city. This chapter therefore suggests that any investment in public transport infrastructure should be accompanied by incentive programmes to increase the demand for commuters to utilise public transport. The San Francisco Commuter Benefits Ordinance was the chosen case study, and demonstrates that the use of an incentive that is financially beneficial for the commuter can help to increase public transport ridership.

The chapter, however, concludes there are many other aspects that are important to consider if such a programme is to make a successful contribution to sustainable public transportation. These aspects include the quality of the public transport service, infrastructure and station environment; institutional integration to ensure that different modes are well-integrated; and the use of other incentives or programmes in parallel to a commuter benefits programme to entice commuters to use public transport.

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organic waste

term

material that is biodegradable
and comes from either a plant
or animal

8. ORGANIC WASTE MANAGEMENT IN THE CITY: FORMAL SYSTEMS, INFORMAL PLAYERS

Marijana Novak and Joanna Glanville

Introduction

This chapter investigates the alleviation of poorly managed waste disposal in Hillbrow, a dense Inner City residential precinct in Johannesburg. The proposal is based on the design of an innovative complementary waste management system for the area, drawing on international case studies and experience.

Waste management is introduced generally as a global issue with a focus on the organic waste stream, general methods of handling it and the economic feasibility of organic waste management systems. Three case studies are detailed with components that are later drawn together to form a system that might be replicated in Hillbrow. The first two case studies cover medium-scale bio-digesters implemented in the different contexts of the EARTH University (as Escuela de Agricultura de la Región Tropical Húmeda is commonly known) in Costa Rica and a semi-formal market in Colombo, Sri Lanka. Costa Rica was chosen as a fully-functioning example of an organic waste management system with clear management systems, technical expertise and successful community participation. In contrast, Sri Lanka's market bio-digester was discontinued due to a multitude of social and technical difficulties encountered. The scale of these two cases is comparable to the locale of Hillbrow. The third case study describes the informal but extensive waste management system operating in Cairo, Egypt. This is valuable as an indication that informal systems can serve a wide and useful service in a city context, and even assist in poverty alleviation.

The final part of the chapter investigates the potential for replicability of organic waste management systems in the context of a local high-density residential neighbourhood in Johannesburg, Hillbrow. Beginning with a detailed description of this area, the researchers attempt to design a complementary organic waste management system, drawing on the lessons of the three cases studies. It serves to respond to some of the specific features of Hillbrow especially the aspects of informality, transience, the high level of unemployment and existing formal and informal waste management systems.

Approach to Study

The theme of this chapter draws on international waste and waste management techniques and strategies as documented in relevant technical reports, journal articles and books. The structured framework of this research was applied to Hillbrow, an urban suburb in a major South African core business and industrial region in the province, Gauteng. Predominantly qualitative methods were used to gather information about waste management in the selected location through site visits, interviews with appropriate experts and an analysis of three case studies. The Costa Rica case study relied on website and site visit reviews, and relevant newspaper articles. The Sri Lanka and Cairo case studies drew on research reports, archival information and articles, maps and books. The South African case was informed by the analysis of the case studies, and an assessment of current waste management in Hillbrow, which resorted to research reports, books, maps, archival information from the City of Johannesburg (COJ) and newspaper articles. The fieldwork done in the area comprised site visits, interviews and a survey through questionnaires with key stakeholders and individuals living and working in Hillbrow, and thence provided supplementary data. Representatives of the academic, private and public sectors that had experience and knowledge of waste management in Hillbrow were consulted regarding the feasibility of the proposed waste management system.

A focus group was organised by Gerard Bester, the Outreach Foundation's coordinator of the Hillbrow Theatre Project, at the Hillbrow Theatre on 19 June 2015, and was conducted independently by the researchers and recorded. It was attended by a group of 26 women, men and children aged between 8 and 50, all residents in Hillbrow. Some of the women were also members of the Boitumelo Project, a skills development initiative started in 2001 for Hillbrow residents. Approximately a dozen informal interviews were conducted with residents, traders and restaurant owners in Hillbrow. In addition, approximately five participants at EARTH University were interviewed on site, and three expatriate Egyptian residents were informally interviewed, one in South Africa, and two in the Netherlands. This fieldwork gave a general view of the waste management situation in the study area. However, a larger sample size and more extensive analysis would be required to ascertain residents buy-in regard the proposed project. Establishing partnerships with other participating actors and bodies would also be beneficial.

Further, during 2015, formal interviews were conducted with:

- Mr. Zacharia Ramatula, president of One Voice of All Hawkers Association
- Ms. Thoko Shomane, Small Business Initiatives section at Pikitup
- Ms. Rochelle Ludick and Mr. Mkhusele Sobantwana, General and Regional Area Managers at Pikitup
- Mr. Mvuselelo Mathebula (Deputy Director) and Ms. Noni Letsoela, both employed at the Waste Policy and Regulation, Environment and Infrastructure Services department of the COJ (the interview was observed by their colleague, Siphwe)
- Mr. Umra Konoboy, student and operator of the bio-digester at EARTH University, Costa Rica

Waste as a Global Issue

Cities and their citizens rely either directly or indirectly on industries for survival and these industries and their products have an impact on the natural resource base of civilization (Brundtland et al., 1987). This happens through the entire cycle of raw materials exploration and extraction, transformation into products, energy consumption, waste generation, and the use and disposal of products by consumers (Ibid.). Until recently, many of these industrial processes operated linearly with regard to waste, opting to dispose of waste in landfills, or burn it, instead of reusing it within the industrial cycle (Binder et al., 2001; McDonough and Braungart, 2002). This means that, in addition to negative localised impacts of waste on air, water and land pollution, there is sub-optimal use of the limited resources available on this planet, mostly through inefficient use of land (Hardoy et al., 2001; Lehmann, 2007; South African Waste Information Centre, 2011).

In response to the public concern and debate on the compatibility of economic growth and environmental concerns, much effort is being put into reducing waste in industrial processes (McDonough and Braungart, 2002). In addition to the environmental and social benefits, companies and institutions do see economic benefit in adopting a more cyclical approach to waste management (Krueger, 2014). From an individual perspective, a safe and clean urban environment is a public good and should be pursued with an effective waste management system as a key tool (South African Waste Information Centre, 2011). Many waste reduction and management solutions exist. Each focuses on a different concern, strategy and scale from the individual level to factory level, such as pollution prevention, or as Berrone and Gomez-Mejia (2009) refer to it, 'end of pipe', or 'end user behaviour'.

This chapter dissects how to use existing successful waste management practices to leverage the economic benefits currently reaped by companies for the betterment of communities and their individuals. A crucial component of end of pipe waste management solutions is the sorting of the waste stream into its various components, inter alia plastic, glass and organic waste as part of the reuse or recycle mechanisms. The waste stream is the total mass of solid matter from various organisational institutions that as to be prepared for disposal. Different materials require different handling processes (Binder et al., 2001; McDonough and Braungart, 2002) for recycling processes. Some recycling arrangements, for example those for glass or paper, are sophisticated and have been successfully integrated into societal and commercial processes with defined methods to collect the materials and remunerate the collectors. These systems serve both large-scale collectors and individuals, many of whom are informal collectors who earn a living from operating within this form of recycling infrastructure (Didero, 2012). Indeed, the development of related recycling industries has also led to a boom of informal collectors all over the world (Strasser, 1999).

Waste Management in Urban Areas

Poor urban waste management affects the safety and comfortable living standards of residents adversely (Peters, 1998; Kosoe and Amoah, 2014). Moreover, the lack of adequate garbage disposal in an area often results in negative attitudes that contribute to a general deterioration of community development and cohesion (Mwaura, 1991). The ubiquitous presence of waste indicates a lax attitude towards abiding by a set of common norms of conduct. The implication of stricter by-law enforcement around litter and waste, demonstrated by a clean space, communicates a zero-tolerance approach to all infringements of the law that eventually translates into lower non-appliance levels (COJ, 2014). Large quantities of unregulated waste also have the capacity to directly impact the health of the inhabitants interacting with the waste (Hardoy et al., 2001). This is especially important for the health of children who play in, or are exposed to these open areas. Dumping of organic waste leads to higher instances of disease vectors such as rodents, birds and insects (Hardoy et al., 2001; Kubanza, 2010).

Excessive waste also puts strain on pre-existing structures; for example, spillover into a storm water drainage system can cause blockages and damage to existing infrastructure. The resulting sewage coupled with excessive waste on the sidewalk becomes a hazard for pedestrians who are forced to walk in the street to avoid waste (Hardoy et al., 2001; Togarepi and Tsiko, 2012). Functional waste management systems do well to mitigate these negative effects and such a strategy can create a dignified living space for residents (UN-Habitat, 2015).

Dealing with the Organic Waste Stream

The organic waste stream is chosen as the subject of interrogation for this chapter because it applies to the locale of this case study. Currently there are no waste management systems in or near Hillbrow that deal directly with the organic waste stream. However, other waste handling processes for glass and plastics already exist to some degree, even if in an informal way. The negative effects that result from waste, as described, hold true for organic waste, and are particularly true for disease vector components.

Organic waste

Organic waste consists of all organic material such as food scraps, human and animal waste, as well as any plant-based material and some degradable materials such as paper and cardboard to a lesser extent. Organic waste biodegrades naturally over time and feeds valuable nutrients back into the soil (Food and Agricultural Organization, 1996). Thus, the dumping of this organic waste into landfills is both an inadvertent waste of natural resources, as well as an inefficient use of land. Additionally, the decomposing waste results in heightened greenhouse gas emissions which could be avoided if organic waste was dealt with in a closed cycle. An attempt should be made to return waste organic material to the soil or their emissions should be harvested for other uses (Taylor, 1999; Zurbrügg et al., 2004).

Managing the waste stream

There are essentially only two forms of managing the organic waste stream: either the waste is composted; or the waste forms the input into a waste-to-energy system. Composting forms the relatively easier route but is the less useful of the two options, with fewer skill requirements and less specificity about the organic waste input (Peters, 1998; Zurbrügg et al., 2004). Composting has been in existence for thousands of years, and has in present times evolved into a huge industry with sophisticated technology. Moreover, this industry can produce fertiliser that is specific to the needs of a crop or one that can limit the effects of pests and climates of particular localities. A downside of composting is that it is very difficult to produce commercially competitive fertiliser especially with the inconsistency of the feedstock received from urban areas. Nevertheless, the compost created from household organic waste is suitable for non-agricultural green land or household farms (ibid.; Cornell Waste Management Institute, 2015). Another difficulty is that the space required for large-scale composting is not trivial, especially in urban areas (Rodrigues, M. and Lopez-Real, J. 1999). This can be mitigated via household-scale composting bins which require user education as well as higher capital investment. Composting has some benefits, but is generally not applicable in the dense urban context on a large scale (Hart and Plumbers, 1996; Peters, 1998; Togarepi and Tsiko, 2012).

Waste-to-energy systems in the context of this discussion refers to the use of organic waste as an input into a system that produces gas as one of its outputs (Abbasi et al., 2012; also Konoboy, Pers. Comm., 2015). Such input is a combination of foodstuff, human waste and manure. It is a biological process in which organic matter is essentially 'digested' by bacteria through anaerobic digestion to produce gas and solid matter (Food and Agricultural Organization, 1996; Abbasi et al., 2012; and Konoboy, Pers. Comm., 2015). The gas, termed bio-gas, is the primary output and differs in its exact composition but comprises mostly methane and carbon dioxide (ibid.). The second output, solid matter, is rich in nutrients and can be used to produce fertiliser (ibid.). The bio-gas produced can also be upgraded via removal of carbon dioxide and water vapour that is used in a generator to create electricity and heat. The fertiliser can also be processed to create compost (ibid.). Although the system remains largely the same, the technical differences between different installations can be quite complex as considerations of the site, inputs, bacteria types and quantities, and other local conditions must be taken into account in the design of the system (Dilhani et al., 2011; Coolsweep, 2013; Biotech, 2015; and Konoboy, Pers. Comm., 2015).

Reflection on World Wide Waste Management Systems

Waste management systems exist in diversity and abundance, and to describe the exhaustive set of these systems is outside the scope of this paper. In this discourse, a balance between breadth and depth is sought in a general discussion of the economic feasibility of organic waste management systems, through providing some detail on specific case studies. The first case explores the functionality and effectiveness of a bio-digester in the largely formal context of a university, although it has a transient student population. The second case offers the context of a semi-formalised organic market, while the third case study explores the possibilities and limitations within the informal sector. These components inform the proposed solution outlined in the next section of the chapter for the South African local context, Hillbrow in Johannesburg.

Economic feasibility of organic waste management systems

The notion that the reuse of waste provides an economic benefit, both from a financial and efficiency perspective, is not new. Extraction or collection of gas from decomposing organic matter dates back to the late 1800s and was used throughout the 1900s in various forms in agricultural systems in predominantly India and China (Abbasi et al., 2012). Interest in waste-to-energy systems increased in the 1980s across the globe in response to a spike in the oil prices. The trend continues, and today it is fuelled by additional economic trends resulting in paradigms based on limits to growth, the circular economy, industrial symbiosis and bio-based economies. These are all premised on the idea that waste is actually valuable and should be used as an input into the relevant symbiotic industrial process, instead of being disposed of and actually wasted (Hart, 1995; Binder et al., 2001; McDonough and Braungart, 2002).

Policy and regulations have also evolved in line with these trends to promote and prioritise investment in the field of waste-to-energy (Coolsweep, 2013). Currently the European Union sits as the leader in this regard, with the most widespread and sophisticated business models. However, significant progress is also now being made in other contexts such as East Asia and Latin America (ibid.). There are now countless examples of successful businesses dealing with waste management across the globe at a variety of scales, and suitable business models can be derived for a range of contexts. Large-scale solutions are offered by large, often national or international, companies that partner with agricultural processors or industrial manufacturers, and municipalities. In these instances the by-products of the factories or agricultural processes are converted into gas, and then used to produce electricity which is sold to local municipalities (Coolsweep, 2013). The plants are designed to optimise the production of gas for the constant and uniform supply of organic waste. These projects are capital-intensive but offer an efficient and ultimately cost-effective solution to utilising organic waste (Coolsweep, 2013; Biotech, 2015; Sustainable Sanitation and Waste Management, 2015).

However, there are also business solutions for smaller scale enterprises, for example, at a household or smallholding level. The packages on offer typically have the technology already developed and offer user education for maintenance as part of their product (Biotech, 2015). These products often allow municipalities to partner with businesses in rolling out the technology in poorer areas where households lack the means to adopt the technologies themselves. Examples exist across, inter alia, India, Bangladesh, China and Vietnam (Abbasi et al., 2012; Biotech, 2015). The technology is relatively simple to install, and offers a cost-effective solution to reduce electricity consumption and utilise waste as the waste a household often generates is enough gas to supply most of the household's energy needs (Biotech, 2015). The maintenance is generally fairly simple but does require conscientiousness application (Abbasi et al., 2012). The constraint is not the availability, complexity or appropriateness of technology, but difficulties that come with user education and its related cost and other requirements, and with its maintenance (Estoppey, 2010; Hojnacki et al., 2011; Research for Development, 2015). This is problematic despite the fact that small scale solutions are generally simple and readily adaptable to different contexts.

Two examples of this form are investigated in the following section, which illustrates more specifically how systems operate in specific locales, and in formal, semi-formal and informal contexts. Medium-scale solutions as a system in which the waste is centrally treated are defined and the actors in the system are individuals who contribute directly to or benefit directly from the system.

Case Studies

EARTH University, Costa Rica: Medium-scale bio-gas in a university with transient students

The EARTH University is a small undergraduate institution in Costa Rica which brings in 1 000 students a year from 40 countries to study Environmental Sciences (EARTH University, 2015). This university takes a hands-on approach and facilitates practical projects for all levels of students, as well as participation with and support for neighbouring communities (Konoboy, Pers. Comm., 2015). The university itself is carbon-neutral through sustainable practices, such as disallowing plastic bottles and utilising energy efficient buildings (EARTH University, 2015). Waste management practices are taught as a compulsory module to all students in all degrees (Konoboy, Pers. Comm., 2015). EARTH University undertook to reduce both its overall waste level and the use of Liquefied Petroleum Gas that was used to cook in the cafeteria. They achieved this through the installation of several biogasifiers on campus (EARTH University, 2015; and Konoboy, Pers. Comm., 2015). Four aspects are discussed next: the system, participation, impacts and replicability.

System: the system has eight bio-digesters installed strategically at EARTH University with five currently in use on the main campus and three are used in the agricultural grounds (see bio-digester in Photograph 8.1). On campus, direct pipelines from the kitchens, dormitories and bathrooms feed waste water as well as solid mass and any food matter into the digesters. The water and solids feed are mechanically stirred to prevent blockages, and fed into a tank, or pit, typically but not necessarily underground. These tanks where the digestion takes place are oxygen-controlled. For example, a tank must be sealed to prevent continuous free-flow of oxygen, although some is permissible and even useful to aid digestion (ibid.). The bio-digesters produce two by-products, liquid fertiliser and methane gas. The gas is collected above the pits in a large sack, and the liquid fertiliser runs out. The liquid fertiliser is used in the grounds and the gas is filtered and used in the kitchens for cooking (ibid.).

Photograph 8.1: Bio-digester at EARTH University



Source: Photograph by Novak, 2015

Participation Required: Students, staff and professors participate actively in this system by separating their waste at source. They do this to promote the correct use of the system. It is compulsory for all new students entering the university to spend a term in the manual waste sorting facility. Pipes and tunnels transfer the waste directly to the bio-digester which is monitored by the student group allocated this task and overseen by the corresponding professor. The culture of the university promotes environmental awareness: students are taught that everyone generates waste either directly or indirectly and understand the reasons humankind should

reduce its footprint on the planet. Bio-digesters are proposed as one possible model to aid natural resource management (ibid.)

Impacts: The impact of the bio-digester system at EARTH University is multi-faceted. On an environmental level, it reduces the waste and footprints of all activities taking place at the university, as well as providing fertiliser for the agricultural lands on campus. Economically, the university has reduced its Liquefied Petroleum Gas costs in the cafeteria, as well as waste clearing and fertiliser costs. At community level its effect too is real as the functional and useful bio-digester system raises environmental awareness and a culture of ecologically conscious behaviour, with a possibility for hands-on experience (ibid.).

Replicability: Bio-digesters are most effective if their use is implemented so that separation takes place at its source. An attitude that accepts this practice needs to be propagated through the community or institution utilising the bio-digester; otherwise maintenance and repair costs will begin to overtake its benefits. Alternatively, a sorting system has to be implemented. A barrier to replication is the technical skill required to operate and monitor the bio-digester. In this case study, students manage the plant but with appropriate oversight and management. Assistants have to be trained to help in the operation of the plant (ibid.).

Colombo, Sri Lanka: Medium-scale bio-gas and compost production from market garbage

Kahikatoa in Narahenpita, Colombo, Sri Lanka, is a busy market area in the commercial capital of the Sri Lanka. It is a market that generates about one tonne of fruit and vegetable waste per day (Dilhani et al., 2011; de Alwis, 2012). Prior to the implementation of the digester, all the waste was dumped in alleys and in footpaths. Because of the high level of bio-degradability of the waste matter, all those operating in the market were exposed to the health hazards created by this prevalence of waste which allowed rats and other disease vectors to thrive (ibid.). Sri Lanka's Sustainable Energy Authority initiated a multi-objective project to deal with the large quantities of waste in collaboration with the National Engineering Research and Development (NERD) Centre, and the Colombo Municipal Council. The objective of the project was to demonstrate that processing waste into bio-gas was feasible as both a waste management system and as a means to create electricity. Moreover, a saleable by-product of organic fertiliser was simultaneously produced (Dilhani et al., 2011). It is important to note that at this initial stage long-term objectives around community engagement and environmental awareness were neither set nor even engaged in (Dilhani et al., 2011; Muneera, 2012). The project was rolled out over one year, and several difficulties were encountered. Ultimately, the project was limited to a reduction in waste but not a significant reduction in costs. The reason for this decision was because of unexpected expenses due to technical errors and poor community engagement. As a result, the project was discontinued (Dilhani et al., 2011; de Alwis, 2012; Muneera, 2012).

System: four digesters, with the capacity to deal with 480 tonnes of market waste each year, were installed in outhouses near the market. Both market participants and other outsourced individuals were engaged to collect the organic waste from the market and transport it to the plant (Figure 8.1). At the plant, the sorting or filtering

of the waste was done manually but not in a sophisticated manner; for example, a carefully thought-out process to ensure non-contamination was not in place. The organic waste was prepared for the digesters by chopping it into 1-2cm pieces using a low-energy chopper. The bio-gas eventually provided the fuel to run the chopper. Wastewater and the chopped matter fed into an airtight tank. The gas was piped from the digester and used to power an engine and a catering size gas burner in the area. The gas burner formed part of a cafeteria that could then offer reduced cost meals to its clients. The plant was monitored daily on the following metrics: the rate of bio-gas production, pH values, pressure variation and details of feedstock. Whenever problems arose, appropriate adjustments were then made to continue the operation of the plant at unexpectedly high costs (Dilhani et al., 2011; Muneera, 2012). The operation eventually was deemed unsustainable for that community, and closed down.

Figure 8.1: Installation and operation of the bio-digester in Sri Lanka



Source: Muneera (2012:2,5,6)

Difficulties encountered in the system: the system failed both in the dimension of community involvement and technical management. From the perspective of the market participants, there was a marked reluctance to participate in the system as dealings with organic waste were considered as 'dirty' (Dilhani et al., 2011).

This can be attributed to insufficient education about the benefits of the project, as well as the situation that there were no clear direct benefits for participating (Dilhani et al., 2011; de Alwis, 2012; Muneera, 2012). The technical aspects of the project were not planned for and managed correctly as several setbacks and difficulties arose throughout the implementation of the digester and accompanying system. Poor understanding of the waste stream, both in quantity and composition, led to inappropriate materials used in the construction of the tank which then suffered repeated damage that required repair (Dilhani et al., 2011). Eventually the tank system had to be re-evaluated and rebuilt entirely (ibid.). Additionally, there were damages to the bio-digester from contamination via non-organic materials (ibid.). Lastly, too much waste was fed into the digester and there was considerable damage from the overproduction of gas and fertiliser (ibid.).

Cairo, Egypt: Informal waste collection

As waste management becomes modernised, privatised and mechanised waste management services become common strategies. The focus is often on efficient collection and disposal rather than on recovery and recycling waste. It is significant to note that the design of formal waste collection systems has more potential to deny the informal sector access to waste as a resource than the actual outcome. Nevertheless, where the means to monetise publicly available trash exists, an informal sector for this exists as well. Unfortunately, the role of informal practices alongside formal waste management systems is not well understood. For instance, plastic, tin and glass reclaimers are present in cities across the globe, and there is some indication of a will to elevate their value in society (Didero, 2012). Attempts to assist informal arrangements for waste reclaimers via formalisation and regulation might do more harm than good when poorly managed (Didero, 2012; Fahmi, 2005). This case study in Cairo, Egypt examines one of the largest informal waste collection systems in the world. It is immensely complex, having evolved over time, growing with the population of the city and largely without formal rules and regulations to guide it. This section provides only a brief and simplified overview highlighting key points and lessons, with references providing further detail.

Informal Organisation: in the early twentieth century, a group of migrants entered Cairo and were known as the Wahiya. They established themselves as being responsible for the collection and disposal of all household waste in Cairo, for which they collected a fee from the residents (Haynes and El-Hakim, 1979). Several decades later, another group of migrants entered Cairo, and the Wahiya and this group came to be known as the Zabbaleen as they collaborated in setting up a mutually beneficial waste collection system (Fahmi, 2005). In this arrangement, the Zabbaleen became responsible for the collection of all waste (ibid.). They collect garbage on donkey-pulled carts or small pickups, and transport it back to their village. There they separate out recyclables, and other valuable pieces, and then use the organic waste for feeding pigs and other livestock which are then sold (Ecomena, 2015). They also sell the sorted secondary materials such as paper, tin, rags, glass and plastics to intermediaries. For all of this, the Wahiya have retained control over payment for, and access to the waste and collection rights, and the Zabaleen, typically, have had no share in the fees paid by those residents, but pay the Wahiya to gain access to the waste garbage (Fahmi, 2005).

Some Successful Interventions: on receiving some funding from, inter alia, the World Bank and the Ford Foundation, the Zabaleen formed the Zabaleen Environmental Development Programme themselves. It concentrated on establishing community-based recycling enterprises designed to maximise the resource value of waste and to generate income (Neamatalla, 1998). In addition to advanced plastic handling, the Zabaleen Environmental Development Programme set up a composting plant designed for simple operation and maintenance. “This plant aimed to transform the vast amount of accumulated organic waste in the settlement into saleable fertilizer” (Fahmi, 2005). Responsibility for managing the composting plant was assumed by a local Non-Governmental Organisation, the Association for the Protection of the Environment (ibid.). “Uncontaminated organic waste was sorted for the production of a higher-grade compost, with retrieval of 80 per cent of the materials and with the remaining 20 per cent being dumped on the outskirts of the city” (Neamatalla, 1998). This recycling system prevented the need for unsanitary landfills, as well as protecting the environment from the uncontrolled disposal of organic waste (Fahmi, 2005).

Replicability: The choice to include this Egyptian case study is twofold. The first is to illustrate both the immense possibility the informal sector offers for supportive participation and the potential that exists for an effective informal waste reclamation service. The replicability of such a sector in South Africa is evident as waste reclamation is already a thriving industry in Johannesburg alone with a particular focus on the reclamation of plastics, steel and tin (Zack and Charlton, 2011). The possibility therefore of establishing a strong network of reclaimers in other waste matters appears strong. The second point of importance drawn from this case study is that formalisation of such a market, or network, can do more harm than good and remove people’s livelihoods as opposed to improving them or providing opportunity. As the possibility of replication is considered, caution and sensitivity should be exercised.

Lessons from the Case Studies

The three case studies illustrate several important lessons that will be used to design a system for the South African suburb of Hillbrow. Although it is apparent that bio-digester systems can operate successfully at an economically feasible level at a variety of scales, there is still substantial room for failure in the implementation of such a project. Reasons for failure can either be attributed to technical difficulties or lack of community engagement, or some combination of the two. Technical difficulties can lead to significant delays and cost overruns, as the second case study indicates. However, these difficulties might be avoided with careful planning; analysis of the site and the waste stream; and proper design and construction of the plant as well as the processes used to run and manage it. This form of failure is evident in the case study of Sri Lanka, but successful mitigation is seen in the case study of Costa Rica.

Community based organisations are more likely to reach their objectives in a certain project, but inevitably, the community, or a sense of it, will have to be fostered first. For example, if a community with some sort of common objective does not already exist, it might be difficult to resolve conflict of interests within a specific space. In Sri Lanka, a relationship with the community did not exist, nor were there any significant attempts to encourage one. In Costa Rica, the culture for environmental awareness already existed and engagement was

carefully and continuously fostered. All relevant parties should be made clear about the objectives of the project, goals should be aligned and there should be clear reasons for each of the parties to participate. Ultimately, community engagement and committed buy-in is equally important as technical robustness. Responsiveness and support from the targeted community engaged in the initiative will improve its overall efficacy and the capacity to deal with any problems should they arise will be available.

Replicability in the South African Context

Hillbrow as a specific context in South Africa was chosen to explore the potential for replicability of a waste management system for a number of reasons. Hillbrow is an area with a severely degenerating infrastructure of which poor waste management is a key component, but it is also an area that the COJ has recently been identified as a key area for rejuvenation (COJ, 2005). Hillbrow as a space is constantly under pressure with different relationships always being renegotiated: it is a fluid space with a complex history, and interventions must have the flexibility to respond to its history and current context.

This section starts with a consideration of its context that refers to an examination of the current forms of waste generation in Hillbrow and how it is handled. In proposing a new system that might function well in Hillbrow, consideration is given to both lessons learned from the international case studies described and the successes and failures of the existing systems in Hillbrow.

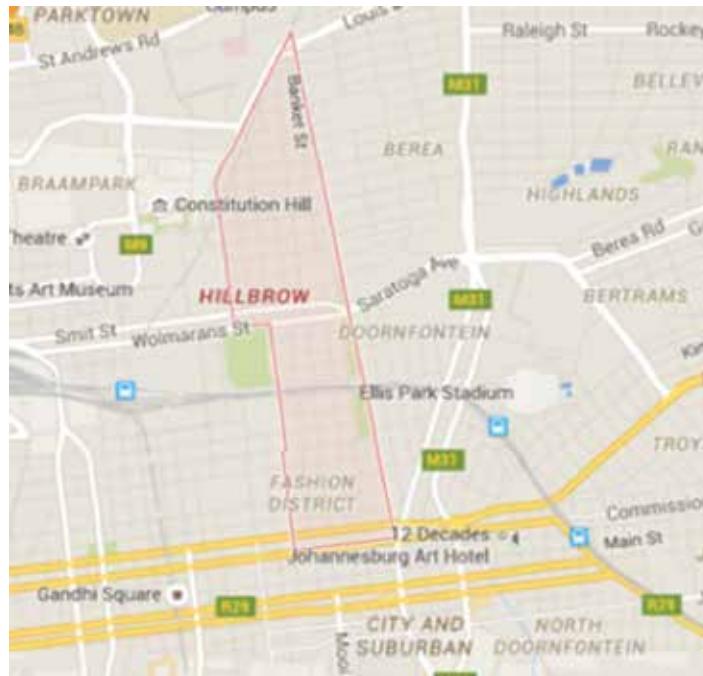
Introduction to waste management in Johannesburg

The waste management policies of Johannesburg are devised and determined by the Environment and Infrastructure Services Department in the COJ. In its most current form the approach to waste management is contained in its Integrated Waste Management Policy (2011). An interview with the Deputy Director in the department, Mr. Mvuselelo Mathebula (Pers. Comm., 2015), indicated that while the waste management policies in Johannesburg are aimed at integrated and environmentally sustainable strategies, they are generic for the city as a whole, with the operational service provider on site translating it into an area-specific strategy. Pikitup, established in 2001, is the official waste management service provider for Johannesburg (COJ, 2002). It is a company the COJ owns and is charged with the responsibility of removing and managing waste in Johannesburg. Pikitup functions operationally according to the regions into which the city has been demarcated that are numbered from A to G. Hillbrow falls within Region F, which includes the other parts of the Inner City and also the southern suburbs.

Context of Hillbrow

Hillbrow has a geographical location of being sandwiched between Berea, Braamfontein, Doornfontein and the historical Central Business District (CBD) (Map 8.1 below). As part of Region F (Map 8.2), and for waste management service delivery, the operational area of Hillbrow is bounded approximately by Louis Botha Avenue to the north, Catherine Avenue to the east, Kotze Street to the south and Hospital Street to the west (Sobantwana, 2015) (Map 8.3 o).

Map 8.1: Location of Hillbrow



Source: Google Maps (2016)

Map 8.2: Johannesburg's municipal regions



Source: CommonwealthNetwork (2016)

Map 8.3: Pikitup's operational area in Hillbrow



Source: Map Studios (2016), with operational area superimposed by authors

Built Environment and history of occupation

First proclaimed in 1890, Hillbrow has a long history of transience. As the original semi-detached houses of the 1920s gave way to high-rise buildings of the 1950s, the earlier lower middle-class Jewish neighbourhood became a more mixed, but still largely white, immigrant precinct (Rubin, 2008). Racial integration began with departure of white residents from Hillbrow in the 1970s when banks offered low-interest bonds to first-time home buyers in suburban Johannesburg (Morris, 1999). With this new opportunity, black residents struggling to gain a foothold into the city progressively filled high-density areas during the heyday of influx control regulations. Hillbrow, a whites-only area in the 1970s, under the restrictions of the Group Areas Act (Silverman and Zack, 2007) meant that black residents were wary to draw attention to themselves, so problems with building maintenance often went unreported (Morris, 1999). The infrastructural demise of the buildings was further affected by landlords taking advantage of vulnerable tenants by charging extortionate rents. This tended to force residents to erect makeshift areas to sub-let in order to afford the rental costs (Rubin, 2008). Dangerous structural deterioration in over-occupied buildings resulted, as the infrastructure to accommodate the growing densities of residents did not exist (Silverman and Zack, 2007). With the deteriorating building stock, and growing numbers of tenants, conflict emerged between tenants and property owners, and a number of buildings were abandoned by the owners (ibid.).

By the mid-1990s, large numbers of African immigrants moved into Hillbrow, once again changing the character of the area. What characterised Hillbrow across these periods was transience, flux and heterogeneity (ibid.).

The transience of the area, combined with increasing densities, means that the area has historically challenged sound urban management. With the income profile of typical residents declining over time, the ability of residents to undertake their own maintenance has also reduced. Sub-letting is still common. A number of buildings having been hijacked and are now controlled by slumlords who intimidate tenants into paying rent. Payments are then pocketed rather than being used to pay for municipal service charges and the necessary maintenance of the buildings. There is also evidence of private businesses operating from inside residential apartments, which may be putting additional strain on the services and infrastructure of the buildings. This, combined with relative local government neglect, has contributed to a deteriorating environment (ibid.). However, while physical decay is a feature of Hillbrow, it exists alongside still well-maintained, or recently refurbished, buildings. Although a comprehensive regeneration programme has not been in place, there has been some state-led investment the Johannesburg Development Agency. A curious combination of decline and improvement, in physical terms at least, is observed (ibid.).

Street life and public infrastructure

The buildings are situated on lively, busy streets dominated by non-residential activities, notably pedestrians using Hillbrow as a thoroughfare between the Central Business District, Berea and Doornfontein and trading economies. Hillbrow contains both formal and informal retail activities (COJ, 2011). The formal retail stores are tightly packed on the ground floors of the buildings along the edge of the narrow sidewalks. The street and building layout of the area has provided very little interstitial space, and this has resulted in almost all informal trading activities taking place on the already congested pavements, mainly but not only along Pretoria and Kotze Streets, or at the end of service roads (Silverman and Zack, 2007). The intensive pedestrian traffic, combined with an estimated residential population of 74 000 inhabitants in 2011, makes Hillbrow one of the densest neighbourhoods in Africa (Statistics South Africa, 2011).

Important demographic features

Transient residents

Multiple sources and interviews have indicated that a defining feature of Hillbrow's demographics is the transience of its residents. Statistics from a 2007 study indicate that 38% of the residents in Hillbrow had only moved into the area in the past two years (Silverman and Zack, 2007). Furthermore, 90% of residents were not living there 10 years ago (COJ, 2015). This being said, interviews with women living and working in Hillbrow did reveal that some of the residents have lived there for more than 10 years and have well-established relationships with their communities (Focus Group, 2015). This intersection of permanence and impermanence creates a space where participation in long-term education and the implementation of municipal or community systems or services is not always feasible.

Foreign nationals immigrating into Johannesburg experience Hillbrow's liminality as a space in many ways. Hillbrow has historically been a port-of-entry neighbourhood with clusters of foreign national communities providing support networks and informal economies before, generally, moving out of the area (Winkler, 2008) in various directions. It is expected that 25% of the residents who are in Hillbrow are foreign born (Kihato, 2011), although other sources suggest that this number is a very low estimate even at that time with its definitely continuing increase in numbers from an even wider range of countries. Many of these transient residents are undocumented and unable to participate in the formal economy due to their illegal status. Foreign nationals who work and live in Hillbrow also have to contend with xenophobia which limits their integration into the host community further limiting their chances of finding employment (Silverman and Zack, 2007).

The transient groups in Hillbrow comprise young, upwardly mobile professionals who are waiting for the opportunity to leave the area and recent migrants who are struggling to find an economic foothold and social acceptance. What the different groups have in common, however, is their limited participation in both the invented and the invited spaces of participation. They are excluded for various reasons, particularly legal status, social discrimination and lack of interest in an area they accused of only passing through and, significantly, a lack of willingness of state officials to engage with these groups.

Young, unemployed and resourceful

According to the most recent census data released by Statistics South Africa (2011), Johannesburg tends to have a young population between the ages of 18-35 years. As Hillbrow is often a port-of-entry for both migrants and immigrants, this leads to another dominant demographic feature of Hillbrow, the youth and a high level of unemployment (COJ, 2011). Statistics indicate that, in central Johannesburg in which Hillbrow lies, more than a third of the unemployed youth are actively seeking work but have been unable to find employment (ibid.) and this figure will have increased in past five years. The statistic for Hillbrow's youth unemployment is higher than the estimated percentage of unemployed residents unemployed nationally (ibid.).

In Winkler's (2012) work the roughly two-thirds of Johannesburg's population in some form of employment, whether, self-employed, casual or more permanent, earn between R800 and R3 200 a month, which is barely enough to cover the rent of accommodation. This amount is also often intended to cover funds to send home to family members in other parts of the country and even neighbouring countries in Africa, thus does not represent a sustainable income (Winkler, 2008). Many job seekers, as part of a low income group, turn to entrepreneurial, sometimes survivalist, strategies to make money (Rubin, 2008). Much of this informal employment appears to respond to the needs of the space available and the community members, although formal data is limited. Most of the informal employment is tied to trading, either in the formal markets, or informally in designated or illegal areas, as well as casual labour (Silverman and Zack, 2007). There is also evidence of informal businesses thriving in Hillbrow's residential flats like shebeens (un-licensed taverns selling alcohol), crèches, laundry services and salons (ibid.). Another strategy for making money is the practice of reclamation of plastic and its sale to Buy-Back Centres (Zack and Charlton, 2011).

Because of the volume of waste generated in Hillbrow there is a strong presence of the mobile reclaimers in Hillbrow and the surrounding areas (ibid.). The reclaimers have the capacity to function as a very useful complementary waste management system. However, because those disposing of plastic items do not generally bother to be separate these from the other waste, the rubbish bins the municipality provides are often upended to find the plastic goods and the remainder of the waste is then left on the street and this further contributes to the waste disposal problem instead of solving it. The Zack and Charlton study conducted in 2010 reports that the amount of money generated for the reclaimed material is between R17 and R270 per week depending on the nature and amount of material collected (ibid.). Based on the desire to find work in the area and the willingness and innovation of residents to create work for themselves, it is possible that if there was a legal complementary waste system from which to make money residents, would be willing to participate in it.

Waste in Hillbrow

Waste generation

There is an estimate that Pikitup removes 12 tonnes of allocated waste daily and an additional 900 tonnes of illegally dumped waste monthly from Hillbrow (COJ, 2007a). The generation of this waste appears to come predominantly from four sources: from places of residence, from the pedestrian traffic of Hillbrow and the activities of the formal and informal economies in the area.

Residents

As indicated in the section framing the context of Hillbrow, many of the residential buildings are unable to accommodate the strain of overcrowding. One of the results of this is an intense mismanagement of waste in some buildings. In interviews with residents have mentioned that facilities available to accommodate the volume of waste generated are inadequate. In the worst cases, plastic bags are filled with waste and left on the street. The other option for residents is to throw the waste directly out of the windows into service lanes below (Focus Group, 2015). This can lead to a massive accumulation of waste some of which enters storm water drains damaging the infrastructure that causes sewage to rise to street level (Silverman and Zack, 2007). In interviews with residents, it came to light that the largest proportion of this generated waste from individual households is of organic origin (Focus Group, 2015).

Thoroughfare and pedestrian traffic

There are an estimated 800 000 people moving through Johannesburg's Inner City daily (COJ, 2011a). Much of this through traffic is directly via Hillbrow which is situated along many of the public transport routes. The effects of this are obvious as waste often builds up around the street bins but there is also a scattering of litter along the sidewalks.

Retail trade

Hillbrow is home to both formal and informal trading economies. Formal trading is associated with registered businesses of people who work for themselves or have employees who work for them and who have employment contracts and are protected by labour laws. According to Tissington (2009), informal traders are those who operate outside of this domain, are self-employed or work for small unregistered businesses. Hillbrow is fertile ground for small to medium-sized informal trading enterprises. They perform an important function in sustaining and developing the area. The informal trading visible in this study area tends to focus on the sale of necessities like food, drink, clothes and daily provisions that are predominantly of organic origin as observed during site visits on 17 and 20 June (see Photograph 8.2: Informal market in Hillbrow below).

Photograph 8.2: Informal market in Hillbrow



Source: Photographs by authors, site visit, 20 June 2015

Statistics on the exact percentages of waste generated at such Inner City markets especially by category are not available. This may be because of the type of wares being sold, but also due to the efficiency of the mobile plastic recyclers who have removed much of the recyclable waste from the markets. Interviews with residents of the Inner City in general and the area managers of Pikitup raise another point, namely, that the waste restaurants generate appears to be one of the primary culprits of illegal dumping. This would include plastic bags that are filled with waste and are simply placed outside restaurants, around trees and on the pavement (Ludick, 2015).

Current Waste Management systems

Pikitup has initiated multiple long-term systems and short-term campaigns to address the excess waste that abounds in this study area.

Bins

The COJ reports that Pikitup has two rotational shift systems in the larger Inner City, comprising 700 staff members and 30 vehicles (COJ, 2007a). There are currently three components to the waste collection service that operates in the Hillbrow area: large, black Pikitup dustbins, street dustbins and very large underground dustbins (COJ, 2007b). Pikitup manages all three of these services. Typically, large black plastic bins with a volume of 240 litres are provided to residents of Johannesburg at a rate of 1 per single stand dwelling unit or one-third per flat (COJ, 2007d). During an interview conducted on 2 June 2015 with the Pikitup general and area managers of Hillbrow, their vehicles clear these residential bins in the Hillbrow area every day, working throughout the day (Sobantwana, Pers. Comm., 2015). Bins are also allocated to restaurants, formal trading areas and to permanent residents. Pikitup also clears areas that have been utilised as dumping grounds, generally, in the alleys found between the buildings (Ludick, 2015). Residents estimated that Pikitup removes this waste twice a month although Pikitup said that there are some areas that are inaccessible and are not cleared as often (Focus Group, 2015).

The second system accommodates pedestrian traffic using immovable street dustbins with an estimated capacity of 0.2 metres cubed. It is evident from the placement of the street dustbins that foot traffic has been correctly mapped as dustbins are clustered close to denser areas of pedestrian movement. The third service component addressing waste management in Hillbrow was developed in 2007. The COJ installed two large underground bins with a capacity of 1-3 tonnes that would be cleared when full. They are specifically designed to accommodate Pikitup trucks. Accompanying this project, street prefects were employed to facilitate the education of the residents on the use of new bins. They had to give feedback on this initiative to Pikitup (COJ, 2007).

Additional manual street services

Pikitup appears to be responding to the specificity of Hillbrow's needs through a variety of supplementary services that also have street sweepers who follow the trucks and remove any debris. In addition, an area team leader interacts with the workers and the community to ascertain any specific issues around illegal dumping and bins that need to be replaced.

Markets

Although not an initiative of Pikitup, there is an ongoing attempt to address the waste management issue in trading areas to create a clean and safe working environment particularly for trading areas (COJ, 2007c). The COJ refers to this as 'block cleaning' and the initiative began in 1999 under the auspices of the Metropolitan Trading Company, a Municipal-Owned Entity.

Its purpose is to meet the needs of the traders (COJ, 2007d) and the Johannesburg Property Company now facilitates the markets. The market requires traders to pay a rental fee which drives up the cost of their wares and increases competition with those continuing to trade at lower rates outside of the formal space (Simone, 2004). Many traders have chosen not to participate in the formal market and continue to trade on the streets but are at risk of being targeted by-law enforcement for infringement of by-laws (COJ, 2012). The by-laws surrounding the process of informal trading emphasise cleanliness, hygiene and their aesthetic appearance. Section 7 points specifically to the sanitation of the area and the issue of littering (*ibid.*). To address this, Pikitup insists that the traders use plastic bags for debris both inside and outside of the market to leave the area clean once they have completed their trading day (Sobantwana, Pers. Comm., 2015).

Community education and upliftment

Pikitup works to involve the community in the waste management issue through educational campaigns in the area and holding municipal meetings. One of Pikitup's goals is to facilitate the integration of the efforts by independent entrepreneurs working in waste management and the current Pikitup strategies applied in Hillbrow (Shomane, Pers. Comm., 2015); one of these is to comply with the Jozi@Work co-production programme launched in September, 2014 (COJ, 2014a). According to interviews with a specialist contracted by Pikitup, part of participating in Jozi@Work results in 10% of the budget being allocated to tenders intended to involve community members in the management of the waste (Shomane, Pers. Comm., 2015). To facilitate this process Pikitup is attempting to formalise sectors that are currently fluid and informal (*ibid.*). Once formalised, there will be co-operative bids for the Jozi@Work tenders. One such attempt has been the formalisation of the plastic reclaimers. In this case, the formalisation process meant the personal identification of reclaimers on a Johannesburg-wide database, and the provision of protective gear and new trolleys for the reclaimers (*ibid.*). Pikitup also assists with funding and structuring by facilitating relationships between those trying to formalise cooperation with the private sector (*ibid.*).

Success of systems

The residents interviewed were asked to evaluate the success of implemented waste management systems in Hillbrow. They were requested to comment on the visibility of Pikitup in the area; how effective the Pikitup's systems were; and to draw attention to any areas of waste management that needed to be reassessed.

During interviews with the Pikitup area and general managers of Region F were asked to point out what issues had to be addressed during the implementation of some of their strategies concerning the bin and street services provided, community education and upliftment and the markets.

Bin service and manual street service

The following information was drawn, predominantly, from the focus group session with residents held at the Hillbrow Theatre on 19 June 2015. Although residents were provided with bins after the 2007 Census, many have since been lost, damaged or stolen (Focus Group, 2015). One particular resident commented that the material of the waste containers was an issue as they are sometimes stolen for scrap (Focus Group, 2015).

Another resident mentioned that members of Pikitup's teams were removing and reselling the bins to other residents (Focus Group, 2015). There is a fee of R385 to replace the bins which residents are unable or unwilling to pay, particularly as the possibility of it being stolen again was so high (COJ, 2007d). Many of the residents interviewed remarked that there was a shortage of bins to accommodate the number of people living in their buildings. If waste was put next to the bins in plastic bags, the bags would be taken back inside the buildings by Pikitup (Focus Group, 2015). The areas where the street dustbins are allocated seem appropriate to the position of the footpaths. However, because of the lack of residential bins in certain areas, these smaller street bins are now used for both residential and street stand waste disposal purposes. These bins are nowhere near large enough nor are they placed at frequent enough intervals to accommodate all waste that needs disposal. Since there are so many overflowing bins, rubbish is placed next to trees or at street corners to form "organised trash dumps" (Focus Group, 2015). Despite attempts to find enough space to place bins, there is still excessive scattered littering throughout Hillbrow (COJ, 2014b). The Hillbrow area manager of Pikitup (Sobontwana, Pers. Comm., 2015) indicated that the large underground bins are still in Hillbrow, although they are not currently being used, as they are need of repair. The inadequacies of the maintenance of this particular system could account for this situation. There is a possibility that this technological innovation was inappropriate for use in this community.

Community education and upliftment

For their experience, the residents reported that the team leaders Pikitup had assigned to liaise with them had never consulted them about how many bins were required for their immediate living area (Focus Group, 2015). Ms. Ludick and Mr. Sobantwana (Pers. Comm. 2015) mentioned that it was difficult to enforce by-laws regarding illegal dumping, particularly around restaurants, because of the lack of residential bins in use in the area. Pikitup attempted to formalise the informal sectors so that people in this sector could participate in the community tenders, an initiative that has potential, both foreign nationals and undocumented residents are excluded; this increases their vulnerability, as they are unable to participate in formal economies and often have to rely on informal practices to survive.

Markets

On a walkabout on 25 June 2015 at one of the main formal trading markets in Hillbrow, it was observed that the waste generated was primarily organic and that only a limited strategy was in place for managing it. On this site visit there appeared to be no running water and the most prominent disposal method was the use of street bins or it was merely left on the streets (Photograph 8.3 below). This was confirmed during an interview on 1 August 2015 with the president of One Voice of All Hawkers, Zacharia Ramatula who also intimated that there was very little consultation with the representatives of the informal traders about the needs for the market. Complaints from this organisation's members about facilities for sanitation and waste disposal have been ongoing (Ramatula, Pers. Comm., 2015). Although Pikitup claims that they provide traders with bags, it is not clear where the bags are expected to be thrown (Ramatula, Pers. Comm., 2015). Pikitup area and regional managers, Ms. Ludick and Mr. Sobantwana, have indicated that in other areas with large trading grounds larger bins have been allocated for waste, but this is not the case in Hillbrow (Ludick, 2015).

Photograph 8.3: Evidence of street litter in Hillbrow



Source: Photographs by authors, site visit, 20 June 2015

Potential reasons for inadequacies in the waste management system

Despite its many efforts, the municipal service of garbage collection and disposal has failed in Hillbrow. The possible reasons for Hillbrow being a supremely difficult suburb to manage could be ascribed to the following:

Buildings

The over-occupation in and a lack of maintenance of many of the Hillbrow buildings has led to dangerous living conditions, especially as the infrastructure can neither contain nor manage the excess waste generated within the buildings. The waste is typically thrown out of windows into alleys and also placed around overflowing dustbins and trees on the streets.

Street life

Traders and restaurants generate large amounts of solid waste with little capacity to dispose it. In the absence of enough street bins much of this is then left on the streets (Silverman and Zack, 2007). Some of those who buy from informal traders and general pedestrians also generate large amounts of waste by littering on public streets.

Lack of a sense of community

The instability of the area creates a reluctance to invest in it financially and emotionally. The desire to move onward and upward means that resources are held until occupants are able to leave and very little investment occurs (Winkler, 2008). The lack of a settled community affects the development of a sense of accountability to look after the environment in the area. Residents attempting to organise themselves and participate in waste management projects to benefit their communities struggle to do so with the volume of transient people moving through the area.

Complementary Waste Management System in Hillbrow

The following system is designed to complement the existing waste management systems that exist in Hillbrow by targeting the organic waste stream which, as yet, is not effectively managed.

The proposed system is based on the case studies presented in this chapter but also acknowledges both the informal practices typical of Hillbrow and its characteristic complexity. The system in many ways mirrors the Sri Lanka case, but aims to avoid the same pitfalls. In applying the lessons learned from all the cases, the apparent success of the system in Costa Rica is noted. A key starting point is to acknowledge that many of the informal practices and processes (especially with cardboard as seen in Photograph) have flourished as a necessary antidote to the failure of formal processes. An example is especially the use of cardboard. Some of these practices have the capacity to contribute positively to a functional waste management system in Hillbrow. Instead of vilifying or criminalising informal systems, it is possible to integrate some of these practices into a multi-faceted waste management system that responds to the complexity of the area.

Photograph 8.4: Informal collection of cardboard in Hillbrow



Source: Photographs by authors, site visit, 20 June 2015

Actors in the system

Generators of organic waste

Informal interviews conducted with residents, the focus group discussion and site visits indicated that the largest generators of organic waste could be drawn into a system. They are the informal traders, the restaurant owners and the residents in buildings with badly managed waste. Borrowing from the formal plastic recycling processes of separation, large bins would be distributed in key areas with negotiated buy-in from representatives and communities to avoid theft and destruction of the bins. The bins should be a manageable size so that they can be stored inside and then taken outside. Organic waste will be deposited directly into the bins and moved to an accessible area once full. The collectors would deal then with them appropriately.

Proposed system

Essentially the proposed system would centre on the digestion plant that would have to be built. Tanks would be installed and relevant actors hired and trained. Importantly, the surrounding community would be involved and integrated into the process. Restaurant owners and street market vendors generate organic waste in Hillbrow that residents would collect, check for contamination of non-organic matter, and then fed into the bio-digester situated within the area. Collectors and checkers would be employed via a hybrid informal-formal system. A trained technician would oversee the correct operation of the plant with the help of trained assistants. Long-term residents are preferable in this role to avoid redundant training and continuity costs. The by-products of the bio-digester are fertiliser and methane gas.

The fertiliser would be packaged on site and sold to fertiliser companies or local relevant Non-Governmental Organisations. The methane gas will be filtered and used either directly in buildings that have a gas infrastructure or compressed, packaged and sold.

The bin distribution would be done by the informal traders. It might be better to have the bins at the more formalised markets where they could be better controlled and stored to avoid theft. Engaging those associated with restaurants, and building management, to agree to participate would be beneficial.

Collectors and checkers

Bearing in mind the need for poverty alleviation and the existing long-standing practice of cardboard-recycling practices in Hillbrow, the collection portion of the waste management system could support residents in the area looking for short-term employment. This would afford the opportunity to engage with the transient and unemployed groupings in Hillbrow. Participants in this component would be able to buy a large, subsidised, durable bag and protective gear from the bio-digester plant, and use it to transport organic waste from the bins back to the plant to be checked and weighed. A suitable remuneration schedule will need to be determined. The amount and type of remuneration will depend on what is currently the norm for informal work and what participants are willing and able to work for. The work is low skilled and requires moderate to no training. However, it will create an additional revenue stream in the informal sector.

Operation and administration

The operational portion of the waste management system would use residents in the area looking for medium- to long-term employment. Participants in this component would receive training in the operation and maintenance of the bio-digester. Technical and administrative assistants would have to be numerate and literate at a secondary school level. It is likely that people with the capacity to fill the employment positions this complementary waste management system would offer would be found in the local settled Hillbrow community in which unemployment is a recurring problem.

Structured participation

Structured participation is key to the success of this project and needs to be carefully attended to avoid the shortfalls that arose, as in the Sri Lanka case. Some preliminary insights into participation are presented as relevant to the Hillbrow context.

The markets and centralised collection point

Participation from the generators of waste in the market areas would be elicited not with the promise of monetary remuneration, but with positive long-term benefits. Effectively disposing of the organic waste in the formal markets and designated areas would result in a cleaner, safer working environment. Hopefully too, the possibility of harassment from law enforcement agents around the infringement of the by-laws would be reduced.

Representatives of the informal traders have already expressed willingness to participate in a system that would keep the area clear of the organic waste. It is felt that it is organic waste that tends to be the primary cause of unpleasant odours in which it is unpleasant to work and which drives customers away (Ramatula, Pers. Comm., 2015). Restaurants would benefit by avoiding fines for illegal dumping of waste outside their establishments and from not ensuring that the sanitation of their restaurants is maintained. Some residents in the buildings have already attempted to better manage their own waste and have offered to participate in any system that alleviates the mismanagement of waste in their buildings and all the negative impacts associated with it (Focus Group, 2015).

The bins with pre-sorted waste could help alleviate the issue experienced with some plastic reclaimers who turn street and residential bins upside down in search of plastic. If a proper waste management system is established, then individual traders will then not need to maintain the system through long-term participation. Given the transient character of the area this is not easy to effect. That being said, many narrative accounts of the area do indicate that most of the traders in Hillbrow have been operating there for many years. They have established networks and systems already and these would be able to absorb the introduction of a new system. The difficulty in establishing fair remuneration in such a system might be relieved to some extent by having a centralised collection point.

Buildings and tenants

Service charges for waste management in managed and maintained buildings can be very costly. The installation of a bio-digester might tangibly reduce costs in both electricity provision and waste management. An incentive for building owners to investigate the feasibility of installing a bio-digester in the basement of the building, and educating the tenants to utilise it correctly could be offered.

Current policy and precinct planning

There is potential for incorporating the system into a larger overall policy for precinct planning. The system could be incorporated in future developments in the area. Suggesting how to negotiate such an initiative is outside the scope of this research. The COJ has identified Hillbrow as a key area for rejuvenation. There might therefore be an increased possibility of leveraging the owners of buildings that have been identified as bad buildings into participating in improvement plans. Waste management could be a component of the provision of a cluster of emergency services. If the complementary waste management system was integrated on a smaller scale into the pre-existing infrastructure, it could provide gas directly to the buildings and lower the cost of living in those buildings. There is also the possibility of incorporating the system in currently operational systems like Jozi@Work. However, strong caution should be exercised to ensure that the formalised nature of Jozi@Work does not threaten the survivalist strategies encouraged by the collection process of the system. Should the system be too tightly regulated, a similar situation as described in the Cairo case study might result. This would stymie the potential this area has for informality.

Technical considerations

An important consideration would be to test the viability of this project for determining the waste stream in Hillbrow. Currently there is no available data as to the composition of the waste in Johannesburg let alone a detailed examination of this situation in Hillbrow. Field trips and resident commentary on the amount of waste generated would establish the nature of the noted high levels of organic waste. It would be necessary to know that there is enough waste to justify implementing a system that would affect the entire area. A more rigorous study of the organic waste component would be essential. An engineer would deal with the technical requirements for constructing the bio-digester, its tank shape, size and materials needed. This could only be done once an appropriate location for the plant had been determined. Existing infrastructure may need to be assessed on its ability to hold the bio-digester. An assessment of any health and safety regulations of those operating the plant would be imperative. The size of the bio-digester would be determined by the available organic waste and possibly be adjusted and extended once the system gains momentum. Digesters offer the possibility for relatively simple upscaling and the design the engineer creates should be able to accommodate change easily as the needs of the market will grow and change.

Community engagement

Moving forward and securing buy-in from community residents would require negotiation with specific actors and groups. The informal trading unions like the One Voice of All Hawkers Association, the South African National Traders Retail Alliance (SANTRA) and the South African Informal Traders Forum (SAITF) are well organised and established. Their representatives have already shown interest in participating in the system should it come into fruition. However, the recycling of waste should be structured as a livelihood strategy for the collectors. Outside of participation for the sake of cleaner living and working environment, generators of the waste in the residential buildings and the formal economies should be offered worthwhile incentives.

A note of concern from a resident in the area was around who would be able to work as a proficient and reliable collector. The ease and volume with which organic waste becomes accessible could create such a lucrative a practice that collectors would be tempted to start stealing organic products if they had enough worth once processed. Another resident suggestion was to start a youth initiative to give them the capacity to work as collectors. This would target the specific issue of unemployed youth in the area. However, this could be questioned as a new set of difficulties could arise around registering the collectors if they are not legal residents.

Conclusion

This chapter assessed the use of bio-digesters as a possible tool to manage organic waste in an urban context. It proposed a complementary waste system for the locale of Hillbrow in Johannesburg. To do this, three international case studies were examined and lessons extracted for local application in the South African context. First, in the Costa Rican EARTH University, the fully-operational and advanced bio-digestion system is willingly supported by students and staff who separate their trash at its source. The by-products of the system are used in the university to reduce its carbon footprint and some general running costs. Second, in a Sri Lankan market, the attempts to install a bio-digester system without community buy-in resulted in a lack of participation and an expressed disdain from the users. In addition, although the technical aspects of bio-digesters are not particularly advanced, they were not overlooked and would still require careful consideration. Lastly, the third case was a highly complex yet informal waste collection service in Cairo, Egypt. It provided evidence that the informal market can and does participate meaningfully alongside formal systems.

From the results of this research, the conclusion is reached that bio-digesters can be a viable method of dealing with the organic waste stream. When installed correctly, they serve to create a cleaner environment that is a valuable asset for the people living and working in the vicinity. There is potential for such a system to be implemented in Hillbrow. It would both service the great need for more and better waste management systems in the area and offer increased job-creation opportunities to improve livelihoods. However, care must be taken to avoid the pitfalls evident in the case studies and yet draw from their successes. Especially important is the point that, although technical soundness is a necessary condition for success, the lack of community buy-in will topple even the most robust system.

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User Experience

noun

the overall experience of a person
using a product or service

9. KNOWLEDGE-DRIVEN SOLUTIONS: IMPROVING USER EXPERIENCE WITHIN THE PARATRANSIT SECTOR

Nonjabulo Zondi

Introduction

The considerable challenges of rapid urbanisation in the Global South are widely recognised (World Bank, 2002; United Nations, 2014). One of the most daunting of these challenges in rapidly growing cities is that of human mobility. Each day, transport systems must move huge numbers of people around large cities, and do so efficiently, affordably and sustainably. This challenge also exists in urbanising South Africa where the National Development Plan (RSA, 2011) has identified human mobility as one of the key dimensions of human capability. As Harrison (2015: 125) explains:

Although transportation is addressed in detail in Chapter Four of the National Development Plan (which deals with economic infrastructure), it features in almost all chapters of the Plan. It is a concern in relation to the economy, environmental sustainability, spatial transformation, global connectivity, state capability, social cohesion and health. Transportation is truly a cross-cutter rather than a sector-based concern.

In South Africa, there is the additional challenge of the legacy of apartheid policies and modernist spatial planning (Orcutt, 1997) that have led to unsatisfactory land use arrangements. These arrangements have resulted in physical breaks in the spatial and social fabric of communities, thus reducing urban mobility and accessibility (United Nations Department of Economic and Social Affairs, 2012; Roman, 2015). The urban poor, who remain largely concentrated on the outskirts of economic centres, are most seriously affected by both social and spatial exclusion (Wolpe et al., 2012). In more recent decades, efficient, reliable and inclusive public transportation is recognised as one of the crucial drivers of social and economic transformation for the urban poor to achieve increased accessibility to economic opportunity.

Meeting mobility challenges requires innovation, especially in resource-constrained contexts where the public purse and household budgets are limited, and expensive mass transit solutions are not feasible. This research seeks to contribute to identifying opportunities for the state to collaborate with private sector actors in initiatives that will provide knowledge-driven solutions to urban growth pressures.

The research focuses on the need for integrated, inclusive and accessible urban transportation solutions to improve social and economic conditions of the urban poor. It investigates whether ‘civic data mapping’ (a technique allowing formal stakeholders and members of the public to collaboratively collect and collate data, using a common technology platform, which is then mapped and potentially used for policy-making processes), as a knowledge-driven tool, can be replicated in Johannesburg, South Africa, to support the integration of public transportation. The subject is pertinent as the provision of adequate urban transport facilities is essential to the social and economic fabric of the rapidly expanding metropolitan areas.

An integrated urban public transport system comprises different modes of transport and characteristic sectors. This chapter focuses on the ‘paratransit’ sector; in particular, the form of public transport, that consists of the Nairobi ‘matatu’ (or minibus taxi, or ‘matatus’ for more than one ‘matatu’) industry as the form of ‘paratransit’ transportation. There are issues of definition regarding the use of the term ‘paratransit’. Existing literature does characterise the matatu as an example of informal ‘paratransit’ (Mc Cormick et al., 2013; Thaimatu and Moronge, 2014). Graeff (2009:3) calls the matatu industry in Nairobi a form of “organised chaos”. In this chapter, although it might lack the formal structure and recognition as a form of formal public transport, the matatu industry is internally organised and therefore represents a hybrid system appropriately labelled as ‘paratransit’.

In this study the Digital Matatus project of Nairobi, Kenya, is used as a lens to interrogate how knowledge creation can be used to spur innovation within the transport sector. The project is a collaborative venture by researchers from the Massachusetts Institute of Technology (MIT), the University of Nairobi and a design firm, and is made available on Google Maps for users on cell-phones or as a printed map (Digital Matatus, 2015). It draws on nearly ubiquitous cell-phone technology to make an open-source data platform accessible to both city officials and public users. The Nairobi case study was chosen as it was based on the practical yet innovative use of relatively accessible technology to transform the way in which urban residents relate to their city using a comprehensive matatu route map of Nairobi. The public transport sector in Nairobi improved significantly through public and private actors having the knowledge to create and use digital strategies innovatively.

The context of the research project is presented first, followed by a more detailed introduction to the paratransit sector. The methodology used in the research is detailed and a literature review explores the relationship between knowledge creation and innovation to support civic data mapping as a way of prompting innovation within the minibus taxi industry. Public transportation in developing countries is outlined next with a specific focus on the role of private transport providers of mass transit. This serves as background for the context of the Digital Matatus case study that is analysed in more depth. The research findings are presented and in the last section, conclusions are drawn and recommendations for further exploration, investigation and/or implementation of the findings offered.

Introducing Paratransit

Public transportation can be categorised as two forms, institutional transport and paratransit transport. Institutional transport has been referred to as planned or scheduled transport services, provided by public or private companies with a formal structure, according to the regulations defined by the relevant urban transport authorities, according to the *Coopération pour le Développement et l'Amélioration du Transport Urbain* known as CODATU (CODATU, 2015). Institutional transport brings the benefits of regulation and established standards. However, for a city where a large proportion of the population is poor it has a downside. Abiding by the regulations and meeting the set standards often forces the cost of transport up, hence institutional transport struggles to offer the poor majority a reliable and affordable service (Ibid.).

In many cities, paratransit modes of transport have emerged to fill the gaps in service provision (Cervero and Golub, 2007; CODATU, 2015). Cervero (1998:15) explains that paratransit is a form of “adaptive transportation” that involves “the spectrum of vans, jitneys, shuttles, minibuses and minibuses that fall between the private automobile and conventional bus in terms of capacities and service features”. Internationally, forms of paratransit include the jeepneys of Manila (converted American army jeeps), the jitney vans in Miami in the United States of America, the *carros pur puesto* minibus cars in Caracas in Venezuela, the minibus taxis in South African cities and the *matutus* in Nairobi (ibid.). Proponents of paratransit transport argue that the sector provides the important benefit of access to critical services and economic opportunities, particularly for the poor (Cervero and Golub, 2007) as it is more widely available than institutional transportation. That minibus taxis cater for 60-65% of all public transport daily commutes in South Africa (Barret, 2003), demonstrates its importance to the majority of all South Africans. Many writers recognise the challenges of the paratransit transport sector, particularly safety, pollution and illegal practices, but cannot deny it is an integral part of public transport provision and opens access for the poor in ways that institutional transport cannot achieve (CODATU, 2015; Cervero and Golub, 2007).

The characteristics of the paratransit sector in comparison to institutional transport (Table 9.1 below) differ in respect of regulatory frameworks, vehicle capacity, services offered and their internal organisation.

Table 9.1: Characteristics of the paratransit industry

ELEMENTS	PARATRANSIT SECTOR	INSTITUTIONAL TRANSPORT
REGULATORY FRAMEWORK	<ul style="list-style-type: none"> Emphasises the absence of adequate regulation - standard routes, fares, quality of vehicle etc. Services that do not fit with the idea of a modern urban public transport system -. schedule and reliability of service Flexible regulatory environment or even total deregulation - semi-formal routes, fares, quality of vehicle etc. 	<ul style="list-style-type: none"> Sector is governed by regulatory frameworks put in place by transportation authorities
VEHICLE CAPACITY	<ul style="list-style-type: none"> Small and medium-sized vehicles - 4-seater sedans to 35-seater minibuses, most often ageing 	<ul style="list-style-type: none"> Buses, trains
SERVICES	<ul style="list-style-type: none"> Flexible mode of transport lacking schedules or frequencies Often direct service networks (minimal pax transfer) Cash fare collection 'Fill-and-go systems' at ranks 	<ul style="list-style-type: none"> Scheduled services Makes use of both cash and pre-loading systems, like the Rea Vaya bus card
INTERNAL ORGANISATION OF THE SECTOR	<ul style="list-style-type: none"> Route associations/cooperatives Two main business models: owner-employee model vs. owner-lessee model 	<ul style="list-style-type: none"> Systems governed by local and/or regional government structures Outsourcing: contractual agreements between private service providers and government Government directly provides transportation services

Source: Author's formulation based on Bruun and Behrens (n.d.), Cervero and Golub (2007) and CODATU (2015)

The paratransit sector is often seen to be in direct competition to institutional transport (Woolf and Joubert, 2014). It is this that has led to local government authorities pushing for formalisation of the sector (ibid.). The sector is also seen as cornering the market unfairly; providing cut-throat competition for institutional transport by avoiding regulations and all related costs; resisting reform; and pushing out competition from lucrative routes (Ayodele, 2008; Woolf and Joubert, 2014). Paratransit transport, therefore, is often deemed detrimental to the overall transport system (CODATU, 2015). However, the stance taken in this research is that the presence of the paratransit sector is justified as it fills the gaps of service provision due to its key value propositions for the urban poor, affordability and accessibility (Ibid.). In this regard, promoting the minibus taxi industry therefore holds a number of scientific, social and political opportunities (Woolf and Joubert, 2014).

Since institutional transport is generally insufficient to meet the demand on its own, and the paratransit sector continues to provide a vital supplementary role, it is clear that establishing a sustainable and inclusive urban transport system, that integrates both institutional and paratransit transport, is required. Such a system would depend on developing a comprehensive and integrated approach to policy decision making, with the aim of developing affordable, economically viable, people-orientated and environment-friendly transport systems (United Nations: Department of Economic and Social Affairs, 2012). In many contexts, paratransit is likely to play a continuing, or even greater role, although this does not mean that the shortcomings of paratransit transport should not be overlooked. There are multiple problems that accompany a lack of adequate regulation, critically, safety and unreliability. The one particular challenge addressed in this chapter is the lack of accessible information for users in the paratransit industry. While information does flow through informal networks it is often only partial and accessible only to those who are part of these networks.

Given this situation, this research investigates ways in which these limitations could be resolved. In particular, the use of civic data mapping tools that have the potential to make paratransit systems more visible to users. The particular case used is that of the Digital Matatus project in Nairobi. Before moving to it, however, the research method employed and an outline of some helpful scholarly literature are presented.

Research Method

The study adopted a qualitative research approach designed to examine how and whether the Digital Matatus project, which made use of civic data mapping, could be replicated in a city such as Johannesburg in South Africa. The case study approach allows for a contextually situated analysis of existing experience with replicability receiving concurrent consideration (Tellis, 1997). Use of a variety of data gathering methods supported the research process (Yazan, 2015).

Problem statement

Institutional transport on its own is generally insufficient to meet urban residents demand. The paratransit sector provides a vital supplementary role in the provision of a public transport service that is affordable and accessible, particularly for the urban poor. Integrating and legitimising the paratransit sector can be challenging, but the integration of suitable modes of transport adds value as they fill key gaps. Economically viable, people-orientated and environment-friendly transport systems (United Nations Department of Economic and Social Affairs, 2012) come from sound decision making. Through an analysis of the Digital Matatus case study, this research introduces the use of purpose-built technology for mapping of complex, semi-formal transport systems. Multi-purpose tools, such as a comprehensive visualisation of the matatu system in Nairobi, can be used to inform policy making and find appropriate ways to place routes in cities. The use of civic data maps has the potential to expose key points of overlap where integration can be pursued.

The research identifies the relationship between knowledge creation and innovation using the civic data mapping case study. The value and credibility of knowledge is recognised as an approach to innovation to address urban pressures in the paratransit sector; and the possibility of the replicability and adaptability of the Nairobi matatu case study in the South African context is assessed to illustrate that knowledge creation and innovation in combination have the potential to yield results.

Data gathering and analysis techniques

Project and documentation reviews as well as individual and group interviews provided the data required. The selection of interviewees was purposive (Table 9.2 below), and were key stakeholders within public institutions, the private sector and civil society. Normal procedures were followed for conducting interviews (duration 25-80 minutes) which were voice-recorded with the consent of the individuals. Recordings were transcribed and data analysed. Field notes and databases were used to categorise and reference data for subsequent interpretation. In addition to the interviewing process, direct observation was used. In a case study approach observation occurs when the investigator makes a site visit to gather data.

Table 9.2: List of interview respondents

RESPONDENTS	NAME		THEMATIC AREA	SITE	DATE
Knowledge Manager – Bus Rapid Transit (COJ)	Ms. Zarina Goondiwala	Female	Knowledge creation	Site	6 July 2015
Digital Matatus founder (innovator)	Ms. Sarah Williams	Female	Kenya, Civic data mapping replicability	City of Johannesburg offices	25 June 2015
Director of School, Technical University, Kenya, Nairobi (academic)	Dr. Nixon Ochara	Male	Innovation and technology Transport landscape of Kenya	Skype interview with respondent in Nairobi	13 June 2015
Founder of Moovah App	Ms. Megan Harrison	Female	Transport (taxi) industry Innovation	University of Pretoria	26 June 2015
Academic/Artist/Taxi Hand Signal Author (innovator)	Ms. Susan Woolf	Female	Innovation	Moovah App offices in Johannesburg	18 June 2015
Researcher at the Institute of Research and Innovation and Tshwane University of Technology (academic)	Mr. Lindelani Ndabeni	Male	Innovation Knowledge	Tshwane University of Technology	13 July 2015
Associate Professor, Department of Industrial and Systems Engineering, University of Pretoria	Mr. John Joubert	Male	Transport Engineer Taxi Industry	University of Pretoria	20 August 2015
Taxi owner, member of ARMSTA (Alexandra, Randburg, Midrand, Sandton Taxi Association) and TATA (Tembisa Alexandra Taxi Association)	Mr. John Dladla* (pseudonym at respondent's request)	Male	Taxi industry Transportation industry	Alexandra Taxi Rank (Pan African Mall Taxi Rank)	13 June 2015

Source: Author's formulation

Literature review

A growing body of knowledge seeks to reshape the understanding of the relationship between knowledge creation and innovation. Knowledge creation has been referred to as the hidden driver of innovation (Riordan, 2013). Sometimes knowledge is almost used interchangeably with innovation when innovation is referred to as new knowledge (Popadiuk and Choo, 2006). Knowledge, and knowledge creation, is claimed to be a central tenet of innovation (Katsikis, et al., n.d.), and seen to drive innovation (Pei, 2008; Tekic, et al., 2012; Agile Innovation, n.d.). In accord with the theme of this research to relate knowledge creation to promote integration in the paratransit transport sector, a conceptual framework of the innovation system is used to build the argument for civic data mapping. It will be applied to route mapping as an innovative way to find areas of overlap and potential. The Nairobi case study will also be reviewed as a body of knowledge that could potentially shed light on how research for this case study could be used in Johannesburg.

Process of knowledge creation: the innovation system

Literature on knowledge creation and its link to innovation generally has two main approaches: first, the Nonaka and Takeuchi (1995) model, the Socialisation, Externalisation, Combination and Internalisation (SECI) model of new knowledge creation that is based on innovation within a single firm or company; and second, the innovation system that is based on innovation among a number of organisations, institutions and various actors.

Based on the work of Polanyi (1967), the Socialisation, Externalisation, Combination and Internalisation model accepts that knowledge has two dimensions: tacit and explicit. Tacit knowledge is defined as knowledge that is difficult to formalise, not easily expressed, such as experience and opinions. Explicit knowledge is described as knowledge that is formal and systematic and is typically documented or expressed, inter alia, as words, numbers, codes, formulae (David Skryme Associates, 2011). New knowledge is created through the conversion and interaction between tacit and explicit knowledge (Riordan, 2013), and is a social process taking place among the interactions of individual actors. New knowledge is created either when tacit knowledge is converted to new tacit knowledge, a process called socialisation; or explicit knowledge, a process called externalisation; or when explicit knowledge is combined with other explicit knowledge, called combination; or becomes tacit knowledge known as internalisation (Fischer, 2001; Riordan, 2013). Within this model the new knowledge created is viewed as the innovation. In the context of the taxi industry and the Digital Matatus case study, tacit knowledge, knowledge about taxi routes, rider experience and the like, that has historically been shared through socialisation is now being transformed into explicit knowledge such as maps and visualisations, making them innovations in and of themselves.

The innovation system is the other model of knowledge creation. It follows a Systems of Innovation approach and has been gaining ground in policy and academic circles the past two decades (Fisher, 2001; Dantas, 2005). The innovation system differs from the Socialisation, Externalisation, Combination and Internalisation model as the approach represents a major transformation in the way that the knowledge creation is viewed (Dantas, 2005). It shifts attention away from research, towards the whole process of innovation, in which research is only one element (Fischer, 2001; Dantas, 2005).

The concept of 'innovation' in this model refers to the search for, development, adaptation, imitation and adoption of technologies that are new to a specific context (Dantas, 2005). An innovation system is therefore a network of organisations within an economic system that are directly involved in the creation, diffusion and use of scientific and technological knowledge. Organisations responsible for the coordination and support of these processes are also part of the process (ibid.). In this approach, innovation is seen as an iterative process that begins with research, development, design, engineering and production, and ends with the successful introduction of new products and processes (ibid.).

This innovation system is a more appropriate lens for this research, as its approach is geared to ultimately informing and creating policy that will benefit society as a whole. This view is opposite to the Socialisation, Externalisation, Combination and Internalisation model that is more geared to increasing the competitiveness of individual organisations within an economy. As integration within the transport sector requires a number of local, provincial, regional and national institutions, private actors, both formal and informal, commuters and private business, the innovation system can guide policy integration by shifting the focus of policy from individual organisations to both the organisations and the interactions between them (ibid.). The model also shifts the focus of policymakers to begin looking into the processes involved in introducing new products and methods to a particular economy (ibid.). This approach allows the emphasis of policy to move away from deciding on whether to support the supply or the demand for innovation, and move towards issues that affect the interaction between the supply and demand of knowledge and innovation (ibid.).

Civic data mapping as a process includes interaction among people and the interpretation of knowledge, as the mapping of elements such as routes requires the interaction of both formal and informal actors. Therefore, civic data mapping shows a definitive link between technology, knowledge creation and innovation. This research seeks to demonstrate that it is thus part of an intricate and iterative knowledge creation process; and that it is a grassroots knowledge creation process that has the potential to convert tacit knowledge to explicit knowledge. In this capacity it can spur on various types of innovations. This is because the success of a civic data mapping process relies on the experiences of the commuters themselves as well as the geo-mapping skills of specialised institutions, as was the case in the Nairobi study. Attention now turns to the paratransit sector in a developing country context, using a particular example.

Digital Matatus as Case Study

Background of paratransit in Nairobi

The dominant mode of transport in Nairobi is by informal paratransit vehicles known as matatus (Preston, 2009). The use of this mode of transport started in the late 1950s when an increase in the number of rural migrants came to Nairobi, which led to the development and proliferation of informal settlements (ibid.). In most informal settlements, there was no public transport and many of the residents could not afford private vehicles hence a new mode of transport was introduced (Graeff, 2009). A matatu is defined as a 14 seater minibus which provides transport for those travelling between the rural and urban areas and from the informal settlements to other parts of the city (ibid.). Over time, the matatu have become one of the most important transportation modes in Nairobi (Intelcap, 2012.). As a paratransit mode they contribute 24% of the modal share in Nairobi, the highest (ibid.). Beyond the numbers, Gonzales et al., (2008) point to the critical role played by matatus in Nairobi's transport system because of their ability to serve a need that is unmet in the city. Patinkin (2014) reinforces the size of the matatu industry, saying that these vehicles ply hundreds of routes in Nairobi and comprise the vast majority of the city's public transportation system but are almost totally informal and unregulated.

The informal and unregulated nature of this mode of transport is due in part to the lack of involvement on the part of local authorities (Graeff, 2009). The routes the matatus use are based on a bus network that existed in Nairobi 30 years ago, and have since multiplied and expanded to incorporate further routes as the city has grown in population size (Badger, 2014). Information about the direction and paths of routes, cost of fares and any other enquiries can only be obtained through interaction with another matatu user. This makes this form of knowledge creation that of socialisation, where the knowledge moves from tacit to tacit.

As the main mode of transport for most people to commute to work, the lack of consistency in routes, endless delays and changing fees per shift, not only affects the passengers but the industry as a whole (Timbs, 2015). The lack of regularity of fixed stops means routes can easily be diverted “in response to passenger needs, congestion, construction or the presence of the traffic police” (Klopp, 2014). As Klopp (2014) notes “Matatu operators and owners – in interaction with their passengers – are Nairobi's invisible public transit planners”. Nairobi citizens have a complex relationship with this home-grown system. It elicits admiration, as is evident in websites that are devoted to matatu art and culture, but also anger, as seen in frequent editorials in the newspapers about the 'matatu menace'. Commuters and the community at large generally complain about poor driving behaviour from the matatu drivers as well as security issues because of the traffic congestion (Graeff, 2009).

Ample opportunities for criminal activity abound as matatus often bring movement in the city to a standstill due to a lack of updated transport infrastructure, as well as the large number of matatus on the roads. At the same time, the matatu drivers complain about the lack of job security, and having to constantly deal with police bribes (ibid.). Furthermore, the matatu owners complain that they have to recover high initial and operational costs, leaving the industry competitive and profit driven (ibid.). There is also a lack of data and transport knowledge on the part of the local authority which means there is lack of general planning and poor implementation of existing plans.

All stakeholders spontaneously agree that it needs to be better regulated and planned. The question is how. Importantly, it is essential to fully understand the context of the industry and look at the different stakeholders within this system. There are also constituencies that are often indirectly affected by the industry on a daily basis, such as businesses through their employees. Graeff (2009) identifies seven stakeholders of the matatu industry (Table 9.3).

Table 9.3: Description of actors operating in the matatu industry

ORGANISATION	DESCRIPTION
Matatu owner	Owns matatu vehicle(s); owners can choose to drive their vehicle
Matatu operator	Vehicle driver, often hired by matatu owner to drive a vehicle
Commuters	Users of the vehicle
Regulators/Civil Associations Ministries, Transport Licensing Board (TLB)	Local and national government officials whose responsibility it is to implement rules and regulations the various transportation departments set
Matatu Owners Association (MOA)	Association formed by matatu owners that governs the matatu routes. All matatu owners need to be registered with the Association to operate on a route
Matatu Welfare Association (MWA)	Trade union of people working in the matatus industr
Transport Licensing Board	Ministry whose mandate is it to ensure all vehicles are roadworthy and compliant in terms of safety
Support industries	Established roles within the matatu industry such as conductors, drivers, mechanics, car-washers, etc.

Source: Author's formulation based on Graeff (2009)

Rationale for choosing the Digital Matatus project

The case study was chosen based on the practical yet innovative use of relatively accessible technology to transform the way in which city residents relate to their city. This research has the potential to address critical issues of access to the city, scaling requirements and addressing informal transport. It could begin a process that would involve recommending implementation strategies and frameworks to proactively manage the development of transport facilities in a city through collaboration among various actors. Most importantly, the case study could produce knowledge for the general public in the form of a civic data map compiled with data accessed with readily-accessible technology. This could be used to spawn a number of related urban innovations, making it a project that could support considerable further research, development and innovation in a range of spheres.

The Digital Matatus project addresses a major challenge in the availability and use of data within informal and hybrid formal-informal systems. As Williams et al. (2015) have noted, informal systems are often regarded as too chaotic or complex to offer reliable data. There are also often active attempts to prevent data collection as operators either try to keep information hidden from government, or colluding with government officials to prevent openness. Where data is collected there are major challenges of cost, reliability and standardisation across sectors. It is in response to these challenges that the Digital Matatus project is a potentially important exemplar

The Digital Matatus project

The Digital Matatus project is an innovative city intervention which sought to ensure that transportation in the City of Nairobi becomes more efficient and open. The study collected and standardised transit data for Nairobi's matatu system to make information about the various routes publicly available. It thus created Nairobi's first comprehensive visualisation map of the matatu system (Figure 9.1). The data collected and the map are most noteworthy achievements as the information and the finished map are now used as planning tools for local government (Digital Matatus, 2015). Matatu owners and commuters both put the map to very good use (Klopp et al., 2015). The Digital Matatus project of the Civic Data Design Lab at the Massachusetts Institute of Technology⁴ is in partnership with the University of Nairobi, Groupshot, a private design firm, and Columbia University's Centre for Sustainable Urban Development (Digital Matatus, 2015). The aim of the project was to demonstrate that the use of specialised data-recording phone apps, equipped with an integrated Global Positioning System (GPS) tracking function for cell-phones, can effectively and efficiently capture important transit information, especially in informal transport contexts. This will support better ways of finding data for mapmaking and journey planning (Klopp et al., 2015). The project utilised General Transit Feed Specification (GTFS), a form of data collection using a Google Maps platform that was first used in 2005 by Portland's TriMet transit agency in 2005. Also used was the General Transit Feed Specification Exchange, a web-based programme for sharing data (Williams et al., 2015). These systems were developed in the United States of America but the innovation was applied in the semi-formal Kenyan paratransit system.

⁴This entity develops alternative research and data collection practices to enhance the quality and reach of data and information, making information and information sharing more relevant and responsive to the needs and interests of citizens traditionally on the margins of policy development. The practice of civic data mapping develops data visualisation and collection tools that expose urban phenomena that might previously have been hidden or understood differently (Civic Data Design Lab, 2016).

The project emerged in Kenya as an example of a low cost solution to collecting data using commonly available technology, in this case the cell-phone. As Williams et al. (2015) explain, Kenya has a higher rate of cell-phone penetrations than Africa as a whole, and Nairobi has a higher rate than the average for Kenya. There is also a recent history in Kenya of the innovative use of technology to resolve urban problems, M-PESA (M stands for ‘mobile telephone’ and pesa means ‘money’ in Swahili), for example, is a mobile banking service, while Ushahidi is a community crisis mapping tool using mobile technology that was first used in Kenya, before being applied internationally (Ibid.).

Figure 9.1: Digital Matatus’ stylised route map for Nairobi



Source: Digital Matatus (2014)

The Digital Matatus project was, importantly, the result of a transnational partnership. Although the approach was introduced from the United States of America by the Massachusetts Institute of Technology, Columbia University and Groupshot, the University of Nairobi led the data collection process. The 136 matatu routes were identified and students were sent on each to collect detailed information during the data collection phase (Ibid.).

The project achieved the development of a standardised route map through the use of off-the-shelf, purpose-built cell-phone technology that allowed for data collection to take place directly while riding in a matatu on a specific route. Due to the semi-formal nature of the matatu routes, the research team, with the help of Nairobi residents, commuters and operators, mapped all stops, signs and shelters along the routes. Their mapping efforts on larger, popular and central stops and terminals (ibid.). University students also contributed to the map by adding places of interest (Klopp et al., 2015).

Testing was conducted to ascertain which would be the most suitable cell-phone app to use and a decision was made based on experiments in the field. Data was collected, cleaned and formatted into the standard General Transit Feed Specification used by Google. Importantly, the data was placed on open and shared platforms including the Digital Matatus website and Facebook page, and the General Transit Feed Specification Exchange, a website that collects General Transit Feed Specification feeds from various cities (ibid.). Many of the technical details of collecting, compiling and disseminating data are available in Williams et al. (2015).

The Digital Matatus project may be regarded as a successful civic data mapping effort, in terms of its innovativeness, as the creation and sharing of the knowledge spurred the development of several applications that made use of the data, such as a phone based routing application called Ma3Route⁵, proving the capacity of knowledge creation to not only be an innovation in itself, but to have the capacity to stimulate other innovations. Furthermore, the knowledge was shared with Nairobi communities who might not use mobile technology for their daily commutes. To enable accessibility of this facility, the stylised map by Digital Matatus was created with a style borrowed from transit maps such as those found in New York, London and Paris. The map was extremely well received and adopted as the official transport map of the city.

The programme director of the Kenya Alliance of Resident Associations, currently Mr Henry Ochieng, who works closely on transit policy, is quoted saying, “You cannot do a policy or a plan without having a clear understanding of where the public vehicles operate or the stages” (Patinkin, 2014). This successful mapping method has the potential to enable critical discussion within local governments to address challenges that not only have deep social impacts but also profound economic implications for trade and investment, such as Nairobi’s traffic congestion problem (Klopp et al., 2015).

⁵ Ma3Route is a mobile/web/SMS platform that crowd-sources for transport data and provides users with information on traffic, matatu directions and driving reports. Ma3Route aims to make traveling easier in developing countries by democratizing timely transport information.

Findings and Analysis

Relevance of civic data mapping for Johannesburg

Knowledge creation is a frequently overlooked driver of innovation. Civic data mapping provides an avenue for revealing information that is often inaccessible, such as the way communities feel about their places and the way that commuters feel about their user experience. The creator of the Digital Matatus map referred to civic data mapping as an alternative practice or method of representing and collecting data to make it richer, smarter, more relevant and more responsive to the needs and interests of citizens traditionally on the margins of policy development. Therefore, civic data mapping provides an opportunity to experiment with and develop data visualisation and collection tools that highlight complex urban phenomena and represent them in widely accessible ways. Further, the creator noted that this mapping allows the researcher to borrow from traditional method of science and design by using spatial analytics to expose patterns and communicating those results, through design, to new audiences (Williams, Pers. Comm., 2015).

During the interviews for this research, it emerged that the concept of civic data mapping was broadly understood by the interviewees. Mr. Dladla (Pers. Comm., 2015), a taxi owner, highlighted areas where civic data mapping could be used to change the taxi industry for the greater benefit of taxi owners and operators as well as commuters. The taxi owner mentioned that the map could assist in putting key governance and management systems in place for the taxi industry as much of the knowledge and processes within the taxi industry exist in the form of tacit knowledge and then are shared through the socialisation process (moving from tacit to tacit knowledge). Mr. Ndabeni (Pers. Comm., 2015) noted that the strength of mapping knowledge systems is the ability to expose areas where solutions are most needed. The suggestion was also made that such maps could reveal solutions that might exist already but are previously untapped.

Participation and consultation

Participatory literature has stressed the importance of community consultation on urban development to ensure the buy-in of the community for the success of the interventions and the sustainability of the programmes. A critical question is the extent to which this initiative, brought from the United States of America involved locally based collaboration. The partnership with the University of Nairobi has been explained but did the initiative include the matatu operators, local government, and the users of paratransit? There were indeed focus group discussions involving matatu owners to gauge reaction to the paper-based map, which did introduce a participatory and collaborative element to the process. There was also a partnership with the Kenya Institute for Public Policy Analysis, which is a government think tank concerned with improving public transportation. The Nairobi city government was also involved in many of the workshops held in the course of the project, and its support for the project is indicated in the way in which it has designated the product as an official transit map (Williams et al., 2015). There were, however, limitations to the participatory nature of the project, given its origins as a research initiative. For example, students collected the data; and the operators and users of paratransit service actually collected the data and become deeply involved in the initiative, which could have affected its conception.

From the perspective of the taxi industry, Mr. Dladla (Pers. Comm., 2015) acknowledged the importance of consultation, especially with local government. He noted that, although structures and procedures for participation were in place, “true participation” was not ensured and taxi owners often feel steamrolled by local government decisions. He felt also that taxi owners themselves were not well represented either by the associations that represent them or by government as a whole. He questions the continued exclusion of the taxi industry from the greater urban planning debates, discussions and decision making. While the Digital Matatus project initially developed as a research endeavour rather than as an initiative from within the matatus industry, an attempt was at least made to engage the industry.

Perceived value and appropriateness of innovation

The recognition of innovation seems to be highly linked to the perceptions of the value of the innovation to the end user. Dr. Ochara (Pers. Comm., 2015), for example, questioned the value of the Digital Matatus map as he noted that cell-phones, internet connectivity and maps were fairly accessible in Nairobi, essentially arguing that the Digital Matatus map is redundant. Dr Ochara’s argument can, however, be deepened as his argument not only bring into question the value of the Digital Matatus map but also whether everyone in Nairobi would have equal access to the high degree of connectivity required, whether everyone would choose to make use of maps on their cell-phones or even whether the end-users are digitally literate. The value of the Digital Matatus map therefore lies in its accessibility from a variety of platforms such as paper-based, online and General Transit Feed Specification formats. This value needs to be built into the system from the very beginning to ensure the success of the project.

To support his argument, Dr. Ochara (Pers. Comm., 2015) asserted that:

With M-PESA, even though there’s an issue of literacy, people went out of their way to learn how to use it... The issue is that applications need to be valuable. If people don’t see value in it, then it won’t work.

His view highlights the notion that the more valuable an innovation is perceived to be, the more people will tend to learn how to use that innovation. It is true that innovations are sometimes difficult to introduce to people as using them often requires a behaviour change whether concerning the products itself or having to learn how to use a new technology or rethinking the ways in which technology is used.

Mr. Ndabeni (Pers. Comm., 2015) argues that in many cases, informal activities are merely survivalist in nature and it is likely to be the case in this study area, with cell-phone ownership not a given. Therefore, he noted, innovating in this context is not always bound to succeed. He shared this thought:

What we shouldn’t be confused with is that not every activity in the informal sector is productive. Some are just poverty alleviation. So no matter what you do in terms of innovation you may not succeed. You cannot succeed in turning every informal activity into an innovation that is, for example, productive and that can be mainstreamed. But you will find pockets of innovation within the informal sector that you can use.

This is critical to note, as the ultimate intention of any innovation should be agreed upon before it is pursued. Furthermore, the ultimate goal of innovations, especially within the informal sector, should ultimately be to improve the lives of the urban poor.

Lastly, Ms. Woolf (Pers. Comm., 2015) and Ms. Harrison (Pers. Comm., 2015) both highlighted that the consultation aspect of their Hand Signal and Moovah app projects respectively, was essential for the implementation of their projects. Both innovators had followed similar lines of engagement, making initial contact with the taxi associations and influential taxi owners before initiating their projects. The consultations were done to establish the value and benefit that taxi owners and associations would have from allowing these projects and innovations to continue. Thus, the expected value of innovations for users was highlighted as an important area that any innovator needs to question before carrying out their idea.

Innovation and exclusion

Questions related to participation also brought about discussions regarding inclusion versus exclusion, especially with respect to technology-based innovations. This is due in part to the contextual reality of innovating within an African context, as this requires dealing with high levels of inequality and also the reality of an often extreme digital divide. Mr. Ndabeni (Pers. Comm., 2015) pointed to the fact that technological innovations sometimes reinforced inequality, as uneven power dynamics meant that innovations responded mainly to the needs of already privileged actors in the formal sector rather than those of the more marginalised actors who operate informally. All respondents noted the lack of power that commuters have within the transport industry in Johannesburg which was seemingly an issue in Nairobi as well. Respondents indicated that there is a need for participation in urban development by taxi industry owners in particular and commuters generally. The respondents felt that being excluded from the transport planning processes was the fundamental reason for lack of buy-in into technology based innovations in the paratransit sector. One respondent cited the example of the cashless (card) system in Tshwane, South Africa, which failed as it did not include the taxi drivers as one of the key stakeholders in the planning process. Here, the cashless system was seen as cutting the income of the taxi drivers; it is common practise for taxi owners and drivers to agree on a set amount the owner wants at the end of the day and any extra income to go to the driver. Taxi drivers therefore did not want the new system as it would account for all the extra money and so be inaccessible to them, with the system thus seen to benefit owners but not drivers.

Commenting on innovation in Nairobi, Dr. Ochara (Pers. Comm., 2015) provided a clear perspective around the dynamics surrounding technology and innovation in developing country contexts. He noted that, although Nairobi, and Kenya as a whole, were booming with innovations and technology, there was still a sizeable majority of people who felt that the use of technology within the matatu industry would exclude a large proportion of the population that was poor, relatively uneducated and would experience the effects of the digital divide adversely (Ochara, Pers. Comm., 2015).

Technology can be divisive in that it can create a preference for those that are able to use it such as the youth and educated people in society. What is interesting to note is the pervasiveness of this division, in that Ms. Goondiwala (Pers. Comm., 2015), working with the Rea Vaya in Johannesburg, explained that the Bus Rapid Transit system was expanding to those members of society that are more open to technology and who can learn new innovations easier; and pointed out that innovation is highly susceptible to reinforcing exclusion. This reiterates what Mr Ndabeni (Pers. Comm., 2015) said when speaking about the System of Innovation, the power dynamics and how difficult it is to change institutions' ideas and underlying ideologies. Professionals and government officials who are unfamiliar with the priorities and circumstances of the informal sector would not be in a position to adequately represent their interests in debates in future planning processes, making it important to secure the participation of the urban poor in other ways to ensure their interests are met. A lack of technological knowledge limits potential use of a digital map. However, technology and innovation could be led by the youth, particularly young people within families of taxi owners (ibid.) who would possibly have understanding of the minibus industry.

While technology can often exclude a majority of people, this need not always be the case. The use of widely available technology for civic data mapping, for example, could be a pertinent tool to ensure the inclusion of the marginalised into policy development and into the greater economy and society. From these findings it would require a degree of adaptation to be able to match the matatus' innovations in Johannesburg. This suggests that innovation can either be a tool which has the potential to reduce inequality and increase inclusiveness or a tool which perpetuates the current realities of various members of society.

It is therefore quite clear from the examples given that the dualities of the role of innovation are present. Some respondents tended to instinctively associate innovation with technology-based systems, whilst others expressed concern that technology could alienate certain groups of people which would contribute to the failure to innovate and of innovations with potential to succeed.

Challenges and opportunities for innovation in Johannesburg and Nairobi

Respondents noted the lack of power that commuters have within the transport industry in Johannesburg, and it was seemingly an issue in Nairobi as well. There was agreement that taxi industry owners in particular and commuters generally should participate in urban development. The fundamental reason for lack of buy-in into any innovation was due to users being excluded from the transport planning processes. One of the main impediments to effecting improvements in this paratransit sector that those involved as users or providers of a service in the taxi industry were deprived of sharing their knowledge. Most important to developing the ability to innovate within the taxi industry is to understand the way the industry is governed as this is where the knowledge and innovations within this sector are created, used and disseminated. Taxi associations in Johannesburg are the main governing organisations for the taxi industry.

The level of decision-making power and the extent to which taxi associations make various key decisions seems to vary. It was noted by Mr. Dladla (Pers. Comm., 2015) that certain decisions are occasionally taken by associations and sometimes by taxi owners and although not often, by taxi drivers.

This seems to be directly linked to the power dynamics and internal relationships within and among individuals of a taxi association. Those with greater influence and power will tend to make critical decisions, like changing the prices of fares for the taxi routes. Taxi drivers, although located at the lower level of the chain of authority, also tend to have considerable power within the taxi industry. In groups, they have the ability to veto decisions made. An example happened in Pretoria when taxi drivers rebelled against the instituting of cashless ticketing systems being piloted in the taxi industry (Dladla, Pers. Comm., 2015). Respondents had varying views regarding the efficiency and effectiveness of taxi associations in Johannesburg, ranging from very good to poor. Mr Dladla called the taxi associations' governance into question (Pers. Comm., 2015). This was due to challenges such as delays in replacing out-going executives and the over-utilisation of interim committees. Therefore, what can be seen is that, although institutions govern the taxi industry in Johannesburg, there are a number of other dynamics that will affect innovations coming to the fore in this sector.

When asked to discuss the way in which decisions are made within the taxi industry, Mr. Dladla (Pers. Comm., 2015) spoke about the lack of relevant knowledge or not being able to use models to assist with forecasting and to make critical decisions, like increasing the price of a single ride. This, according to Mr. Dladla (Pers. Comm., 2015), has resulted in taxis on some routes experiencing losses, whilst others over-charge their passengers. Ms Woolf (2015), on the other hand, cautioned against the tendency to provide blanket statements of the general level of effectiveness of the associations. She made this statement based on her experience with a taxi association that was organising its responsibilities effectively during her interactions with association heads when conducting research for her taxi hand signals project. She mentioned that, like all institutions, the power of the organisation lies in its members and the overall way in which the actors in the taxi industry owners and operators relate to each other. The lack of a standard practice is apparent and each association operate differently, although the functions of such an association are well understood.

In Nairobi, the matatu industry relies strongly on associations (Ochara, Pers. Comm., 2015). He noted that unlike in Johannesburg, there are fewer entry points into the matatu industry as the taxi associations are the biggest gatekeepers and regulators of the industry. The associations in Nairobi are more formalised and are large institutions with hundreds of thousands of members who act as very strong lobby groups. They are effectively part of the governance of the cities in general and are in constant consultation and engagement with local authorities. The system seems to be much more centralised in Nairobi as opposed to Johannesburg (Ochara, Pers. Comm., 2015).

Associations in Nairobi manage the day-to-day operations of the industry, the hiring of taxi drivers and, importantly, they also manage the finances. Matatu owners, in this system, are actually equivalent to investors in a system. The associations oversee many of the operational functions. It is important to note here that blanketing the industry should also be avoided. Dr. Ochara (Pers. Comm., 2015) explains that the generally centralised way in which the matatus system is managed, means a number of innovations in the industry are now part of their organisation. These have benefitted matatu owners and commuters alike (Ochara, Pers. Comm., 2015.):

Formalising the registration of associations could be the best thing that could ever happen to the sector, especially for members. Commuters have also got somewhere to run to complain. And by the way there were also many spinoffs on businesses...associations started having courier services. So those who have started those businesses are increasing the profitability of the matatus

What is suggested is that the structure of the matatu alias minibus industry could be receptive to supporting the take-up of an innovation or inhibit its acceptance. In Nairobi, its relatively centralised and formalised structure could support the diffusion of the innovation whereas, in Johannesburg, South Africa, the more diffused and informal structure would make take-up more difficult. However, further research on the nature and effect of the manner in which the associations in both settings work and the impact they have on their overall capacity to innovate is required to confirm or reject this hypothesis. The next section concludes with various considerations in the replication of the Digital Matatus project in Johannesburg.

Conclusions and Recommendations

This research sought to contribute to the identification of opportunities for the state to collaborate with various actors within the innovation system to provide knowledge-driven solutions to urban growth pressures. The point of departure was the focus on the need for integrated, inclusive and accessible urban transportation solutions to improve social and economic conditions of the urban poor. It investigated whether civic data mapping, as a knowledge-driven tool, could be replicated in Johannesburg, South Africa. The use of civic data maps has the potential to expose key points of overlap in routes, service provision and other areas where the integration of the use of minibus taxis as a paratransit service could be pursued.

Theoretically, the research showed that civic data mapping has the ability to transform tacit knowledge into some tangible, usable form of knowledge that can be used by a variety of actors like policymakers and innovators. The Digital Matatus project done in Nairobi, Kenya produced a critical body of knowledge that has the potential to represent civil society through exposing user attitudes, popular routes and other choices. Information of this nature is critical to have for effective policymaking discussions. The map produced as part of Digital Matatus project showing the routes and stops for the matatus in the City of Nairobi as a visual representation is not only of practical value, useful and marketable, but also provides an opportunity for integration of transport routes in a major city in Africa.

The power of civic data mapping is that it employs data visualisation and mapping techniques to expose and communicate identifiable urban patterns. The map can also be used to illustrate policy issues to broader audiences. In addition, and in the same way that knowledge sharing can create opportunities, so too could digital civic data mapping expose new data and trigger the development of new markets in the transport sector where demand exists. Moreover, gaps in knowledge can be identified and solved and methodologies shared with other African countries.

Findings showed that the civic data mapping could be used to change the taxi industry for the greater benefit of taxi owners and operators as well as commuters. Local, tacit knowledge truly does exist in numerous forms, both formal and informal. It is critical to continue to build on the knowledge that exists and use it to inform innovations and that new civic data is created to contribute to this. The strength of mapping knowledge systems is the ability to merge the formal and informal knowledge and expose areas where solutions are most needed and where they exist but are untapped. Overall, the objective of seeking innovations, especially in developing world contexts, should always be to resolve society's deepest challenges.

The success of an innovation is to a large extent determined by the interactions amongst actors. An important determinant of the success of innovations is the presence of interactions and flow of information amongst actors within the innovation system. As was mentioned by a number of respondents, maps of the taxi routes in Johannesburg do exist however, whether this knowledge is widely consumed can be questioned and this might be attributed to the power dynamics and relations amongst actors within the innovation system. This is even more interesting when realising the ultimate power of knowledge which, if shared, creates opportunities to innovate.

Most important to the ability to innovate within the taxi industry is understanding the way the industry is governed, and therefore how knowledge and innovations within this sector are created, used and disseminated. Johannesburg and Nairobi seemed to have opposing governance structures within the taxi industry, which might therefore allude to the challenge that would exist in trying to replicate the matatus' route map. This requires further investigation. When innovating within the paratransit sector perceived value for users is significant. Innovators must question the value of the innovation before carrying it out. This value needs to be built into the system from the very beginning, to ensure the success of the project. Taxi owners must be involved in the innovation and use this process as the impetus to change the taxi industry for the greater benefit of taxi owners and operators as well as commuters. With knowledge of the possibilities of an innovation issues of sustainability can be dealt with through recycling, putting key governance and management systems in place.

Interaction and flow of information about the innovation should form the fundamental basis of innovations. Different actors such as universities, enterprises and civil society should interact and learn from one another as part of an innovation system. Since technology and innovation are intricately related, discussion regarding technology-based innovations and systems must ensure that no sector of society, especially that which the taxi industry serves, is excluded. Striving to eliminate inequality, innovations should be simple, user-friendly and easily accessible. Invariably, it will be through ensuring greater inclusion and participation that the innovation will instil a sense of ownership, and improve the user experience in the paratransit sector.

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Spatial

adjective

relating to, occupying, or having
the character of space

10. REALISING SPATIAL TRANSFORMATION THROUGH THE CIVIC ACADEMY

By Adoné Kitching and Chido Muzondo

Introduction

While community participation in governance is widely regarded as positive, there are continual disappointments with the quality and outcomes of participatory processes. In many instances, the problem rests with state officials who offer lip service to participation, avoiding the uncertain consequences of real engagement. These officials may also have little concern with, or understanding of, the local knowledges that genuine engagement and partnership offer to development processes. But, there is an additional problem. Local residents often lack the information, knowledge, skills, contacts and resources to engage effectively with government authorities. As Marcus (2007:2) puts it, “[m]any individuals and interest groups are ill-prepared for participation in public planning processes and do not understand how municipal government functions, the key dilemmas it faces, or the urban planning concepts and procedures that shape economic, social and physical life”.

The ‘civic academy’, sometimes also referred to as the ‘citizen (or citizenship) academy’ – two related but not entirely interchangeable terms with our preference for the former as it is not limited by any definition of who a ‘citizen’ might be – is a potential instrument to empower individuals and communities to engage more effectively in processes of governance by providing the information, knowledge, skills that make participation or community activism more effective. It also offers the opportunity for networking between local residents and government officials, opening the way for a blending of local and professional knowledge, and for new collaborations across the state-community divide.

This chapter is a response to the South African context where poor communities living in South African cities are still unable to fully enjoy the rights enshrined in the country’s constitution. Although there is an official commitment to the making of inclusive cities, the planning and development often proceeds on a largely technocratic basis with participation often in name only. The recent proliferation of protest action highlights both the inability of the state to bring about tangible and lasting change in the urban environment, and the inadequacy of current structures of public participation for highlighting the needs, priorities and contributions of urban communities (Von Holdt et al., 2011).

South Africa’s National Development Plan (RSA, 2011) does recognise the need for both spatial transformation and inclusive governance. The Plan “[requires] municipalities to provide as much information on local areas as possible on an open-access basis and support citizen training in spatial competencies” (ibid.:291). Prompted by the National Development Plan, Isandla Institute, a Cape Town-based public interest think-tank, has drawn on the idea of a ‘civic academy’ to propose a mechanism for both enhancing the capacity of citizens to engage meaningfully in development and creating platforms for deliberation and collaboration between residents and

local government. After reminding the reader of the challenge of urban spatial governance in South Africa the idea and history of the civic academy internationally is introduced. Isandla Institute's research on the civic academy to date is then introduced and used as a starting point from which to formulate critical questions regarding design and operationalisation of such an instrument within the South African context. Local and international case studies illustrate methodologies through which civic organisation, outcome-driven deliberation and collaborative engagement can be enhanced. The aim of this analysis is make practical recommendations for the refinement and implementation of the civic academy concept.

Inclusive Governance, Spatial Transformation and Idea of the Civic Academy

While there are many accomplishments to be celebrated in post-apartheid South Africa, particularly improvements in the provision of basic services, it is also necessary to acknowledge that the South African constitutional vision of a just and equal society is not yet achieved in South African cities. The National Development Plan notes that 'South Africa remains a highly unequal society where too many people live in poverty and too few work... The apartheid spatial divide continues to dominate the landscape' (RSA, 2011:24). In his analysis of the lingering effects of apartheid spatial planning, Berrisford (2011:249) insightfully puts it this way:

...each town and city in South Africa reflects not only an unequal distribution of infrastructure, amenities and accessibility, but the distances between the places in which the poor and the well-off live exacerbate that inequality.

The Presidential Twenty Year Review also picks up on the continuing tendency for South African cities to be divided by class and race, as it notes that "many of the state's urban settlement interventions and other affordable housing projects remain on the peripheries of cities" (The Presidency 2014:70). The urban poor are, for many reasons, relegated to the periphery of the city where there is limited access to economic opportunities. Even when the urban poor are able to access well-located land, their vulnerability does not improve due to precarious living conditions, exacerbated by a lack of secure tenure and limited basic services.

For Marcuse (2009:3), the reality of where resources are unequally allocated over space represents one of two cardinal spatial injustices, along with the involuntary confinement of any group to a limited space. Its inverse, spatial justice as defined by Soja (2009:2) is the "fair and equitable distribution in space of socially valued resources and the opportunities to use them", suggesting it is experienced not only as an outcome, but also as a process (Soja 2009:3). In similar vein, Marcuse (2009:3) contends, "[s]patial remedies are necessary but not sufficient to remedy spatial injustices – let alone social injustice." Following this line of thinking, the full realisation of spatial justice would imply both just outcomes, the equal distribution of resources over space, and just processes, the equal distribution of decision-making power between stakeholders. This is the stance adopted in this discussion. Spatial remedies must also be coupled with processes that promote justice.

While the value of public participation is recognised in South African policy and legislation, participatory processes related to human settlements development have not yet ensured that all urban residents, particularly the urban poor, have an adequate say in the creation of their living environments. Existing structures for public participation have encountered numerous challenges related to their design and management. Internal accountability systems have cultivated a ‘compliance mentality’ among local officials, and, as a result, public participation is often perceived as a box to tick, instead of being the result of a critical process that should significantly influence state action (Van Donk, 2012). A particular concern is that existing processes of public participation in South African cities are often poorly connected to the exercise of real power and decision making. Ward committees, for instance, were designed as “an attempt to ensure that democracy not only is the preserve of central parliament but that citizens have a stake in governance at the local level” (Naidu, 2011:1). And yet, according to Smith (2008:20), “available research suggests that ward committees are in general not having a significant influence on the decisions made by council and how resources are allocated at ward level”.

The notion of a civic academy that focuses on spatial literacies offers a possible way of seeing spatial justice both as an outcome and a process. It puts forward a theory of change that is rooted in the recognition that citizens must participate in the development of urban living environments as equal partners. In doing so, the civic academy does not disregard the role of the state, but rather encourages greater emphasis on collaboration, and deliberative engagement, between stakeholders.

Evolution of the Civic Academy

The idea of the ‘citizen’ or ‘civic’ academy originated in the United States of America. Patrick (2000) relates the rise of civic education in the 1990s to a growing concern with civic apathy and a decline in direct political engagement. He calls for “education in citizenship for democracy” (Patrick, 2000:4). In the same edited volume, Battistoni calls for “civic education through service learning” as a “means to a more engaged and knowledgeable citizenry” (Battistoni, 2000:30). There was clearly a renewed interest in civic education in the United States, at least in the 1990s but, as Boyte (2000) reminds, there was an earlier history of civic education. He argues that civic education had its roots in the civil rights movement of the 1960s, and especially in the Civic Education Programme of the Southern Christian Leadership Conference. The citizenship schools that emerged from this programme taught mainly black children in the American South the skills of citizen action. This approach combined a philosophy of non-violent civil rights activism with a belief in the possibilities of American democracy. It was a period of experimentation in citizen democracy, and education for democracy, which was followed by the decline in engagement, described by Atherton (2000:94) as a “malaise in the nation’s civitas”.

In the 1990s the Center for Civic Education launched Project Citizen which was a curricular initiative in civic education designed to teach students how to monitor and influence public policy (ibid.). This initiative was, however, actually about inserting citizen or civic education in the existing curricula of schools and colleges. In addition to this, there was also a rise in community leadership programmes initiated by local government. A further development was the creation of separate citizen or civic academies. These academies were informed by the renewed interest in civic education and the community leadership programmes, but was also modelled

on existing citizen police academies (Morse, 2012). The citizen police academy had, in fact, originated in Great Britain in the late 1970s but had been taken up enthusiastically in the United States in the 1980s (Maffe and Burke, 1999). Like citizen police academies, ‘citizen academies’ were created by local governments and, like community leadership programmes, they covered a range of topics related to local government. However, while citizen police academies concentrated on the workings of the police department, a particular division of local government in the United States of America, citizen academies were geared towards increasing awareness and understanding of local government as a whole. Citizen academies also diverged from community leadership programmes in that they were less prescriptive about who was allowed to participate (Morse, 2012:86). In his analysis of citizen academies in North Carolina, Morse (ibid.) sets out three key features observed relatively consistently across a number of programmes. The first is that citizen academies require a significant investment of time on the part of participants. Second, they require substantial resources from local government as officials from different departments conduct different sessions of the programme. Third, and this is an important and positive point, citizen academies offer opportunities for hands-on learning. This observation is also made by Callahan and Young (2005:10), who show that:

The citizen academies provide comprehensive hands-on learning experiences that give residents an opportunity to interact with city management staff and learn about the challenges facing local government. A variety of interactive activities provide participants with a better understanding of the evolving principles advocated by the local government such as: cutting red tape; better customer service; creativity; shared decision making with community groups; and increased connectivity with other government agencies.

This hands-on approach allows for collaborative problem-solving, as citizen academies encourage participants to come up with solutions to existing challenges (Callahan and Young, 2005; Morse, 2012). Morse’s analysis also considers what local governments hope to achieve through citizen academies. Three goals are highlighted, namely: transferring knowledge, increasing involvement and building community relations (Morse, 2012:91). Each of these goals have both basic and advanced manifestations. With knowledge transferral, the basic intended outcome is to share information about local government with citizens. Advanced outcomes however, include “feedback from citizens regarding governmental programmes and services” (ibid.:92); discussion on existing issues faced by communities; and engagement in dialogues that allow for mutual learning. Where citizen academies are conducted to increase citizen involvement in local government, an advanced outcome is for participants to serve on boards, commissions or councils (ibid.). A further advanced outcome of citizen academies is the establishment of strong relationships between citizens and local government, and the creation of opportunities “for local officials and citizens to engage in dialogue on important issues” (ibid.).

Civic academies were well popularised across the United States from the 1990s, with at least half the municipalities Morse (2012) investigated as having an existing or previous academy. While many of the civic or citizen academies in the United States of America maintained a broad focus on the workings of local government, some were more thematic. In particular, “citizen planning academies” had a strong focus on planning or spatial literacies (Marcus, 2007).

Recent research from the United States of America suggests that the outcomes of civic academies have been broadly positive, but that there are limitations and pitfalls. Marcus (2007:2) concludes that:

these academies do broaden citizen understanding of planning and government, foster improved personal relations between citizens and planners, improve citizen’s (perceived) ability to influence decision-makers, and invigorate public interest in government boards and commissions.

However, Marcus also goes on to write that:

academies rarely integrate local and professional knowledge into what they teach and they face an inherent conflict between “capacity building” and “allegiance building”.

The American experience of civic academies is clearly important for informing the possibilities and limitations of the model in contexts like South Africa. However, we do need to look at how the model has travelled internationally, and also at other models which may have similarities to the American-initiated civic academy. Importantly, other cases suggest that the civic academy need not always be initiated and controlled by local government, and also that the purpose of a civic academy may have wider objectives, including supporting local actors in more assertive and activist roles in relation to the state.

Civic education programmes resembling citizen academies have also been observed in the Dominican Republic, Poland and Zambia (Sabatini, 1998; Bratton and Alderfer, 1999; Finkle 2002). They differ from those found in the United States in that they were funded and conducted by non-governmental institutions rather than by local government (ibid.). Programmes such as Grupo Accion por la Democracia and Dialog Project in Poland illustrate the potential of civic education to move beyond merely sharing information to citizen empowerment and reconstituting governance relationships. Both Polish initiatives sought not only to enhance civic knowledge, but also to encourage collective problem-solving and cooperation between citizens and local government (Sabatini, 1998). In his analysis of the outcomes of civic education programmes, Sabatini (1998:25) finds that “[increased] participation appears to be related to mobilisation around particular goals rather than democratic norms” and “[is] also strongly related to programmes that promoted more direct participation compared to those that emphasised workshop or classroom-based approaches”.

In 2011, South Africa's draft National Development Plan recommended that "every municipality should promote citizenship education and training to strengthen community organisation, planning and project management skills and competencies, perhaps through some kind of 'citizenship academy' run by a non-governmental organisation or educational institution" (RSA, 2011:258). While specific reference to a 'citizenship academy' is omitted in the final version of the document, the analysis and its component parts are retained. Prompted by the National Development Plan, and by their analysis of the shortcomings of existing mechanisms for public participation, Isandla Institute began to investigate what a citizenship academy could look like in the South African context. Given the National Development Plan's assertion that municipalities should carry the responsibility of ensuring that citizens are informed and organised, this organisation defined a citizenship academy as a local government-funded programme. As the Lublin Neighbourhood Revitalization Programme in Poland (Sabatini, 1998) did, Isandla Institute also emphasises spatial transformation as a critical outcome of a citizenship academy.

In June 2012, Isandla Institute hosted a national round table to assess the feasibility of such a programme to formulate its scope and functioning. In the input document presented at the event, Isandla Institute's analysis of the contextual challenges that warrant the creation of a citizenship academy was rooted in the recognition that "the consolidation of political participation and representation presupposes an active, engaged public that is able to claim rights, negotiate priorities and accept negotiated outcomes" (Isandla Institute, 2012:2). The organisation suggested that South African citizens are not adequately equipped with the capabilities necessary to make participation meaningful. Given that the state predominantly focuses its attention on addressing supply-side issues, the citizenship academy was thus put forward as a mechanism for shifting emphasis to demand-side challenges. The national government would make more funding available to already dysfunctional structures such as ward committees.

Participants at the round table discussion took issue with a citizenship academy that focused only on strengthening citizens' skills and competencies, without addressing the shortcomings of the participatory spaces in local government. While acknowledging the necessity to balance supply- and demand-side solutions, participants cautioned that such an approach "presumes that the problem is with citizens and not the state" (ibid.:18). In its contribution to the 2013 State of Local Governance Publication, Isandla Institute responded to these concerns by recasting the citizenship academy as a platform for both learning and deliberation (Görgens et al., 2013). At that point, the intention was "to create structured spaces where community groups, civil society organisations, state officials, politicians, and progressive professionals [could] be equipped with relevant skills and information, and have the opportunity to debate possible solutions to social and technical problems, thereby deepening their understanding of the motivations and positions of other stakeholders" (ibid.:40).

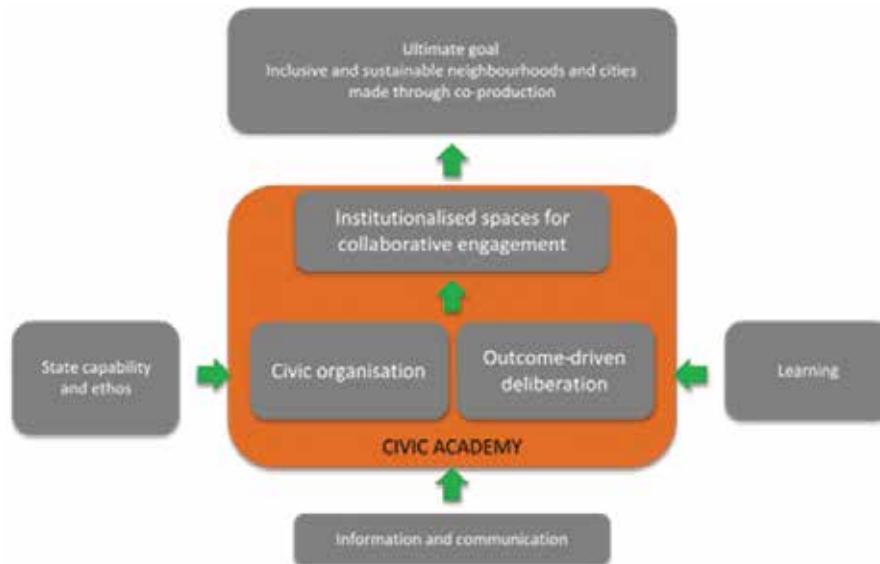
Between August 2013 and July 2014, the institute built support for what became known as the civic, instead of citizenship, academy through consultative forums. While the idea remained largely conceptual, Isandla Institute's analysis of contextual challenges, as well as its proposed solution to these, was received well. In developing the latest iteration of the civic academy, the institute took the definition set out in the 2013 State of Local Governance Publication (Görgens et al., 2013) as a starting point for considering the practical workings of such

a mechanism. At the time of writing, the civic academy is construed as a tool for realising the objective of liveable, inclusive and sustainable cities that result from genuine co-production. It is defined as a local government-funded programme aimed at enhancing citizens' capacity to act as partners in development and to create platforms for deliberation and collaboration between citizens and local government.

Current Conceptualisation of the Civic Academy

In a concept note entitled *A Civic Academy: Towards better spatial outcomes through enhanced civic activism and deliberative local democracy*, Isandla Institute (2015) identifies six critical 'missing ingredients', the absence of which impedes the achievement of transformative goals. The document suggests that the civic academy could address three of these ingredients, namely: civic organisation, outcome-driven deliberation and institutionalised spaces for engagement (see Figure 10.1).

Figure 10.1: Missing ingredients in local governance in South Africa and positioning of civic academy



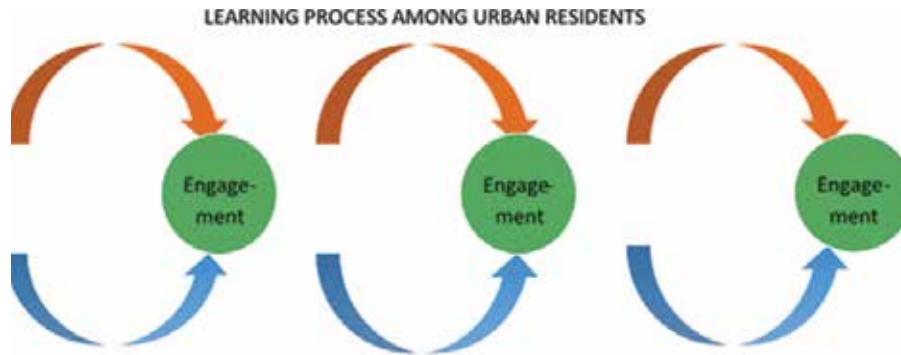
Source: Isandla Institute (2015)

As with previous versions of the concept, the intention is for the latest iteration of the civic academy to be funded by a municipality and conducted by a non-governmental or tertiary institution. This is to ensure that municipalities enact the responsibility stipulated in the National Development Plan, while also allowing the civic academy some independence from the state. On the one hand the civic academy is designed to empower citizens to engage meaningfully in the making of their living environments. On the other, its mission is to create spaces for collaborative engagement where urban residents and the state can work together to find solutions to prevailing urban issues. Participants in the civic academy therefore engage in a process of learning, where the skills necessary to organise for and deliberate about development are fostered. To strengthen citizens' ability to organise, the civic academy will emphasise skills like community mobilisation, electing leaders and coordinating and documenting meetings. In this way, the programme will aim to enhance skills that allow citizens to engage actively in the planning and design of their environments. Through learning skills of enumeration and community mapping a better understanding of the prevalent challenges in their neighbourhoods and settlements will stand the citizens in good stead when negotiating with local government authorities. It is these skills that improve spatial thinking that depends on an understanding of the concepts of space, access to tools of representation and an ability to engage in processes of reasoning (Bednarz and Kemp, 2011). To enhance outcome-driven deliberation, the civic academy will also strengthen citizens' ability to deliberate and negotiate.

The learning processes are also intended to cultivate a sense of readiness among urban communities to interact, collaborate and partner with government stakeholders. While Isandla Institute recognises that government itself has to learn and unlearn systematically, it is beyond the scope of the civic academy to take responsibility for such a process. Instead, the concept note suggests that other institutional bodies, like the Department of Cooperative Governance and Traditional Affairs and the South African Local Government Association, are mandated to ensure that local government engages meaningfully with their constituents (Isandla Institute, 2015).

Furthermore, the learning process will be complemented by and advanced through moments of collaborative and deliberative engagement processes where communities and local government officials can co-produce solutions to particular local challenges (see Figure 10.2 below). The intention is for these platforms of engagement, along with the learning process that precedes and follows it, to be outcome-orientated. If, for instance, a community identifies early childhood development as a critical issue an effective solution has to be design. Essential to the learning process is to ensure that residents have access to relevant information regarding their city's commitments to education. It will then have to hone in on the skills needed to plan for early childhood development centres and build the community's capacity to negotiate with government stakeholders. During moments of collaborative and deliberative engagement communities and government stakeholders will then work together to develop viable strategies for addressing the issue. Roles and responsibilities will have to be set and an action plan produced. These moments of engagement will be designed to enhance stakeholders' understanding of one another's perspectives and positions by allowing space for open discussion and for the negotiation of tensions.

Figure 10.2: Learning processes and engagement between communities and local government



Source: Isandla Institute (2015) (learning processes interspersed with moments of deliberative and collaborative engagement between communities and local government)

It is this dimension of the civic academy – facilitating the institutionalisation of regular forums for engagement and co-production – that offers an innovative approach to urban governance issues. While existing initiatives, both state- and civil society driven, endeavour to empower urban residents through education and training, these have not yet adequately dealt with the need for formalised spaces of collaboration and deliberation among stakeholders as equal partners in development.

Framing the Research

At the outset, interest lay in determining how urban innovation could best contribute to the refinement of the notion of a civic academy, in theory and in practice. The central emerging research question was how can the civic academy be operationalised in the South African urban context? It was clear that much work was required to better understand the tools and methods needed prior to the civic academy becoming functional. In an attempt to answer this question, local and international case studies that offer insight into two main issues were investigated. First, effective civic education methodologies which, as Sabatini (1998) suggests, involve a variety of activities ranging from voter education to the creation of civil society organisations (see Box 10.1 below). The interest of the civic academy resonates with the definition of civic education as those programmes that “explicitly seek to convey democratic values and/or promote the knowledge, skills and values necessary for democratic participation” (ibid.:5). Second, also considered was the institutionalisation of engagement between urban communities and the state. A desktop study and a review of relevant literature as well as personal correspondence with key informants⁶ involved in local interventions profiled in the paper provided information.

⁶We acknowledge the contributions of Jak Koseff (Pers. Comm., 2015), Carohn Cornell (Pers. Comm., 2015) who provided access to learning materials used in the Fellowship Programme (Pers. Comm., 2015), and Gavin Andersson (Pers. Comm., 2015).

Box 10.1: Forms of civic education

Formal civic education: Incorporated into the formal school system, these programmes often weave teaching about democratic institutions, principles and practices into courses that emphasise national identity and unity.

General civic knowledge, value and skills: Often informal courses, these programmes seek to increase knowledge of democratic principles and a country's democratic institutions and practices. They promote democratic values especially compromise and tolerance. They may also teach skills in a limited fashion. The emphasis is on workshop learning, with the idea being that the transfer of basic knowledge, values and skills will translate into participation outside of the classroom. Fundamental is the idea that a basic set of attitudinal and knowledge-based are prerequisites for participation.

Issue-based or rights knowledge: Usually informal courses, these seek to raise awareness of particular political issues, and to increase knowledge of democratic, political and human rights. They may also teach skills useful for addressing the issues at hand. Trainees maybe encouraged to participate, but actual participation is not necessarily an element of the programme. Issue-based programmes deal with concerns like corruption. Rights programmes focus typically on groups whose rights are seen to be unfairly limited, such as women, certain ethnic groups, the economically underprivileged.

Voter Education: These programmes educate citizens on how to register and vote, and promote the sense of civic duty to vote, monitor the elections and to respect the outcomes.

Civil society creation and mobilization: These programmes seek to mobilise citizens and build constituency for civil society. In the classroom, the emphasis is on issue awareness and conveying knowledge of the political system and rights. Civic education in these cases is used as a means to generate participation in a particular civil society organisation, to build and mobilise membership.

Community/Group problem-solving: These seek to promote knowledge and skills for the exercise of rights and the use of democratic processes and institutions established for specified purposes. Examples are programmes in local communities to increase participation in local government matters or efforts to develop local community groups' abilities to address community issues. Participation is immediate and focused. Classroom work may be limited.

Source: Based on Sabatini (1998:5-6)

The research was shared with a reference group⁷ during a meeting in August 2015 and served as a platform for meaningful feedback since the participants had been involved with the civic academy project. During round table discussions held in September 2015, the findings of the research were also shared with representatives from civil society organisations based in Cape Town and Gauteng.

⁷ Attendees included Edgar Pieterse, Mirjam van Donk, Hopolang Selebalo, Sonwabo Gqeqge, Scott Drimie, Xoliswa Dilata and Goitse Konopi.

Lessons from Existing Practice

As illustrated earlier in Figure 10.1 on, Isandla Institute envisions the civic academy as a programme that will address the need for civic organisation, outcome-driven deliberation and institutionalised spaces for collaborative engagement. In this section, we investigate case studies that point to methodologies used in addressing each of these. While the essence of civic academies is not necessarily resembled, valuable insight is offered into the way in which capacity enhancement and collaborative engagement have already been undertaken. This is preparation for the discussion on the implications of the design it will implement that summarises the seven key lessons emerging from the analysis of the case studies looked at for this research.

Enabling and strengthening civic organisation

The ability to organise around pressing needs such as housing and access to basic services is essential for poor urban communities fighting for spatial justice. In her analysis of the impact of relocation on racial integration in Cape Town, Oldfield (2001) describes instances where communities have claimed rights, challenged the state and worked towards the betterment of a shared living environment through local organisations. According to Oldfield, the struggle for housing in Delft South built trust among families in the settlement, and contributed to racial integration. Indeed, she claims “[race], political affiliation, and individual and group politics were put aside explicitly in order to prioritise and organise the invasion of housing in Delft South” (ibid.:197).

To organise effectively, particular capacities are required on the part of urban communities to ensure the credibility of local structures that will influence development processes realistically and reliably. Primarily, leadership capabilities that adequately represent the interests of members in the organisation and make decisions on their behalf are essential. However, that the members accept leadership structures and decisions willingly (ibid.) too is as important. A shared history or a collective experience that connects members is a valuable asset. Indeed, community organisations that are created merely to fulfil project requirements rarely achieve significant influence, since they lack such a foundation (United Nations Human Settlements Programme, 2011) that unites and strengthens. Millstein (2008) also suggests that, in South Africa, the state requires community organisations to produce a constitution as well as a register of members as evidence of their legitimacy. While community organisations may claim legitimacy based on internal relationships and democratic processes of decision making, those that hope to enter into meaningful dialogue with the state must have the necessary capacity to comply with formal requirements. Finally, community organisations require the capacity to express their struggles, and establish networks through which activities can be coordinated (Millstein, 2008:39; United Nations Human Settlements Programme, 2011).

The Organization Workshop methodology that the Seriti Institute employs in South Africa offers important insight into the ways in which community organisations can be enabled and strengthened. The Seriti Institute is a non-profit organisation, established in 2009 that aims to “promote the use of community organisation methodologies to create socially healthy and economically vibrant communities, and thereby promote sustainable livelihoods and prosperity” (Seriti Institute, 2011).

The Seriti Institute is well-known for its role as an implementing agent for the Community Works Programme, the goal of which is to address unemployment and poverty by creating regular work opportunities in economically marginalised areas (ibid.). The institute also works towards the achievement of sustainability and prosperity through a learning and capacitation programme for co-ordinators of the Community Works Programme's, through the Youth Development Network, and through its Organization Workshop methodology (Carmen and Labra, 2011).

The Organization Workshop is an exercise that strives to promote economic and social development through training large groups of people (Seriti Institute, 2011). Its emphasis is on organisational methods, as it requires participants to act collectively as an enterprise. The Organization Workshop is defined as "a practical exercise in the creation of a real, but temporary enterprise aimed at facilitating the development of organisational consciousness through a planned acceleration of practice in a large group that needs to act in an organised manner" (Carmen and Labra, 2011). Through skills development and vocational training offered throughout the practical exercise, it is used to address extreme poverty and joblessness (ibid.). The exercise takes the form of a workshop that runs over six weeks, and between 150 and 350 participants can attend a session.

The Organization Workshop process begins with the identification of prevailing local issues. Mr. Andersson (Pers. Comm., 2015), the Director of the Seriti Institute, explained issues may include a lack of services or the provision of adequate infrastructure or educational and recreational facilities. Increasingly the need to address social issues like public and domestic violence, AIDS prevalence and food scarcity has arisen. The first step involves determining the priority issues in which the community members at the workshop form a Participants' Enterprise. The organisation engages the community in an extensive consultation process. This serves as a formal entity that represents and makes decisions on behalf of the community. Members of the Participants' Enterprise carry out the work needed to address the issues identified through public consultation and interact with the Facilitators' Enterprise (Seriti Institute, 2011). Participants, namely volunteers from the community with the Seriti Institute paying for time and labour, are given a free rein in the establishment of their Participants' Enterprise and therefore make independent decisions on its internal leadership structure and how funds are spent. Those serving on the Participants' Enterprise are paid according to market standards for the work undertaken (Carmen and Labra 2011), and they must determine how income is divided among the participants.

The Seriti Institute provides the resources required to complete the work in accordance with the Organization Workshop methodology. The cost of administrative work and construction material and equipment is met. Participants are also provided with food for the first few days of the Organization Workshop, after which they provide for themselves. Participants can work full days knowing that their children are taken care of as the Seriti Institute also provides a child-care service for the duration of the Organization Workshop (Andersson, Pers. Comm., 2015).

In addition to working a minimum of six hours per day, participants are also required to attend daily lectures on the Theory of Organisation offered by the Institute. According to Carmen and Labra (2011), the “lectures take place for one and a half hours a day for a period of two weeks, and enable participants to gain a perspective on their historical, social and economic context; working of the market economy; current patterns/models of organisation; as well as individual and collective behaviour”. Mr. Andersson (Pers. Comm., 2015) mentions that the Theory of Organisation lectures inform the different ways in which participants choose to organise their activities during the Organization Workshop. Practical experience of managing an enterprise accompanies the lectures that present the necessary theoretical underpinnings of community organisation. Learning through going through this process prepares participants to implement what they learned once the workshop is over.

Positive outcomes of the Organization Workshop the Seriti Institute facilitates include the improvement of local living conditions. Since the Organization Workshop begins by identifying prevalent local challenges in consultation with the community, it ensures that the work the Participants’ Enterprise undertakes meets the needs of local residents. During an Organization Workshop conducted in Diepsloot in 2010, for instance, a school was renovated, a gardening enterprise was assisted to expand by three hectares of production, six kilometres of crime hotspots were cleared of reeds and long grass, and four safe zone crossings were built for schoolchildren along a stream (Seriti Institute, 2011 that also has details of the outcomes in various communities). Furthermore, the Organization Workshop equips participants with the knowledge and skills that they need to establish new enterprises and to undertake development work, thereby preparing participants for entry into the formal employment market.

Examples given suggest that the skills required to effectively build community organisations are best taught through practice. This is also picked up in the Jozi@work initiative instigated by the Office of the Executive Mayor of Johannesburg (COJ, 2014; 2015) (Box 10.1). The Seriti Institute’s Organization Workshop allows participants to make crucial decisions about leadership structures, decision-making processes, division of labour and the distribution of resources. Hence participants are able to test out various ways of organising themselves, and to experience first-hand the challenges that may arise from managing multiple interests and personalities. Importantly, evidence given shows that theoretical knowledge is a valuable resource for communities who use it to shape their own organisations. If a civic academy intends to strengthen citizens’ ability to organise, both its content and processes must be geared to practical problem-solving. A civic academy must engage citizens in exercises that enhance their capacity to identify needs, to design solutions, and to organise themselves in ways that allow for the efficient implementation of projects that enhance the community’s state of well-being.

Box 10.2: Harnessing civic organisation for service delivery

In September 2014, the Office of the Executive Mayor launched a programme called Jozi@work (Joziatwork 2015). It aims to address two prevalent issues faced in South African cities: inadequate service delivery and unemployment by lowering barriers to entry into the formal employment market for urban residents. Jozi@work sets up new supply chains that allow community co-operatives and micro enterprises to bid for work packages that directly address local service delivery challenges.

The programme is based on the recognition that poverty is multidimensional, and that it manifests not only as a 'deficit in basic living conditions, income, and education, but as a more complex and prohibitive deficit of capabilities' (Office of the Executive Mayor 2014). In addition to lowering barriers to entry into the formal market, the programme also aims to develop residents' organisational, administrative and vocational capabilities. To this end the Office of the Executive Mayor set up seven regional forums where residents are provided with a space to deliberate over possible approaches to particular service delivery challenges and to receive details about available work packages.

The programme's operational model also includes the appointment of sectoral capability support agents that act as members of the regional forum and provide administrative and compliance support, as well as vocational training, to community co-operatives and micro enterprises. The capability support agents are also responsible for implementing the apprenticeship programme, through which unskilled residents can become part of the City of Johannesburg's procurement process. Those enrolled in the apprenticeship programme are placed with existing community co-operatives or micro enterprises. In this way, they add to the labour force and receive on the job training. Apprentices are also given access to instructional material compiled by the capability support agent. These are to be viewed after hours or during break times, and apprentices are expected to access the instructional material using their own devices or communal viewing areas set up by capability support agents. The programme concludes with an online certification process, or skills developed while working, which may be certified through recognition of prior learning.

Source: COJ (2014; 2015)

Enabling and strengthening outcome-driven deliberation

Numerous authors agree that citizen deliberation is critical for the full realisation of democracy (Pimbert and Wakeford, 2001; Fung, 2006:74; Carpini et al., 2004). While a representative system is meant to ensure that all citizens have a voice, it "has been heavily criticised for its inability to protect citizens' interests" (Pimbert and Wakeford, 2001:23). The interests of the poor often fall by the wayside as representatives fail to take heed of their needs and priorities. Failure to adequately represent the interests of the poor results in a crisis of legitimacy (ibid.). Public participation and deliberation serve as mechanisms through which these gaps in the representative system may be filled, as they allow citizens greater influence over decisions that affect their lives.

As Carpini et al. (2004:317) suggest, deliberative democracy is not considered to be an alternative to representative democracy, but rather the expansion of representative democracy. Drawing on Gastil (2000:4), Carpini et al. (2004:317) note that:

[Full] deliberation includes a careful examination of a problem or issue, the identification of possible solutions, the establishment or reaffirmation of evaluative criteria, and the use of these criteria in identifying an optimal solution. Within a specific policy debate or in the context of an election, deliberation sometimes starts with a given set of solutions, but it always involves problem analysis, criteria specification, and evaluation.

The value of deliberation in a democracy lies in its effect on the perceptions and behaviour of both citizens and the state. Deliberation ensures that all citizens have a voice (Pimbert and Wakeford, 2001), and that they are able to participate in and influence decision-making processes. Deliberation may therefore also increase citizens' faith in democratic processes, and enhance perceptions of legitimacy (Christiano, 1997:244). Importantly deliberation helps citizens and the state to understand not only their own needs and preferences, but also the needs and preferences of others (Christiano, 1997; Pimbert and Wakeford, 2001; Carpini et al., 2004). Deliberation contributes to the cultivation of attitudes of tolerance, and of a propensity for negotiating trade-offs in the light of a deeper appreciation for the realities of others.

Of course, deliberation is not without limitations. Fung (2006) suggests that participatory ways of decision-making are complex; even where deliberative engagement between stakeholders occurs, the distribution of power is an important factor that determines the efficacy of the engagement for achieving just outcomes. Indeed, Pimbert and Wakeford (2001) note that those who facilitate deliberative processes hold disproportionate power over its outcomes. Facilitators are those who decide what will be discussed, and how issues will be framed. Inevitably, "[the] initial choice of problems and definition of criteria drives the end results" (ibid.:27). Effective deliberation requires the commitment of willing stakeholders who accept deliberation over other methods of public engagement as the best course of action. In the absence of such willingness, deliberation is insufficient (Fung, 2006).

Ndifuna Ukwazi's Fellowship Programme is an example of an initiative through which citizens' capacity to deliberate is enhanced. Ndifuna Ukwazi is a Cape Town-based activist organisation that promotes justice and equality through research and strategic litigation (Ndifuna Ukwazi, 2015). Ndifuna Ukwazi supports other activist organisations so that they deliver credible campaigns substantiated with reliable evidence. It also equips leaders with competencies needed to engage in discussion with the state. The organisation is closely affiliated to the Treatment Action Campaign and the Social Justice Coalition. In 2015, Ndifuna Ukwazi began offering short courses after an internal evaluation of their Fellowship Programme that indicated that community activists struggled to commit to extended courses if they had a job or were enrolled for formal studies.

The Fellowship Programme comprises a series of short courses mostly attended by practising activists from affiliated organisations. These courses allow attendees to gain deeper insight into their struggles through training in critical thinking, reading and writing. The Fellowship Programme encourages learning that draws on, and is relevant to their everyday experiences. The available courses include 'Politics, Law and Society', 'Struggle Histories for Activists', 'Community Police Forum Training', and 'Local Government and Basic Services'. All courses are coupled with an 'English for Confidence' module that aims to strengthen attendees' ability to speak, read and write English, and to develop their critical skills. The 'English for Confidence' sessions are conducted according to a set of guidelines that determine the interaction between facilitators and attendees, and between attendees as classmates.

The prescribed guidelines encourage students to ask questions; to feel comfortable to express themselves despite the trouble they may have pronouncing English words; to treat one another with respect; to look after work materials distributed by Ndifuna Ukwazi for use as resources by local organisations or consulted again after course completion; and to turn off their cell phones during sessions. In this way students develop their ability to facilitate discussion and negotiation between members of their organisations, as well as to utilise policy and legislation as tools for making assumptions to support an argument.

During 'English for Confidence' sessions that are explained in detail here, facilitators give students practical assignments that encourage storytelling in a structured manner. One such an assignment includes pair interviews. Facilitators sketch a scenario to be used for the assignment, in which attendees simulate being interviewed on BBC Africa Service radio. This channel broadcasts in English to communities in urban and rural areas across Africa. Each pair of students is given a list of twenty-two questions pertaining to life in their community, and to the work of their community organisations. Students take turns to ask and answer questions. In this way they practise articulating their experiences. Those participating in the programme are also tasked with presenting their narratives in written format. They receive individual feedback on their work. At the end of the course, Ndifuna Ukwazi collates attendees' personal narratives as a publication called *Activists Write: 'Ndifuna Ukwazi fellows write about their lives'*. In this way, learning and action become rooted in combination and a deeper understanding of their own context and their position in it develops.

The 'English for Confidence' module also covers context-specific, thematic issues such as 'Gangsterism in communities'; 'Exploring hidden/forgotten histories in our communities and our city'; and 'Voices of activists from around the world, past and present'. During learning sessions facilitators rely on various methods to elicit discussion on these themes. After engaging with material related to the theme, students may be asked to write and present monologues, rap songs, poems, dramas or speeches. The methods used during these learning sessions are valuable not only for strengthening activists' ability to speak, read and write English, but also for cultivating their ability to engage in deliberation over current local issues. In presenting their work to the group, the participants share their experiences and perspectives and are, in turn, exposed to experiences and perspectives that are likely to differ from their own.

Finally, the ‘English for Confidence’ module promotes deliberation by equipping attendees with skills that they can use to facilitate discussion at their local branch or community meetings. During workshops attendees are exposed to various learning methods like pair discussions, group brainstorming, moving debates and roleplaying. With each of these methods the intention is to encourage discussion about immediate issues that attendees face in their living environments. The stories or statements used during exercises can therefore be tailored to reflect local realities. Attendees are given guidelines on how to structure and coordinate these discussions, and are encouraged to do some research to ensure that their material is evidence-based. In order to assist attendees in implementing these methods at their local branch or community meetings, Ndifuna Ukwazi has developed a booklet entitled ‘Stories about Youth Gangs: Ideas for group work in branch meetings’.

The booklet offers further information on how to use the methods set out during the ‘English for Confidence’ module, as well as over forty stories from young gangsters and other community members that attendees can draw on during their meetings. Another example that illustrates the value of deliberation is the ‘Imagine Durban’ initiative undertaken in eThekweni Municipality between 2006 and 2009. During this time the municipality set out to develop a comprehensive vision for the city’s future, to formulate an action plan for realising this vision, and to educate citizens about sustainability. An interdisciplinary team drawn from the Policy and Research Unit, the Planning Department, the Communication Office and the Economic Development Unit within the eThekweni Municipality drove the ‘Imagine Durban’ initiative.

Throughout the process the team also recognised the value of drawing on the experiences of multiple stakeholders with an interest in the city’s future. The team partnered with communities, schools, tertiary education institutions and local businesses to design and bring to life a collective plan.

During the scoping phase, a service provider was appointed to conduct a survey assessing citizens’ priorities for the future. The research was supplemented by the distribution of postcards at public libraries, local restaurants and other venues that the public visited regularly. The city’s residents were asked to send postcards back to the municipality with details of their aspirations for their neighbourhoods. Using the data gathered through surveys and postcards, the ‘Imagine Durban’ team distilled six draft goals as a starting point for their engagement with stakeholders. The goals were: to create a safe, accessible and prosperous city where everyone enjoys a sustainable livelihood; to celebrate cultural diversity, arts and heritage; to ensure a more environmentally sustainable city; and to foster a caring and empowering city (eThekweni Municipality, 2009).

Following the process of priority identification, stakeholders from across the city were invited to reflect on the draft goals and to participate in the development of potential strategies for realising these. In their reflections on the ‘Imagine Durban’ initiative, the team noted that these engagements differed from other participatory planning platforms like the Integrated Development Planning forums. Significantly, they relied on stakeholders to produce action plans instead of merely asking them to comment on plans already developed by officials (ibid.). By drawing the city’s residents into the conceptualisation of a long-term development vision, ‘Imagine Durban’ public buy-in and commitment to the process was accepted from the beginning.

As noted, deliberation serves as an important strategy for ensuring that citizen voices are heard. In the case of 'Imagine Durban', deliberation over priorities for the city's future as well as over the most effective means of achieving a collective vision influenced the municipality's planning. As with the Organization Workshop model and the Ndifuna Ukwazi Fellowship Programme, participants in the eThekweni task team action learning methods were applied. All these initiatives also illustrate the value of both reflections associated with a personal narrative approach and the merit of empowering citizens through offering contextually relevant content.

Enabling and strengthening collaborative engagement

Communities that are enabled to organise themselves and engage in deliberative processes are indeed in a better position to negotiate improved spatial outcomes. However, if urban residents are to play a meaningful role in the co-production of South African cities, fundamental changes in governance relationships are required. It is the intention of a proactive civic academy to contribute to the realisation of a shift of entrenched thinking by creating institutionalised space for deliberative and collaborative engagement.

An initiative undertaken in Caracas in Venezuela offers valuable insight into the workings of spaces of co-production and collaboration. McMillan et al. (2014) trace the development of technical water committees (namely Mesas Técnicas de Agua), which first emerged in Caracas in the 1990s and were institutionalised across Venezuela by 1998. McMillan et al. (ibid.:203-204) describe the water crisis experienced in the city at the time:

Water service problems have long plagued Caracas, particularly the city's populous hillside barrios (low-income, informal settlements). Prior to 1999, government water service policy was highly discriminatory. It prioritized building networks in the formal neighbourhoods and within the formal city, and it privileged the high-income areas over the middle-income areas (Cariola and Lacabana, n.d.:6). The result is the present situation of 'water apartheid': the upper- and middle-class areas, where the majority of the residents self-identify as 'white' according to the most recent census, benefit from high-quality services, while the lower-income areas, where most residents identify as 'mixed-race', develop informally in the absence of attention from the state.

Before the establishment of the technical water committees, the only recourse for poor barrios residents was protest (ibid.:204). Under the auspices of a progressive mayor and his 'change team' however, the technical water committees were mooted as mechanisms through which to ensure the direct participation of the urban poor in the design and management of service solutions. Communities living in the barrios can establish a technical water committee through a three-step process: first, conducting a census; second, planning or sketching; and third, diagnosis (ibid.:208). The official utility supports communities throughout this process. The information gathered has a dual purpose that benefits the utility: the environments where services are to be provided can be analysed; and it also serves an important political function in that it allows communities to position themselves as meaningful partners in the development process.

Regular community water council (Consejo Comunitario de Agua) meetings were held in the city (ibid.). During these meetings, technical water committees met with utility staff to discuss service issues, as well as adequate solutions to these. The authors suggest that the three key functions of these meetings were “to prioritise issues from identified needs; to organise solutions and create work plans; and to follow up on work” (ibid.).

Through these regular engagements, community members and utility staff began to work together to identify pressing needs in the barrios and to produce solutions that could be implemented and monitored in a partnership. McMillan et al. describe the success of the processes of the technical water committees and regular community water council meetings by referring to the management of “water distribution in areas where piped water is delivered to households in rotation” (ibid.). Because the barrios are built on steep inclines, the city is unable to pump water to all areas simultaneously. Water is therefore delivered periodically. Before the development of the technical water committees and regular water council meetings, communities did not have access to a schedule with which they could determine when they would receive water. After the institutionalisation of these mechanisms however, “engineers work with communities to deliver water according to a predetermined schedule, so that communities can better plan their water storage” (ibid.). An important outcome of the technical water committees and regular water council meetings is therefore also the breakdown of barriers between communities and perceived experts (McMillan et al., 2014). Through these mechanisms barrios residents are recognised as the custodians of invaluable knowledge that contributes to the improvement of service delivery.

“It is not uncommon for community members to contradict an engineer’s proposals, explaining to them why a certain proposed solution would not work” (ibid.:208).

This case study offers three key lessons that are particularly relevant for the refinement and operationalisation of the civic academy. First, it highlights the importance of political backing for the realisation of transformation in urban governance systems. While the initiative was highly successful when first implemented by the administration of the progressive mayor, it was disbanded when he lost to a conservative counterpart in the following election (McMillan et al., 2014). It was only when Hugo Chavez was elected as President that the technical water committees were again pursued in the interest of addressing the water crisis in the country. Under his administration, the initiative became institutionalised and still operates today. Second, the case study points to the importance of increased public participation occurring in parallel with increased public investment in service provision (ibid.:207). Third, the Caracas case shows that platforms for collaborative engagement can contribute to the recognition of different forms of knowledge as valuable in the process of spatial transformation. These platforms build trust between stakeholders, and allow for genuine co-production when the urban poor participate in development as equal partners.

Implications for Design and Implementation of the Civic Academy

The local and international initiatives examined in this chapter offer the following practical recommendations to guide further research and development of the civic academy concept.

Implement through partnership

While state commitment is vital to the establishment of a civic academy, it is also important that the initiative be undertaken through a partnership between a municipality or local form of government and one or more non-profit actors. As shown above, non-profit actors bring invaluable orientations, experiences and capacities to the table. These are essential in the process of reconstituting governance relationships and realising spatial transformation. A key lesson from 'Imagine Durban' is, in fact, that the involvement of civil society actors lends credibility to state processes (eThekweni Municipality, 2009). In practice, this means that stakeholders should formalise their partnerships through memoranda of understanding that detail roles and responsibilities from the outset of the agreement.

Make adequate resources available

The process of enhancing community capability is a costly one. It requires the involvement of a skilled facilitator who can manage and guide the learning endeavour. Costs are also incurred for materials and for additional requirements such as food and/or transport for participants (see eThekweni Municipality, 2009; Seriti Institute, 2011). The same holds true for the process of coordinating spaces for collaboration and deliberation. It is therefore necessary that adequate resources are available to support learning and such engagement. As demonstrated in the Caracas case study, this is a necessary and worthwhile investment for a municipality to make.

Ensure diversity among participants

The initiatives of a civic academy will target marginalised urban residents, because spatial transformation is a priority in the area within which they live. Residents are exposed to precarious living conditions, and must be drawn into processes that will enable them to make tangible changes to their living environment. Hence their neighbourhoods will become better integrated into the urban fabric. As with the Ndifuna Ukwazi Fellowship Programme, the civic academy will target participants who are already involved in civic organisation in some way. As such, the selection will be skewed in favour of a particular profile. It is necessary that careful attention be given to the selection process, and to the identification of ways in which representivity can be ensured.

Adopt a varied, context sensitive learning methodology

Ndifuna Ukwazi's Fellowship Programme and Seriti Institute's Organization Workshop both use various learning methodologies to enhance community capability. Ndifuna Ukwazi strengthens capability through action learning methodologies, such as role play and debate, as well as classroom style learning. The content of the Fellowship Programme, as well as the methodologies through which it is communicated, is tailored to suit the context of participants in the programme. The inclusion of learning methods and programmes is an important aspect of the function of a civic academy.

Learning material as well as classroom activities must be relevant to the lives of the participants to ensure that their experience of the programme offered is appropriate and applicable. Seriti Institute uses both action learning and classroom style learning methodologies. Given the positive impact the theoretical content is expected to have on the participants in the Organization Workshop, effective programme planning is an imperative. Classroom style learning is a recognised teaching strategy for communicating complex principles that can be altered and applied in action. However, from this research, it is recommended that the civic academy adopts a variety of methods. Equally important is that, throughout the design of its curriculum, serious attention be given to the context in which the programme will be implemented.

Dedicate time to learning prior to engagement

The Seriti Institute's Organization Workshop, Ndifuna Ukwazi's Fellowship Programme and the 'Imagine Durban' initiative illustrate the importance of dedicating adequate time to capacity building to ensure that citizens acquire particular skills and build their confidence to engage and negotiate with the state. While deliberation and collaboration between citizens and local government is critical, it is also necessary that citizens enter into engagements as capable partners.

Make moments of engagement outcome-driven

Seriti Institute's Organization Workshop, as well as the technical water committees in Caracas, illustrate the value of collective problem-solving and outcome-driven processes. For the moments of engagement between urban residents and local officials to be meaningful, it is necessary that they be designed to address particular challenges in the urban environment. From the outset of a partnership agreement, participants must agree on the intended outcomes of their engagement, irrespective the nature of the initiative, whether it be an action plan for addressing crime in the neighbourhood, or a new ablution facility. The adoption of specific outcomes will allow for greater clarity regarding the expectations and responsibilities of different actors in the process and will allow parties to hold one another accountable for a meaningful report back. Outcome-driven engagement also ensures that the residents do have an opportunity to voice their opinions concerning the development agenda. To date, current platforms for public participation have limited this option.

Establish clear rules of engagement for moments of engagement

A clear set of rules for engagement should be prepared prior to the implementation of the project at the first encounter between urban residents and local officials and maintained for its duration. This will enable a civic academy to begin to make a significant contribution towards the reconstitution of governance relationships in South African cities. On the one hand, rules of engagement as determined prior to implementation should be universal in that they are applicable across all cities and neighbourhoods. This will ensure that the essence of the programme is maintained despite contextual variations. On the other, however, rules of engagement

should also be negotiated by participants and will thus inevitably be informed by local realities. In this regard, rules guide interpersonal communication, and ensure buy-in to a collectively defined process.

Conclusion

For spatial transformation to be realised in South African cities, it is necessary that governance relationships be reconstituted in ways that allow for deliberation and collaboration between citizens and local government. As it stands, the urban poor are barred from participating meaningfully in development processes. As a result, development outcomes are rarely considered to be responsive to their needs. On the one hand, some citizens lack the skills needed to act as partners in development and structures for public participation. On the other hand, opportunities for genuine collaboration between citizens and local government are often not available. At this juncture, South Africa needs a catalyst through which inclusive and responsive development practices and governance relationships become invigorated. This could bring about real and lasting change in South African cities. In this chapter, the mechanism the Isandla Institute promotes as a civic academy is seen have the potential to serve as that catalyst.

Morse's (2012) work on citizen academies in the United States indicates that such a mechanism is valuable for informing citizens about the workings of local government and cultivating democratic attitudes. The civic academy concept cuts to the heart of challenges facing South African cities in three special ways: by encouraging dialogue and collective problem-solving; by ensuring substantial citizen involvement in decision making; and improving relationships between citizens and local government. Drawing on the model the Isandla Institute developed, a civic academy can serve as a mechanism for addressing the need for civic organisation, outcome-driven deliberation and institutionalised spaces for collaboration. Investigated cases offer insight into how this could be done.

Given that the civic academy is still a conceptual model, it has been examined as a possible mechanism for operationalisation in the South African urban context. Lessons emerging from the analysis of selected cases are intended to feed into ongoing research endeavours to inform the concept's refinement, piloting and implementation.

Can civic academies resolve the estrangement, anger and distrust between many urban residents and local governments? The answer to this question is probably not, qualified by, at least, not on their own. The introduction of civic academies would need to be accompanied by a deep transformation in the relationship between government and the people, with mutual commitments to accountability, responsiveness and engagement. However, civic academies could certainly be part of a packaged programme designed to build the skills and networks needed for broader transformation.

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Community

noun

a group of people living in the same place or having a particular characteristic in common

II. THE DISTRIBUTED CITY: EMPOWERING COMMUNITIES THROUGH SUSTAINABLE TECHNOLOGY

Azra Rajab

Introduction

The chapter seeks to understand whether it is possible for alternative technologies and processes to be used in the upgrading of informal settlements, with particular regard to the provision of electricity services to energy-poor communities, across South Africa. The research hopes to answer this question by investigating two projects, M-KOPA and the iShack Project, through a critical analysis of their institutional and funding arrangements, and success factors. It then considers the aspects of the cases that could be replicated in South Africa. In conclusion, an enabling institutional framework for the realisation of the broader use of alternative technologies in this country is recommended. The objectives of this paper are therefore to:

- Describe and assess the relevance of the ‘Distributed City’ concept for the South African urban context
- Identify and analyse implemented innovative case studies representative of the ‘Distributed City’ concept, namely the pay-as-you-go service for solar-powered, home-lighting systems in impoverished Kenyan communities through M-KOPA and the South African iShack Project
- Assess whether, and how, these examples are replicable in the South African urban context

Research Method

A literature review, desktop research and a policy review concentrated on gathering information about the concept of the theme of this discourse, the ‘Distributed City’, and the characteristics and processes typical of the South African urban environment. Research on the two examples to be used was carried out using a case study approach. All case studies start with “the desire to derive a close or otherwise in-depth understanding of a single or small number of ‘cases’ set in their real-world contexts” (Bromley, 1986:1). The case studies were chosen as they reflect the principles embodied in the theme of this chapter. The two case studies are:

- M-KOPA, a residential solar power system provider, nationwide in Kenya – the ‘M’ stands for mobile and ‘kopa’ means to borrow’ in Swahili
- The iShack Project that focuses on the Enkanini – meaning ‘force’ – informal settlement in Stellenbosch, South Africa

The data collected for each case was analysed and a report on the results was written. The collected data was reviewed. Organisations and individuals involved in the development and implementation of the projects were consulted. A project documentation analysis was conducted using internal strategy documents, published project reports and qualitative interviews held with appropriate people. In presenting the findings from this investigation, the motivation, origin, intention, functionality, customer payment models, impact and funding mechanisms of each project were explored. This chapter presents the lessons drawn from all the information gathered, the success factors and delivery mechanisms that could meaningfully contribute to the replication of similar Pay-As-You-Go in South African urban areas.

The ‘Distributed City’

According to Blowfield and Johnson (2013:second cover):

Three cities of the future are emerging. The first is Petropolis... locked into the century old technologies of fossil fuel-driven mass production... This is the city of rising inequality, credit-fueled consumption (and) climate volatility... The second city is Cyurbia. This is mass production on the steroids of IT... that risk(s) reducing (its) citizens to digital factors of production in the supply chain of big data. The third is the Distributed City, where technology is deployed with the intent to connect us not virtually but physically—from Nairobi’s network of innovation spaces to Hamburg’s Participatory Budgeting experiments, (and) from Barcelona’s network for micro-manufacturing, to Austin’s distributed smart grid.

These three models of how future cities could develop each have very different economic, social and environmental implications for urban citizens, businesses and state institutions. Blowfield and Johnson (2013) introduce and strongly advocate for a movement towards the third emerging cityscape – the concept of the ‘Distributed City’. These authors propose that the ‘Distributed City’ is an innovative approach that provides a holistic and achievable response to many of the social, economic and environmental ills that urban areas experience. It envisions the collaboration of government, business, research institutions, civil society and communities, in the production and distribution of innovative technologies. These structures should provide opportunities for poor residents to sustain themselves while stimulating economic growth across all income groups to achieve equitable distribution of a city’s capital and resources. It is not concerned with replacing existing market-driven systems but enhancing and expanding them. Furthermore, it suggests that advancing fields of technology such as Information and Communication Technology for Development (known as ICT4D) could bridge the digital disparity between different social and income groups (Toyama, 2010). Renewable energy generation, and the localisation of state services, offer the potential to respond to many of the socio-economic and development challenges facing cities (Blowfield and Johnson, 2013). When doing so, the concept as defined forms the basis of a model of development that aims to achieve inclusive economic growth within a society that is based on equality while conserving the natural environment (ibid.). Aside from improved distribution of urban resources across income groups, the strategy presented in this chapter offers opportunities to capture value from investment for those who usually do not benefit from development and are not involved in its progress.

One example of emerging technologies being used in the manner the ‘Distributed City’ model envisages is the smart micro-grid that distributes and regulates the flow of electricity to and from consumers at the local settlement level. These grids use renewable energy created by individual households that can then be used on the broader grid. This enables people to be independent co-producers of power. The impact of such initiative is not just on resource conservation and climate change mitigation, but also on mediating energy costs. Communities “become a group animated by the collective intent to build the city they want to live in” (Blowfield and Johnson, 2013:224). In this way, the residents become empowered and optimism increases.

The first example is the Kenyan M-PESA/M-KOPA project. M-PESA (‘M’ for ‘mobile’ and ‘pesa’ for ‘money’ in Swahili) uses mobile phone technology to allow poorer users without bank accounts to store and transfer money as mobile credit. This process can be used to pay for various services when their cash flow is limited. It also allows users to pay for services and goods in pre-arranged instalments, especially the Pay-As-You-Go services. M-KOPA then couples this advanced payment to the ‘D.Light’ portable solar home-lighting unit embedded with a SIM card that allows impoverished households to pay for the lighting unit in micro-instalments.

The second example is the iShack Project implemented at the Enkanini informal settlement in Stellenbosch, South Africa. It makes solar energy available and affordable to poor informal dwellers through a prepaid instalment system.

The benefits of these technical solutions and associated implementation systems go far beyond simply lighting up a home. The solar lights and associated easy-to-pay solutions have resulted in tremendous cost-savings in energy. This, in turn, led to low-income consumers investing in other technological products, developing businesses and accessing improved services and micro-finance. The result is a cycle of resident self-sustenance that provides the opportunity to break individuals and communities out of poverty (Johnson, 2013)

The ‘Distributed City’ as a possible concept for South Africa

The ‘Distributed City’ concept is a holistic response to the economic, environmental, social and institutional challenges many cities face (Blowfield and Johnson, 2013). The concept suggests that these global issues represent an opportunity for businesses to unleash a new wave of inclusive economic growth involving information technologies. The following section of the paper explores the ‘Distributed City’ approach further and investigates whether it is relevant to the South African context. It asks whether our urban challenges call for such a reform and illustrates the high-level strategic thinking behind the two case studies chosen. (Johnson, 2013)

The ‘Distributed City’ concept proposes a re-invention of the capitalist system – a system which has, arguably, contributed to the concentration of wealth in the hands of a few (Blowfield and Johnson, 2013; Picketty, 2014). It moves towards a market that facilitates the sharing of wealth amongst a larger base of goods and service producers. It is an approach that can be applied both in a top-down manner that incorporates government intervention, as well as from the bottom-up involvement of active citizenry or a collaboration of the two.

More importantly for the South African context, it allows for a move away from a dependence on social welfare, towards a means of increasing the productive potential of the poor, while simultaneously providing increased opportunities for all income groups. This form of governance, which increases citizen productivity, is what Blowfield and Johnson (2013) refer to as the ‘entrepreneurial state’.

The importance and rationale for the South African government to progress from an emphasis on welfare to an entrepreneurial state occurs in circumstances where poverty persists, citizen dependency is high and there is a need for pro-poor economic growth. Beyond conventional social welfare of income grants, South Africa’s support system for the poor also includes free basic housing, Free Basic Electricity (FBE) and Free Basic Water supply. In recent years, the number of welfare grant recipients has increased from an estimated 4 million in 1994 to 16.9 million beneficiaries by 30 September 2015. Such a high dependency on government assistance is not sustainable (Ferreira, 2015). Treasury’s long-term fiscal study shows that “the current level of social spending will be sustainable as long as the economy grows by 3% a year” (Bisseker, 2015). Michael Sachs, National Treasury’s head of Budgeting, stated that if growth continues to come in below 3%, which has been the case the past few years, the continuation of current social spending policies would place South Africa’s public finances at risk, making it vulnerable to global economic shocks (ibid.).

Although studies consistently show that grants, particularly the child-support grant, are well targeted at very poor households and are central to poverty alleviation over the post-apartheid years, they have had little effect on creating sustainable livelihoods and improving the high levels of inequality in the country (Leibbrandt et al., 2012; Ferreira, 2015). The severity of this inequality is evident in the country’s Gini Coefficient. In 2015, South Africa’s Gini Coefficient ranged from about 0.660 to 0.696, which indicates that South Africa is a highly unequal society, more unequal than Brazil and India (Bhorat, 2015). Increases in wealth and an improvement in the standard of living have only occurred for selected groups of people – groups that were historically advantaged during apartheid and those that have managed to gain an entry point into the economy through post-apartheid economic policies (Bhorat and Khanbur, 2006). On the other end of the income spectrum, a large population still remains in informal settlements confronted by extreme poverty and unhealthy living conditions. The report on the Economics of South African Townships: Special Focus on Diepsloot by the World Bank, stated that half of South Africa’s urban population lives in townships and informal settlements, accounting for 38% of working-age citizens, but is home to nearly 60% of South Africa’s unemployed (Mahajan, 2014).

However, the majority of the South African population that remains in poverty is not solely a product of capitalist industrialisation as seen in many developing countries such as India (Blowfield and Johnson, 2013). Inequality and poverty continue to increase rather as legacies of apartheid, such as a lack of basic education, large-scale unemployment, entrenched spatial segregation separating poor communities from economic opportunities and a persistent backlog of basic infrastructure and services. In addition, the accumulation of wealth continues, for the most part, to sit in the hands of a generally white, elite group through the means and modes of production and administration.

Blowfield and Johnson's (2013) concept of the 'Distributed City' is then of particular significance in the South African context as it focuses on generating industry that allows poorer households to become involved in the production of goods and services. This could, in part, lower the persistently high levels of inequality and unemployment. Encouraging self-employment and increasing access to and affordability of renewable resources, could contribute to a more sustainable living environment. Given the emphasis on the redistribution of wealth in post-apartheid policy, the suggested concept is appropriate.

In addition, the country's current electricity supply relies on large-scale, centralised, coal-powered generation, and decision-making that is not transparent (Greenpeace, 2012). With an energy crisis manifest in the on-going series of load shedding schedules there is serious need for government intervention with regard to energy generation, management and supply. It has become evident that current energy supply and distribution systems are not going to address major energy issues such as access to affordable electricity, mismanagement of the current supply and the continued dominance of energy-intensive industries that are detrimental to the environment (*ibid.*).

Minimising human impact on the environment as a means of tackling climate change will increasingly be a key driver of government policy and public attitudes. The 'Distributed City' concept tackles the challenge of how society can replace conventional, high carbon energy sources with decentralised, low carbon alternatives. It achieves this while increasing the overall energy supply in response to population and economic growth (Blowfield and Johnson, 2013), unlike other types of climate change mitigation or adaptation strategies like carbon taxes and carbon pricing. This approach would entail the accountability and intervention of government and Eskom, South Africa's main electricity supplier to invest in the substantial roll-out of localised renewable energy projects as opposed to building new coal-fired power stations. Operational procedures like those the M-KOPA and the iShack Project employs, could be considered in such cases.

In South Africa, the development of renewable energy resources has been through the Renewable Energy Independent Power Producer Procurement Program whereby corporations were able to bid for the opportunity to feed power derived from renewable sources like primary solar and wind generated energy, into Eskom's distribution grid (Eberhard et al., 2014). The programme as it currently stands, however, does not allow specifically for medium, small, micro-enterprises or community involvement, and assumes that companies have the capital to construct large-scale renewable energy sources.

Similarly, attempts to install smart electricity distribution grids in South Africa, through the large-scale installation of smart meters to increase revenues and control resource-use, have been undertaken by the local city governments of Johannesburg and Tshwane. These initiatives have not considered the possibility of partnering with communities in electricity distribution and generation through renewable sources of energy and have been criticised for poor community participation, the use of inappropriate, low quality meter technologies and overpriced service fees (Serumula, 2014). This can be seen as an unnecessary imposition on the poor who can least afford to pay for electricity, while wealthy households remain exempt from municipal meter installation

requirements. Advances in technology, such as smart micro-grids, move away from the pollution, wastage of resources and structural issues associated with conventional, centralised power grids.

The promotion and empowerment of energy-independent communities allows residents to be involved in the co-production and selling of clean power and sharing in services like waste management (Blowfield and Johnson, 2013). This could be relevant in the case of South African cities where large numbers of informal settlement dwellers do not have access to basic services such as water, electricity and sanitation. For instance, available statistics show that more than half of the country's households do not have access to piped water (Statistics South Africa, 2011). In addition, Informal settlement upgrading under the government-led Upgrading of Informal Settlements Programme has been slow and largely critiqued as ineffective (Huchzermeyer, 2009; Misselhorn 2008; Tissington, 2011). The provision of Pay-As-You-Go services in informal settlements offers the state an alternative approach to service delivery.

Economic markets also benefit from the localisation of services such as small-scale manufacturing and urban agriculture where small businesses and informal traders have the opportunity to provide goods and services to communities through sustainable technologies such as smart water pumps and open-source 3-D printing (Blowfield and Johnson, 2013). This offers a way for individuals to share in the value they produce through self-employment or local businesses, as opposed to receiving a minimal wage for labour done through a large corporation. An increase in the amount of transactions within local areas also generates spin-off economic opportunities through an increase in money circulating within a particular community.

In summary, as an overarching macro-approach to South African circumstances and urban pressures, the concept of a 'Distributed City' offers relevant strategic principles and practical responses that can be applied to the South African context. These cover aspects like the distribution of production capabilities and opportunities through sustainable technologies; an alternate approach for the state to adopt for service delivery; the upgrading of informal settlements; the stimulation of entrepreneurship and economic opportunities in poverty-ridden areas; and a move away from fossil fuel reliance to environmentally conscious, renewable energy production.

Appropriateness of M-KOPA and iShack for South Africa

Beyond the broader urban challenges that South Africa faces, as explored in this chapter thus far, there are specific dynamics related to energy demand and supply in many South African settlements. The cases examined to support the objectives of this enquiry are the work M-KOPA Solar does and to which the iShack Project responds (Figure 11.1 below). Combining the results of their endeavours, the relevance and value of a solar-powered home-lighting system, supported by an innovative prepaid payment service, is recognised as a possibility for replication in South African urban informal settlements.

Figure 11.1: M-KOPA and iShack and project logos



Source: Images from M-KOPA (2016) and iShack (2016)

As previously introduced, the carbon footprint of the South African national electricity utility, Eskom, continues to grow substantially as it remains reliant on fossil fuels, damaging water resources through unsustainable technology choices and waste mismanagement (Greenpeace, 2012). In addition, households and businesses have begun to experience prolonged power-outages in the form of scheduled load shedding brought on by the mismanagement of electricity generation and supply.

Real prices for electricity which reduced by around 67% over a 20-year period, subsequently escalated by 300% over four years (ibid., 2012). Although Eskom has introduced alternative programmes like the Independent Power Producer Procurement Programme, its decisions to up-scale and develop more coal-based electricity generation plants (Kings, 2015) have confirmed the utility's commitment to large-scale centralised energy-intensive generation and grid-based distribution. The need for government intervention more sustainable

practices, accountability and renewable energy supply is evident. Government does have certain levers to elicit more sustainable practices from Eskom as shareholder, regulator, policy creator and political patron (Greenpeace, 2012:13). However, these numerous roles have led to confusion over who is to be held accountable for Eskom's decisions – the parastatal itself or the state. This ambiguity opens up the possibility for corruption, ad hoc interference, and most importantly, a lack of accountability amongst all players (ibid.). A commitment to the provision of localised, affordable, renewable energy in energy-poor areas offers an outcome that will decentralise decision-making and production thereby potentially avoiding corruption and mismanagement of energy supply.

Since 2003, the government has provided Free Basic Electricity to energy-poor households in previously disadvantaged and impoverished South African settlements. Currently, this free service is 50 kilowatt hours per household per month and is intended to supply enough electricity for basic lighting, media access, water heating and ironing (Department of Energy, 2015). The state's programme of providing free basic water and electricity services for all poor households is a response to the many years of discrimination and inequality under apartheid administration and policy as experienced by generations of previously disadvantaged individuals.

However, according to the latest census figures published in the Statistics South Africa (2011) official Census report for 2011, about a third of South African households qualify for state-funded electricity but do not have access to an electricity supply facility. Furthermore, when using the energy-expenditure approach used by the Department of Energy (2013), results show that two-fifths (43%) of all South African households can still be classified as energy-poor. Although an estimated four million households have been connected to electricity since 1994, many of these connections are characterised as inadequate with an under-supply of less than 100 kilowatt hours per month (Greenpeace, 2012). The Department of Energy (2013) estimates that 26% of all households do not receive sufficient energy to meet their needs. Service-related protests in informal settlements, where the large majority of these households are located, are therefore commonplace and often related to electricity (ibid.).

In addition, the well-being of energy-poor consumers and those without access to state-funded electricity is negatively affected by the alternate use of harmful and polluting fuels. Energy-poor households are forced to spend a significant amount of their income on these costly and inefficient alternative fuels such as paraffin, kerosene and firewood (Winiński et al., 2014). Fuel-based lighting is a significant cause of fires and produces over 150 million tons of carbon dioxide each year (Johnson, 2013). Likewise, informal settlements in South Africa are vulnerable to the spread of fires due to organic settlement form, lack of safety standards and the use of flammable building materials (Goven, 2010).

A further concern involves the buying and selling of electricity through illegal connections. According to a South African electricity expert (cited in Vermeulen, 2015), about 32% of all electricity delivered by City Power to Johannesburg is lost to theft and non-payment. Similarly, in 2014 Eskom revealed that as much as 7% of the country's electricity is stolen via illegal connections, something the state power utility could not and cannot afford (Etzinger, 2014). The issue therefore has wider repercussions as suppliers and those that acquire electricity

legally are negatively affected. Although many poor, informal communities receive electricity through illegal connections, this does not come for free. The majority of these residents pay a high price for illegal electricity as they are often forced to pay a premium for black market power. An article appearing in the Cape Times suggested that residents who benefit from illegal electricity connections are willing to pay for illegal electricity (Phaliso, 2015). Because of this, connecting electricity illegally is a big business in some townships and informal settlements. For example, one resident of informal settlement charged R300 to R500 (US\$ 35) per month for electricity diverted from municipal street light poles to informal dwellings (ibid.).

The illegal accessing of electricity represents a need and demand for affordable electricity in impoverished communities, and more importantly, that these communities are willing to pay for this service as opposed to relying on alternative sources of energy such as firewood or paraffin illustrates an opportunity to be addressed. Pay-As-You-Go solar, home-lighting systems therefore could respond well to the myriad of urban dynamics concerning energy generation, supply and demand experienced in South African cities.

Case Studies: M-KOPA and iShack

The Kenyan business model of M-KOPA Solar and the research-driven model of the iShack Project in South Africa are two examples of the 'Distributed City' approach in practice. This section discusses the origin, intention, functionality (Figure 11.2 below), motivation and financing models of the case studies.

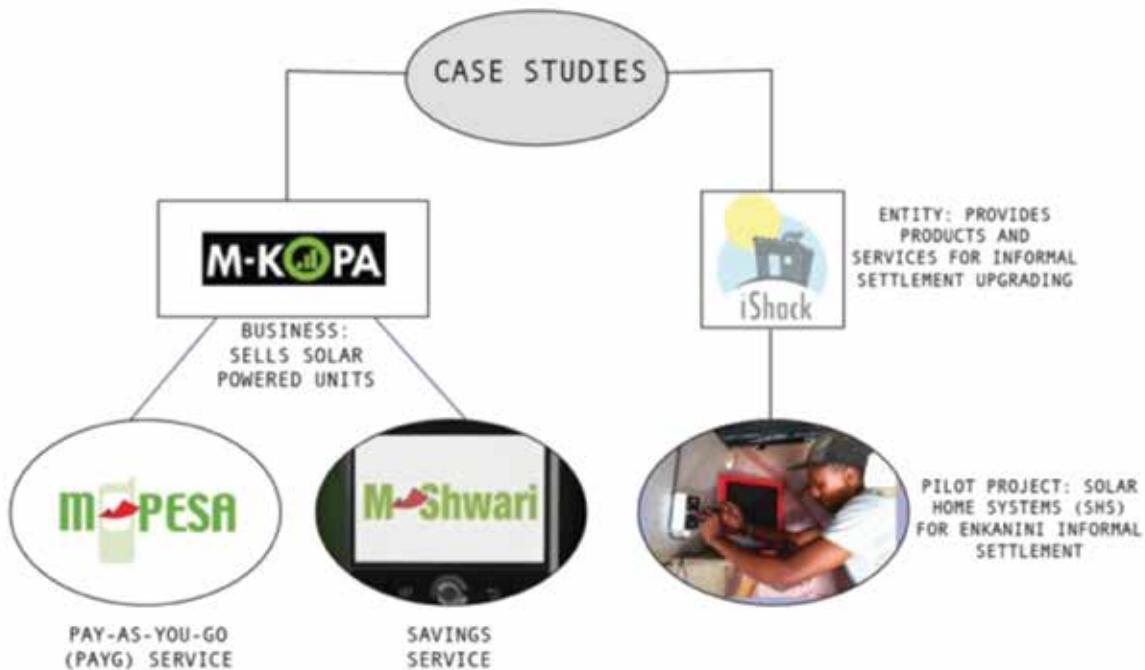
Origin and intention of M-KOPA and iShack

In response to the widespread energy challenge, dozens of companies have developed high quality, solar-powered solutions targeting the needs of the energy-poor. New distribution models developed by these companies are bringing these products to off-grid areas around the world. One of these companies is M-KOPA and it manages to respond by providing access to electricity through an emphasis on digital finance. M-KOPA Solar's website proudly advertises that their organisation has become the world's leading Pay-As-You-Go energy provider to off-grid homes. With an effective business model and Safaricom, a mobile phone network operator with a user base of 18 million people, as a partner, M-KOPA have provided over 200 000 households with solar home systems in East Africa as of May 2015; this lights up a projected 500 new homes every day (Ward, 2015).

The iShack Project in South Africa with its non-profit, bottom-up, participatory approach, on the other hand, experienced a range of political and social challenges as a result of the complex informal settlement context it was based in. Despite the risks and challenges involved in the roll-out process, however, to-date the service of making solar-home lighting units affordable and accessible to informal dwellings has been delivered to over 1 000 households and was currently in a consolidation phase till the end of 2015.

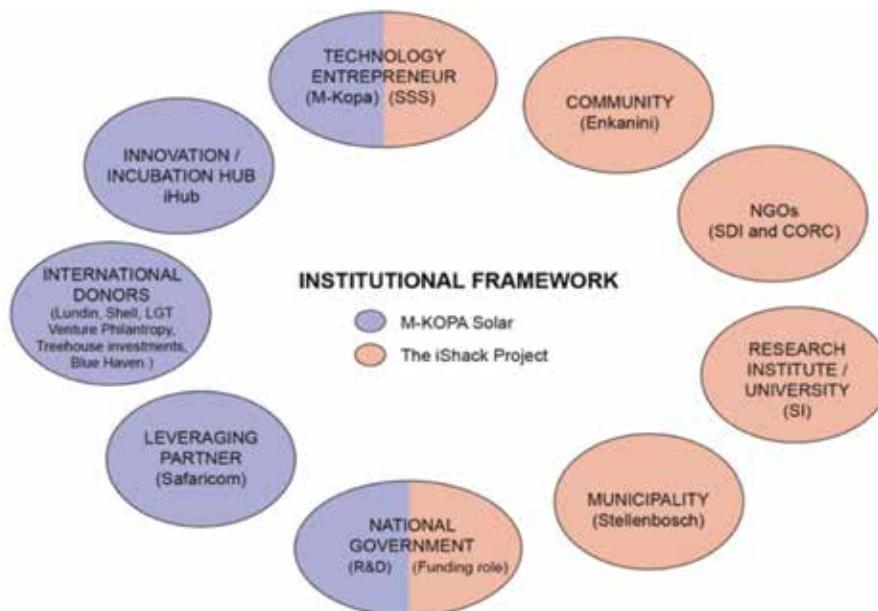
There were, and continue to be, a range of stakeholders involved in the development and product delivery of these initiatives. Both cases show a fair amount of strategic thinking in establishing a network of actors (Figure 11.2 below), all of whom understood and contributed to the respective implementation models. A discussion of the actors, their roles, as well as the linkages between each other follows.

Figure 11.2: Illustration of different services offered by M-KOPA and iShack



Source: Author's formulation with images from, clockwise from top, iShack (2016), Sustainability Institute (2015), CBA Group (2016), Payments Industry Intelligence (2013) and M-KOPA (2016)

Figure 11.3: Stakeholders involved in M-KOPA and iShack



Source: Author's formulation

Actors and agents: networks for success

The success of delivery and distribution of the Kenyan example was made possible by a range of actors beyond M-KOPA. Nick Hughes, Co-Founder and Executive Chairman of M-KOPA, explained that the whole initiative started in 2003 when, at Vodafone, he began to explore the mobile payment concept that became M-PESA, which allows money transactions to be made via mobile phones (Yizhen, 2015). Hughes became aware of two basic needs: the ability to make small transactions quickly and safely; and the gap in access to reliable grid electricity for close to 1.5 billion people (ibid.). He then took this analysis and developed the M-KOPA business model, which responds to both needs simultaneously. He explains that at a fundamental level M-PESA's and M-KOPA's business models work because they provide a solution that addresses a massive problem. In addition, the success of the model, he states, is that the company is focused on making delivery replicable and scalable across many markets and products (ibid.).

The close relationship between Pay-As-You-Go solar companies, like M-KOPA and well-established mobile money agents such as Safaricom and Vodafone, allow emerging companies like M-KOPA to leverage off partner brands in terms of market status, user access, retail outlets, authorised dealers and other product distribution channels (Winiacki et al., 2014). M-KOPA announced its partnership with Safaricom in October 2012 and partnered on the distribution of the M-KOPA units through Safaricom's agent network. With both companies having an aligned ambition of bringing new services to customers, especially around digital inclusion and green power, it was a simple process for each partner to benefit. M-KOPA products and services are sold at all Safaricom retail outlets across East Africa. "The big opportunity with Safaricom", said a media representative for M-KOPA, "is that they have 50,000 outlets, 18 million customers, and they like our product" (cited in Wills, 2012). The fact that the solar units are small in size and sold out of a single product container, typically the size of a shoebox, added to the success in numbers sold through consumer electronics retail and fast-moving consumer goods distribution channels (Winiacki et al., 2014).

In contrast, the iShack Project began as a research activity, part of a post-graduate course offered at the Sustainability Institute - an affiliate institution of Stellenbosch University. A lecturer, Mark Swilling, academic head of the Institute, asked his students, "What can be done in the interim while residents in informal settlements wait for houses and services to be provided for them?" (Swilling, 2015b). His students attempted an answer to the question which resulted in the birth of the iShack Project - a retrofitted, ecologically designed dwelling unit. The students together with supervisors applied a lens of informal settlement upgrading to provide affordable access to basic services for poor residents.

Further research and development of the concept led to the development of an affordable and sustainable way of providing solar-powered electricity units to shack dwellers in Enkanini with a similar payment system of prepaid instalments to that of M-KOPA's. Damian Conway, director and manager of the Sustainability Institute Innovation Lab, a special purpose vehicle initiated to implement the iShack Project, stated the idea behind the project was not to provide a house or product, or even just an energy service, but "it is an attempt to develop a sustainable social enterprise model for delivering affordable, incremental services to residents of informal settlements" (Wild, 2015:1). The iShack Project's intentions are therefore social as opposed to profit-driven

Unlike M-KOPA, the institutional structure of the iShack initially consisted of a formal working group involving Stellenbosch Municipality, Stellenbosch University, the Sustainability Institute, Shack Dwellers International (SDI) and elected community leaders, which was established to implement the project (Swilling, 2014). The technology entrepreneur associated with the enterprise is an outsourced business, called Specialized Solar Systems and provides lighting units to the iShack Project at a negotiated fee (Sustainability Institute, 2014). The purchase of these units and other operational costs of the project are made possible through government and international donor funding (Swilling, 2014).

Research and development support in both case studies was provided partly by state funding. The iShack Project, for instance, was awarded a grant from the Green Fund, which was established by the South African government and managed by the Development Bank of Southern Africa. The iShack Project was specifically awarded support by the fund as the objectives of the project were in line with the states vision on transitioning to a green economy (Swilling, 2013). R17-million has since been granted to the iShack Project as a result of the award (Mahlaba, 2015) and has been used for the installation and maintenance of new solar units. Additionally, the Stellenbosch Municipality supported capacity building, planning and community participation efforts.

Partnerships with international funding agencies and well-established donors, such as the Shell and Lundin Foundations provided additional and vital funding in the case of M-KOPA, and also came with a wealth of expertise regarding business monitoring and evaluation, market awareness and the ability to respond to structural barriers. Valuable lessons can be drawn from this institutional arrangement.

The iShack Project, which started off as a rather narrow technical intervention spiralled out into a wider community mobilisation process and a push for further settlement upgrading for Enkanini. The core group of community members, working with Doctoral and Masters' students of programmes at the Sustainability Institute, accumulated skills and knowledge through training modules paid for by the project. The delivery process of the project also incorporated the local knowledge of residents to assess community needs. In addition, the project trained and supported a small team of local residents employed as 'iShack field agents' to install and maintain solar-powered units, as well as to manage users of the solar energy supply system – all of which was possible with a localised off-grid system as oppose to a centralised power station.

The many challenges to note experienced by the initiative included political interference, technical difficulties and a lack of capacity. Disconcerting was the fact that the Enkanini community mistrusted the involvement of the Stellenbosch Municipality. However, this resulted in a more autonomous process driven by clusters of households who continue to cooperate with the iShack initiative to improve their lives. Therefore, a process ensued that was not driven by any formal community leadership or political party. Academics from Stellenbosch University and the Sustainability Institute promote the iShack Project as a community-run social enterprise, whose model could be replicated in other informal settlements.

The latest effort to scale the project up, involved the Sustainability Institute Innovation Lab carrying out a series of extensive consultations with the community to promote the design of a social enterprise model. With official training from Specialised Solar Systems, a number of residents were democratically selected to play a role as Hub Operator (Wessels, 2015). These operators were proposed to work in cooperative groups of three to five and are responsible for the initial installation of the solar system and monthly servicing of 250 shacks each. Hub Operators are expected to be residents of the community and earn an income (ibid.)

Technical specifications and use

In line with the ‘Distributed City’ approach, a key factor of the M-KOPA model is to innovatively use available technology to help customers save money and provide them access to previously unaffordable and clean energy products (Wills, 2012). The M-KOPA system offers the opportunity to light up two to six rooms in a home or a business venue simultaneously. Each battery-powered, eight-watt system includes three lights, a phone-charging facility and a chargeable radio. It is backed by a two-year warranty and a customer-care telephone line offers 24-hour technical support. The unit can charge several mobile phones at the same time and can also power small Direct Current (DC) appliances, such as a fan (Winiński et al., 2014).

Concerning the iShack Project, the technology partner, Specialized Solar Systems, based in George, worked with the Sustainability Institute to develop a modular system that could be upgraded as more funds became available to the households involved. The starter pack comes with a 25-watt panel including three lights, a cell-phone charger and an outdoor security light. This could be upgraded at a low cost to a starter pack plus a television and/or radio that runs on 12 volts. The entire system is rented, not sold, to the energy consumer, which is at a lower cost than the total paid for energy services plus cell-phone charging (in 2013). The costs concerning the solar system include a once-off installation fee of R350 and a monthly electricity service access fee of R150 per month thereafter (at 2015 prices, with R1.00 equivalent to \$0.08) (Sustainability Institute, 2015). Additional possible upgrades at further costs are possible and can include a satellite television system, a fridge, extra lights and a solar hot water system (Sustainability Institute, 2013).

Payment models

The affordability of energy and its ability to be managed remains a significant factor to mass adoption of clean energy technologies in poorer South African communities. Solar energy solutions are far out of reach for most people living off-grid without state support due to a lack of access to private financing options such as loans or instalment payment mechanisms. Many in need of these alternative technologies generally cannot afford to buy energy products on a cash basis. Energy product and distribution companies are often unable to finance customers directly, and formal finance providers have shown limited interest in designing products that meet the financing needs of the energy-poor sector (Winiński et al., 2014).

M-KOPA and the iShack Project address issues of affordability and access by emphasising digital finance. M-KOPA’s innovative Pay-As-You-Go service, called M-PESA, offers the advantage of no large initial cash outlay for consumers. Its payment system is similar to a cell-phone contract that is monitored with a SIM card.

Customers pay an initial deposit of \$35 (2014) (about R450), followed by 365 daily payments of \$0.43 (R6) (at 2014 prices). Electricity credit is loaded on to a cell-phone like airtime, and then payment is transferred to Safaricom (the mobile network operator involved) for access to solar powered electricity as requested. After completing this payment package, customers own the solar powered home-lighting system outright.

In further detail, M-PESA is a mobile banking service launched by leading Kenyan mobile operator, Safaricom, in 2007. It is a Pay-As-You-Go system that allows customers to open a simple electronic account, transfer money to each other by pressing a few buttons on their mobile phones, deposit funds (like loading airtime) or withdrawing money at a large number of local shops near where they live or work. Users can simply send a text message to transfer money to another cell-phone user. “Three and a half years after M-PESA’s commercial launch” says Ignacio Mas, a technology researcher at the University of Oxford, “half of Kenya’s adult population is using it, and collectively they make more money transfers than Western Union handles globally. That’s real scale” (Mas, 2012). M-PESA partners with M-KOPA and they manage to combine Pay-As-You-Go pricing and innovative end-user financing to solar-powered home-lighting units as well.

Relevant to the South African informal settlement context, the M-KOPA system coupled with M-PESA, allows customers’ payments to be easily monitored and administered in a manner that leaves little room for debt accumulation and illegal connections. M-KOPA has made this possible as each product system is embedded with a SIM card. Energy services are denied to customers when their prepaid balance has been used or has expired. Access is enabled again when the customer adds prepaid credit to the appropriate account (Winiacki et al., 2014). M-KOPA sends proof of payment data directly to the solar devices through the cell-phone network to unlock the service. It also receives product performance information and customer usage data from each unit (Winiacki et al., 2014), similar to a Pay-As-You-Go cell-phone account.

Concerning the iShack Project, payments for the service have been transferred through Automated Teller Machines. However, the intention is for a system similar to M-PESA to eventually be used, making it possible to buy pre-paid energy units from local shops. The iShack Project is currently similar to M-KOPA/M-PESA in that it centrally controls each solar unit via a cell-phone network, where defaulting clients are automatically switched off from accessing solar power. Flexibility measures are however built into the service offering alternative fee structures to clients who struggle to keep up with set monthly fees (Sustainability Institute, 2015). The option to pay for electricity access in affordable instalments is the first of its kind in South Africa.

Lastly, Pay-As-You-Go solar businesses often service customers who do not have access to other forms of formal finance, which is the case experienced by many shack dwellers in South Africa. For many off-grid consumers, paying off a Pay-As-You-Go solar product might be the first formal credit experience they have ever had in their life – a historical moment for them. In the future, this data could be used as a credit reference to meet prescribed conditions required for these consumers to obtain other services or facilities that require a formal credit history. In the South African context, this situation could apply to retail purchases, accessing affordable rental accommodation or applying for social housing.

Impacts of innovations of case studies

A range of benefits has accrued to communities that use M-KOPA and iShack services and these go far beyond simply lighting up a shack. As stated, many residents using M-KOPA have invested the money saved, in micro-savings accounts and/or on other sustainable technologies. Some users have used the available funds to invest

in crop fertiliser or trading stock, which in turn has resulted in additional income being generated (Blowfield and Johnson, 2013) or even paying for critical daily expenses.

There are consumers who are now able to access micro-insurance and make micro-payments for productive equipment that falls within the same technological market as M-KOPA, a market that assists disadvantaged households to sustain themselves. Such technologies and the cycle of financial accumulation they offer are clearly an approach residents can adopt, as it would lead to self-sufficiency that can break certain poverty traps or alleviate problem areas. Moreover, it would create further opportunities for new markets in locations where there is currently little economic activity, hence giving space for them to emerge.

Furthermore, 92% of households in one community using M-KOPA reported that children are now able to study or do homework for longer hours with improved lighting availability; this has resulted in the examination pass rate of schoolchildren in that community going up from 68% to 82% (Blowfield, 2014). In addition, 92% of all M-KOPA users felt safer at night as the solar lighting removed the risk of fire or burns from equipment using kerosene or paraffin (Ward, 2015). In addition, the lighting provided allowed for increased surveillance allowing for purposeful crime prevention (ibid.). Such benefits can be seen in Kenyan informal settlements where home and street traders remain open for longer hours, into the night, now that their goods are securely displayed in light (Blowfield and Johnson, 2013). Such information is easily accessed through impact assessments done via M-PESA's text message monitoring and evaluation system.

M-KOPA's growth has also had significant impact on the local economy. As of March 2016, M-KOPA employs 757 full time staff and 1 251 field agents across East Africa in rural and urban settings (M-KOPA, 2016). The sales network throughout the country, with agents in rural communities, is an important income-earner. Their high performers can earn an estimated \$850 per month, putting them at the top 25% of all earners in their own age group and socio-economic bracket (Lundin Foundation, 2014). Over the next three years it aims to employ over 500 extra staff and 2 000 new agents in East Africa to reach their target of providing over one million homes with lighting by 2018. Since the launch of M-PESA, banks have incorporated various financial products that utilise the M-PESA platform. Individuals without formal bank accounts can accumulate micro-savings if products on offer have integrated accounts with M-PESA. Examples of such accounts include M-Kesho (from Equity Bank), M-Shwari (from Commercial Bank of Africa) and M-Benki (Kenya Commercial Bank). M-Shwari ('shwari' means 'calm' in Swahili) mobile-based credit and savings initiative through M-PESA has proved to be the most successful of the products. It follows a similar cyclic principle as M-KOPA and M-PESA. The advantage of this is that the more you manage to save as a user of the product, the higher the loan amount the bank is willing to approve. In addition, with M-Shwari, you are not required to visit any branch to transact business. A cost is not incurred when withdrawing money from M-Shwari to M-PESA but getting a loan from M-Shwari means paying a loan processing fee of 7.5% of the loan amount. These spin-off financial services are important to note as they illustrate the varying degrees of opportunity, impact and benefit experienced by mobile consumers.

The Sustainability Institute mapped out a business plan for the iShack initiative to become a fully-fledged renewable energy utility franchise in the future. A Project Implementation Plan (PIP) was drawn up internally (Sustainability Institute, 2013). The business model includes detailed operating systems and procedures that enable and encourage the agents to continue delivering a high quality, sustainable energy service to their users. This includes such elements as installation targets and schedule, training and capacity building programmes, project operating expenses and capital expenditure, on-going maintenance and potential risks. It offers a comprehensive outline for willing investors and shareholder to replicate and scale up (Swilling, 2015a).

According to the Sustainability Institute Innovation Lab (2015), the intention of the Sustainability Institute is to establish a functional and income-generating community enterprise. Therefore, much time and funding focuses on capacity building and the creation of a catalytic platform that encourages community participation with the aim of upgrading communities through mobilisation, job creation and socio-economic opportunities. Furthermore, the Innovation Lab argues that, without a well-designed set of operating systems; good training of locals to provide a quality maintenance and user management service; and without a robust revenue collection platform, the iShack system will effectively become a government handout. Should this happen, the project has a high-risk potential of becoming a malfunctioning white elephant (ibid.). For this reason, the custodians of the project dedicate their energy to refining the implementation process until it reaches optimal capability. This will go on until an appropriate investor comes forward and presents a valid and feasible opportunity to upscale the existing initiative (ibid.).

There have, however, been clear impacts of the project in Enkanini in the Western Cape, South Africa. The results of an initial assessment show that households get four to six hours of extra thermal comfort each day, a reduced risk of fire and improved lighting (Swilling, 2013). In addition, solar power helps protect poor households from the consequences of increased energy prices. Thus many poor South African residents, who currently pay a large portion of their salary for an illegal electricity service, will save on energy costs while simultaneously contributing to incremental improvement of their homes. In turn, residents become more energy-independent as they move away from relying on Eskom's centralised grid system.

The Sustainability Institute (2013:5) claims that there are other progressive advances that have been achieved through the iShack Project:

Hub Operators get trained as 'barefoot engineers' and become skilled solar technicians thus creating the human capital base for a new local economy; technical and financial systems get designed, tested and perfected over time that can then be transported to many other communities where systems are needed to maintain and operate community-based infrastructures; a new kind of leadership is created that does not need to compete with Councillors for 'constituency support' but rather emerges as a 'service leadership' to cooperative groups who have entered into a contract with him/her to improve their lives (including accessing state resources).

Lastly, once informal communities realise the benefits of cooperative action, states the Sustainability Institute (2013:6), they will have social and institutional structures in place that will make it possible to continue to struggle for further improvements, such as secure land rights and access to subsidies for housing, jobs and other services

Analysis for Replication of Case Studies

This section analyses the delivery frameworks for M-KOPA and the iShack Project to determine how such initiatives can be replicated in the South African urban context.

Analysis of institutional framework

The network of actors in each case is discussed in this chapter. Their responsibilities and the relationships between them make up a critical delivery structure that ensures shared success amongst all stakeholders. A lesson to learn from these institutional networks, and a reason these cases were selected to represent the ‘Distributed City’ concept, is the business logic that underpins and lends itself to the long-term sustainability of each project. Ignacio Mas, a world-renowned expert on inclusive technology, suggests that most development projects fail because they do not adequately address core business concerns, such as intelligent marketing, distribution and branding (Mas, 2012).

Reflecting on M-KOPA’s business logic, for instance, the value of partnering with a Mobile Network Operator like Safaricom is evident, as they continuously and effectively focus on the development of their distribution channels and this action motivates growth. If a company offers an unknown product that consumers have never heard of, and is rarely stocked in local shops, it cannot be expected to achieve market success. However, integration between a product and an established Mobile Network Operator like Vodafone would more than likely lead to greater opportunities. In the case of M-KOPA, the partnership with Safaricom offered tremendous exposure to large market shares, a wide network of retail outlets and well-established business infrastructure across Africa. It should be noted that, in the event of M-KOPA introducing a service into the South African market, a good working relationship, supported by a tight commercial agreement, with a well-known national mobile network operator (like MTN, Vodacom or Cell C) has to be firmly in place (Alliy, 2014). This process should be relatively easier to initiate in South Africa than in other African countries as Vodacom has already launched M-PESA in the country.

The notion of treating Information and Communication Technology for Development (ICT4D) projects as businesses is gaining acceptance, as Swilling (2014) suggests. He draws attention to the research on community-based energy alternatives and community-based infrastructure upgrading (Swilling, 2014). The conclusion is that, unless there is an on-going flow of funds for on-going maintenance and operations, the infrastructure created will end up deteriorating and eventually collapsing (ibid.).

Informal settlement dwellers already pay for the services they need in the form of candles and paraffin for lighting, paraffin or gas for cooking, expensive generators to run their television sets or payment agreements for setting up illegal electricity connections. It is essential to redirect some of these financial flows into a business entity that provides safer and more affordable forms of energy. This approach would also make any form of a community-based project more sustainable especially if it were to focus on infrastructural upgrading (Swilling, 2013).

Lastly, the wide range of actors, each utilising their own field of specialisation, contributes to the success of each project by allowing for the collective effort of a diverse set of capabilities. Networks such as these create healthy partnerships between the public sector, the private sector and civil society. This type of collaboration allows for accountability between actors, as each contributor is required to fulfil a predetermined and specific objective. They are obliged to do this to realise the success of the project.

Analysis of funding arrangements

The funding arrangements that support each project are closely linked to the institutional arrangements. This is especially the case in the M-KOPA delivery model as many funders contributed to the delivery of the product. The state's involvement in the establishment of the iShack Project through the Green Fund demonstrates that state funding in informal settlements can provide a foundation for financially sustainable local economies; the expansion of upgrading of informal settlements programmes; and greater emphasis on the state's role as an active participant in income-generation. This marks a fundamental break from the traditional state welfare approach or the traditional donor-funded approach (Swilling et al., 2013).

The proposed iShack enterprise model is designed by the Sustainability Institute to self-fund the long-term running costs from a combination of user fees and the municipal Free Basic Electricity subsidy (Sustainability Institute, 2014). Securing this subsidy from the municipality (via the provisions of the Municipal Finance Manage Act) as a monthly contribution to the iShack running costs is also a first in South Africa (Sustainability Institute, 2014). It therefore provides a valuable lesson in the creative utilisation of state resources.

It can be concluded that, when replicating these two case studies in the South African urban context, there should be a balance between state funding, international donor funding, private sector funding, also referred to as venture capital, and capital generated from the project itself. Donor or state funding in the form of research and development grants is of particular importance to allow for and support a culture of innovation. Technology developers should feel free to be flexible with their outcomes. The Shell Foundation, an international donor funder of M-KOPA, states that there is an absence of viable pipeline funding (Desjardins et al., 2014). This illustrates the need for more organisations, especially foundations, to deploy unrestricted, risk-tolerant grant capital to help early-stage social enterprises adapt to market needs (ibid.). Although this type of funding does exist, state departments can easily replicate donors' business models to support innovative outcomes.

The Lundin Foundation, Blue Haven Initiative and Treehouse Investments are all examples that can be explored for social investment organisation and approaches, as they were involved in the financing of M-KOPA. In addition, international donors can bring market status to projects and offer business expertise that gives the project implementers confidence.

Other critical success factors

There are other factors to consider when replicating existing projects of a similar kind. M-KOPA, in particular, achieved success in several ways. It supported new customers by stressing that their service had a human face (Aker, 2012). It achieved this through a promotion campaign conducted at a chain of retail stores and independent local shops. This initiative was well supervised and organised (ibid.). It stressed that mobile phones are simple to use, do not require a significant level of literacy and can be learned quickly (ibid.). M-PESA offered a range of payment options for solar units and mobile phones. Moreover, care was taken to adapt M-KOPA services to local situations to ensure that they were culturally appropriate. Importantly, the distribution system of M-KOPA extends into rural and urban areas and includes both payment and mobile phone facilities (ibid.). M-KOPA and M-PESA manage to stand out as being more successful than other Information and Communication Technology (ICT) initiatives. This is evident in their significant spill over effects with benefits that go beyond the specific objectives of the intervention: the Kenyans who now use these services will be eligible to 'graduate' into full banking relationships and take up other mobile data services (Mas, 2012).

Concerning the special case of Information and Communication Technology for Development (ICT4D) studies, as found in Toyama (2010), an evaluation of such social-issue projects identifies the reasons why certain of its initiatives fail. Its enthusiasts do not design context-appropriate technology; or account for a poor supply of electricity; or build relationships with local governments and communities; or develop an appropriate viable financial model; or provide incentives for all stakeholders (ibid.). Toyama, a development researcher, suggests that if issues are context-dependent, then so are solutions (ibid.). The aim should be to have practical expectations and strategies that are appropriate for individual contexts (Toyama, 2010). Non-technologists from communities with local knowledge, such as a concerned teacher or an experienced businessman, should therefore be consulted. They could possibly be more successful in identifying the shortcomings of technologies in given contexts, and be better equipped to foresee how proposed technological solutions complement or compete with other available non-technological solutions (Morozov, 2012). They also anticipate the political and institutional backlash that can result from choices of Information Communication Technology such as the M-KOPA system (ibid.)

In line with this thinking, M-KOPA applied a user-centric approach to the built-in monitoring system so that the customer dictates what key decisions should emerge from the business model. From an early point in its development, M-KOPA knew it was possible to collect micro-payments from customers, but before making a decision on this, they surveyed potential customers as to whether they wanted to own the solar product, or just pay for the electricity that they used. Their final decision was based on the user feedback to this question; “The answer, overwhelmingly” says Hughes (cited in Wills, 2012), “was that customers wanted to own the product, so we designed the rest of the business model for that demand” (ibid). Understanding the true needs, wants and decision-making processes of the target customer is crucial to the success of any product (Desjardins et al., 2014) and this maxim should be applied to the theme of this chapter.

In assessing the concept of Information and Communication Technology for Development, Toyama (2010:5) concludes that technology, no matter how well it is designed, is only a “magnifier of human intent and capacity.” It is not a substitute for it. With a foundation of competent, well-intentioned people, appropriate technology can amplify their capacity to achieve specific goals (ibid). The major message to understand when replicating Information and Communication Technology for Development in the South African context is that technology has positive effects only if people are already willing and able to use it positively

Enacting new technical strategies, therefore, requires a strong, overarching, philosophical foundation to guide outcomes rather than viewing technology as a single simple solution to global problems.

The concept of the ‘Distributed City’ is a good example of the merit of this idea. Government institutions and businesses should instead see technology as one tool alongside other tools for solving local, small-scale, specific problems that contribute to an overall vision of equitable and sustainable development (Morozov, 2012). In conclusion, it is therefore crucial to have all these facets, as outlined in this discussion, realised in the delivery of an innovative technological tool. Toyama’s (2010) term for it is the ‘magnifier’ that encompasses a sustainable overarching guiding philosophy that confirms a purpose; input from community members; a context-driven research design research; and a practical and effective business model with committed and competent planners, implementers and financiers.

Conclusion

As defined (on page 367) the concept of the ‘Distributed City’ offers a practical method for government, the private sector, NGOs and individual citizens to empower impoverished communities by improving access to and distribution of resources and opportunities (Blowfield and Johnson, 2013). It is an approach that is relevant for the challenging circumstances that South African cities currently experience concerning inequality, poverty, a lack of access for residents to basic services, environmental degradation and the mismanagement of energy generation and supply.

From the discussion presented in this chapter, it emerges that it is critical for South African tiers of government to take on innovative approaches to urban pressures. It advocates accelerating the transition to new, environmentally friendly, general-purpose technologies and approaches that will construct an economy that is equitable and supportive of productive growth. It has provided an approach that aims to move away from disconnected welfare systems to government’s comprehensive engagement with market-related opportunities for social justice and an inclusive economy. As Johnson (2013) states, the ‘Distributed City’ approach offers a particular way of thinking about markets and, in this case, it is simple, “the poorest of the poor spend \$36 billion a year on kerosene alone. The market for M-KOPA is believed to be \$1 billion a year in Kenya. It is a market that is the opposite of the sub-prime. It is big, growing and, when you serve it, by raising user productivity and income, you expand it.”

Two case studies that support the principles of the ‘Distributed City’ approach, namely M-KOPA and the iShack Project, have been explored. These cases introduce innovation as a response to state service delivery. The idea involves incremental upgrading of informal settlements and the livelihoods of the poor. The projects discussed offer approaches that can empower South African institutions and communities to accelerate tangible, environmentally conscious and socio-economic responses. M-KOPA’s profit-driven model demonstrates the value of a viable business model supported by strategic institutional and funding frameworks that deliver on a context-specific technology.

The iShack Project, on the other hand, seeks to develop and demonstrate a viable, large-scale alternative community-based enterprise model for incremental informal settlement upgrading, using environmentally sound technology and building local skills and meaningful jobs. While the drivers of this initiative state that the primary objective has already been largely achieved, there is still work to be done concerning the creation of a collaborative and enabling institutional framework. Should the state decide to adopt such a model as a standard form for basic service delivery at a national level, it should be characterised by political acceptance, advocacy, policy-changes and budget allocations.

In combination, these two case studies illustrate how the provision of Pay-As-You-Go solar power in poor communities can contribute to government objectives that focus on: the localisation of energy production; the equitable distribution of resources; increased opportunities for the poor; environmental conservation; community empowerment; and inclusive economic growth, while limiting opportunities for corruption and increased poverty.

The case studies were assessed to draw out the critical success factors for the replication and up-scaling of effective, affordable Pay-As-You-Go solar home-lighting systems in South African informal settlements. The strategic integration of mobile telephony infrastructure, money transfer capabilities and energy-generating products enable rural and urban households to access affordable, decentralised, renewable energy products and services. Such intervention offers a clean energy alternative for the millions of poor South Africans who either are using toxic fuels as a source of energy, or are paying for risky illegal connections. Many in this population sector are underserved with regards to state-funded electricity. The business innovation model presented enables greater affordability and choice for energy-poor households through frequent, incremental and flexible payment options that mirror the income patterns of indigent households.

Furthermore, unbanked populations are reached and offered an alternative form of micro-financing that includes savings and further investment opportunities. This could significantly contribute to the up-scaling of modern energy access in the country. In this way, a response to a range of issues is offered, such as poverty, local economic development, climate change, electricity shortages, health and safety in informal settlements, environmental conservation and opportunity generation. It should, however, go without saying that such approaches are only possible with a thorough understanding regarding the complexities of financial sustainability, the coordination of multifaceted institutional processes and the inclusion of alternate approaches in broader, often rigid, government programmes.

In conclusion, sustainable technologies such as Pay-As-You-Go solar-powered home-lighting systems are not a solution in and of themselves. They are not a singular alternative to sound community-based settlement planning and development. Instead, acquiring any form of sustainable technology can be an effective aspect of a broader empowering social process. The benefit is immediate and a sound step towards improving the lives of informal settlement dwellers alongside the formal government processes of incremental upgrading and other poverty alleviation measures.

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conclusion

noun

a judgment or decision
reached by reasoning

12. CONCLUSION: A PIPELINE OF INNOVATION?

Margot Rubin and Philip Harrison

Introduction

Urban innovation is a fairly new field of study and recognised practice. The first references to urban innovation appeared in the wake of the economic turbulence of the 1970s. The chief advance followed the global financial crisis of 2008 with the launch of the largest initiatives in support of urban innovation occurring in 2015. In post-apartheid South Africa, the National Innovation Plan, adopted in 2008, and pervasive references to innovation in the National Development Plan of 2012, have firmly entrenched interest in innovation in current state thinking. The National Department of Planning, Monitoring and Evaluation and the Gauteng Provincial Government have taken up the concept in a collaborative initiative (detailed in Chapter 1).

This book is a product of this collaboration. It is, specifically, the result of a call from the Department of Planning, Monitoring and Evaluation for research contributions from young post-graduates and emerging researchers, under the age of 35. Selected authors were required to document “innovative responses to urban pressures in localities internationally or within South Africa that could potentially be replicated in, or adapted for, a South African context” (RSA, 2015). The innovations that were highlighted had to have a purpose. The selected case studies had to contribute to the goals set out in the National Development Plan, in particular, “to eliminate income poverty and reduce inequality by 2030” (RSA, 2011).

As an edited collection, the work of these young researchers brings together a variety of urban innovations that have the potential to be replicated for the benefit of urban residents in South Africa. The researchers subjected these cases to careful analysis, avoiding naïve assumptions about their translation into a new context. In this final chapter, we assemble some of the insights gathered from the various case studies presented, acknowledging that we cannot do justice to the richness and detail of the individual contributions. We have structured their insights according to the ‘pipeline of urban innovation’, which is a coined expression that represents how an idea can become an effective reality in urban development, if it is implemented in a systematic way (Urban Innovation Partnership, 2016). All elements and influencing factors need to be recognised and enabled so as to function as an entity. A few thoughts on taking the collaboration further, rounds off the documentation of this research endeavour, concluding this chapter, and the book.

The Pipeline of Urban Innovation

Chapters 1 and 2 of this book reveal the complexity of the field, with its many strands and sub-strands of thought and practice, locally and internationally. The urban innovations outlined in this book relate in various ways to these different strands, and offer multiple insights into the way innovation is practised across different contexts. What connects the very different innovations described in the book is the importance of governance, which reinforces the emphasis given by the Partnership for Urban Innovation. There are many creative ideas, for example, in relation to new technology, new forms of social organisation and new regulations. Essentially, though, the translation of these ideas into meaningful practice depends on the willingness and capacity of the various agents of governance to take-up and to scale up these ideas.

The concept underlying urban innovation can be summarised by the following formula:

Urban innovation = creative idea + initial implementation + initial impact + replication
+ extended impact

Creative idea

It is clear that there is significant inventiveness in cities with creative ideas bubbling up from within government agencies, the private sector, communities and non-governmental agencies. That this is so, is revealed in the case studies presented in this book. Important though, is to be aware that those recorded here reflect but a fraction of what abounds across the globe. There are many ideas that have been entirely lost to practice, or have never been implemented at an observable scale.

The ideas represented in the case studies are diverse. A number of them respond to very specific material challenges in cities: the shortage of affordable housing (Kaplan); service provision in informal settlements, such as power supplies (Rajab); managing urban waste in dense urban precincts (Novak and Glanville); mobility constraints of the urban poor (Zondi); and the burial of the dead (Leuta). Some of them respond to non-physical, but nevertheless critically important, matters. Kitching and Muzondo discuss innovations that respond to a concern that poorer people lack platforms for real engagement with the state. They claim that the processes of public participation that do exist “are often poorly connected to the exercise of real power and decision-making”. The eKhaya precinct, described by Mkhize, is a response not only to the challenges of urban decay that deter investment in the inner city, but also to a critique that interventions have ignored the needs of the poorer people in the inner city.

Some of the case studies reflect ideas that are intended to proactively shape urban futures. Kotzen and Suttner investigate the extent to which the South African urban initiative, Cosmo City, has contributed to reshaping the city towards greater social equity and integration. Finally, Letang explores a technical regulatory instrument, the San Francisco Commuter Ordinance Benefit, which could serve the broader purpose of restructuring a city around public transportation.

The chapters offer pointers that enable the identification of the source of creative ideas. To some extent, the contributions challenge the perceptions that new ideas are either mainly the result of personal inspiration or that they emerge in some straightforward way from a rationally-designed research process. This knowledge gap about the origin of ideas requires more research. The case studies generally support the notion that new ideas emerge through processes of collaboration and co-creation, and then, as some scholars (Mulder, 2012; Sørensen, 2014) aver, gradually evolve through experimentation and incremental adaptation.

The creative design process involved in the recently built Diepsloot cemetery is the case study Leuta examines. In it the role of the individual designer and the engagements between the designer for Johannesburg City Parks and Zoo, and the users of the cemetery and various stakeholders, tend to get entangled. In the case of academe and civics, Kitching and Muzondo elaborate on the evolution of the concept of innovation with its adaptations and variations. The creativity comes through incremental application to different areas of concern, via collaborative processes involving government and civil society, and result in spatial transformation.

There is a similar story around the evolution of ideas around employer-based transportation management programmes. Parikh (2000) points out that it is a case of early ideas, some of which apparently go back to the 1920s when the Readers' Digest, a privatised bus system for relocated workers evolved incrementally, with moments or periods, of creativity along the way. The oil crisis of the 1970s, for example, provoked a new round of creative experimentation (Environmental Protection Agency, n.d.) with the progressive approaches of the Obama administration. Federal legislation allowed pre-tax benefits for employers of their transportation management programmes, a federal initiative limited to voluntary participation. Creative local initiatives, such as the San Francisco Commuter Benefits Ordinance, gave the idea a powerful boost.

Kaplan's story of the Mayor's Housing Covenant in Greater London reveals the interactive nature of creativity. Although it is not entirely clear how the creative idea of a housing covenant emerged, a long history of covenants culminated in the Greater London Authority experiencing a high moment of innovation in 2012. Importantly, in turn, it provoked creative responses from actors in the private sector, illustrating how creativity feeds off creativity.

Mkhize offers the interesting case of the eKhaya Residential Improvement District. South Africa's concept of a City Improvement District (CID) is an adaptation of the North American City Improvement District model. The story of the transfer of this idea has been told elsewhere (Peyroux 2006; 2007; Peyroux et al., 2012) but Mkhize's account takes it further and shows how creative evolution happened in the South African context as a CID, typically commercially-focused, was translated into a Residential CID, with its own specific character. In this particular process, the interests of the property developers are thought to have coincided with the residential neighbourhood community's concerns for security and orderliness.

Zondi's account of the matatus (privately owned minibus taxis) in Nairobi is especially helpful in showing how a web of interactions between actors – the innovation system – produced an idea. The company that developed M-KOPA did not, of course, invent the technology. What it did was to find a creative way of making solar installations affordable to the poor through a financial arrangement. Similarly, in creating the M-PESA network, the mobile network Safaricom adapted an existing technology. It organised that service payments could be made using a cell-phone. The story of the iShack Project, told by Rajab, is similar. A creative idea evolved incrementally within a network of actors, building on the opportunity provided by a technology.

Some of the case studies point to the role of individuals, *the idea entrepreneurs*. The clearest lesson is that the production of creative ideas is generally an adaptive, incremental, social process. The case studies also show that ideas come from different sources: the private sector and community entrepreneurs in the case of M-PESA, M-KOPA; the digital matatus and mapping for the iShack Project; and government, in the case of the Greater London Mayor's Covenant and the San Francisco Benefits Ordinance. A closer look, however, shows that, in almost all instances, the creativity emergence lies at the interface between agencies. The real creativity in the case of the Greater London Mayor's Covenant is to be found in the way in which private sector players responded to the opportunities the Covenant provided. In the case of the iShack Project, the creativity emerges from engagement across the academic, community and private sectors.

Initial implementation

Creativity becomes innovation when institutional support ensures the implementation of the idea. One of the key concerns of the Partnership for Urban Innovation is to identify the enablers and inhibitors of implementation. The case studies give us significant pointers in this direction that still remains elusive in the South African context. Kitching and Muzondo offer numerous examples of how the idea of a civic academy has been taken up in part or wholly by either a non-governmental agency or a partnership involving a government agency. Key to implementation is the openness of authorities to co-produce. The San Francisco Commuter Benefit Ordinance was partly enabled by a supportive federal government programme. However, it was the creative vigour experienced locally that led to its success within the San Francisco Bay Area. Specifically, the strength of environmental management department within city government and the growing sense of environmental

consciousness amongst the public that made this possible. Political acceptability was a key. Kaplan shows clearly how the problems of gap market housing delivery in Greater London produced a context that strongly encouraged implementation of creative responses from both the public and the private sectors in engagement with each other.

Each story involves not only an identifiable creative idea but also the participation of an institution that has the power and resources to make the idea a reality. In most cases, ideas were embraced because they offered the potential for solving a problem that had become increasingly pressing. The story is, however, not only of a well-resourced agency taking up and implementing an idea. It is also one of the brokering roles of institutions that might not have the required resources, but are able to bring various agents together to promote a process of innovation. In South Africa, for example, the Isandla Institute in Cape Town plays a brokerage role in relation to the idea of civic academies. The iShack Project was supported by a university agency facilitating the relationship between technical entrepreneurs, communities and government in the uptake of an innovation. Universities play a similar role in Nairobi, Kenya.

Rajab explains a case in the adaptation of new technologies for broad public use, noting that these brokers are most successful when they allow the different agents in a process to satisfy their own motivation, and apply their own logic when participating. In the case of the iShack Project, a university facilitated a relationship between the technical entrepreneurs and the governance aspects of the project. Non-Government Organisations (NGOs) played their role in ensuring that there was community engagement. This means that the business sector was able to guarantee it would turn profit from its initial investment; and the mobile phone network was able to increase its reach and market. Institutions and organisations were thus able to satisfy their needs.

The case studies also strongly suggested that implementation is generally not linear. There is a process of learning-by-doing that blurs the boundary between creative ideas and implementation. An example is the eKhaya initiative, which emerged gradually from experimentation rather than from a blueprint of what a residential improvement district could be like. The Diepsloot Memorial Park presents a special challenge, as community take-up is slow, requiring careful adaptation to local feelings and needs. Cosmo City involves the evolution of a new urban form that is between 'suburb' and 'township' and which creates possibilities of different kinds of urban experiences and urban livelihoods. Mistakes have been made, but prospects for creative adaptation exist. Both formal revisions to planning and management systems, and bottom-up responses, offer such opportunities into the future.

As case studies, the documented stories are understandably limited in the extent to which they can clearly reveal the actual processes of uptake, brokerage and implementation. This would require detailed institutional knowledge, which could come from forms of ethnographic research but this is beyond the scope of this book but should be considered for future work on urban innovation

Initial impact

While evaluating impact is a difficult and complex challenge, the case studies do point to certain elements that illustrate the effect an innovation can have on a particular locality. These are identified in three distinct areas: first, the connection between an innovation and the overall vision and strategy of the state and local governance; second, the extent to which a single innovation has multiple effects and simultaneously addresses a range of objectives; and, third, the scale at which the innovation is implemented.

Connecting to urban visions – and stretching the boundaries

Individual innovations that address immediate material problems in a city clearly do have value. Yet the real impact comes from interlocking innovations that together support a wider imaginary for a city. As initially indicated (Chapter 1), the question needing an answer is: innovation for what purpose?

Most of the cases outlined in this book make the connection between the individual problems that the innovations address, and broader and deeper visions for the city. They do link in some way to longer-term goals and strategies, and are steps towards a greater urban project of some kind. Importantly, however, these innovations are not necessarily contained within the formally stated city visions or long -range plans. They support the now broadly stated goals for cities such as 'sustainability', 'resilience', 'liveability' and 'inclusiveness' and, in some case, actually advance the visions.

The idea of co-production, for example, which is central to ideas of 'civic academies' (Kitching and Muzondo) or of the 'distributed city' (Rajab) is currently only marginally recognised in most city strategies, which are mainly overwhelmingly focused on the role of government alone.

The case of digital mapping of the routes of matatus (Zondi) shows how the knowledge gained from daily life and lived experience can inform policy and decision-making within the echelons of power. By drawing local or tacit knowledge into a formal system of knowledge, city decision-making becomes more responsive to the needs and interests of residents, stretching the boundaries of governance vision and practice. The case of the eKhaya precinct (Mkhize) may also destabilise both bureaucratic and scholarly imaginaries as they illustrate how visions of urban orderliness can co-exist with social sensitivities and concerns through inclusiveness. Novak and Glanville demonstrate how an apparently mundane activity such as the collection of waste can serve a powerful social purpose by mobilising the energies of a community that is often represented as being transient and disconnected from urban agency. Kotzen and Suttner offer different and more inclusive methods of evaluation that incorporate the sensibilities of local residents, thereby building a more inclusionary city. Innovations such as these that constructively transgress boundaries (Fontan et al., 2008) offer more than an immediate fix to a specific problem. They expand the conceptual and political envelope, opening further spaces for creative action in the future. In some cases, the innovation may even change the nature of state-society relations as it did in the case of the Mayor's Housing Covenant in Greater London.

Multipliers

To have a significant impact, an innovation must have multiplier or leveraging effects. Ideally, it should address more than one goal, serve different interests and draw in the energies of different agencies. While innovations may attempt to address or ‘solve’ one issue, they have an expanded purpose if they are able to engage with the multiple challenges a city or community face. The case studies suggest different ways in which this has happened

The Diepsloot Memorial Park is an example of a design that accommodates different purposes (Leuta). The core function is for burial but the facility is also used for recreation and environmental management. The challenge in this case, however, is that potential users are hesitant to accept multiple possibilities of its use and the longer-term future of the initiative is uncertain. There are also unexpected – and possibly, unwelcome – uses such as the Park being a shortcut for minibus taxi drivers. Similarly, the proposed installation of bio-digesters in Hillbrow not only addresses issues related to waste management, but also raises concerns about health, unemployment, livelihoods and community cohesion (Novak and Glanville).

In the case of the M-PESA and the iShack Project innovations that addressed single problems created new long-term relationships between actors which, in turn, flourished as a spinoff of the original idea (Zondi, Rajab respectively). The digital matatus project was a very technical project at one level and yet drew the local state and citizens into a dialogue that had not existed before. Overall, urban governance improved as authorities listened to the narratives of the daily experience of residents to which they responded – to some degree, at least – in revised approaches to the informal transit sector (Zondi). The eKhaya initiative too has moved beyond its initial intentions of only ensuring order, safety and cleanliness. It began to also engage with more socially-orientated concerns and to access a higher degree of services and amenities from the city authorities (Mkhize).

The Greater London Authority Housing Covenant is an excellent example of the benefits of leverage (Kaplan). It includes a series of innovations in public financing that maximised that value of considerable private sector resources through innovative responses. An example is the practice of the private sector developer, Pocket Living, to use crowd-sourced funding.

The impacts of innovations are also multiplied with multi-faceted innovations. A new use of a technology could be found for either governance reform or a regulative change. The M-PESA and M-KOPA projects in Nairobi are good examples as they simultaneously include an adaptation of cell-phone technology with new financing instruments; the training of a network of community workers; and a higher level of community involvement. The iShack Project is a South African example of a similar approach, while the eKhaya precinct is also becoming increasingly complex in the way it combines different innovations.

Scaling

Small-scale experimentation is valuable as it reduces the risk of large scale implementation but ultimately, for meaningful impact, innovations need to be scaled up. The cases discussed in this book have been implemented at varying scales and some of their potential impacts have yet to be experienced fully. The eKhaya initiative, a neighbourhood development programme of the City of Johannesburg, is currently confined to only one part of Hillbrow in Johannesburg. The boundaries of the precinct are likely to expand gradually but its significance is sure to rest in the possibilities it offers for other parts of Johannesburg, and even beyond the city. The iShack Project currently remains a largely experimental project with the accompanying idea of franchising. Given the support it now too receives from South Africa's Green Fund, the possibilities for upscaling do indeed exist.

Some initiatives have done extremely well in a short period within a particular city or national context, like M-PESA, M-KOPA, and the digital matatu scheme in Kenya. Significantly, they have changed the lives of their urban residents. The next phase in their development is to reach other contexts internationally. Indeed, international interest in the models is strong. The San Francisco Commuter Benefits Ordinance is a somewhat different case. As a model it is recognised across the United States and Canada at least, but what San Francisco offers is a successful local variant, which is attracting international interest. The international examples of waste management are small-scale projects that have had mixed success and upscaling has not been attempted. However, a hybrid combination of these projects may suggest a model that could provide solutions in other contexts and at a larger scale.

Potential for replication and expanded impact

Without doubt, replication expands impact significantly through implementation in places that might be far distant from the original site of application. Since replication stems from initial ideas and practices that are often located within specific historical, geographical, political, social and institutional contexts. Replication is not a simple matter. The timing of innovations in particular places too is rarely accidental. Thus, understanding the backdrop to both the creative idea and its implementation is an important first step in assessing the potential for replication. In Johannesburg, the creation of the eKhaya precinct can hardly be understood without the context of a thirty-year struggle to regenerate the inner city, with its heated controversies over the limited impact of municipal-led efforts, and the effects of regeneration on the urban poor (Mkhize). There was clearly a moment when property investors in the inner city were prepared to experiment with something different – arguably, something more socially inclusive than previously. Every case has its own context, with its own story in relation to location, timing and opportunity. Each must be properly understood before replication can be considered.

Specifically, what factors, in addition to the history and broader context, make specific forms of innovation a success? One significant common feature is the presence of an institutional champion, either an individual or an agency. Clearly the benefaction of the Mayor of Greater London was critical to the success of the Housing Covenant (Kaplan), but most other cases have institutional champions, even if less obvious than in this instance. In the case of the iShack Project, the Sustainability Institute at the University of Stellenbosch was key to getting the innovation off the ground, while eKhaya's success is attributable in part to key individuals who were able to weave strong networks of local support. The M-PESA, M-KOPA and Digital Matatus projects are good examples of co-production where multiple actors play a role in the evolution of particular innovations, but where particular actors are the key facilitators.

Given the context-specific enabling factors, can these innovations be applied elsewhere? If so, what would it take to make them really work? In most of the chapters there was a sense of cautious optimism. Mkhize suggests that the eKhaya model could be taken up in other inner city contexts in South Africa. The proviso attached is that dedicated project teams with strong leadership are required to sustain the effort needed to make it work in a complex environment. Kitching and Muzondo suggest a range of issues that are needed for successful replication of programmes common to civic academies: partnerships; diversity among participants; dedicated resources; context-sensitive learning methodologies; good, objective facilitation; clear rules of engagement; and an outcomes-based agreement. From attempting to replicate the San Francisco Commuter Benefits Ordinance in the context of Cape Town, Letang provides an 'analysis matrix'. It lists, in some detail, the essential elements for a successful transportation policy environment: institutional arrangements; investments in infrastructure; incentive programmes; and locational choices.

Kaplan also offers quite specific guidance around the requirements for the local replication of the Greater London Housing Covenant, arguing that at least four key shifts are required in the approach to housing in South Africa. These are identified as significant reform to the procurement framework for Public and Private Partnerships (PPPs); the supply side equity ownership options at multiple price entry points; the devolution of powers and functions to local government; and increased flexibility in Public-Private Partnership project packaging and deal structuring. If this were to happen, argues Kaplan, there is a strong possibility of replication which would improve the scale of housing delivery in South Africa.

Zondi contends that there would be real value in replicating the digital matatus mapping project for the minibus taxi industry in South Africa. However, she cautions that the nature of the taxi industry in these two African contexts differs significantly. In Nairobi, there is a higher degree of centralisation in the industry.

This could possibly make the mapping of routes easier than in the more complex, decentralised and fluid operational instances in the cities of South Africa. For Zondi, the possibilities for replication have to be explored in terms of the intricacies of networks and power relations between urban actors. Novak and Glanville have a different approach. They begin with the specificities of the South African case and construct a contextually-informed solution that draws from the lessons of a number of international cases, rather than attempting to translate a particular model from elsewhere.

There is far more detail the researchers identify in the case studies than is outlined here. However, the overall impression is that replicating the documented instances of urban innovation is desirable. In all cases, replication is considered a viable prospect. However, the researchers are not naïve about what would be required. They all acknowledge the significance of context, and the enormous challenges of effective translation. Each case is specific about what would be required for replication but there are some generic requirements that apply across a range of different cases.

It is clear that institutional championing and leadership is necessary and that these are often best structured through partnerships and collaborations, rather than through hierarchical instruction within a municipality. Through collaboration, innovation becomes far more deeply embedded in a social context than it would if it were a project of a single agency, or effected between specific individuals within an agency. Furthermore, participating agencies should offer institutional environments that are both supportive of experimentation and accept the risks associated with implementing new ideas. This requires both adaptive leadership and reforms to regulations, procedures and processes that currently inhibit innovation; public procurement and performance management are particular cases in point.

Then, there is the critical question of financing. Budgeting processes and auditing requirements are often stumbling blocks to innovation, as they are too rule-bound to accommodate the surprises that characterise new practices. Dedicated funding to support innovation would be advantageous as has been the case in the European Union's Urban Innovation Actions initiative. To avoid dependence only on government, finding diverse sources of funding is advocated. Rajab writes in her case chapter on 'the distributed city' that:

It can be concluded that when replicating these models in the South African urban context there should be a balance achieved between state funding, international donors, private sector (venture capitalists) and capital generated from the project income itself with the assistance and leveraging of digital finance.

In the case of the M-KOPA project, Rajab offers the suggestion that, before the project is mainstreamed through conventional institutional funding streams with their bureaucratic requirements, its initial phases should be piloted using donor and grant funding. This procedure gives the flexibility required to evaluate the innovation and consider its merit for financial support. The sustainability of funding is also critical if the innovation is to have a positive long-term effect. Either the innovation must be self-sustainable in financial terms – hopefully even making a profit – or adequate provision must be made in future budgets for matters such as maintenance and replacement (Swilling, 2014).

Moving Forward

We conclude this book by proposing a *Partnership for Urban Innovation in South Africa* as a platform for supporting local actions that will improve the lives of urban residents. In this book, operational innovations or clusters of innovations have been identified, some which have the potential to be adjusted for use in compatible local contexts elsewhere. Realistically, the challenges of adaptation and translation would have been addressed but, hopefully, good practices can be replicated. A Partnership could begin by taking these cases of innovation researched and documented in this publication and deciding which should be prioritised for replication within a typical South African context. Experimental action could prepare the way for envisaging and planning thoughtful and structured innovation on a far greater scale too.

As acknowledged, the cases presented are a fraction of the sum of urban innovations globally and in South Africa. A *Partnership* could assemble and evaluate many more cases of innovation, using different methods for dissemination. This book provided the opportunity for young researchers under 35, to record, analyse and explore urban innovations with an emphasis on poverty alleviation replicable for the South African context; there could be further calls for research but also beneficial would be for various actors to come forward with their own innovations that could be accessed using electronic platforms, administered surveys, special events, exhibitions and competitions or awards.

Since insights emerge through research or other processes, *Partnership* does not need to take a firm position and make recommendations for institutionalising and systematising innovation within urban governance. The focus could be in relation to organisational arrangements, funding, regulations, performance management and public procurement. Suggested questions that a Partnership might consider answering in appropriate detail could be both interdisciplinary in scope, while concomitantly focusing on the ethos of urban planning in spatial context. What is required is the depth of understanding that comes from ethnographic and other forms of detailed on-site investigation. How are ideas really generated? How are they taken up, if at all? What are the enablers and disablers of success? What is it about context that makes innovation possible? What are the real impacts of innovation on everyday life? How does translation across contexts actually happen?

Perhaps the key lesson that comes from both the literature reviews and the international scans in the first two chapters of this book, and the various case studies, is that creativity generally emerges through networks of learning and collaboration. Moreover, innovation happens within a system of interactions. The primary task of a *Partnership for Urban Innovation* may be to bring thoughtful, creative people together to stimulate new ideas, explore existing ideas and find ways to make these ideas real. This involves, inter alia, creating what Leydesdorff and Deakin (2011) calls a ‘triple-helix of innovation’ that interlinks “the intellectual capital of universities, the wealth creation of industries, and the democratic government of civil society”(ibid.:53).

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