W110 - Informal Settlements and Affordable Housing

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W110 - Informal Settlements and Affordable Housing

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PART 6 : CIB W110 INFORMAL SETTLEMENTS AND AFFORDABLE HOUSING

The second Programme Partner linked to the International Council for Research and Innovation in Building and Construction (CIB) is:

CIB W 110 Informal Settlements and Affordable Housing. This international research group engages with issues of sustainable livelihoods and community participation in informal settlements as well as how the exchange of technology may be achieved towards the development of the physical, social and economic conditions of human settlements. The commission also explores topics on the provision of affordable housing across the whole housing market.

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ECOLOGICAL CATHARSIS THROUGH URBAN ACUPUNCTURE

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ABSTRACT

Buildings as living machines entails the implication that context is merely a consequence of the geo-political dynamic between built forms, rather than a discernible progression of spatial motivations. Considering a broader perspective of terming cities as ecosystems that engage through a variety of interaction points, it is evident that the synergy of natural processes maintains its own progression independent of architectural intervention. The nature of public space and the genetic grains of urban fabric are similar, terming context as the precursor to architectural intervention rather than its sequential result. The traditional interactive relationships between natural ecosystems and built environment influenced by local culture and identity are gradually deteriorating; causing cities to lose their distinctive cultural identity and urban landscapes. If we consider the city as a living being in and of itself, growing exclusive of the built environment as an emergent entity similar to the cyclic evolution of a neural network, we can associate that both have an interconnected network structure and sustain the capacity to adapt and self-organize by manipulating morphogenetic information. Successful examples of such cities evolve in a very specific manner, retaining older patterns while responding to change by adding novel adaptations. As a result, a thorough initiative to engage the communities in active participation of urban renewal needs to be conducted, where individuals learn how to produce small-scale socially catalytic interventions through urban acupuncture, leading to the transformation of a larger urban context. The objective of this research is to establish the need to understand the paradigm of urban ecosystems and how the built environment is shaped through it, while investigating the phenomena of cultural landscape and ecology as part of city image. Cities with engaged communities are more resilient and adaptive, gearing their activities towards poverty alleviation and the achievement of sustainable ecological communities.

KEYWORDS: Urban Acupuncture, Neural Network, Sustainable Neighbourhoods

INTRODUCTION

The city represents a multi-layered progression, similar to the transmission of multiple ripples; which conflict with each other and struggle to reach an equilibrium. Most architects have thoroughly emphasised the importance of understanding buildings as living entities, which grow and evolve with time. One could inquire why the built form is attributed a temporal and corporeal identity, while the urban fabric that houses the structure is simply considered as a consequence of geo-political dynamics between built forms. Context, which is observed as a mode of reference for architectural intervention, should be rightfully defined as an evident progression of spatial motivations, terming the city as a living ecosystem which maintains its own growth independent of architectural interference. The aim of this paper is to highlight the importance of observing the city as a living ecosystem, in lieu of which, lead to an observation of the processes and urban practices that give shape to public space. Since city infrastructure and built environment always need to undergo comprehensive revitalization, it would bode well to consider public space, as Lefebvre said, as a 'the space thus produced also serves as a tool of thought and of action', hence encouraging analysis on the processes of spatial production rather than merely the space itself. In this essence, it would be beneficial to consider the individual and communal motivations that give shape to the public space and are the core foundations of the city as an ecosystem. Far from a mechanical attribute, such an ecosystem is a living entity which consistently evolves and undergoes catharsis, as a means of purification and growth.

ECOLOGICAL ECUMENOPOLIS

In order to understand the dynamics associated with the evolution of cities as living entities, it is crucial to understand why cities exist; where to understand why cities exist we may begin by postulating a world without cities. Although they are characterised has highly complex spatial phenomenon, cities can be categorically defined by assessing a settlement with regards to productivity. The distinction of cities from large settlements took place, when not all inhabitants of a certain locale were engaged in agrarian activities, giving rise to specialised occupations, such as trade and food storage. For a world without cities

to exist, each individual must engage in equal productivity, making them responsible for their own sustenance, preventing specialised occupations from occurring and negating the existence of cities. Since, the aforementioned is a highly idealistic and somewhat counterproductive situation, cities came into place as central hubs of trade, exchange of ideas and sharing of natural resources. A notable characteristic in the distinction between a small city and a large town, is the existence of organized government. Where a town accomplishes common solutions through informal agreements between neighbours and community dwellers, the city has professional administrations and regulations to handle policy making, in addition to a method of taxation. It is thus apparent that cities and urban space came into being; not due to architectural or infrastructure advances, rather due to developments in social arrangements and occupational habits, leading us to question when urbanization and city building became a purely corporal endeavour.

The expansion of transport networks stretching farther than anticipated, has led to the emergence of 'metropolis' and 'megalopolis' where the primary concern with regards to governance, is urban sprawl. This comprises of the diaspora towards a suburban milieu, infrastructure development replacing rural land and high segregation between residential and commercial uses, causing negative consequences to public and private health, environmental degradation and socio-cultural disparity due to fragmentation. Such dispersion causes a large increase in cost for services, where provision of water, sewerage, electricity and security becomes substantially expensive per household. In addition, the environmental side-effects are even more problematic, where the quality of air in modern suburbs is more contaminated compared to smaller settlements, since the average suburban resident generates more carbon emission per capita due to increased transport. Cars and trucks account for approximately 30% of emissions of oxides of nitrogen and 30% of hydrocarbon emissions. An additional driving related emission is CO_2, an end product of the burning of gasoline, which is the major greenhouse gas accounting for approximately 80% of emissions with global warming potential. As a result of this, automobile traffic is a major contributor to global climate change, which is a by-product of urban sprawl.

Farmlands and wildlife habitats are constantly displaced in favour of infrastructure development, throwing the ecosystem out of balance, replacing forestry with impervious surfaces such as concrete and asphalt, which are less effective in absorption of rainfall into the ground. Negative side effects of urban sprawl, eventually lead to urban decay, where parts of the city, or in some cases the complete urban fabric, becomes debilitated, resulting in deindustrialization, economic starvation, rampant unemployment and an unreceptive cityscape. Even though there is no single cause of urban decay, it is mostly an outcome of inappropriate planning decisions and distribution of facilities; as a result of which, it is important to consider the design and planning decisions that have led to such degradation of the metropolitan tissue. Form-focused theories of urban design do not deal with society at large, rather the formal quality of urban space aiming to establish specific aesthetic prototypes of urban design. In this essence, urban design is seen as a means to repair the urban fabric, restoring the quality of urban space to a non-deteriorated previous state.

CITY AS A NEURAL NETWORK

The modern city can be observed to contain hybridized relations between the individual, ecology and urban space; where the structure of the city tends towards a synthesis between the physiological needs of the human body and the physical infrastructure of the city. If we consider the city as a living being in and of itself, growing exclusive of the built environment as an emergent entity similar to the cyclic evolution of a neural network, we can associate that both have an interconnected network structure and sustain the capacity to adapt and self-organize by manipulating morphogenetic information. In theory, a metropolis could constitute a form of organization of the city, analogous to a biological network that functions as the structural organization of the brain. Akin to the neural network, the city is continuous but not homogenous, articulated on different layers with varying connections and subdivided in thousands of different branches, defining the city essentially as an organic structure that is various and changeable, capable to incorporate mutations and self-organise.

Studying the city as a neural network means considering the whole system as field of interactions, making it plausible to segregate a parameter and test the reaction of the system according to the chosen values for it. This reveals an enormous potential to directly manipulate the genetic code of the city itself, following

the rules of its natural behaviour, where development is not considered a designed superimposition on the city, rather the result of a manipulation of its intrinsic structure. Starting from this structure, the city can simulate grow different configurations, permutations and iterations, refining and redefining the city vision which has emerged through the uncovering of its individual neural network. In addition to isolating a particular parameter for stress-testing of the city system, it is most beneficial to isolate particular areas of the urban layout and conducting analyses on the particular points as means of inculcating agents for revitalization of the urban fabric. These particular points may be referred to as urban pressure points, which may be the locus operandi regarding various activities, ranging from religious centres to post offices and in many cases parks and public squares. The isolation of such pressure points, ensures that urban intervention with a guided purpose will be conducted in a controlled environment and if successful, may be permitted to propagate into the milieu.

URBAN PRESSURE POINTS

In essence, a localised response to community needs, rather than a large-scale urban renewal, would respond to localized needs with a greater comprehension of how city-wide systems converge at that very node and how working on that particular pressure point could cause a ripple-effect of renewal to spread outwards. This method of urban revitalization is termed as urban acupuncture, which is most aptly defined by Marco Casagrande as a 'manipulation of the collective sensuous intellect of a city'. This strategy views the city as a multi-dimensional, living, breathing organism and locates areas that are in need of repair, similar to the energy-flows observed in the Chinese practice of Acupuncture. Projects pertaining to sustainable design and efficient spatial usage, may be linked to the puncture needles that revitalize the organism or system by working intensively on the parts. By understanding the city as a living entity, the process promotes a community-centric method, highlighting localised nuclei which are analogous to nodes and vital organs of the human body. Although sites are selected through analysis of social, economic and ecological factors, the small-scale catalytic interventions are not necessarily geared at influencing such literal aspects of the locale, rather in many situations may focus on miniscule changes in the fabric, such as plantation of trees, introduction of street furniture and even introducing new shades and colours in the ambiance. Since large-scale revitalization projects are not only less effective in achieving the required result, not to mention less economically feasible; targeted small-scale changes as an approach to gradual heal the larger urban setting is the practical motivation.

Perceiving the city as a thoroughly interlaced living, breathing entity, the urban acupuncture perspective promotes communitarian machinery and sets localized nuclei – analogous to the meridians of the human body. Urban acupuncture exploits the temporal nature of urbanization through punctual manipulation of urban energy flows in order to create ecologically sustainable urban developments. Compared to traditional methods of large scale urban renewal, these interventions have resulted to be more sensitive and adaptable to community needs, since they respond to local necessities with the knowledge of how overlapping urban layers converge at a particular node. Interventions at such strategic nodes prove to be the antithesis to the corrosive outcomes of mass-industrialization, by engaging the ecological undercurrent of the milieu and allowing environmental emergence to take place.

THE ARCHITECTURE NEEDLE

With regards to the urban organism such small-scale interventions trigger cathartic processes, establishing a relationship between the urban collective consciousness and the vital systems of nature. Interventions of such a nature are exemplified in feats of Architecture such as the Guggenheim Museum in Bilbao by Frank Gehry, The Sydney Opera House by Jorn Utzon, the Pompidou Centre in Paris by Sir Richard Rogers and Renzo Piano, pointed interventions which led to real revolutions of the city fabric. The pioneer of the practice, Brazilian architect and politician Jaime Lerner's approach in Curitiba, Brazil is an exemplar of urban acupuncture, with the proposition of affordable public transport, incentives for waste collective and the construction of small parks scattered throughout the city. Lerner asserts the simplicity of the process by expressing, 'the city is hit, but of it, it benefits all the country. Sting the park with a needle, and of it, benefits the whole metropolis.'

In the Netherlands, urban renewal and regeneration have been a key concern for the past 50 years, since after World War II and the bombardment of Rotterdam, the key issue was the restructuring of the city

because of the housing shortage. From the end of the war and the late 60s, there was a period of urban restructuring considered an improvement of the urban structure, with the aim of ensuring adequate functioning of city centres in respect to expanding settlements. However, in the 90s, more differentiated housing was seen as a solution to discourage spatial segregation, with projects like Borneo & Sporenburg revitalization taking shape in the Docklands. 2500 low-rise dwelling units focused on water-related activities were designed, as a new interpretation of the traditional Dutch canal house. However today, since the economic crisis it has become more inconvenient to create large scale transformations for whole neighbourhoods, so the demand for small scale interventions is increasing. Urban acupuncture, in this instance can be considered a 21st century strategy of urban regeneration, since it implements the small scale interventions in such a way that it takes into account the long term goals and the requirements of the area. For successful transformation of the physical environment and its social attributes, it is essential to maintain and strengthen positive characteristics of the spatial identity, so as to not inculcate a reprogramming of the genetic code, rather merely restructuring and repairing the damaged topographies. An additional example, can be observed in Beirut, Lebanon, where Vladimir Djurovic's proposition for the 'Samir Kassir Public Garden', acts as a gateway to the Central District of Beirut. The core concept revolves around the framing and emphasising of two ancient trees that have stood in the locale for a long time. An ecologically focused approach, the architect proposed a raised pool, lined with pebbles to create a sense of solitude and respite on a miniscule site located in an urban district. On a larger scale, the ecological restoration of industrial cities, can observe urban acupuncture as spontaneous emergence of urban farms and community gardens punctuating the more mechanical city and tuning it towards a more sustainable co-existence with the natural environment. Ecological interventions in large-scale revitalization projects generally fail to achieve the purpose of balancing out the urban hardscape, primarily because the ecological milieu gives shape to its own self-contained microcosm, which counterproductively fails to engage with the hard cityscape and instead distinguishes itself as 'the park' or 'the green belt'. Hence, it is apparent that large scale ecological interventions are impractical and as a result destructive to the city fabric, since an active dialogue between built and natural needs to take-place on a much smaller scale, one that is achievable through urban acupuncture geared towards ecological intervention, in essence, an ecological catharsis of the milieu.

Small-scale ecologically motivated interventions are also a positive motivation, since they endeavour to bring together community dwellers, in attempts to be part of an environmentally-friendly development of their locale. It is evident that architects and planners participating in such urban acupuncture initiatives can utilize such opportunities to educate communities on the importance of small-scale socially catalytic interventions. A thorough initiative to engage the communities in active participation of urban renewal needs to be conducted, where individuals learn different methods of contributing positively to their neighbourhood, such as planting trees, cleaning streets and even repairing walkways, leading to the transformation of a larger urban context. The objective of the initiative is to establish the need to thoroughly understand the paradigm of urban ecosystems and how the built environment is shaped through it, while investigating the phenomena of cultural landscape and ecology as part of city image.

CONCLUSION

Cities with engaged communities are more resilient and adaptive, gearing their activities towards poverty alleviation and the achievement of sustainable ecological communities. The goal is to not only inculcate a manner of rational and clear thought, but also to find methods which alleviate the difficulties associated with different environments and inhabitants. Lacking a thorough understanding of grass root settlements in most cases, architectural intervention as a means of social revitalization fails to establish a symbiotic relationship with the community and eventually succumbs to impassive lethargy. A successfully geared urban acupuncture initiative can eventually lead towards poverty alleviation and self-sufficient settlements, creating cities with adaptive and resilient communities, gearing their activities towards communal progress and generating a vibrant urban context and to achieve sustainable ecological communities.

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FROM CHAOS TO ORDER: A CONTEXT-SPECIFIC DESIGN RESPONSE FOR KHUTSONG SECTION INFORMAL SETTLEMENT, IVORY PARK, MIDRAND, JOHANNESBURG, SOUTH AFRICA

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Abstract

Informal settlements are a common feature in developing countries like South Africa. Due to the rising interest for in situ upgrading in the Department of Human Settlements in South Africa, an exploratory design research was carried out by the author for Khutsong Section informal settlement located in Ivory Park within the City of Johannesburg area. The Breaking New Ground policy upon which upgrading initiatives are founded, promotes context-specific approaches to upgrading projects. Through a context-informed design a sustainable upgrading vision for enabling urban environments may be developed to be used for participatory and incremental in situ upgrading for Khutsong Section. Building on lessons learned from an in situ upgrading project in Swaziland and Katamay's (2004) research on Khutsong Section, a context-specific design response was developed using a qualitative visual method. The visual research involved mapping and analyses of the urban spatial structure of this highly dense urban settlement (more than 60 persons per hectare). The analysis showed that Khutsong possess some characteristics of a pedestrian-oriented city like complexity, linkage, human scale, imageability and enclosure , but lacks legibility, coherence, transparency, and tidiness. These findings were then used to do a visual iterative process using sketches resulting in site-specific design solutions for the in situ upgrading of the settlement.

Keywords: Khutsong Section informal settlement, pedestrian-oriented urban structure, context-specific design.

INTRODUCTION

Khutsong Section (see Figure 3 below) is one of many informal settlements that mushroomed in the City of Johannesburg area created by relocated residents from townships and immigrants from rural areas of South Africa and other countries. It is located in Midrand, Ivory Park township, on municipal land zoned for community currently occupied by close to 300 households on 24 hectares piece of land. Informal settlements are usually established without a town planning scheme on land which does not legally belong to those who are occupants (Augustijn-Beckers, Flacke, & Retsios 2011, p. 94). Informal housing closes the gap of shortage of social housing and financing solutions for people with low-income levels (Zhang 2011, p. 481). Although some informal settlements have road reservations and allocated boundary lines because of prior planning before construction of dwellings, most of them, like Khutsong, spontaneously grow so fast such that the resulting urban spatial structure becomes organic, lacking orthogonal order and hierarchy, adequate transportation, services, and social infrastructure. The advantage of high density urban informal settlements with a fine grain urban spatial structure is that proximity to desired spatial destinations increases. This is the same advantage of cities. In cities, social and spatial proximity facilitates human interactions, urban social capital, and flow of knowledge (Agrawal, Kapur, & McHale 2008, p. 268, Helsley, & Zenou 2014, p. 427). Being far away from cities can contribute towards inequality and worsened socio-economic poor conditions (Zenou 2013, p. 113).

The main feature of an urban spatial structure is a transportation network infrastructure (López 2012, p. 186). Transportation networks may be a result of a car-oriented, pedestrian-oriented, and a combination of car- and pedestrian-oriented urban spatial structure (Anas, Arnot, & Small 2003, p. 5-6). Compared to car-dominated spatial structures, pedestrian-oriented urban fabric in high density informal settlements can increase levels of face-to-face social interaction and can benefit micro scale economic activities (Farber & Li 2013, p. 276). However, if there is inadequate amenities, enabling open urban spaces and water, electricity, and sewer services, high density pedestrian-oriented urban structures can become overcrowded resulting to poor living standards. In situ upgrading of informal settlements in urban areas may involve the creating an urban spatial structure with a variety of economic and activity nodes, high mix-use density, adequate accessibility for pedestrians and vehicles, and increased access to services and opportunities (Cheng, Bertolini, le Clercq, Kapoen 2012, p. 175).

Participatory and incremental in situ upgrading approaches are different from formalisation projects whereby informal settlement residents are often involuntarily relocated to newly constructed houses in South Africa (Jordhus-Lier 2014, p. 1, Wekesa, Steyn,& Otieno 2011, 242). The National Upgrading Support Program (NUSP) of the Department of Human Settlements and its Upgrading of Informal Settlement Program (UISP) has been recently introduced to look for socio-technical solutions that are sensitive to existing informal settlement conditions through a participatory and incremental approach (South Africa National Department of Human Settlements 2013, p. 1). The Breaking New Ground (BNG) policy is used to drive in situ upgrading indicating a shift to case-based and context-specific upgrading as opposed to a mass provision of new houses irrespective of the context (South Africa. National Department of Housing (NDoH) 2004). Context-specific design in this paper refers to sustainable interventions in the physical urban environment that are informed by the existing physical urban features and socio-economic understanding. Incorporating existing elements and adding a degree of formality into an organic urban structure may enhance spatial order and hierarchy which can facilitate incremental, flexible, and collective upgrading activities in informal settlements (Jordhus-Lier 2013, p. 7). Once in situ upgrading projects are implemented local municipalities fail to put in place a sustainable maintenance strategy (Marias & Ntema 2013, p. 93).

Through a context-specific design response, incremental upgrading can result to holistic, enabling and self-sustaining informal settlement urban environments (Hamdi 2010). An enabling urban spatial structure provides environments, resources, facilities, services, and infrastructure to the community for self-help towards improving households' socio-economic conditions (Wekesa et al. 2011, p. 238). Through this approach new interventions can be added to existing informal urban spatial structure in a subtle and yet effective manner sparking off self-help upgrading projects, enabling good governance and socio-economic activities while reducing the need for relocations. Urban open space improvements can contribute positively the community and support physical activities which lead to better living conditions in informal settlements (Saelens, Sallis & Frank 2003, p. 89, Naceur 2013, p. 408). Community-based planning and urban design can play an important role in addressing socio-economic needs in informal settlements (Murungi & van Dijk 2014, p. 75).

As is the case in many developing countries, neighborhood scale mapping of informal settlements is still lacking (Owen & Wong 2013, p. 116). In order to create urban forms and infrastructure that encapsulate the spirit of place, ambience, and self-sustenance a design solution should emerge from the context (Widodo 2012, p. 10).A context-specific design approach may be used to understand existing physical environment and non-physical aspects and then respond by introducing user-appropriate urban elements in movement routes and open spaces of Khutsong informal settlement to improve spatial order and provide an enabling urban spatial structure.

Method
Beyond building on case study the context-specific open urban space design solution for Khutsong was achieved using a visual research methodology. This qualitative approach began with the mapping of the existing informal settlement urban spatial structure through site visits, unstructured interviews, site photographs, notes and sketches to record observed physical and non-physical features (Purciel, & Marrone 2006, pp. 2-5). Using both traditional and digital representation techniques in the process is recommended especially if the designers have acquired advanced skills in the design discipline (Salman, Laing, Conniff 2014, p. 433). The designer can avoid random design decisions if each visual representation is improved by interacting with it on the surface level taking into account the site-specific constructive and functional considerations (Belmonte, Millán, Ruiz-Montiel, Badillo & Boned 2014, p. 409).

Analysis of the urban spatial structure using collected data was done through diagrams, massing models, and sketches to understand existing physical spaces in relation to non-physical aspects (Nguyen & Zeng 2014, p. 3). The final stage of the visual research involved iterative and exploratory design process drawings towards developing a site-specific and consolidated design response. A more intensive and repetitive concept selection method was used during the design process measured using a set of design criteria (Nikander, Liikkanen & Laakso 2014, p. 493).

The intention is not to impose the design proposal to the community, but rather to use it as means to initiate a dialogue towards establishing a sustainable and collective upgrading vision for the settlement. Research is an intrinsic aspect of design and an essential part of the activity of problem solving (Noble & Bestley 2005, p. 18): When using 'to design' as a verb, … meanings include to connect something, to

simulate, to draft, to sketch, to fashion, to have designs on something (Noble & Bestley 2005, p. 48). Zeisel (2006, p. 22) states that design … interconnects three constituent activities: imaging, presenting, and testing. Information is used as a heuristic catalyst for imaging and as a body of knowledge for testing.

Case study 1: The In situ upgrading of informal settlements in Mbabane, Swaziland.
In the early 1990's the Government of Swaziland established the Ministry of Housing and Development which formulated in situ upgrading policies with implementation strategies and procedures (Banes 2000, pp. 1-2). Through the Swaziland Urban Development Project (SUDP) trunk infrastructure, services, and titles for allocated plots were provided to the informal settlements of Mbabane (Msuduza, Mahwalala, eMvakwelitje, emaNgwaneni, eSitibeni, Makholokholo, Zone 6, Hilltop, and eNkwalini). This was achieved through series of community participation activities led by slum committees and leaders in partnership with the Mbabane City Council. In the late 1990's plots were allocated to residents, major roads were improved, new landfill sites, water and sewage treatment facilities were provided (see Figures 1 & 2 below).

Although the project stretched to nearly 10 years to complete due to processes of mapping, plot allocation, relocations, community participation, and construction, there were positive outcomes from the SUDP (Tebbal, & Merrick 2007). Existing major roads were improved used to circulate water and electricity services and provide storm water drainage. The results of the provision of infrastructure and services along with provision of titles sparked many upgrading activities of houses and shops in all the informal settlements. Relocation of existing houses and shops was kept to the minimum and plot allocations were site-specific, site boundaries were drawn around existing structures. Plot sizes range between 300 m^2 to 900 m^2. The market value of the average plot size (500 m$^{2)}$ was estimated to E40, 000 (US$ 3, 768.71) in 2010 and currently going for E70,000 (US$ 6595.25). One of the negative aspects of the project is that urban designers were not invited to provide context-specific urban open space improvements for the informal settlements. The resulting urban spatial structure is car-oriented and lacks the qualities of a pedestrian- oriented urban fabric.

Figure 1 *Informal settlement before the construction of trunk infrastructure, services, and improvement of major roads (Cities Alliance 2014).*

Figure 2 *Informal settlement in Mbabane after the construction of trunk infrastructure, services, and houses for those who were relocated due to road construction and improvement of major roads has sparked self-help housing (Cities Alliance 2014).*

Case study 2: Kampung Improvement Programme (KIP) Kampung Kebalen, Surabaya, Indonesia
In 2011, the author spent a month doing field work in different informal settlements in Surabaya, Indonesia. In these settlements people are continuously building and improving their homes, greening their streets, and recycling their waste with great enthusiasm (see Figure 3 to 4 below). These settlements are called kampungs. They contain 50 % of the city population in Surabaya (Silas 1987). Most of the inhabitants are from lower to middle-income groups.

In 1969 the local municipality introduced a Kampung Improvement Programme (KIP) (Litas & Langkah 1994, Silas 1987). This programme focuses on installing drainage and paving on existing pathways. The urban fabric of the kampung is very fine-grained with transportation networks at different scales. There is a hierarchy in the way small pedestrian and motorbike routes connect to wider vehicle roadways (see Figure 5 below). The closely-packed unity of the housing ensures high densities and a good environment for small-scale economic activities. The elements of KIP consist mainly of the improvement of circulation by constructing footpaths, vehicular roads, and drains alongside the paths and roads (The Local Government of Kotamadya 1991, p. 9).

The local municipality respects existing social network structures and administers development in each section through them. Kampungs are organised in RT sections made up of about thirty families, and these RTs form bigger sections called RWs consisting of about seventy families (Silas 1987). Street widths range from three to four metres, with five-hundred milimetre drainage trenches on both sides. Indonesian culture has a very connected family structure. A father would prefer that his children live close by and this arrangement includes the extended family.

As part of the KIP, the local municipality holds annual competitions, giving an award to the greenest kampung street so that the funds may be used to further its development (The Local Government of Kotamadya 1991, p. 7). This initiative has sparked excitement and energy for establishing plastics recycling programs, and increasing plantings along streets by reusing grey water. Empowering people has proved to be sustainable as far as the settlement's development is concerned. Locals were also trained in building skills so as to be involved in the building of houses. Instead of being just a provider to the residents, the local authority empowered them and trusted them. This also included supporting the informal housing and economic system initiated by residents. The 3 metre wide streets play a vital role in the way the community operates.

Some of the streets are lined with flowers, herbs, plants, small tuck shops, seating areas, a place for weddings, storage, parking for bicycles and motorbikes, etc. The kampung is a system of relationships, and for any development project to be a success, the social structure must be respected and inhabitants must be invloved. The street has become a platform on which these families and communities organise and project themselves.

Figure 3 *Green streets in Surabaya resulted from self-help initiatives that are administered through a strong social network in each street or RT, as it is called. The use of recycled grey water to water the plants, and the spirit of ownership keep these streets green. A strong vision, by a local municipality that supports self-help initiatives, and community teamwork, made this project a success.*
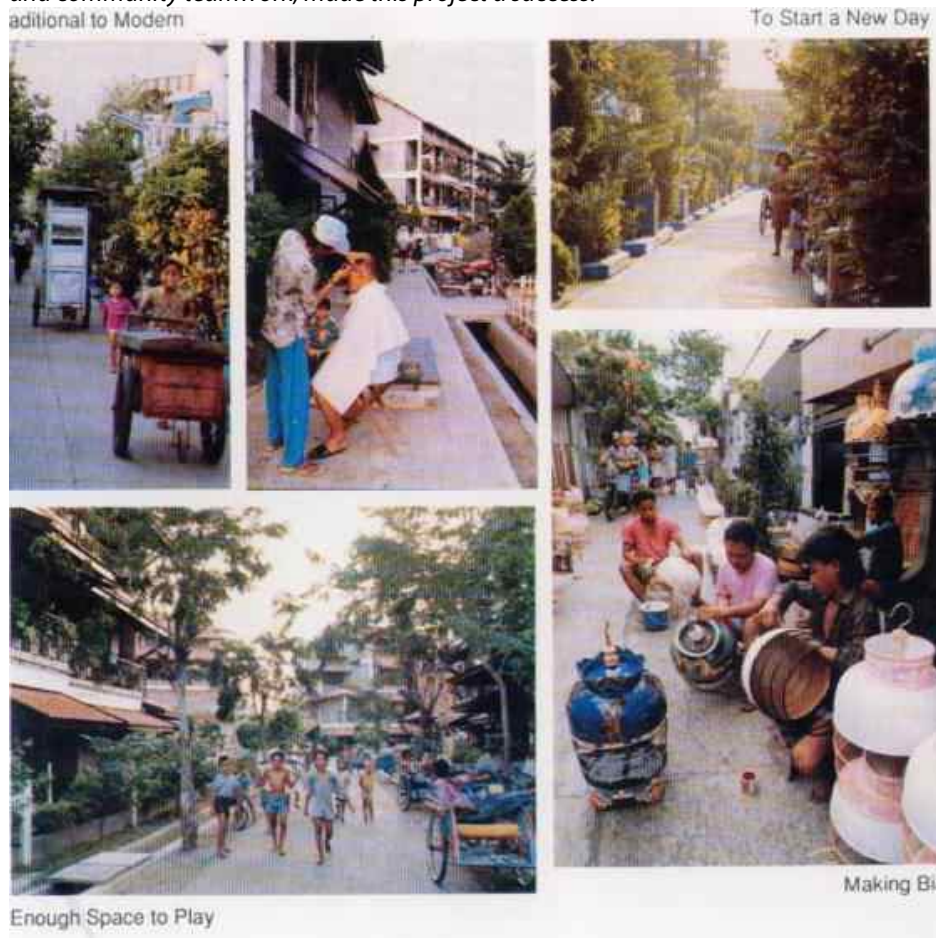
Figure 4 *Streets in Surabaya kampung showing integration of economic and social activities in spaces of flows (Municipal Government of Surabaya 1992, p. 7).*
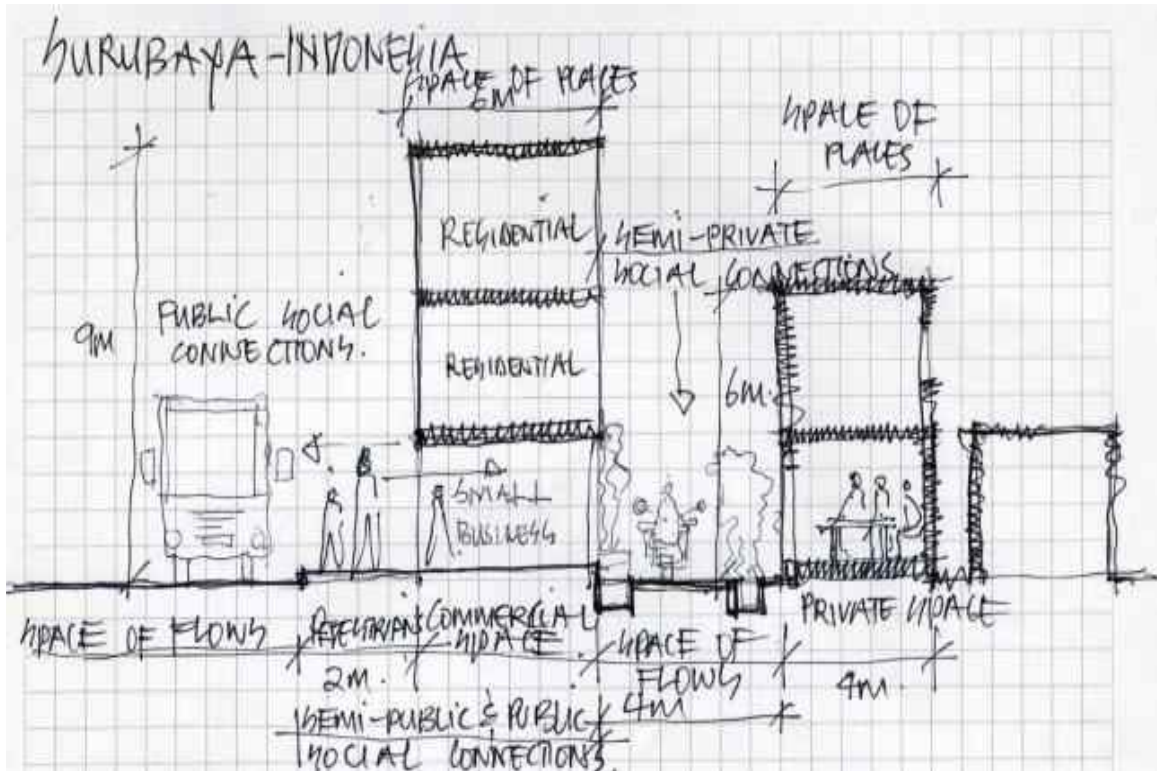
Figure 5: *A block in Surabaya with a mixed-use street edge indicates that the space of places of economic activities serves well as a threshold that separates the public spatial domain from the semi-private spatial domain.*

Context: Open spaces in Khutsong Section

There was a mapping done by Katamaya (2004) in Khutsong settlement which documented existing buildings and spatial uses in the settlement (see Figure 8 below). This study built on the work of Katamaya (2004) and expanded the analysis to understand how and where relationship-building activities occur in the settlement. Figure 7 below indicates the socio-spatial setting of the settlement. The lack of a semi-public spatial domain between the semi-private and the public interrupts semi-private social activities. The variety of form and space created by the informal layout and shack typologies provides a rich spatial experience in the settlement (see Figures 6 to 8 below). Existing pathways and open spaces lack urban elements and enabling infrastructure that can support various social and micro economic activities.

Figure 6 *Location plan of Khutsong Section Informal Settlement in Ivory Park (Google Maps 2012).*

Figure 7: *Residents use the spaces in front of their houses for domestic activities which are intertwined with social activities.*

Figure 8 *Computer mass model of Khutsong laid over the layout done by Katamaya (2004) showing existing houses, shops, routes, vegetation, fences, toilets, and other physical features.*

The observed relationship-building activities in open spaces in Khustong Section are influenced by other activities and the characteristics of spaces. This means that relationship-building activities could be encouraged by introducing other activities like micro economic activities and by altering the spaces to attract more social activities. Existing relationship-building activities could expand if the visual research and spatial strategy provide the necessary urban spatial elements and activities in Khutsong Section. The following spatial analysis of the existing spaces will help highlight advantages and disadvantages that relate to socio-spatial interdependency in the settlement. The aim of the analysis is to identify specific aspects of the spatial structure that need to be addressed to ensure that existing relationship-building activities are protected while new ones can be forged and grown.

Analysis of Khutsong Section open spaces
The urban fabric of Khutsong Section possesses some of the characteristics of a compact city. The fractal nature of pathways and organic layout of buildings is suitable for pedestrian but limiting to vehicle users. Through the visual research process the potential of the existing informal settlement spatial structure was explored in order to create enabling urban spaces and infrastructure. Since vehicle routes are within a walking distances from the settlement, the fractal pathways may be used for the flow of pedestrians, goods, and services.

The spatial analysis in Figures 6 to 8 shows that in some instances there are insufficient spatial thresholds to separate one spatial domain from the other. They show social interactions in spaces of places and spaces of flows. These diagrams were based on the understanding of African settlements and the observation of socio-spatial aspects of Khutsong Section. Spatial thresholds play an important role to demarcate private, semi-private, semi-public, and public spatial zones.
It is also clear that the lack of clean and quality urban open spaces in Khutsong Section limits the potential for more relationship-building activities to occur. Strategic addition of urban elements, services and infrastructure can strengthen the spatial structure of Khutsong Section to ensure an urban fabric that encourage and support more relationship-building activities. The following discussion will delve into proposed systems, spatial elements, and activities that can place Khutsong Section in a strategic position to be a settlement that have growing relationship-building activities which are integrated to economic and environmental sustainable development. The urban qualities shown in table 1 were used to do the spatial analysis and create a design criterion for the context-specific design response that can lead to a functioning pedestrian-oriented spatial structure for Khutsong.

Imageability

Imageability is the quality of a place that makes it distinct, recognizable, and memorable. A place has high imageability when specific physical elements and their arrangement capture attention, evoke feelings, and create a lasting impression.

Legibility

Legibility refers to the ease with which the spatial structure of a place can be understood and navigated as a whole. The legibility of a place is improved by a street or pedestrian network that provides travelers with a sense of orientation and relative location and by physical elements that serve as reference points.

Enclosure

Enclosure refers to the degree to which streets and other public spaces are visually defined by buildings, walls, trees, and other elements. Spaces where the height of vertical elements is proportionally related to the width of the space between them have a room-like quality.

Human Scale

Human scale refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and, equally important, correspond to the speed at which humans walk. Building details, pavement texture, street trees, and street furniture are all physical elements contributing to human scale.

Transparency

Transparency refers to the degree to which people can see or perceive what lies beyond the edge of a street or other public space and, more specifically, the degree to which people can see or perceive human activity beyond the edge. Physical elements that influence transparency include walls, windows, doors, fences, landscaping, and openings into midblock spaces.

Linkage

Linkage refers to physical and visual connections from building to street, building to building, space to space, or one side of the street to the other which tend to unify disparate elements. Tree lines, building projections, marked crossings all create linkage. Linkage can occur longitudinally along a street or laterally across a street.

Complexity

Complexity refers to the visual richness of a place. The complexity of a place depends on the variety of the physical environment, specifically the numbers and kinds of buildings, architectural diversity and ornamentation, landscape elements, street furniture, signage, and human activity.

Coherence

Coherence refers to a sense of visual order. The degree of coherence is influenced by consistency and complementarity in the scale, character, and arrangement of buildings, landscaping, street furniture, paving materials, and other physical elements.

Tidiness

Tidiness refers to the condition and cleanliness of a place. A place that is untidy has visible signs of decay and disorder; it is in obvious need of cleaning and repair. A place that is tidy is well maintained and shows little sign of wear and tear.

Table 1 *Urban Design Qualities (Ewing, Handy, Brownson, Clemente & Winston 2006, p. 226).*
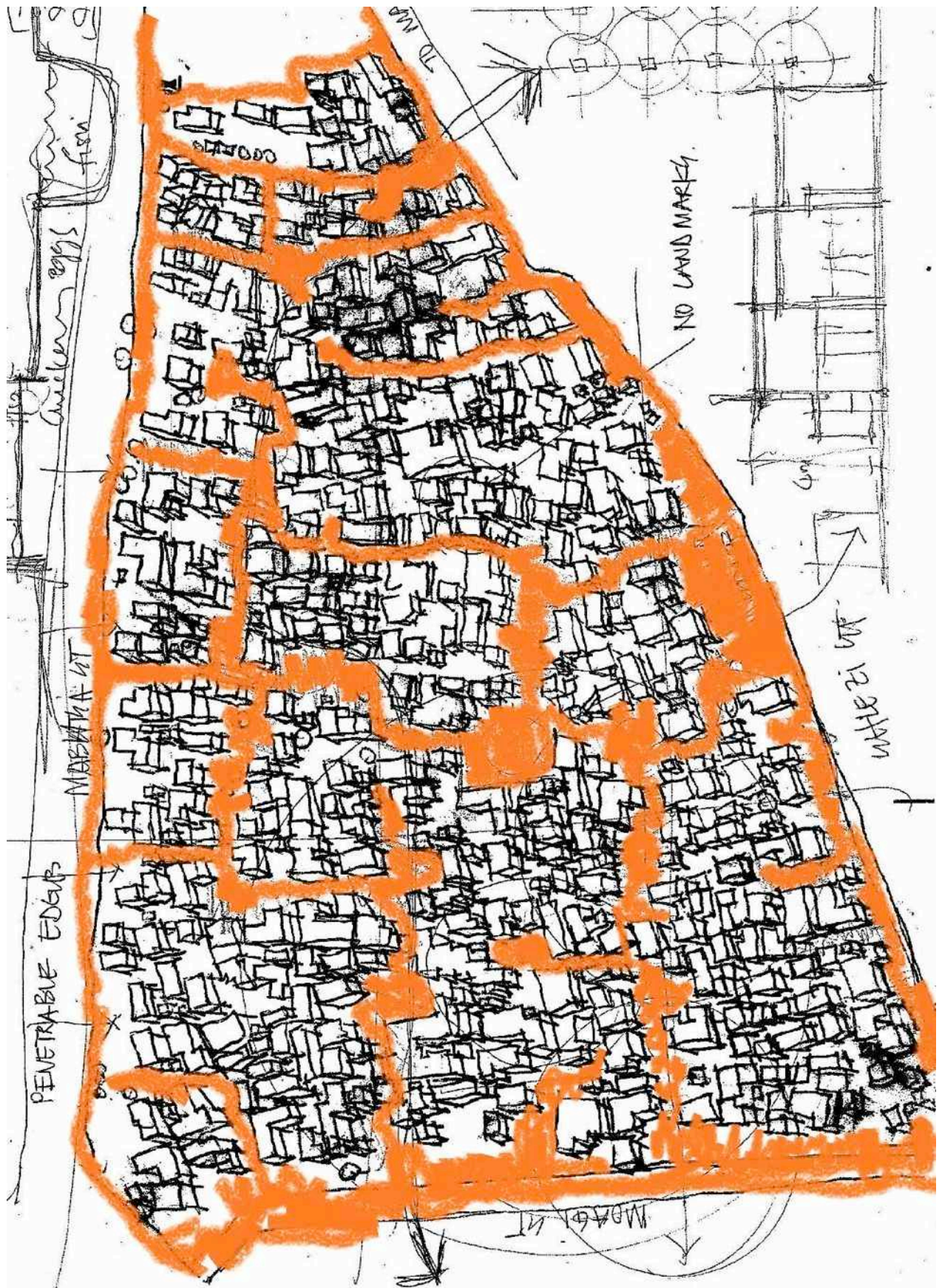
Figure 9: *This drawing shows existing fractal pathways (indicated in orange) that connect to surrounding roads. The fractal pathway system is a result of the fine grain informal settlement fabric which is negotiated by moving pedestrians in order to access other places. Although this spatial structure possesses some of the urban qualities*

like imageability, enclosure, human scale, complexity and linkage, it lacks legibility, tidiness, coherence, and transparency.
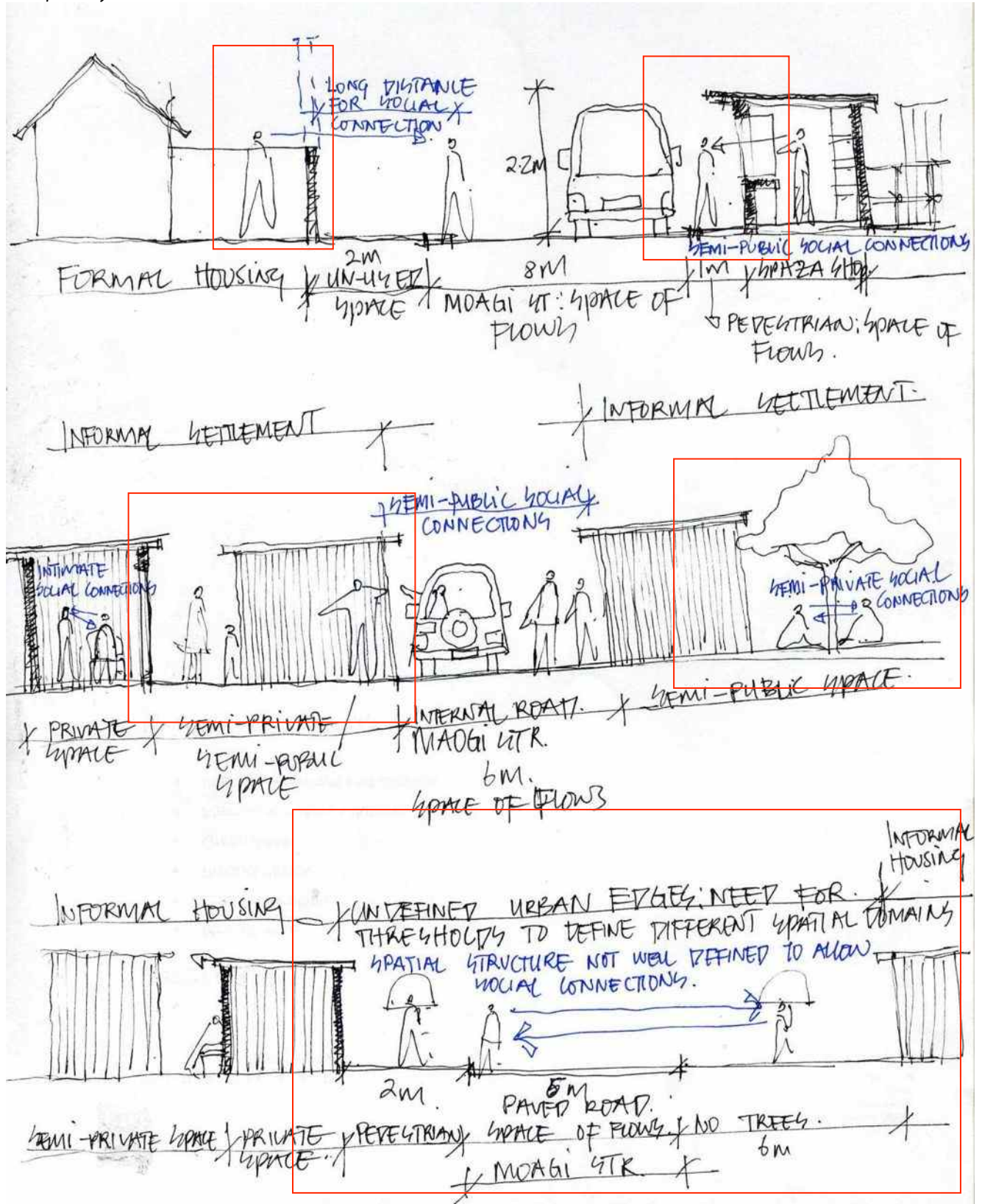
Figure 10: *An analysis of the Moagi Street and adjacent open spaces in Khutsong. These street sections indicate that there is inadequate building and urban form articulations, services, and infrastructure to create legibility, coherence, linkages, tidiness, and transparency.*

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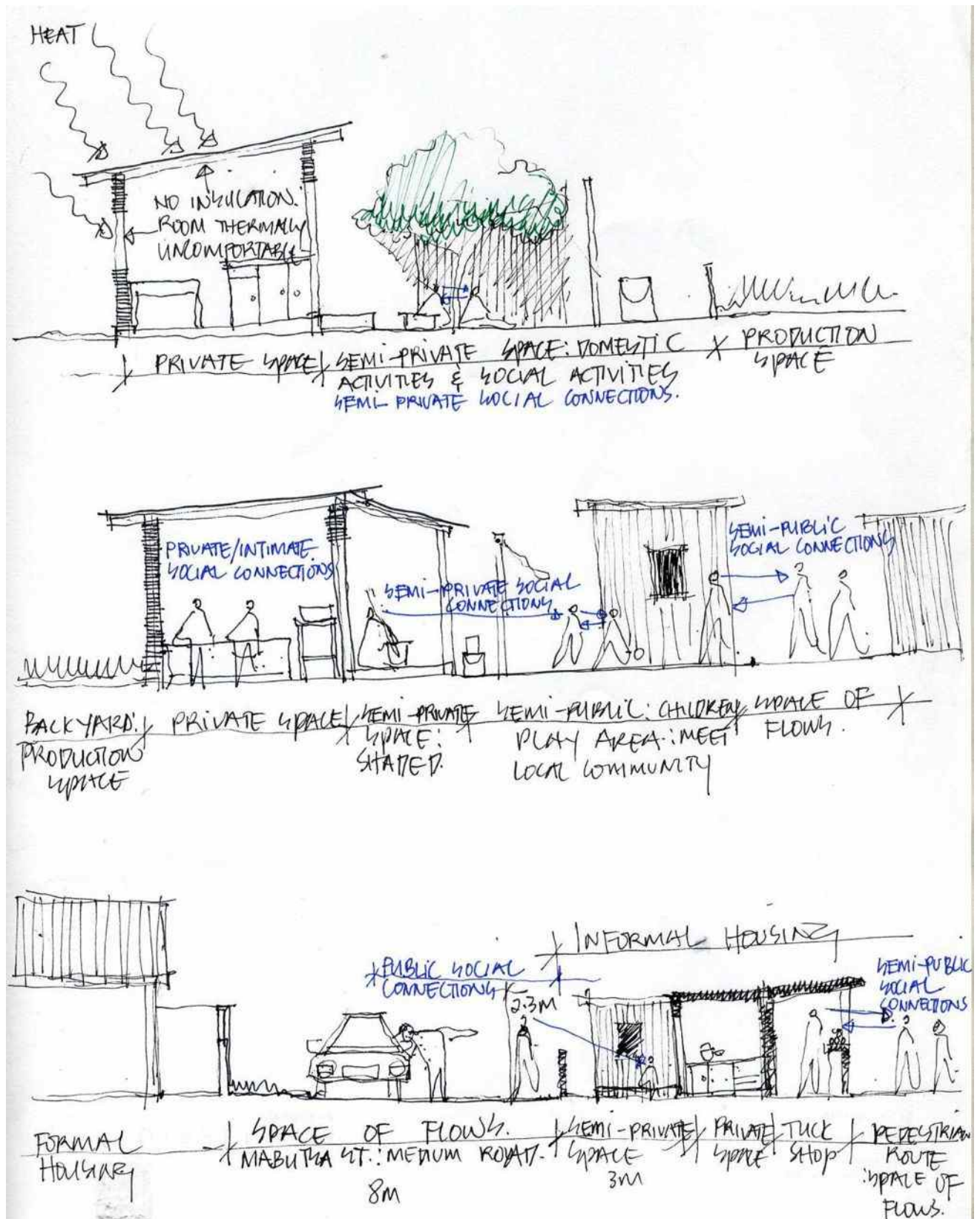
Figure 11: *An analysis of open spaces in relation to enclosed spaces of Khutsong Section. These sections indicate that there is a degree of enclosure, complexity, human scale, linkage, and imageability in the informal settlement's spatial structure.*

Design exploration: towards a context-specific design solution

This design investigation was aimed at finding simplified solutions of urban elements and infrastructure that can enable a variety of social and micro scale economic activities, the flow of goods, services, knowledge and people. This was done in way that promotes collaboration and human interactions in the production and distribution of goods, services and information in spaces of places and spaces of flows and by integrating water quality, green infrastructure and storm water management with social and economic activities. Different spatial configurations and arrangements were explored towards the most effective solutions that grow out of the existing spatial structure, require minimum relocation of residents and simplified construction methods (see Figures 12 to 15 below). Concept selection, evaluation development was based on the following design criterion:

- o Create a fine-grained informal settlement fabric.
- o Activate strong local links and weak distant links, providing good links and connections within the settlement and the rest of the world.
- o Decentralise and fragment services.
- o Build on existing patterns of movement.
- o Plan for the human as well as the pace-of-life micro-scale, approaching an infinitesimally-grained urban fabric.
- o Make each journey enriching.
- o Reduce the need to travel long distances by car by mixing uses and achieving densities high enough to ensure viable, quality public transport.
- o Encourage variety and diversity of social, economic, educational and ecological activities.
- o Increase adjacency, proximity and the efficiency of circulation networks.
- o Promote collaboration in the production and distribution of goods, services and information in spaces of places and spaces of flows.
- o Integrate water quality, green infrastructure and storm water management with social and economic activities.
- o Minimise relocation of residents and houses.

In the book entitled, South African Cities: A manifestor for change, Dewar & Uytenbogaardt (1991, pp. 18-21) list urban qualities which can support small-scale activities in urban areas. The urban form and urban structure of the informal settlement should: accommodate, support and enable the urban activities and events; cultivate the potential and talents of many people in the development of the settlement; allow and increase easy access to the opportunities residents generate; promote specialisation, intensity, diversity and necessary complexity to generate urban opportunities through high levels of human interaction and population density; characterised by quality integration between different urban, architectural, and landscape elements of the informal settlement; and provide a sense of identity and belonging by the provision of well-connected and demarcated private, semi-private, semi-public, and public spaces. Drawing from these urban qualities and case studies, the work of Dewar (1982), and Whyte (2000) the following table (Table 2 below shows guidelines used to achieve a context-specific design response for Khutsong:

GUIDELINE FOR:	DESCRIPTION
Existing pathways	All existing pathways shall be mapped to record the traffic flow of pedestrians and vehicles at different times within the informal settlement. Pathways of a minimum width of 1 metre on busy routes shall be identified for paving. In these paved pathways a drainage channel shall be installed, flowing towards the lowest point of a junction between zoned clusters of dwellings. The size of these drainage channels shall be determined by calculating the storm water flow per zoned cluster of dwellings.
A recycling station and community hall to serve each cluster	At least one water recycling station shall be provided for every two clusters at street junctions where storm water and grey water storage tanks are positioned. All dumping sites shall be identified and allocated for solid waste recycling stations, except if such a dumping site is not accessible from a paved pathway. Each solid waste station shall be equipped with solar panels and a rainwater collection tank, and may be used by local residents to store, sort, package and sell such waste as a means of income generation. A building footprint of a maximum of 18 square metres shall be permitted for each station. Each station shall be equipped with solar panels, play pumps and rainwater collection tanks with a minimum storage capacity of 5 000

	litres, unless rainwater and storm water calculations require otherwise. There should be a minimum of 1 000 litres available in storage tanks at any time of the day for fire-fighting purposes. The solid waste and water recycling stations shall be used as landmarks by articulating their height, form and finishes to help pedestrians orientate themselves within the settlement. These recycling stations shall also be used for committee and other community meetings to drive development projects and to run training programmes for each zoned cluster within the informal settlement.
Existing houses	Clusters of a minimum of 5 houses and a maximum of 70 houses shall be identified and zoned following the existing fractal pathway structure around them. Paved pathways shall be used as a means of supplying services and to access each zoned cluster.
Spatial thresholds and domains	Existing fences and invisible boundaries separating activities at each dwelling shall be identified. Spaces where domestic activities like laundry, cooking and other semi-private social activities take place shall be zoned as semi-private spatial domains. Spaces used for micro-scale economic activities like tuck shops shall be zoned as semi-public spatial domains. Linear spaces used by pedestrians, playing children, vehicles and for community gatherings shall be zoned as public spatial domains. Existing fences and dwelling activity thresholds between semi-private spatial domains and public spatial domains shall be identified and marked for installation of the spatial threshold techniques discussed below.
Seating	Seating and low walls of a minimum height of 300mm and maximum height of 900mm shall be installed as thresholds between any semi-private spatial domain and any relatively less busy pedestrian pathway. All such seating and low walls shall have a minimum depth of 400mm. A minimum of 0.3 linear metres of seating shall be provided for each 3 square metres of urban plaza areas like community gathering spaces, in front of shops, and on pathways. Seating with a minimum width of 760mm shall be accessible from both sides. In order to make provision for handicapped persons, a minimum of 5 per cent of the required seating shall have backs at least 300mm high and a minimum seating depth of 355mm.
Linear spatial thresholds	Where existing pathways of a maximum width of 3m separate two existing block edges of a zoned cluster, a wall with a minimum height of 3m shall be installed with openings aligning with the sizes of doors, windows and gates of the nearest houses, shops and block edges. To indicate gateways and thresholds between one zoned cluster block and the next, such walls shall be articulated by using height, decorations, openings and finishes reflecting social motifs of the relevant cluster blocks. Such walls may be used for signage and graffiti only for the purpose of promoting legal products and services offered within the settlement. Such walls shall be arranged in such a way that they prevent the spread of fire and limit existing zoned cluster blocks from encroaching onto paved pathways.
Shop frontages	Where existing shops face an existing pathway adjacent to an existing fence or invisible activity boundary located a minimum of 2m away from a house located in a zoned cluster, a strip of shops a minimum of 2m wide shall be installed on both sides. These shops shall be installed in such a manner that a continuous block edge of a zoned cluster is achieved. All such uses shall be directly accessible from the adjacent public space or adjoining arcade. The arrangement of such shops should maximise northern exposure wherever possible. Except for that portion of a pathway that widens along a narrow street, a minimum of 50 per cent of the total frontage of new building walls fronting onto an open public space, exclusive of such frontage occupied by existing houses and recycling stations, shall be allocated for occupancy by retail, service establishments, libraries, museums

	and art galleries.
Trees	A minimum of one tree of 100mm diameter or more shall be planted for each 6m of the entire street frontage bordering two cluster blocks. Such trees shall be positioned in such a way that a continuous block edge is formed while shade is provided to seating located in public open spaces. These trees shall be planted in at least 5 cubic metres of soil per tree. Existing trees should be preserved wherever possible unless they are invasive species or obstructing the quality of open urban space.
Existing urban agriculture	Existing urban agriculture and farming activities shall be preserved and conserved. Such activities shall be supported by continuous training programmes in order to ensure their continuity and sustainability
Existing water collection points	All existing water collection points shall be paved and equipped with seating and trees complying with the requirements mentioned above. Drainage channels from taps shall be linked to channels leading water to water recycling stations.
Maintenance	Building owners in each zoned cluster shall be responsible for the maintenance of the urban open space, including, but not limited to, the confinement of permitted obstructions and litter, and the control, care and replacement of vegetation within the zoning lot and in the street nearest to their cluster block.

Table 2: *Design guidelines used in the iterative design process.*

The design guidelines were used through an iterative design process resulting to the following design solutions:
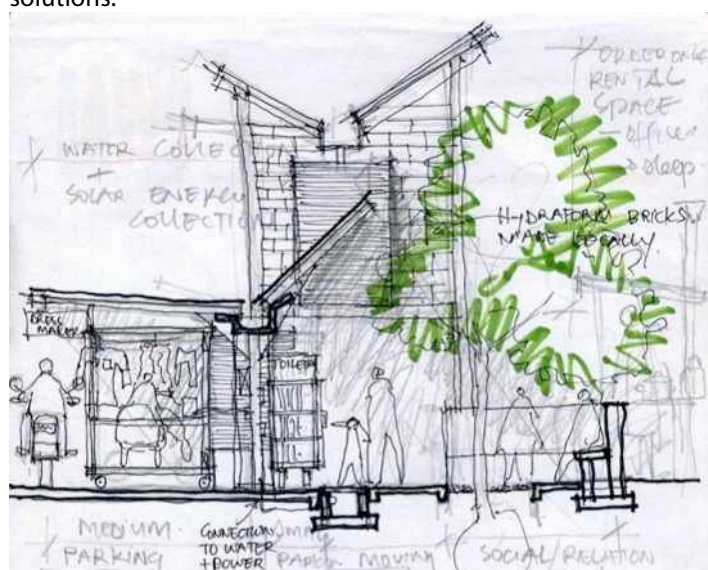
Figure 12: *The insertion of a double-storey building and lightweight structures for micro-scale economic activities provides shaded spaces. Seating can be inserted to support social activities at ground level. Butterfly roof forms can be used to help harvest solar energy and rainwater for the use of local residents (Author 2013).*
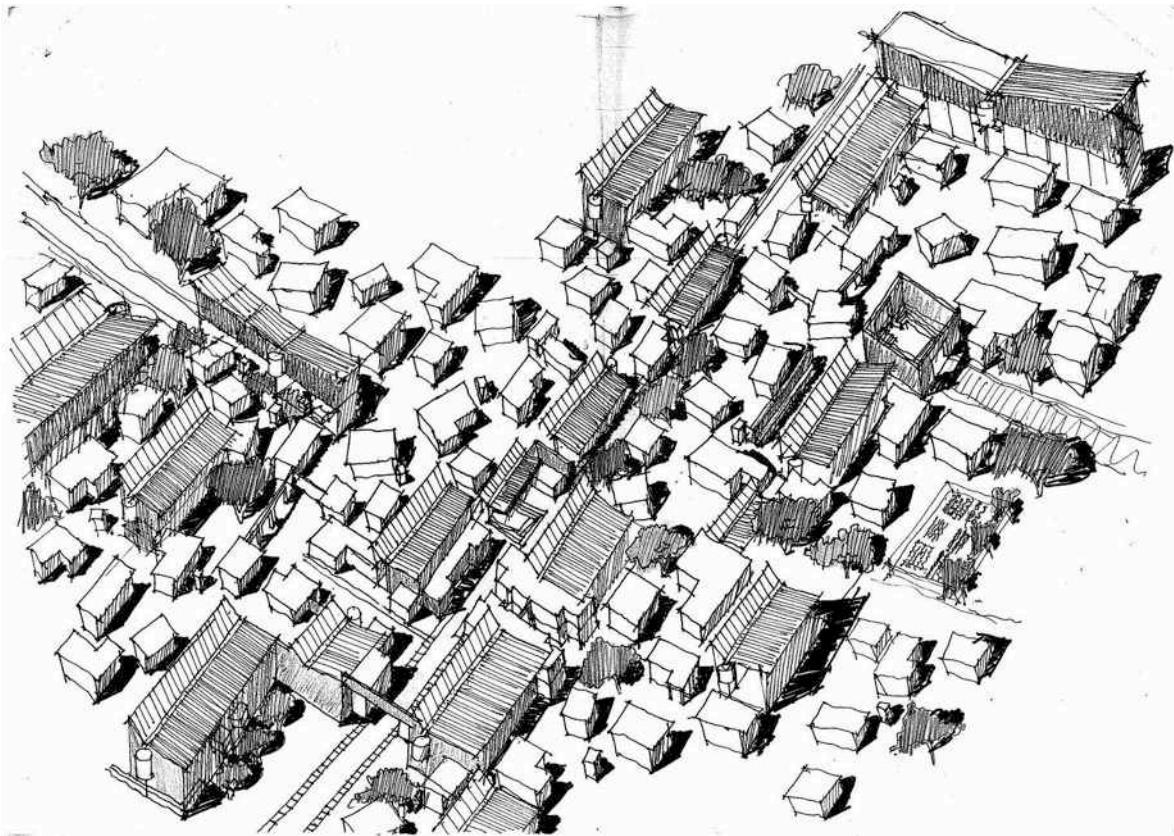
Figure 13: This option aims to insert double-storey buildings as fragments in different open spaces and along busy streets, while also inserting gathering spaces and service systems in between existing structures (Author 2013).
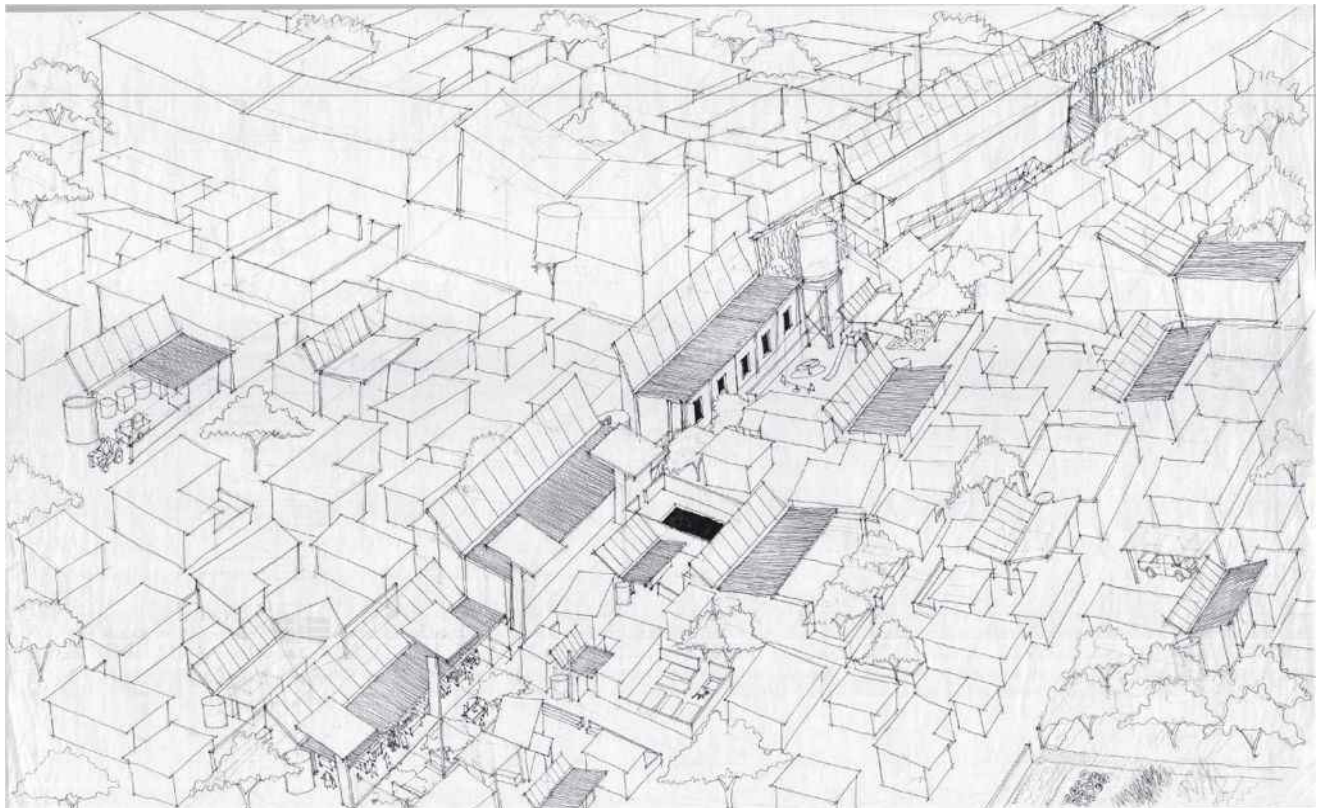
Figure 14: This solution aims to strengthen only the busiest streets with educational, economic and social activities, while inserting recycling stations at existing dumping sites (Author 2013).
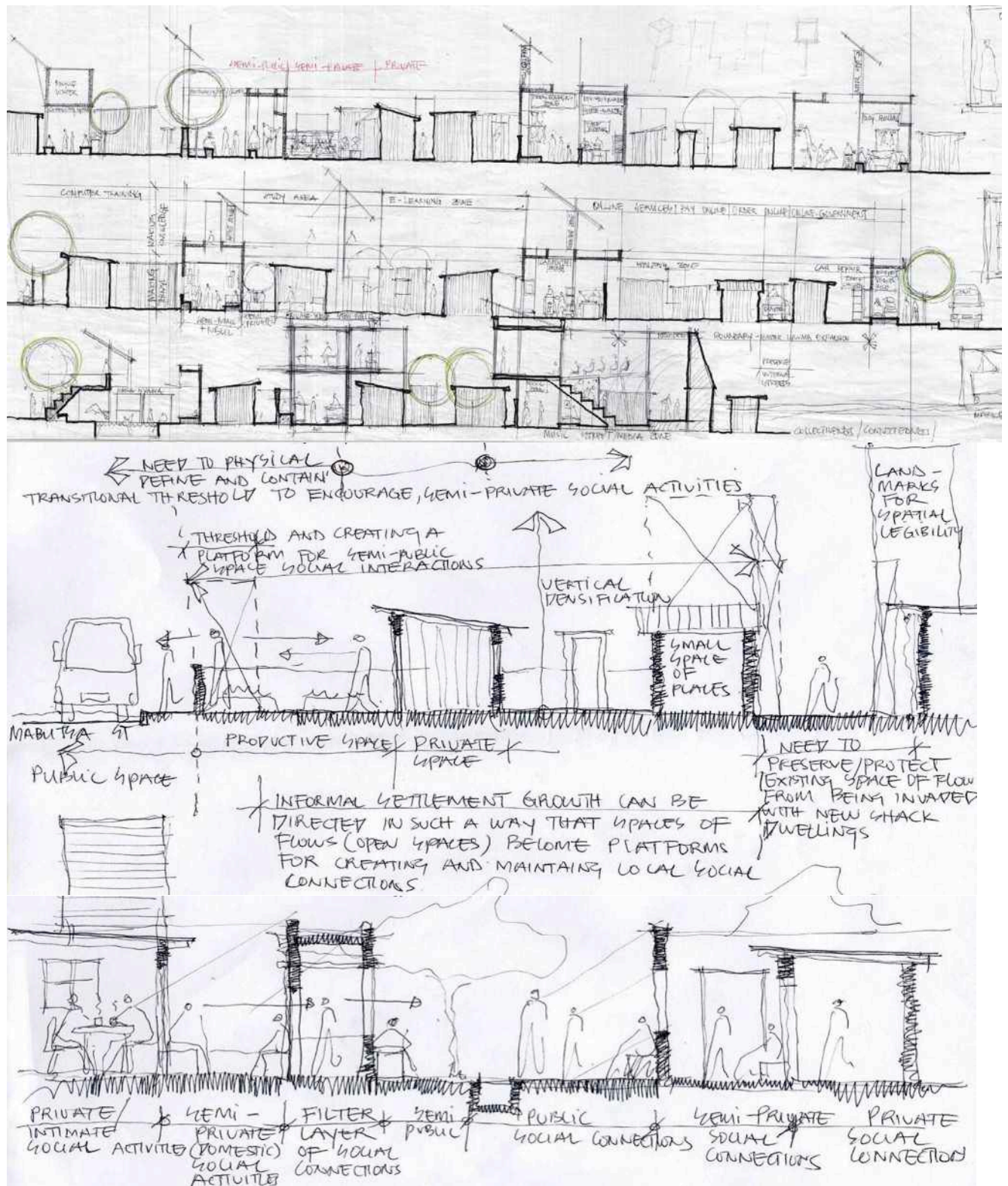
Figure 15: This option responds to the unique physical condition of each street and open space integrating the existing urban form with new enabling urban elements and infrastructure (Author 2013).

Elements that were proportional to existing building forms were inserted in a manner similar to the existing urban layout to achieve a subtle new development. Forms were juxtaposed by imitating the way residents add new houses within the informal settlement. A variety of thresholds are inserted to separate semi-private activities from public activities.

Design results

The last option (see Figure 15 above) achieves maximum design impact by using less visually intrusive forms. Through this design investigation, vertical spatial planes were used to provide transitions from semi-private to public spatial domains. These transitions provide seating, trees, shops, gates, shaded spaces and limited visual connections between semi-private and public spatial domains (see Figures 16 to 20 below).

Figure 16: *Strategic spatial positions and interventions for Khutsong Section in situ upgrading.*

22ND OCTOBER DRIVE
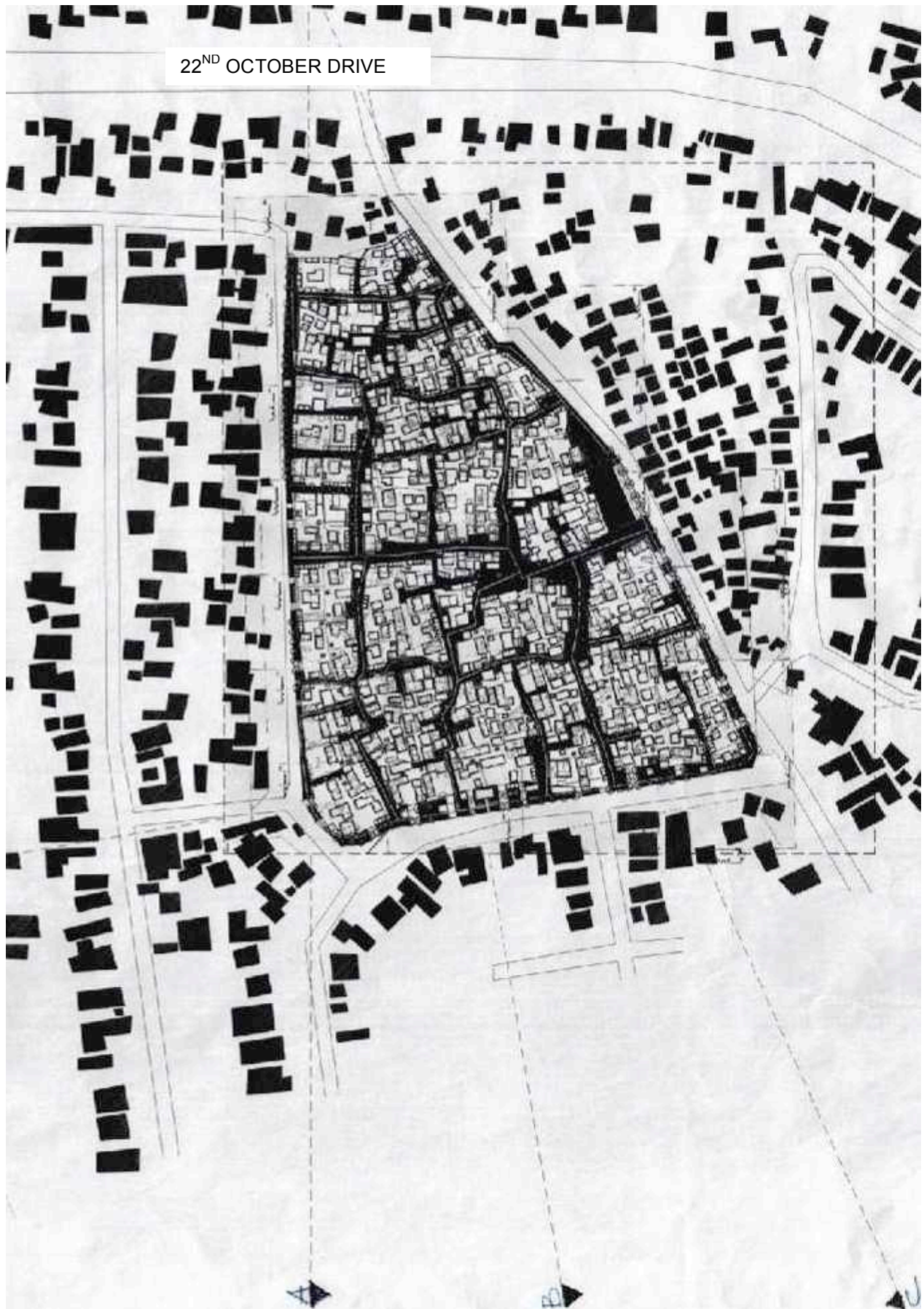
Figure 17: *Khutsong Section context-specific design response: Site plan drawing.*

Figure 18: *Khutsong Section context-specific design response: Sections and elevation drawings.*

The final design solution (see Figures 16 to 21 above and below) shows the use of small shops, vertical spatial planes, recycling stations, seating, trees and low walls to create a connection between semi-private spatial domains and public spatial domains. In Figure 16 below shops are coloured yellow and the spaces used for recycling and community gatherings are coloured red. These lines of shops serve as semi-public spatial domains separating semi-private spaces from public spaces. This responsive design approach strengthen the existing fractal pathway structure by integrating trees, seating, paved areas, water collection systems, food gardens, existing houses and shops, waste collection points, urban elements, community and educational facilities into a holistic design intervention. The aim was to express the identity of place and community values of Khutsong Section by creating an aesthetic appeal, utility and functionality, while increasing opportunities for relationship-building activities which are integrated with educational and economic activities,
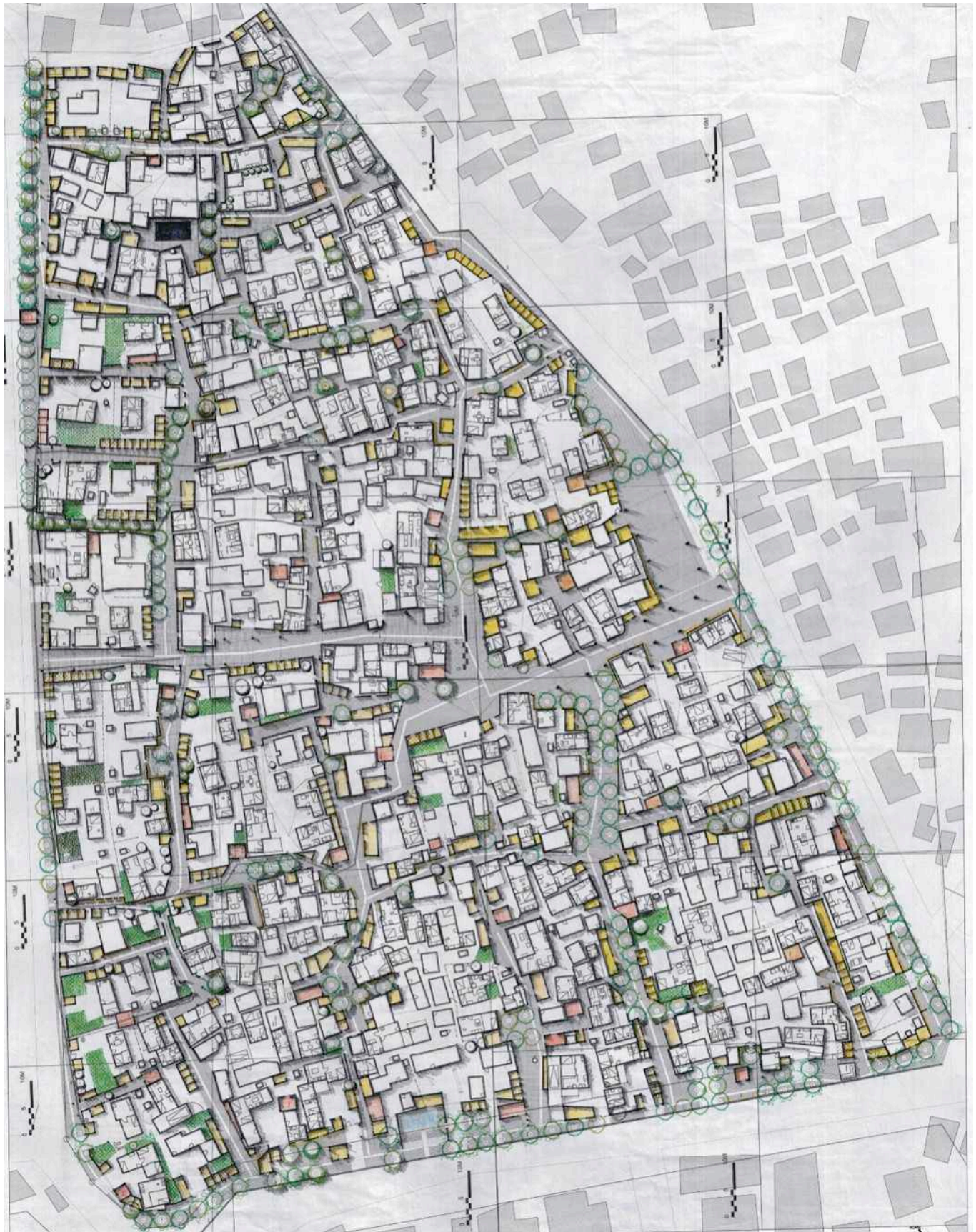
Figure 19: *Khutsong Section context-specific design solution: Layout drawings.*
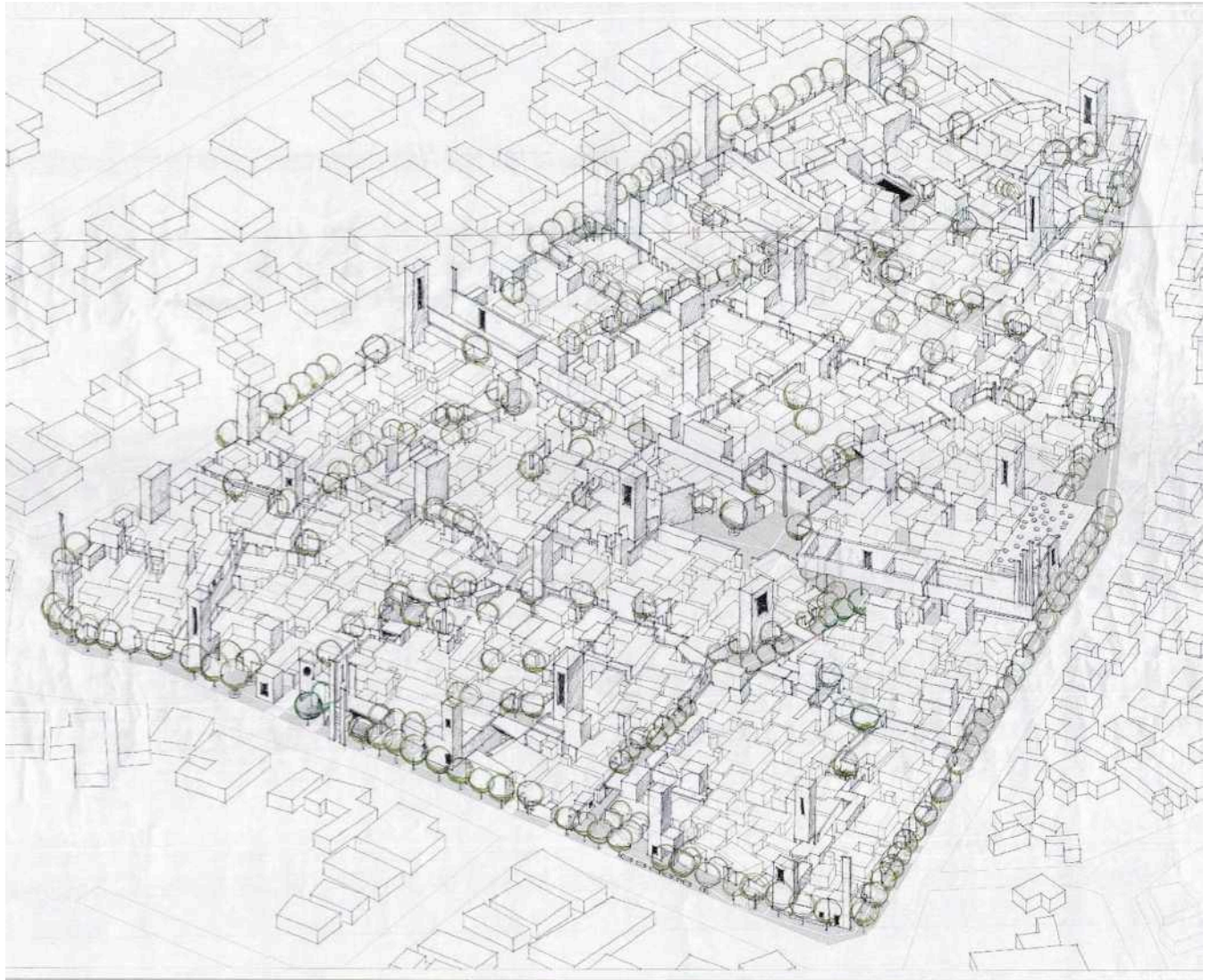
Figure 20: *Khutsong Section context-specific design solution: Three dimensional drawing. Recycling stations for water and solid waste were articulated to function as landmarks and gateways in order to provide legibility within the settlement. Linear thresholds, lines of small shops, trees, seating and low walls are used to connect semi-private spatial domains to public spatial domains.*

An integrative design approach was used to develop a responsive, harmonious, holistic, and recognisable design solution. The solution attempts to reflect the culture of place and community values by providing site specific solutions. The resulting aesthetic appeal, utility and functionality of the design response proposal can help uplift the civic image of the settlement and cultivate its cultural identity and social networks. The design also integrates relationship-building activities with economic and environmental to ensure sustainability through innovative design resolutions. These issues will be used in the spatial strategy to form part of the policy framework for the in situ upgrading of Khutsong Section.
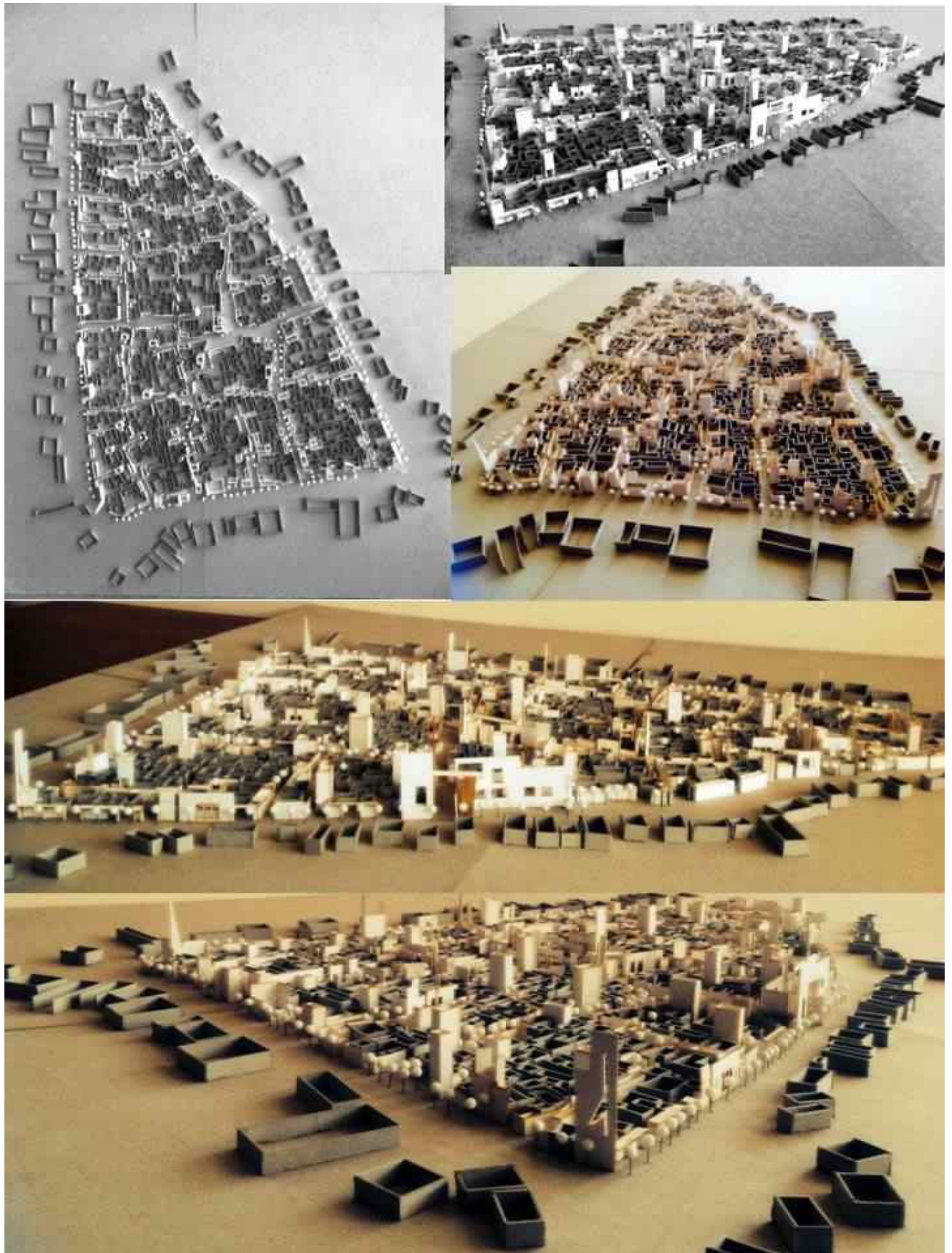
Figure 21: *Khutsong Section context-specific design solution: Model. Existing houses and shops are shown in grey and all new enabling urban forms and infrastructure is shown in white.*

CONCLUSION

The following conclusions were drawn from the visual research process:

1. The mixed-use, very fine-grained, pedestrian-orientated, fractal and fragmental nature of the urban fabric of an African informal settlement tends to increase opportunities for social relationship-building activities.

2. These social activities are integrated with economic, cultural, domestic, political and educational activities.

3. This interconnected nature of the urban fabric of informal settlements is ideal for enhancing social connections.

4. A significant visual and spatial impact can be achieved by subtly introducing edge and threshold defining forms in Khutsong Section. These forms:

 (i) Strengthen hierarchy in the spatial structure of the settlement to encourage relationship-building activities to occur in private, semi-private, semi-public, and public spatial domains.

 (ii) Enhance legibility within the urban fabric of the settlement.

 (iii) Can accommodate services and systems which are necessary for the development of the settlement.

 (iv) Can serve as a skeleton for in situ upgrading of the informal settlement.

A context-specific design approach may be used to understand existing physical environment and non-physical aspects and then respond by introducing user-appropriate urban elements in movement routes and open spaces of Khutsong informal settlement to improve spatial order and provide an enabling urban spatial structure. Consequently, self- help upgrading activities by individual households may begin to occur as was the case in the upgrading of informal settlements in Mbabane. Upgrading interventions that reflect the identity of place can emerge through an understanding of the physical context of the Khutsong. A visual research method becomes a valuable tool in transforming space to become an enabling environment equipped with urban elements and systems that can support socio-economic initiatives in Khutsong. The resulting design drawings and models can be used to communicate the in situ upgrading vision with the community in public participation processes. Depending on the responses and feedback received from the community and relevant stakeholders, the design solution can be developed and altered for further discussion until consensus between the community and designers is reached.

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HOUSING AFFORDABILITY IN NIGERIA

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Abstract

Housing poverty is on the increase in Nigeria. Public housing provision has not yielded much. The country has not complied with the 1976 United Nations recommendation of providing an annual construction rate of between 8 and 10 dwelling units per a thousand populations. The present level of annual Housing provision in Nigeria is so low that it is estimated at between 2 and 3 dwelling units per a thousand population as at 1985 which is as a result of high cost of provision due to utilization of conventional building materials. However, it is believed that if the importation of these expensive construction materials could be substantially reduced using locally available alternatives such as Laterite as is being used in other parts of Africa, the Middle East, Brazil and nearly the whole of Latin America,, such a measure can reduce cost of construction, increase housing stock and also increase foreign reserves of the economy of the country.

This paper therefore, makes a case for the incorporation of Laterite into Housing policies in Nigeria in order to reduce housing poverty. Data used are majorly secondary data which was done through Historical survey approach method and complemented with personal observation .The analysis of past government efforts of the National Development Plan and the National Housing Policy of 1991 were done and the paper found out that the program did not yield much due to high cost of provision of housing units which leads to unaffordability by people, disregard for alternative avenues of housing provision etc.

The paper concludes based on the findings above that in order to achieve sustainable housing provision in Nigeria, the material should be incorporated into housing policies and programs which should not be at the exclusive preserve of Federal Government and at the exclusion of State and Local governments.

Keywords: public housing provision, high cost, conventional building materials, Laterite incorporation, housing policies.

INTRODUCTION

A lot of human activity revolves around housing that it contributes 3 to 8 percent of the Gross Domestic Product (GDP) in many African countries and usually above 8 percent in many industrialized countries (Aina 1990). More significantly, housing is the dominant component of the construction industry.

However, in the developing countries of the world, as important as housing is, the problem of Housing caused by urbanization has become an everyday discussion in all quarters of the public and private services (Aribigbola 2000). It has become increasingly glaring that most of the urban population lives in dehumanizing housing environments, while those who have access to average housing do so at abnormal cost (Dosumu 2002).

In Nigeria, for example, the housing problem is essentially an urban problem (Onibokun 1985, Agbola and Olatubara 1992 and Agbola 2001). Most authors have analyzed this from various perspectives, with most of them giving it a quantitative pre-eminence. Also, they have, at different times, revealed the problems associated with production among which is construction cost.

In Nigeria, for example, in the past, technological advancement made it possible to acquire building materials from the developed countries. However, the economic crisis befalling the country one after the other made Government realize that importing building materials for the industries is beyond their means (Okunola 1998, Agbola 2001, Dosumu 2002).

In order to solve the problem however, several measures were put in place such as the Structural Adjustment Program (SAP) of 1986 which was meant to reduce housing problems (Odunjo 2006, Arayela 2005). The policy was not able to make a remarkable impact on the growth and development of the housing sector. This led to the subsequent establishment of some relevant programs and institutions like the site and service program as well as the Nigerian Building and Road Research Institute meant to undertake research in the areas of housing. Unfortunately, nothing was heard after the first set of brick house was produced by the Institute.

Regrettably, housing problems which result from urbanization are still unsolved up till today due to the fact that, the focus has always been on the use of conventional building materials. According to Dosumu (2002), the focus on this sector alone will always lead to high cost of building materials and consequently make housing unaffordable to the generality of the people. In fact, Onibokun and Ogbuozobe (1985) supported this when they opined as follows: "The higher the cost of building materials, the higher the cost of housing construction; the fewer the number of people who can afford the desired houses, the slower the rate of housing supply. The fewer the supply, the more competitive the housing market becomes and the greater the problems of housing especially to the lower income sector of the population".

According to Onibokun (1985), the factors that affect the cost of housing include the cost of land, construction cost and housing finance and administrative and management costs. In order to reduce the cost of housing, efforts should be made to reduce cost in all these areas. Construction cost can be reduced through the use of Laterite, an indigenous building material (Dosumu 2002, Arayela 2005, Odunjo 2006 and Wahab 1992).

This paper therefore examines the salient issues in housing provision in Nigeria. It identifies the achievements made and the failures recorded. At the end, the paper makes a case for the incorporation of laterite into Housing policies in Nigeria for sustainable housing construction.

HOUSING DEVELOPMENT IN NIGERIA

Three periods or stages could be clearly identified in the housing finance development horizon in Nigeria. These are roughly: 1960 – 1975, 1976 – 1985 and 1986 to 1991 (Agbola 2001).

1960 – 1975: Prior to 1975, that is, within the first two national development plans (1962 – 68) and (1970 – 75), housing was regarded as a social sector, a consumption – oriented, less preferred, non – income generating sector. Paltry sums of money were accordingly allocated. With this type of wrong signal from the public sector, the private housing sector which provides over 80 percent of residential units was not encouraged to invest in housing. Investors were misled into believing that they could not recoup their investment in housing (especially for the low – income people) as fast as in other sectors and with any appreciable margin of profit. Accordingly, the (financial) loans to prospective house builders were few, poorly organized and ineffective.

1976 – 1985: By 1975 however, the housing problems of the country as manifested in the increasing housing shortage, rising house rents, increased overcrowding resulting in slum and unhygienic conditions, etc. can no longer continue unnoticed. The government felt compelled to act. Luckily, the period marked the onset of the preparation and launching of the Third National Development Plan. Consequently, the plan contained the first explicit statements, programs and targets specifically aimed at alleviating housing problems. Amongst these were significant and commendable steps taken to make housing loans available to an increasing number of Nigerians through the manipulation of monetary instruments and the reconstitution of the Nigerian Building Society into the Federal Mortgage Bank of Nigeria to serve as the apex lending institution for home loans in Nigeria.

In addition, a number of administrative steps were taken to increase the source generally. Some of these were the encouragement of the state and local governments and also private employers in the provision of houses or the granting of house loans to their employees. It was within this framework that the Employees Housing Schemes (Special Provision) Decree Number 54 of 1979 came into being. The decree made it obligatory on any employer having a specified number of employees (fifty) to establish, execute and

maintain a housing scheme for these employees. The various governments were to help in the provision of land and other materials. The federal government, through the Central Bank of Nigeria, directed that commercial banks, especially, should devote about 5 – 6 percent of their total deposit (and the insurance companies up to 25 percent of their life deposits) in real estates.

1986 –1991: Despite all the aforementioned steps taken by the federal and most state governments, it was discovered that the housing situation in Nigeria was getting worse. There was the need to face the housing problem as the government was inundated with requests to do something about this problem.

The National Housing Policy of 1991
According to Aribigbola (2000), the National Housing Policy launched in 1991 on its own has as the ultimate goal of ensuring that all Nigerians own or have access to decent housing accommodation   at affordable cost by the year 2000 AD. The objectives of the policy are stated as follow:
  • To encourage and promote active participation in housing delivery by all tiers of government.
  • To strengthen institutions within the system to render their operations more
     responsible to demand.
  • To emphasize housing investments which satisfy basic needs.
  • To encourage greater participation by the private sector in housing development.
In order to ensure the success of the policy, all the three tiers of government (that is, federal, state and local governments) were assigned specific roles and functions to perform in housing delivery and the policy provided for a mandatory home savings schemes under the auspices of the National Housing Fund (NHF). The fund was established with the following objectives:
  • To facilitate the mobilization of the fund for the provision of houses for Nigerians at
     affordable prices
  • To ensure the constant supply of loans to Nigerians for the purpose of building,
     purchasing and improvement of residential houses
  • To provide incentives for the capital market to invest in property development
  • To encourage the development of specific programs that would ensure effective
     financing of housing development in particular, low cost housing for low income workers
  • To provide proper policy control over the allocation economy
  • To provide long- term loans to mortgage institution for on- lending to contributions to
     the fund.
However, it is saddening to note that   the National Housing Policy (and its financial component NHF)

has been in operation for over eight years now. A review of its implementation and performance did not

show any remarkable influence on housing delivery in the country despite the fact that housing needs were

estimated (Tables 1 and 2).

Table 1: Estimated Housing needs Nigeria (1991 – 2001)

	Urban areas	Rural areas	Total
Housing stock 1991 ('000 units)	3,373	11,848	15,221
Estimate no of households 2001	7,289	15,295	22,584
Required output 1991 – 2001 ('000)	3,916	3,447	7,363
Required annual output, 1991 – 2000	1391.6	344.7	736.3

Source: UN – HABITAT, 2002.

Table 2: Estimated Housing Stock, by dwelling types in Nigeria (1991).

	Urban	Urban	Rural	Rural	Total	Total
	%	Units	%	Units	%	Units
Maisonnette	2	67	0	12	1	79
Duplex	3	101	0	-	1	101
Detached Bungalow	10	337	20	2289	17	2,627
Semi – detached	12	67	1	60	1	127
Flat	15	506	0	-	3	506
Room	65	2,194	77	9,200	74	11,393
Others	3	101	2	287	3	388
Total	**100**	**3,375**	**100**	**11,848**	**100**	**15,221**

Source: UN – HABITAT, 2002.

The high hopes, noble pledges, huge sums of money and goodwill which welcomed the program were not sufficient to prevent their failure. In fact, so colossal was the failure of each successive public housing programs in the country that experts spared no pains at advancing reasons for their poor performance which include: the excessive and unnecessary delays in the planning, execution and construction of housing project which invariably add to housing costs, speculation and subsequently limit the number of units that can be built with the same capital; there is also the disregard for alternative avenues of housing provision other than direct construction. Site and services, core housing and the like were part of the explicitly stated housing policy objectives of the third and the fourth National Development Plans, only a handful of states experimented with them. Even where those houses were built, evidences abound to show that many remain inhabitable and thus unoccupied. The target population, taste and preferences were not articulated in the first instance before the standard; almost stereotype designs that have no relation to the immediate cultural environment were adopted. These amongst other reasons account for the colossal failure of public housing in Nigeria (Agbola,2001).

It is not surprising, therefore, that the contribution of the public sector to the total stock of housing is only about the quarter. The implication of this is that Nigeria cannot rely on the conventional methods (direct housing construction) to supply the low income people of this country with decent housing. Since such people cannot cause the private housing market to produce dwelling units for their use without substantial direct subsidy, it is therefore, advisable to explore the non–conventional methods and material such as compacted/ stabilized laterite brick for solving the housing problems of Nigeria. This is because the material is cheap and easily available. Also, there is ease of availability of labor that has the knowledge of construction with the material using the correct technology.

LATERITE AS A BUILDING MATERIAL

The advantages of laterite as a building material are quite many. In spite of the fact that it had been used in the construction of numerous buildings throughout the world since pre–historic times. Today, this material needs some re–evaluation in Nigeria especially now, that economic consideration has begun to dictate the choice of building materials.

Approximately, half of the world's population of over 6 billion people still inhabits dwellings made with soils harvested from the earth's crust. Laterite houses are appropriate for a variety of climates and are ideally suited for passive solar heating and cooling. The interior of such buildings stay warm in cold seasons and cool in the hot seasons with little, if any, need for auxiliary energy. Built largely from soil excavated on site, laterite houses require substantially less fossil fuel – derived energy to build than the conventional concrete buildings commonly found in many urban centers in Nigeria (Arayela, 2005). Materials used for laterite building construction are collected locally and the construction of houses is user – friendly while most

laterite building techniques require very little skill and are ideally suited to owner – building projects. One can learn what one needs to know in a week – long workshop. Laterite building material continues to predominate in the other parts of Africa, the Middle East, Brazil and nearly the whole of Latin America.

Amongst industrialized countries today, there are two aspects to the current revival of interest in laterite buildings. The first, which emerged in the south–western states of the United States of America (USA), is a response to the desire for a more "humane" environment, an alternative to the cold and soulless technology which has come to be symbolized by concrete, plastic and glass, those synonyms of modern progress.

In the south western part of USA, particularly in New Mexico, Arizona and southern California, adobe (sun – dried brick) construction is currently witnessing an ever – increasing popularity. As at the year 2000, there were more than forty (40) adobe brick manufacturers in the region, as well as many small – scale professional. Laterite construction technology is today sufficiently confident to compete against conventional materials and it is time, Nigerians re–appropriate the technical skills needed for their own development.
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CONCLUSION

This paper has shown that housing problems being experienced by people in Nigeria could be reduced drastically with the use of local building materials such as laterite. This is because the material has high quality, readily available, durable, culturally accepted and is cost effective; therefore, it could be used to achieve sustainable housing for all in terms of quality and quantity.

In order to increase housing stock in Nigeria, create a more conductive living environment as well as develop an appropriate housing construction technology, there is the need to incorporate the material into the formulation and implementation of housing policies and programs. This should be done at all levels of government that is, Federal, State and Local governments. Thus, there is a need now, for the Federal government to reach out and effectively involve the people and governments at grassroots levels in the formulation of housing policies.

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SMALL SCALE REAL ESTATES DEVELOPMENT AND SPATIAL PLANNING 'ADJUSTMENT' IN SURABAYA, INDONESIA

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Abstract

Spatial planning in Indonesia has developed since the mid-1980s. Standards on minimum supporting facilities for settlements have also been enacted by The Public Works Department since 1976. The urbanization process, however, converted many land farms into small-scale real estate development on the periphery of Indonesian town and cities. The sizes of these real estates are so small, in many cases only up to 20 plots. However, in some cases, three to five such small real estates are adjacent to one another. Hence, they couldn't provide areas for public spaces and other supporting facilities like shops, kindergartens let alone graveyards. Problems are arisen, as the inhabitant needs those facilities. To accommodate this issue, the established spatial planning needs to be adjusted to solve the problems. Evaluation is required for the implications of such modification.

The methods used in this study are field observations and interviews to related parties including the official governments. The results are then compared to the available spatial planning. The observations include the indication of possible adjustments on the spatial planning. A preliminary result is then discussed in a group meeting, to reach an agreement in preventing such developments in the future.

This study is carried out at the periphery of Surabaya and this paper is a preliminary result of the overall study. From the study it can be figured out that there is a need to set criteria in minimum size of a real estate developer. All the results are expected to be the subject of further studies in order to gain the anticipation of possible negative impacts on city planning.

Keywords: small scale real estate developers, adjustment, spatial planning.

INTRODUCTION

Indonesia proclaimed its independence in 1945. This is an archipelagic country, consisting of almost 17.500 islands and 1.990.250 km2 land area (id.wikipedia.org). It has 237.6 million inhabitants according to 2010 Indonesian Statistical Office Centre. Java is the most populous island with 136.6 million inhabitants (57.5%) although its total area is only 126.700 km2 or 6.7% of total Indonesia (indonesiadata.co.id).

Many regulations regarding housing development have been enacted after independence, including local government regulations. Surabaya is the capital city of East Java Province and the second largest city in the country after Jakarta, the capital of Indonesia. Geographically, Surabaya is located at 07°09'00" – 07°21'00" South latitude and 112°36' – 112°54' East longitude. Surabaya city is comprised from 330.48 km2 land area and a 190.39 km2 sea area. The city consists of 31 districts and 160 villages, with administrative boundary areas as follows:
-   North and East: the straits of Madura
-   South: Sidoarjo Regency,
-   West: Gresik Regency.
As seen in Figure 1, Surabaya is located in East Java, nearly in the middle of Indonesian archipelago. This situation makes Surabaya an important hub for the rest of Eastern part of Indonesia.
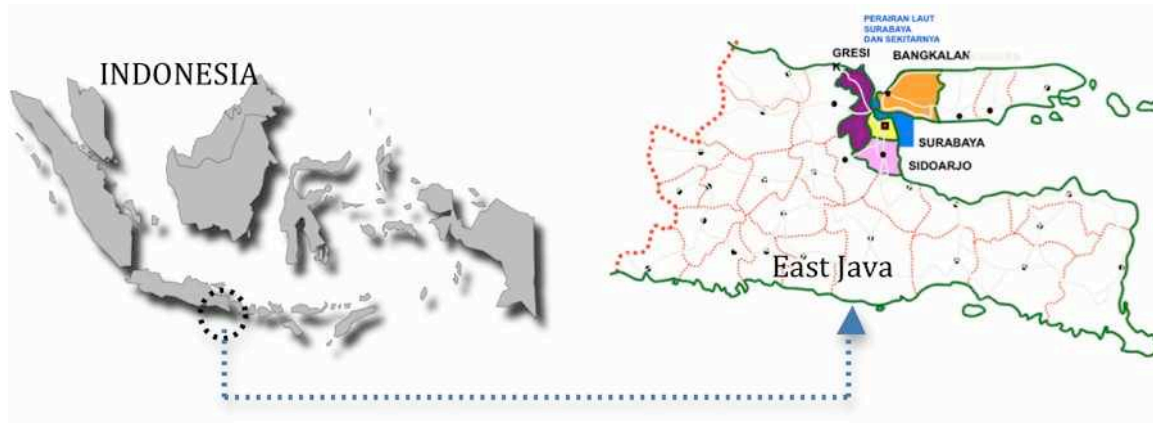
Figure 1: *Indonesian map and the location of Surabaya.*

In 2011, the population of Surabaya had reached 3,022,461 inhabitants, while the population growth rate between 2010-2011 is 0.09%. This population growth is increasing and at the same time the need for housing in Surabaya is also rising.

SPATIAL PLANNING AND HOUSING CONSTRUCTION

As the capital of the province of East Java, Surabaya is also a good place for investment. As such, the city is also providing employment opportunities for the surrounding community. As happened in some major cities, these conditions lead to urbanization process and the increasing need for housing and other development. Consequently, land price in urban areas will also be more expensive than in suburban areas. To control physical development, the Government of Surabaya has prepared a master plan since the 1970s. The Master plan has experienced several evaluation/revision due to developments in the field. Figure 2 is the latest Master plan drawn up in 2007.

Housing developers try to keep their housing prices within the range of consumer purchasing power. Various strategies are used by housing developers to maintain their business, including reducing the house/plot size or building their housing at the periphery areas where land prices are cheaper compared to the city centre. Hence, major housing developers try to take possession of land areas in the periphery from landowners. In Indonesia, land parcels owned by farmers in urban areas are small in size, usually between 0.5 to 1.5 hectares only. Large housing developers have to acquit several of these small lands to be assembled for housing projects.

Some regulations associated with residential development have been established by the government. These include the need to build public facilities and social amenities within the housing projects built. Table 1 is one example of the rules related to housing construction. With these rules, it is generally only about 65% -70% of the land area of the project that can be built for residential land and can be sold to the public.
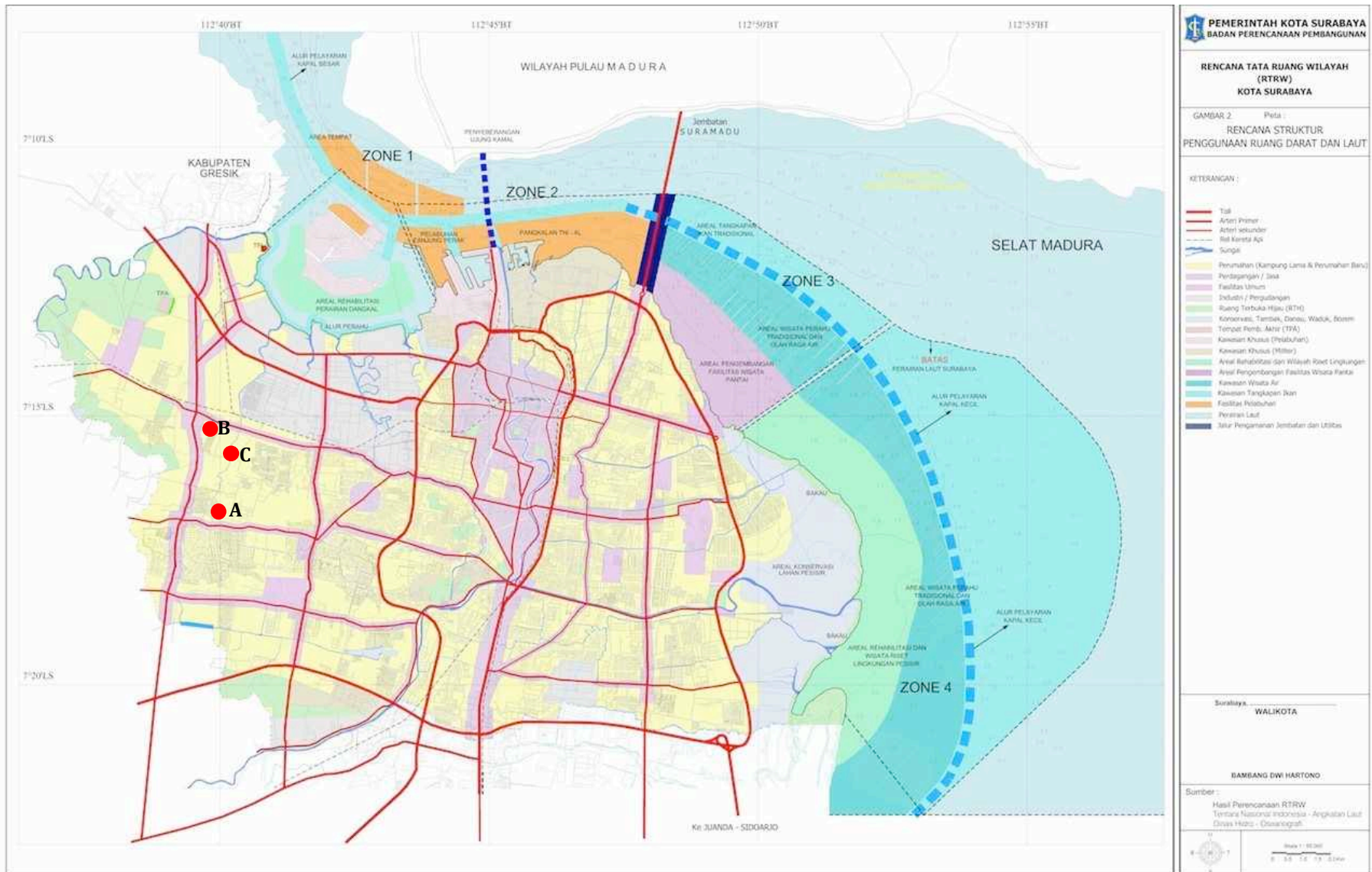
Figure 2: *Master plan of Surabaya 2007; (A, B, C are case studies).*

Table 1: *Minimum area for neighbourhood facilities.*

Inhabitant /number of houses (R) Type of Facilities	250 / 50R	1000 / 200R	1600 / 320R	2500 / 500R	6000 / 1200R	10000 / 2000 R	30000 / 6000 R	120000 / 24000R
Playground Shop	250 m² (1.00) 100 m² (0.40)							
Kindergarten		800 m² (0.80)						
Elementary school			2400 m² (1.50)					
Open space Small religious building Stores Public parking & Public toilet Public hall & Security guardhouse				1250 m² (0.50) 300 m² (0.12) 1200 m² (0.48) 100 m² (0.04) 300 m² (0.12)				
Primary high school Secondary high school Physician Supporting health centres					1800 m²(0.300) 1800 m²(0.300) 150 m²(0.025) 500 m²(0.083)			
Maternity clinic Pharmacy						1600 m²(0.160) 350 m²(0.035)		

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Maternity hospital Mosque/Religious Bldg Neighbourhood Shopping Center Village office Branch Police Office Supporting Post Office Branch Fire office Multi purpose Bldg Public parking/Special Health Centers						9000 m²(0.300) 1750 m²(0.059) 13500 m²(0.450) 500 m²(0.015) 100 m²(0.003) 100 m²(0.003) 200 m²(0.006) 1000 m²(0.030) 1000 m²(0.030) 650 m²(0.021)	
Sport Field Mosque Other religious buildings Shopping malls Sub-district office Police Office Post Office branch Fire Head office Youth-centres Parking and Public Toilets Telephone/Communication office Electrical poles							24000 m²(0.2000) 3600 m²(0.0300) 1000 m²(0.0083) 36000 m²(0.3000) 1000 m²(0.0083) 300 m²(0.0025) 500 m²(0.0041) 300 m²(0.0025) 3000 m²(0.0250) 4000 m²(0.0320) 300 m²(0.0025) 150 m²(0.0012)

Source: Housing Standard, Indonesian Public Works Department**LABORATORIUM PERUMAHAN DAN PERMUKIMAN**

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Aside from the above area needed in Table 1, in Surabaya housing developers have to allocate about 2% of the land for cemetery purposes. These regulations were published, as many housing developers do not allocate this case. In some cases, instead of allocating 2% of land for cemetery purposes, they prefer to pay 2% share out of the price of the land to Surabaya Municipality as participation for the government to build a municipality cemetery.

THE PROBLEMS

There has been a master plan; however, the awareness of Surabaya inhabitants to obtain building permits before construction is not fully adhered to. Currently, only about 70% of the buildings in Surabaya hold building permits. This condition is caused, among other things, by the uncertainty of the process, time needed in processing the permit as well as the cost of the permit application fee.

In the last ten years, many farmers no longer cultivate their farmland due to many reasons including the low price of agricultural products. Instead of selling the land to developers of large-scale housing, they divide the farm into plots for building housing. However, they do not prepare public facilities and social amenities because of the activities that are considered as a small-scale activity. A large number of houses built in this way generally do not reach 50 units. Therefore, they argue they should not be required to provide such facilities mentioned in Table 1 above. Problems arise when there are some farmers who do the same and their location is adjacent to one another. In the long term this kind of development, will trigger irregularities in land use. The inhabitants would require shops to meet their daily needs. Similarly, the will also need kindergarten, health facilities, pharmacies and so on. This situation shows the reality of modest housing area in several cities in Indonesia, which are mixed with a variety of commercial activities. This study attempts to investigate the above situation and look for possible solutions to overcome the problems.

This study includes desk study and observations, followed by field surveys and interviews to various related parties. Furthermore, the results of structured interviews are drawn based on a variety of issues that arise. Meanwhile, the land use on survey sites are compared with the existing master plan. The entire field findings are then discussed with various stakeholders including local government officials. Conclusions and proposals for solving the problems are enlisted to obtain further solution.

Initially, the list of small developers who were enrolled in small-scale residential developers association was examined and selected. Survey was then conducted in the border area of the Surabaya Municipality and Gresik Regency, where the above selected developers operated. Furthermore, the locations of the housing project in question were visited. However, this effort did not match as the small-scale developers because the developers enrolled in this association are generally those who build houses more than 50 units in one location. Thus they are engaged in building public facilities and social facilities as listed inTable1. Based on this result, the survey strategy was changed. Surveys were then conducted directly by visiting the defined study area. Wherever small-scale residential development is found, the developer is interviewed directly.

THE SURVEY

The survey was conducted with three small housing projects (namely A, B and C) of 3 different locations. A, one housing project is located in Wiyung, West Surabaya. The developer of this project could not be contacted for an interview. In this project, plot area is sold in varied measures, namely 70-100 square meters, with 4 meters width of road. From those three projects, two housing developers (A and C) only sell plots of land, while housing project B provides ready-made homes.

Figure 3: *Housing Project 'A'*

Figure 4: *Housing Project 'B'*

Housing project B and C are located in Sambikerep, Northwest of Surabaya. In the housing project B, 40 houses are still in progress. The house type is a 36 m2 house on 72 m2 land. The price offered (in

December 2013) is Rp. 250 million (ca. US$ 21,830) and can be paid in instalments over 5, 10 or 15 years.

Figure 5: *Housing Project 'C'.*

In housing project C, 48 plots have already been sold. Two plot sizes offered here: 6X12 m2 and 6X15 m2. The width of the road in this project is 4 meters. In housing project 'C' one can see that the site originally was rice field. Small poles which were painted red indicate boundaries between parcels.

From the observations, surveys and interviews, the problems arising from the above three small-scale residential construction activities are as follows:
- Reduction of agricultural land into residential activity, so that green space is also reduced.
- No public facilities or social amenities provided on the above three housing projects.
- Damage to public roads built by the government because the roads are used for the transportation of building materials activities, with no attempt from the developers' side to renovate it.
- Mixing of various activities (residential, commercial, education and others) at the same block/area. This situation would obviously disrupt land use in that area.
- No land for cemetery purposes due to land allocations for these activities that are not considered profitable by housing developers.
- No drainage channels built along the up front road in all these housing projects. As a consequence, the area has potential for flood problems.

THE 'RESILIENCE' SOLUTION

The findings of the above issues are then discussed along with various related parties in a forum. The outcomes of the discussions resulted in an agreement as follows:

- The Municipality has to facilitate the building permit application process through transparency in costs and the processing time. In addition, the applicant can check its license through an online application process.
- Issuance of Mayor's decision or local regulation related to the minimum area of land for residential development so that the availability of social facilities and public facilities can be guaranteed.
- To be able to build housing project, the landowner must join with other surrounding landowners so that the minimum area of land for housing activities can be achieved.
- Periodically the government will evaluate the existing master plan associated with things happening in the field and not yet mentioned in the preparation of the master plan. However, other forms of violation of the master plan will get action in accordance with the regulations.

It should be understood that the above decision is subject to change, therefore the solution need to be reviewed as soon as it is first launched to the public. Awareness to obey the law and the enforcement from all parties involved will better ensure the implementation of the above agreement.

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HOUSING CONSOLIDATION: INNOVATIVE ATTEMPTS OF HOUSEHOLDS IN CONSOLIDATION OF LOW COST HOUSING IN SOUTH AFRICA

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Abstract

South Africa's low cost housing provided by the state is described as a starter house. It is intended that as a result of accessing housing, socio economic status of households will improve and households will be able to extend their dwellings to suit their needs (Napier 1998). It has however been documented that households have had challenges in consolidating i.e. improving and extending their dwelling, basically due to financial and site constraints. Despite this, with a self-help approach, many households have attempted to consolidate their dwellings within their means, relying on their limited finances, and technical know-how.

The paper reports on the innovative ways households in the post-apartheid Reconstruction and Development Programme (RDP) settlements have attempted to consolidate their homes. It seeks to answer the question – how can consolidation be enhanced in state funded settlements?

To answer this question, field work research is undertaken and documents innovative consolidation attempts, constraints and impacts of such attempts both on the household and the environment. Focus is placed on visible efforts by purposefully selected households. It is hypothesized that households are resilient in their approach to address housing needs and lessons can be learnt from them.

Findings show that inherent know-how of the household is expressed in the construction methods employed, and where expertise is lacking in the household, assistance is sort from social network groups and broader pull of skilled expertise of the urban area.

Keywords: RDP settlements, housing consolidation, indigenous knowledge systems, site layout, building design.

INTRODUCTION

Internationally, the purpose of housing policy is to allow the largest number of families or ideally every household the opportunity to access suitable housing in terms of location, quality, size and price (Iommi 2009). Based on the premise of making housing accessible to all, the housing subsidy targets the poorest of the poor and employs a socialist approach in delivering housing. The product delivered is a basic shell structure, inherited from the past government. Each unit is constructed on a leveled platform site of 15m by 45m with street access allowed.

The brick and mortar structure has one entrance and is basically four rooms with an internal toilet and shower. The four rooms can be interpreted as a dining and kitchenette, two bedrooms, one living room. The shell is of brick and mortar concrete floor and a corrugated iron sheet roof covering, and floor to ceiling height is 2.3m, with a lintel in place over door and window openings. Walls are bag-wash finished, and in some instances with colored plaster. Metered electricity is supplied to each unit inclusive of light and plug point. In some instances, metered water is also supplied. This shell has been referred to in the policy as the starter house.

The one man one plot prototype is employed after findings revealed this to be preferred over the row or semidetached housing units (Frescura 1986). Frescura further records that the design of the housing units then known as the NE51/9 (Non-European 1951), was informed by then ministers of native affairs statement that it was a "….. wrong notion that the Native who has barely left his primitive conditions should be provided with a house which to him resembled a palace and with conveniences which he cannot appreciate and will not require for many years to come." As such the size of the dwelling unit and fittings were kept very basic and layout of the structure on the site was such that it intentionally disadvantaged building extensions (Frescura 1986). The resulting design by Calderwood in the 1950s has remained the prototype for the RDP

state housing to date. Even though the design considerations shifted from just providing a shell to providing a starter house the design of the initial structure has remained the same. It is noted that the government has always been mindful of the inadequacy of the 30sqm house afforded by the state housing subsidy; but this product has remained on the premise that the inadequacy will be short term and that household swill improve and extend the starter house incrementally (Adebayo 2011).

Beneficiaries of the RDP housing have remained predominantly the black African population somewhat by default as the poorest of the poor due to apartheid history. In many RDP settlements, households are first generation migrants to the city or from squatter settlements in or around the city where work opportunities exist; many coming into the RDP settlements with past experience of self-build dwelling initiatives, either from direct involvement or by observing older family members construct the dwelling, in rural or urban settings.

THE NOTION OF CONSOLIDATION (LITERATURE REVIEW)

The notion of self-help incremental housing has been used in South Africa as far back as pre-colonial times, Adebayo (2011) records that it was the preferred mode of housing delivery for the Africans. Over a period of ten years, she reports that the efforts have yielded mixed results attributed to "…certain local factors such as technical knowhow of small builders available and support from local authorities". Other factors identified include the finance for housing improvements (Rust 2004), design issues not suited for consolidation.

Consolidation in general terms refers to 'the bringing together of different parts, to solidify, to strengthen, to discard unused items and organize the remaining, to compact into one body' (dictionary). It therefore assumes there are various parts to be consolidated into one, and would require a stock take to appreciate what these various parts are. In the life of a building the uses change over time thus the need for renovations, extensions. Slaughter (2001) groups the causes of changes, irrespective of building type into three broad categories; change in function, capacity and flow. Two sources of changes are either as a result of the building such as building deterioration and environmental conditions; and changes as a result of owner's objectives and or the expected facility usage (Slaughter 2001). Buildings are often thus inadequate where they are not flexible and adaptable to accommodate changes over time.

Maury (1999) identified four areas of change to buildings, changes to the building structure, services, enclosure, or the interior finish. The decision taken to effect change will happened based on the owner's objectives, or the expectation of usage as described by Slaughter above. So if the owner's objective is to accommodate more children in the home there will be the drive to provide an additional room, unlike if the need is to express affluence the change could be more in the interior finishes, exterior landscape. These modes of expression are however predetermined by past experiences which are now discussed.

Experiences from rural settings
The RDP settlements are predominantly of migrants from surrounding rural areas, seeking job opportunities in the urban areas. At the onset of democracy in South Africa and the dropping of segregation laws, many African people took the opportunity and moved closer to urban areas, coming in with what can be described as traditional self-help methods of building construction. The typical rural worker is described by Cornell and Inder (2004) as "…a utility- maximizing individual who has a choice to produce the agricultural good or migrate to the urban sector in search of waged employment." This migration is an individual endeavour often leaving behind the household. It must be understood that households in the rural setting are composed of more than the immediate nuclear family (a man, wife and children) but more of a family clan that look out for each other.

Traditional housing construction methods are a joint household effort, using indigenous knowledge and readily available materials to build a form most suited to the natural environment. Frescura (1982) reports that "vernacular buildings of the South African region belong to an architecture which is endowed with a great deal of character, of charm and of personality". Construction method is rudimentary and the know-how of the construction techniques and processes is held with the older members of the clan and permeates down to the younger members, with specific tasks traditionally assigned to each person irrespective of gender. His research showed that construction process was community effort "…often with

the whole neighborhood combining together to erect a man's house in the knowledge and expectation that he will assist when called upon by another to do so." He further emphasizes that it is "an architecture high responsive to the inhabitants' culture, economy, and physical environment. It is therefore with a rich variety of dwelling forms, material texture and inventiveness" (Frescura 1982).

House typology varies but keeps the circular floor plan and thatched roof. In the case of extending the home stead, an additional unit (rondavel) is constructed with reference to the existing buildings. With modern roofing materials, Frescura records that the rural dweller can extend by adding on a lean-to roof round the exiting unit. The layout consequently grows organically with an understood hierarchy between the buildings (Frescura 1982, Mhalba unpublished).

Experiences from urban involvements

Modern construction practice in Africa has been on the increase ever since the colonial years. It is seen as an expression of progress, moving from traditional construction practices of self-help to more sophisticated construction methods practiced in the urban areas (Folkers 2011). Unlike traditional practices, the urban construction process is an individual effort, requiring financial capacity to pull the process through successfully. Folkers notes that traditional building systems have adopted European elements such as standardized family units, use of materials foreign to the environment such as cement, processed timber, and galvanized iron sheets. Construction methods are thus relearnt in the urban areas. It is recorded that many countries under the British Empire were obliged to learn construction practices to meet the requirements of colonial construction methods (Root and Wachira 2009). This method of construction entails factory manufactured building parts and precision equipment in order to achieve the desired finished product. Migrants into the urban areas may find themselves in squatter settlements and the resilient nature aided by the self-help practices are able to create shelter, sometimes these experiences move with them to the formal housing settlements provided by the state.

METHODOLOGY

The approach taken was to observe attempts made by households and report on such efforts. The study site is within the uMhlathuzi municipal area at the uMhlathuzi village. A purposeful survey is employed, and households with visible alterations to their dwellings are approached so as to inspect the construction attempts. At this stage focused is placed on the visible efforts seen within the premises of the household. Intentions of the effort is not questioned but interpreted in the following broad categories – changes in terms of function, capacity, and flow. The methods of construction employed are examined in terms of the inclination towards traditional or modern construction practice and the resulting product.

CONSOLIDATION ATTEMPTS (RESEARCH FINDINGS)

Changes in capacity

Where the units are owner occupied there are more attempts to make substantial upgrade to the building structure. This is an expression of improved social and economic capacity of the dwelling. For example households may opt to demolish the entire structure and built a more structurally sound building adorned with modern architectural expressions (see Figure 1). The findings reveal that not all units are occupied by the original owners.

Figure 1: New structures replacing RDP house.

In other cases where the financial capacity is a challenge, due to stages in life cycle, households have employed the traditional circular building floor plan to increase the number of rooms. This is an external room built of a single skin brick wall and with a traditional type roof and one window (Figures 2 & 3). On close examination, it is observed that the underside of the roof is neatly fitted with isolating material to aid the cooling of the interior of the room. There are no lintels over openings. The room is furnished with a bed and bed side table, no plug points are noted or any ablution facilities. The occupant explained that the toilet and shower is in the main (RDP) house. This household had not only increased the number of rooms but also built a chicken shed where agricultural chickens are breed. The shed is of timber and other recycled materials and fitted with a door. Ventilation is through wire mesh openings in the timer walls and covered with plastic sheets as a sun shading device. The owner confirmed there was help in building the structure from sources known to them in the community.

Figure 2   *Figure 3*

Other efforts to increase capacity were the adding on of a temporary shack utilizing one of the building walls as a support. These endeavours create pockets of behind and in between spaces that are of little or no use to the household (Figures 4, 5, 6).

Figure 4

Figure 5

Figure 6

Some uncompleted attempts are noticed also, on engaging with a home owner who is a single mother of two teenage boys, and who works two days as a domestic worker, she explained she had engaged a friend who was a builder to build her an external room.

Unfortunately she was unable to buy the required materials and so had to abandon the project. On further probing she indicted she will need an amount of R10,000 to complete the room. The uncompleted structure is a single skin circular floor plan structure built out of blocks. There is no evidence of foundation trench preparations or establishing of floor levels for adequate flooring. No provision is made for ablution facilities.

Figure 7

Figure 8

Change in function

The change in function sees the structure taking on more than just shelter, but becoming home. This is done by landscape features around the house, and adjustments to the wall and floor finishes. In one of the houses

visited, the occupant confirmed that he was renting and had a huge home in the rural areas of Kwamsane KZN (Figure 9). He presents a picture of the huge house which is basically a collection of small dwelling units sited in the mountainous planes of rural KZN. On a close examination of the picture, the main dwelling can be seen as the old mud hut with a thatched roof surrounded by building of brick and mortar with a painted wall finish.

Figure 9

Figure 10

Another household within the settlement has upgraded window frames floor finishes and added on elements of beautification to make the house a home (Figure 11). It is occupied by a young family of three with substantial modifications carried out on the interior layout of the building. On the exterior a purpose built braai stand can be seen on the grounds (Figure 12).

Figure 11   *Figure 12*

CONCLUSION

It was found that the consolidation attempts in the RDP settlements are of a self-help initiative with no assistance or monitoring from the state. As a result, consolidation steps are left to the decision of the household who have proven to be technically unskilled to handle building construction even at the rudimentary level. This may be attributed to the disruption of traditional knowledge systems of the rural households due to rural urban migration. Knowledge and support systems are left behind and households seek support from social networks within or pay for services of skilled labour.

Consolidation as a process entails pulling together pieces to make a useful whole. The attempts of households are more of incremental development whereby additional rooms are added within the site boundary, a practice common in the rural settings. The exercise of consolidation is a misnomer when referring to individual housing units but will be more applicable when considering a group of dwelling units at settlement level, a collective attempt with a group of households coming together to reduce lost space between buildings and gain on group effort to employ technical skills.

Households have avoided extending existing structures, which could easily be attributed to a knowledge system that supports the construction of smaller units separate to each other. Financial challenges still remain a problem. After sixty three years since the design of the NE51 housing typology, it would be time to propose a revised typology that takes all the above into consideration.

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A SPACE EXPANSION MODEL FOR PRODUCTIVE HOUSING IN FISH PROCESSING KAMPUNG

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Abstract

Productive housing is an alternative which is implemented for increasing a family's economy. The existence of productive housing also leads to some conflict; one of them is space conflict. Space conflict is as a result of the overlapping between domestic needs and production needs.

This happens in the research area, Kampung Sukolilo, which is famous for fish processed products. In kampung, most inhabitants choose to process fish products as family support. Space conflicts that occurred in this study area don't only occur in the house, but also in the surroundings. Space conflicts occur occurs outside the productive space because of the need for production space that is always increasing while the houses are not able to accommodate the production. In addition, conflicts also occur during the drying process. This is particularly noticeable in the study area where most of the drying process occurs in the road as well as housing alleys for the drying area.

This survey was conducted by interviews and field observations with participant's observation as the primary method. The data collected was analyzed and interpreted in order to understand the basic qualitative approaches that can be used for material synthesis models.

The study found that most inhabitants expanded their house space to accommodate their space needs. Several types of space expansion were done by the inhabitants. The space extension model could be horizontal expansion and vertical expansion. Culture and norms help the inhabitants in expanding the space of their production houses in Kampung Sukolilo.

Key words: conflict, domestic, housing, productive, space, expansion.

INTRODUCTION

The house is the place where the family is developed physically and non-physically (Setijanti & Silas 2000). The increase in Home Based Enterprises (HBEs) growth rate marks its role as a survival function. HBEs is researched and learnt because of its significant impact on issues, such as health security, land security, waste management, resilience, and so on.

This paper is focused on the issue of space which is as a result of the existence of Home Based Enterprises (hereafter referred to as HBEs). The focus of the spatial issue that is researched is "space expansion as an impact and solution of space conflict". Space conflicts occur due to the productive space that could not be accommodated by dwelling space (domestic). Space expansion is an effort done by HBEs operators to synergize their space. Synergy is the adaptation of the activity that occurs and made by the occupants (Wijaya 2003, p. 199).

Research was conducted using some methodologies, such as mapping study, interviews, and participant observation. With these methodologies, the researcher found that most HBE operators expanding their space will encroach on other space or public space.

KAMPUNG SUKOLILO, SURABAYA, INDONESIA

The case study took place in Surabaya coastal kampung named Kampung Sukolilo, which is well known as a Prominent Kampung in Fish Processed products (Kampung Unggulan Olahan Hasil Laut). Kampung Sukolilo is located in coastal town of Kenjeran beach, Surabaya, which consists of 8 alleys. Most inhabitants of this kampung are fishermen (mostly men) and fish processors (mostly women). Kampung Sukolilo is known as a prominent kampung in Fish Processing (Kampung Unggulan Olahan Hasil Laut). Kampung has become a center of Home Based Enterprises (HBEs) in processing seafood into crackers and dried food. Not only to

meet local market needs, but also they supply several products in the market outside the city, outside the island, and to foreign countries. Figure 1 below shows the research site.

Figure 1. Research site Kampung Sukolilo (Source: maps.google.com).

MAPPING, INTERVIEW, PARTICIPANT OBSERVATION

The researcher tried to compile several methods to obtain data. In order to get closer and understand the problem in the kampung, the researcher did a preliminary survey several times. After that, the researcher tried to analyze and get the brief overview of fish processed in producing houses.

From the overview, the researcher chose 3 methods: mapping, field observation and interview and participant observation. The researcher did a mapping case study for four days. Mapping was done in the interest of searching the variants (heterogeneity) of Home Based Enterprises existing in Kampung Sukolilo. This method was also done with the aim of recognizing the HBEs phenomenon in the area.

The interview was conducted for two research samples. The first interview was conducted for the common inhabitants of Kampung Sukolilo. The interview was about the common phenomenon of HBEs (domestic and production activities) and how they deal with the issue. The second interview was a deep interview, conducted for 5 participants (from 5 variants).
Many HBEs activities could be seen in a visible way and were documented by the researcher, but several spaces and territories could not be seen and this was discovered by having a closer relationship with the participants. Participant observation was achieved by taking part in their daily activities. By taking part in their daily activities, the researcher could see the spaces used and the effect of home based enterprises especially for space expansion.

SPACE AND HBEs ACTIVITIES

For the mapping study, it was known that Home Based Enterprises (HBEs) truly sustains the living situations of the inhabitants. The production activities are done every day by the inhabitants. In HBEs, sometimes we cannot ascertain whether it is a domestic area or a production area because there is no visible territory or sign. We can see and understand the area if we know the activities. For HBE operators, they have domestic activities and production activities which should be done in their houses and surroundings. They do not have a particular area for a particular activity. HBE activities in this paper are concerned with fish processed products.

Space availability in the house
In the research site, houses are very small, sticking together with other houses at the back and sides. One or two storey houses with simple construction and an area of about 12 square meters, occupied by 3-5 persons. Some of them separate it into a living room, bedroom, bathroom, kitchen, and storage. But this is not a common condition. Every inhabitant in the research site has similar domestic activities. They do the same activities like eating, sleeping, bathing, cooking, cleaning, etc. The lack of space does not become a

hindrance for them to do HBEs. Bearing in mind, the small area of the house, every house has its own consideration to be dealt with. Figure 2 shows several houses in the research site.

Figure 2: *Small houses in the research site.*

Common HBE activities
HBEs have different production activities that depend on the kind of fish products they have. The different fishery product will affect the particular space they use. In common, they have similar activities and space required as well various production activities. These similar production activities are: (a) receiving raw materials (b) washing (c) arranging the material (d) drying (e) stock fish product in storage (f) saving and maintaining the utensils for production. As said before, certain production activities affect the space required. Most production activities have a correlation with water and fish smell; consequently, the HBEs operators do the activities in an open space, as shown in Figure 3.

Figure 3. *Common production activities.*

Particular production activities
As said earlier, they have different production activities that depend on the kind of fish product they have. The simple production activities were conducted for the production of small dried shrimp. The HBEs operator only does common production activities (receiving raw material, washing, arranging the material, drying, stock fish products in storage, saving and maintaining the utensils for production). Different from the sea cucumber cracker, the HBEs operators should do more complex production activities. The operator should dredge the sea cucumber's egg inside and fry it (sea cucumber and the egg), as shown in Figure 4.

Figure 4. *Operator dredges the sea cucumber egg; operator frys the sea cucumber and the egg.*

Unlike sea cucumber crackers, a more complex production activity is needed to produce jellyfish crackers. To produce them, HBEs operator wash the raw jellyfish several times by stomping it. Then, they have to dredge the intestine and wash it again. The other particular activities are to fry the dried jellyfish with sand and again with oil as shown in Figure 5.

Figure 5. *Operator stomp the raw jellyfish, dredge the intestine, and fry the dried jellyfish.*

Common Production Activities	Particular Production Activities
Receiving raw material	Dredge sea cucumber egg
Washing	Stomp the raw jellyfish
Arranging the material	Dredge jellyfish intestine
Drying	Fry with sand
Stock up fish products in storage	Fry with oil
Saving and maintaining the production utensils	

Table 1. *Common production activities and particular production activities.*

SPATIAL USAGE FOR HBES

It can be seen from Table 1 that most of the production activities need a large open space to be accommodated. Most production activities are done in open space. The magnitude of the need for open space has encouraged people to occupy wherever the open space is. It can mean pathways, side-roads, other people's open space, their personal open space, or free space above. Figure 6 shows a wide open space that is occupied by HBEs operators for conducting their production activities.

Figure 6. *Production spaces at community open space, pathways, and free space above.*

Production activity that requires the largest open space is drying activity. They have some innovation for drying their fishery production. Different characteristics of their housing lead to different drying systems. For HBEs operators who live houses that are closer to the road, the characteristics of their housing area include: small houses and houses that stick with other houses at the back and sides. They make the production process in front of their houses or on pathways. Sometimes they dry the fish with racks down the side road, pathways (ground level drying) or hang it up above the pathways so people will still be able to access the pathways below (raised rack drying). For HBEs operators that live in housing nearer to the beach, they have a larger open space. They do the production in front of their houses, but still in their land. Sometimes, they do some production processes on the pathways. For drying system, they also have an innovation, raised rack drying system. With that system, they can still do production below the drying racks. Figure 7 shows some innovation made by HBEs operators.

Figure 7. *Drying system made by HBEs Operators.*

For the HBEs processors with limited space and without a specific area for raising rack drying will usually make the process on the street in front of their houses. Such processing and drying of products have occurred down through the generations and a problem never occurs among residents. However, drying in a public area like this interferes with the pedestrians and vehicles passing through it. Also, hygiene is not guaranteed.

MULTIFUNCTIONAL SPACE AND SPACE EXPANSION

Many activities, space, function, and space limitation lead to space conflict. Inhabitants (or in this case HBE operators) search for solutions to resolve the space conflict by using its resources or anything they are able to afford independently. Two storey buildings provide increased flexibility as there is an opportunity for vertical distinction between HBE and domestic activity (Kellet & Tipple, 2000, p. 9). Some participants, as mentioned by Kellet & Tipple, use the second floor for domestic space and the first floor for production space. In most cases, participants don't have storey buildings.

The lack of space and the need for having HBEs inside forces HBE operators to share their space to accommodate domestic activities and production activities as well, this is called multifunctional space.

Space can be classified based on time dimension and area dimension. Space division based on the time dimension is the change of activities (domestic and production) in the same area of space. For example, a kitchen that is used for meal cooking in the morning (domestic activities) will be used for frying seafood crackers (production activities) at noon. Two different activities are accommodated in the same kitchen, but at different times. Whereas space division based on space area is marked by the existence of a boundary between one space function and another space function. The boundary and space function will always be that way without being affected by the time. For example, in a house with a kitchen for domestic use and another kitchen for production use, they have two kitchens for different uses. It should be that no other function occupies the space. Figure 8 shows two different of multifunctional space.

Figure 8. *Multifunctional space based on time dimension (left); multifunctional space based on area dimension (right).*

As said earlier, lack of space is not a reason for not having HBEs. Because of the lack of space, more function needs to be accommodated; HBE operators must add space, whether with their own resources or not. In Indonesia, the use of space around the house with the purpose of expanding their workspace or production space is very common (Laboratory for Housing and Human Settlement 2002, pp. 4-38). The pedestrian way in alleys is an important element for sustainability of HBEs (Laboratory for Housing and Human Settlement 2002, pp. 4-12). In Figure 7 above, it can be seen that the operators sometimes expand their space into other spaces that are not theirs (other people's space or even public space).

Space expansion is the further result of multifunction space which can no longer be accommodated by the space owned by HBEs operators. Figure 9 shows the diagram of the change process from multifunction space into space expansion.
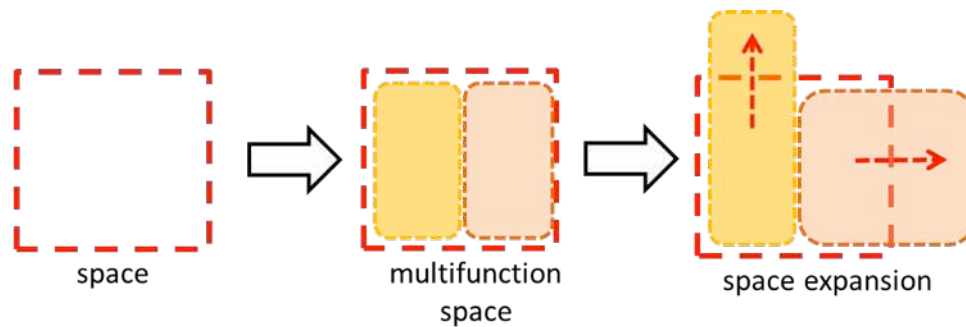
Figure 9. *The change process of multifunction space into space expansion.*

SPACE EXPANSION IN FISH PROCESSED HOME BASED ENTERPRISES

The existence of Home Based Enterprises leads to some need for production space. It can encourage HBE operators to improve their houses. The researcher found two reasons why HBE operators need to improve their houses. The reasons are lack of space and fish smell from the raw fisheries. In common, improving the house by expanding the land or adding some rooms is the best option. In this case study, Kampung Sukolilo inhabitants do not have enough land for production activities, so they have no option other than to expand the space they occupy and wherever there are empty lands.

There are two main types of expansion found in Kampung Sukolilo. The first one is inner space expansion and the second one is open space expansion. For the inner space expansion (owned by the HBEs operator) , it is conducted only for dry production process, for example stocking the fish product, maintaining the production tools and frying the dried fish product. Figure 10 shows the inner space expansion.

Figure 10. *Inner space expansion*

From Figure 9, we see two types of inner space expansion, vertical inner space expansion and horizontal space expansion. Vertical space expansion is usually done for the purpose of storage. The HBE operators provide a vertical rack made from wood to store some production tools and dried fish products. This vertical expansion is done by an operator with small house space. This is the easiest way for expansion if the HBE operators want to have extra space without interfering with other or public space. For wealthier HBE operators, sometimes they do vertical inner space expansion by building the second floor for domestic space and the first floor for production space.

Horizontal space expansion is done by HBE operators who have bigger houses. They expand their production space with terrace. Most HBE operators in kampung do the horizontal inner space expansion.

It is fine for everyone to do their production space on the terrace because they will not interfere with other people's space or public space. They do not have to ask for permission for space expansion because it is officially their space. The model of inner space expansion is shown in Figure 11.
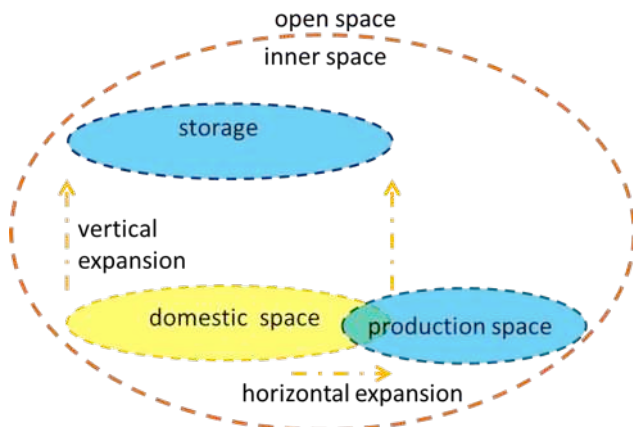
Figure 11. *Model of inner space expansion (section).*

The second type of space expansion is the open space expansion; it is conducted in wet production processes and sometimes for expanding domestic functions as well. For this type of expansion, actors are less concerned with the ownership of open space. So, the expansion could be done for; open space owned by the HBEs operator, open space owned by others and open space owned by the community or public space (pathways and side road). Figure 12 shows the open space expansion that is done by HBE operators in Kampung Sukolilo.

Figure 12. *Open space expansion (left-right: expand to their own open space; rent an open space; use community open space; use public space).*

There are four types of open space expansion based on the ownership of the land (open space): expanding their own open space, other people's open space, community open space and public space. Some HBE operators expand their open space. This type of expansion is only done by the operator who has a bigger area of land to accommodate their domestic used and production uses as well. The HBE operators who do this kind of expansion are able to manage their land. Some operators use their land and some others rent their land to HBEs operators who do not have open space to conduct their production. For large scale HBEs operators, they have a big open space and use it mainly for production. Not only for washing, wet processing, and drying process, but they also build a production kitchen. With this kind of expansion, they will probably not interfere with other people's space, as shown in Figure 13.
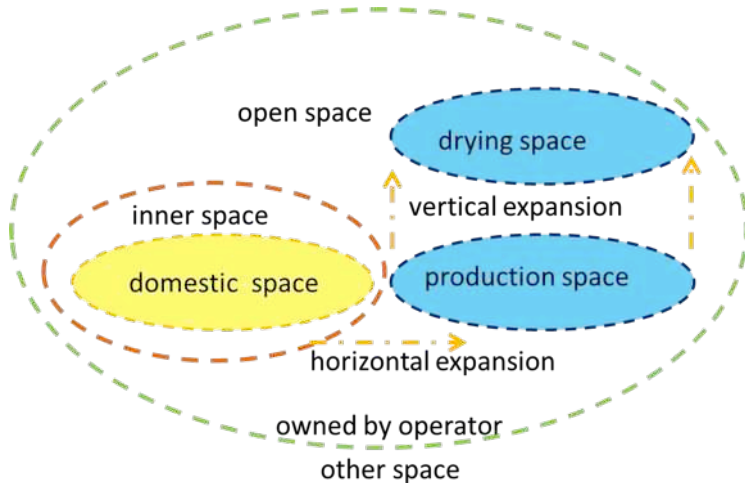
Figure 13. *Model of open space expansion to their own open space (section).*

For operators who have limited land area and they need extra space for production, they will use other people's space, community space or public space. For using other people's space, HBE operators should ask for permission. They rent the land from operators who have bigger open space. They can rent it by paying with cash or with raw materials. Sometimes, this expansion results in conflict. Some operators just expand their production space without asking for permission. Actually, it does not matter whether they use other people's open space without paying anything. The most important thing is the manner with which they ask for permission. Figure 14 below shows the model for open space expansion to other people's open space.
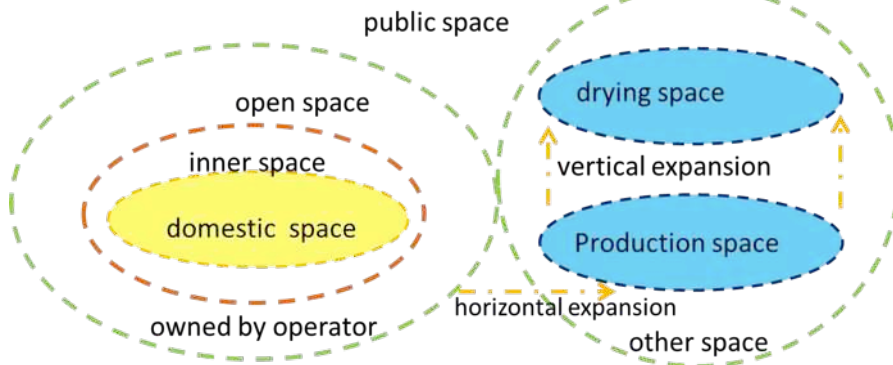
Figure 14. *Model of open space expansion to other people's space (section).*

From Figure 14 above, we can see that the expansion is totally separated from the house or inner space. The expansion has gotten into other territories and can be very sensitive to both.

Unlike earlier, there is an open space expansion of community space. Kampung Sukolilo has a large open space which can be used by everyone to conduct their production process for free. Since everyone is able to access this open space, we can find some HBE operators who use this space at the same time. This condition has more potential to lead to a space conflict between them. In addition, the operators sometimes leave their production tools in the open space so that other operators will be able to use them without asking for permission. Moreover, there is no specific rule in this community space, so they can adjust to the production

territory depending on their need. This kind of expansion has been more sensitive because more people are involved within their territory. Besides, this community open space is the frontier of the kampung, so not all HBEs operators are able to access this open space because of distance. The model of this space expansion is shown in Figure 15.
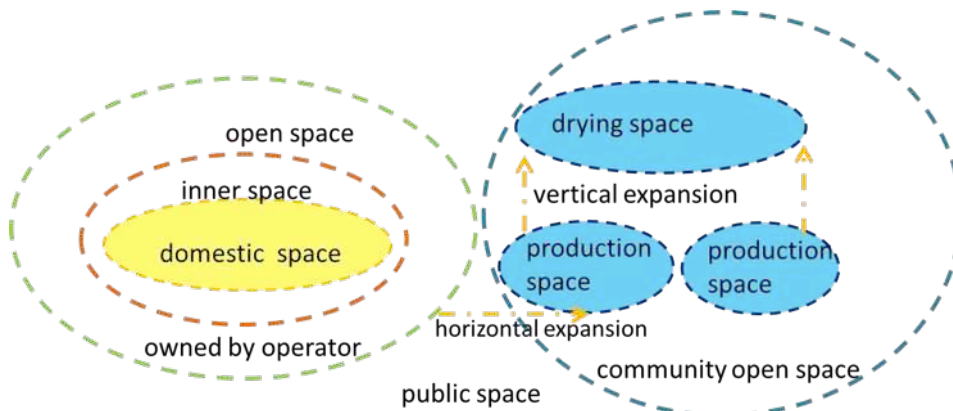
Figure 15. *Model of open space expansion to community open space (section).*

Open space expansion in the public space is mostly seen at the research site. Most HBEs operators in Kampung Sukolilo expand their production space to the public space, though they don't realize it. Figure 16 shows an open space expansion to the public space in Kampung Sukolilo.

Figure 16. *Open space expansion to the public space.*

HBE operators use public space for conducting their production process because of the lack of production space, especially spaces for drying. Some people realize that this expansion could interfere with others but they still do it because they are left with no choice. This kind of expansion is sensitive because it involves not only HBE operators, but also people who visit this site. Besides, they have an innovation for expanding the production space vertically. When they expand vertically, they can have extra space without interfering with public space as much as expanding it horizontally, as shown in Figure 17.

Figure 17. *Vertical open space expansion for drying space.*

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We can see from Figure 17, whether they expand their production open space to the public space, they are still able to use the public space (pathways). Figure 18 below shows the model for open space expansion to the public space.
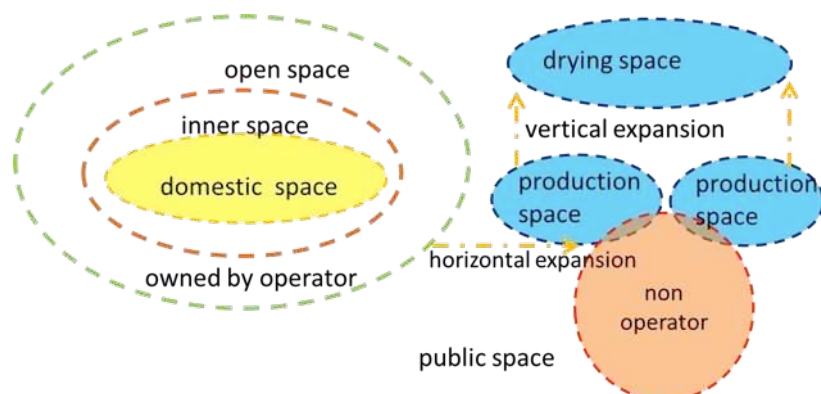
Figure 18. *Model of open space expansion to the public space (section).*

CONCLUSION

Doing some production processes in an open space is one of the requirements of production houses. The odor is the most influential factor of open space usage in production. Considering the lack of space and the small space of houses in Kampung Sukolilo, some improvement and space expansion is done by HBE operators.
Space expansion was done when the space could not accommodate the activities anymore, even though they have been changing the space into a multifunctional space. Space expansion is done for inner space and open space both vertically and horizontally.
Every HBEs operator has a desire to expand their space for domestic and production purposes. The most probable is expanding vertically (2nd floor or above man height). They realize that expansion horizontally will interfere with their neighbors. The main requirement for some improvement is house ownership.
HBE operators who want to permanently expand their space should have their own land or house (ownership is clear and not rent) and also the long term HBE promises to always be there and be done.

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ANALYSIS OF FACTORS AFFECTING UTILITY IN RESIDENTIAL BUILDINGS AT EREKESAN URBAN-CORE AKURE, SOUTH-WESTERN NIGERIA.

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Abstract

Utility in residential building is a measure of the appropriateness of the building to the user. Moreover, the utility of a building depends on user's attitude to spaces within the building and the users' space requirement. However the factors that influence utility in buildings often go beyond the functional arrangement of building spaces. In fact, this research indicated that the household size is a major factor affecting derived utility within buildings in the Erekesan area of Akure urban core. Moreover, the study also revealed that housing need in the urban core is affected by the utility derived from building and that the utility of a building within the urban core determines to a large extent, the rent. Thus, this research examines the utility of residential buildings in the urban-core through four specific variables, measured in interval scale and these are: (i) rent paid per annum (ii) household size (iii) the number of rooms per household and (iv) distance between homes to workstation. These variables being the independent variables was regressed against building utility-the dependent variable, and a model of this relationship for the Erekesan urban-core area of Akure was consequently generated.

Keywords: Erekesan, building utility, urban core, mixed use.

INTRODUCTION

Utility in the residential buildings in the Erekesan area of Akure urban core is reflected in the usefulness of the building to the inmates. At the Erekesan urban core the primary utility consideration in buildings is income generation. This is because the inmates of most urban core buildings in Nigeria are generally poor and live significantly below the minimum of One US Dollar per person per day specified by the United Nations and have been described as the 'urban poor' (Lewin 2000). Thus buildings among residents of the urban core have generally become responsive to the inclement economic climate rather than architectural considerations. In fact, these buildings have become tools for income generation and a profit making apparatus. Thus, buildings that are able to serve well in this regard are considered very appropriate by its users in the urban core irrespective of functional or spatial inadequacies.

In the bid to make the urban core buildings economically responsive, building owners or landlords convert some portion of their buildings to shops, or lettable spaces for rents or other commercial outfits to generate income. This stock of mixed use buildings involving a combination of residential and commercial outfits is very attractive to the urban core dweller for many reasons. Firstly, the majority of urban core dwellers are not literate office workers, but traders who either engage in small retail activity or are skilled laborers such as auto-mobile repairers, tailors and welders and as such need lettable spaces for their activities. Therefore they find it convenient to live in the same building with their shops or very close to it so as to avoid transportation cost. Evidently, buildings of this nature which possess mixed use characters are amenable to the urban core situations and therefore ranked as utility buildings in the urban core. Secondly, the population of the urban cores is quite high. As of the year 2011, national population is estimated at about 140 million with the urban population constituting about 45% (FGN 2006). Olotuah (2000) went further to point out that the urban core dwellers constitute between 33 and 67 percent of the urban population in less developed countries such as Nigeria. Therefore, bearing in mind the 'small' relative land mass of the urban area (particularly when compared with the overall land mass), the relative population of the urban core is quite high. This phenomenon has affected housing needs and demand at the level of the urban core making these factors become competitive and therefore influencing rent and the utility derived in buildings of the urban core. Moreover the induced competitiveness on housing demand and needs within the urban core has consequent influences on household density within the urban core. In effect, household sizes of the core dwellers tend to become a significant determinant of building utility in the urban core.

In view of the foregoing, this study is premised on issues relating to housing utility in Akure urban core, Ondo State, Nigeria. The study identifies some of the factors responsible for housing utility in Akure urban-

core and aim to explain the relationship among these factors in an attempt to determine its implications on housing utility in the urban core.

STUDY AREA

The study area is Erekesan in Akure urban core, and part of Akure South Local Government Area of Ondo State. Akure, however, is 370 meters above sea level (Ministry of Lands and Housing 2011) with a population of 283, 300 and occupies a land mass of 80 square kilometers (Federal Government of Nigeria 1999). Akure is divided into twelve political wards and historical zones with the four innermost zones forming the core (Figure 1). These four zones are namely Erekesan, Idiagba-Ijemikin, Obanla and Okegan. The population of the entire urban core is 71,569 (Akinbamijo 2004). Erekesan area of the urban core, however, has a population of 25,164 (INEC Office, Akure South Local Government 2011) and falls into zone one (1) according to historical division but is politically delineated as ward two (Figure 2). It is bounded by Gbogi, Erekefa, Idiagba and Obanla along Oba-Adesida road in the urban core. Moreover, Erekesan comprises of five major sub-regions, namely: Erekesan-Ijala, Eruoba, Iworokogbasa, Afunbiowo-Alakunre, and Alakunre-Ijofi and a total land area of 7.1 square kilometers (Ministry of Lands and Housing Akure op. cit;).
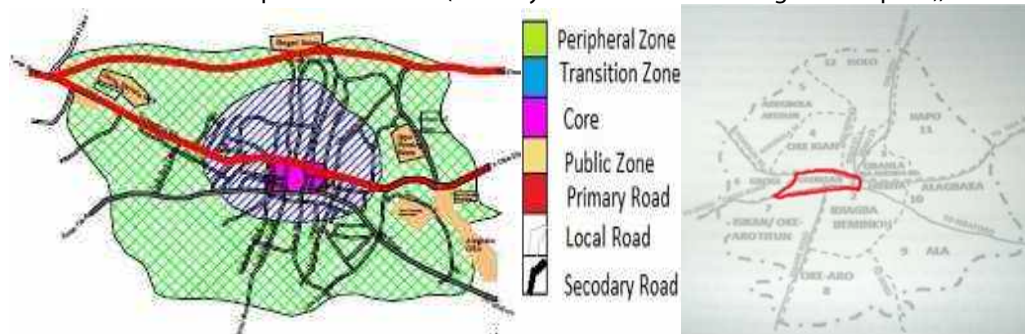
Figure. 1: *Akure showing major zones (2008)*   **Figure. 2:** *Akure showing historical zones*
Source: *Ministry of Lands and Housing Akur**e**with Erekesan highlighted*

BUILDING UTILITY AND FACTORS INVOLVED IN THE URBAN CORE
 Rent
Rents in the urban cores are generally low because of the deficiency of necessary urban infrastructures. The link between rent and urban infrastructure has already been established in housing literature. In fact, Olujimi et.al. (2009) observed that the annual rent of residential property in Akure, has significant relationships with eight urban infrastructure and home-facilitates variable which are: water, burglary proof, refuse disposal facility, toilet, drainage, wall fence, daywatch-security services and night watch security service. In the Erekesan area of Akure urban core, buildings are predominantly of old structures predating the colonial erain Nigeria (i.e., pre-1914) most of which are generally poorly ventilated, dilapidated, squalid and deficient in infrastructural facilities like portable pipe-borne water, drainage, electricity, sewage and refuse disposal system, thus explaining the low rents obtainable in the cores (Olujimi ibid). In fact, Olanrewaju (2004) observed that migrants from rural areas and often tend to live in the urban cores at their first stay in the urban center because of reduced rents in the urban core which invariably inflates the urban core population.
 Distances from home-base to work station
Informal planning, distances from home-base to defined places such as schools, hospitals, churches, bus-stations, etc. are often integrated in the design process ab-initio to forecast walking patterns. This sort of planning involves a complex set of researches realized by quantifying the pedestrian experiences consistently. In the urban cores of Nigeria, planning of this nature is deficient and thus walking infrastructures generally do not exist. Walking distance in the core is usually by unplanned footpaths (apart from recent government interventions in the form of tarred vehicular roads) that evolve indiscriminately through time depending on their behavioral settings (plates 1). The footpaths developed from the cumulative experiences of the inhabitants of the urban core.

Figure 3: *Section of urban core showing recent intervention (road tarred) and derelict condition.*

Number of rooms

Urban cores of most Nigerian cities were founded in the pre-colonial periods and began as trade junctions or market centers (Abianba et al. 2008) which also emanated as the result of interlinking government and political infrastructures. As these communities develop, owing to several factors ranging from state creation, establishment of a railway station, postal and telecommunication systems, location of regional electric power stations amongst others (Proceedings of Annual Conference 2004), many of these agrarian communities began to transform their hitherto traditional compound houses to conform with their current 'modern' statues. In fact, Olanrewaju (2004) observed that this transformation has triggered high housing need in the poorer Lagos urban core where residential properties were fast disappearing as they are being transformed into other uses such as commercial or more economic uses. These new varieties of buildings, (mostly triggered by commercial incentives) are called 'face to face' rental houses and have been described by Ogunsote (1995) as Low-trop architecture. This variety of buildings are usually characterized by umpteenth number of rooms (usually for letting in order to make profits) hence have also called 'roomy' houses. In most cases, tenants rent two rooms and use one as a bedroom and the other as the living which they call 'parlor'. A total of about six tenants in the average, occupy a building, thus making the average number of rooms about twelve (12) in most cases.

Household size

Housing literature has pointed out that the average household size in the urban cores of south-western Nigeria is between 6-8 (Akinbamijo et al. 2005, Akinbamijo 2004, Jiboye ibid.). This has resulted in high crowding index and room density in the urban cores and most of the urban core houses. Moreover, because of the fact that the south-western Nigeria is the most urbanized part of Nigeria with over 40 percent of the nation's 329 urban cores in this region (Adegbehingbe 2012) it can be inferred that household sizes in the urban cores have been significantly influenced by urbanization. This is because urbanization enhances high crowd index, therefore increase housing demand. This invariably conditions more people to live in the buildings, thereby likely, to increase household sizes. However, in a bid to cope with these, the urban cores naturally decentralize into smaller fragments which explain the reason for the high percentage of the urban cores in the south-western part of Nigeria.

METHODOLOGY

The study was carried out at the Erekesan urban core area of Akure. A survey was carried out on the five sub-regions of the Erekesan urban core using a restricted- response questionnaire. The survey sought to examine the resident's perception of building's utility with four variables identified as the factors affecting utility of the building in the urban core. The variables are household size, rent, distance of urban core dwellers from residential buildings to work-outfits and number of rooms per household. Data obtained from the field survey were analyzed and regressed to investigate and describe the relationship between these variables. The census population of the study area is 25,104 (Akure South Local Government 2010). Thus, a sample size of 2,192 was calculated taking the acceptable error 'e' to be 0.05, and 'z' (value of the standard variate at a giving confidence level) as 1.96 from table under normal curve distribution at 95% confidence level. Thus 2,192 questionnaires were administered to the residents of the core out of which 1,198 was retrieved.

 Data analysis and discussion

 The result of this research was based on data collected from the studied area through the specified variables in the structured questionnaire. Table (1) below shows the frequency distribution of the variables and total number of respondents.

Table 1: *Frequency distribution of stated variables and number of respondents*

y:Utility Derived	Frequency	Distance to Work-Station		Rent per annum		Household Size		Number of rooms	
		Distance (Km)	Freq.	Amount (N)	Freq.	Persons	Frequency.	Number	Frequency.
Very Good	20	0.0-0.5	5	1,000-15,000	24	1-2	32	1-2	16
Good	100	0.5-1.0	2	16,000-30,000	40	3-4	32	3-4	16
Fair	46	1.0-1.5	10	31,000-45,000	52	5-6	52	5-6	12
Poor	20	1.5-2.0	17	46,000-60,000	16	7-8	16	7-8	16
Very Poor	8	>2.0	56	>61,000	08	>8	08	>8	80
Total	144	Total	90	Total	140	Total	100	Total	140
		Misisng	10	4		Misisng		04	Missing	4
Total	144		100		144		144		144

Source: Author's field survey 2012.

The relationship between housing utility (y) and the stated variables was examined using regression analysis. Housing utility is the response variable while distance to work station, (variable v_1), rent per annum (variable v_2) household size (variable v_3) and number of rooms per household (variable v_4) predictor variables used in the analysis. The model of housing utility in the urban core area derives by regressing the response variable (y) on variable v_1, v2, v3 and v_4 is:

$y = a+b_1x_1+b_2x_2+b_3x_3 + b_4x_4 +e.$

Where:

y = utility derived,

a = constants (y-intercept),

b = constant (slope of the line $y = a+b_1 x_1 +b_2 x_2 +b_3 x_3$)

e = error term,

x = Point values of variables (v) for a particular value of (y).

The equations to determine the regression model can be written as follows:

$\Sigma y = na +b_1\Sigma x_1+ b_2\Sigma x_2+b_3\Sigma x_3 + b_4\Sigma x_4$

$\Sigma y_1 x_1 = a \Sigma x_1 +b_1\Sigma x_1^2 + b_2\Sigma x_1 x_2 + b_3\Sigma x_1 .x_3 +b_4\Sigma x_1.x_4$ equation……….. i

$\Sigma y_1 x_2 = a\Sigma x_2 + b_1\Sigma x_1.x_2 +b_3\Sigma x_2^2 +b_3\Sigma x_2.x_3 +b_4\Sigma x_2.x$ equation………...ii

$\Sigma y_1 x_3 = a\Sigma x_3 +b_1 x.x_3+b_3\Sigma x_2.x_3 +b_3\Sigma x_3^2 +b_4\Sigma x_4 x_3$ equation………...iii

$\Sigma y_1 x_4 = a\Sigma x_4 + b_1\Sigma x_1 x_4 +b_2\Sigma x_2 x_4 + b_3\Sigma y x_3.x_4 +b_4\Sigma x_4^2$ equation………….iv

Solving the simultaneous equations, the result of the analysis shown in model is $y = -21.5 + 0.22v_1 + 0.96v_2 +1.09v_3 – 0.36v_4$. From the model, the variables are ordered in such a way that household size (variable v_3) is the most important. This is followed by rent per annum (variable v_2), and followed by distance or nearness to place of work (variable v_1) and lastly, number of rooms (variable v_4).

Explanation of the regression model

Household size and the utility derived in buildings

From the model, it is observed that household size is the most important factor determining utility derived in housing. Household size determines the number of residents per room. This value (room density) has been known to significantly indicate the level of satisfaction or derived utility in a building (Akinbamijo 2003). Moreover, from Table 2, the commonest form of house type in the urban core is the Face-to-face rental house. This house type is usually characterized by large numbers of rooms which explains why the house type with a minimum of seven to eight rooms constitutes 40% of housing stocks in the urban core. In most cases, residents of the urban core are only able to afford a room and parlor (Table 2) making room density in the urban core significantly 4-5 persons per room. Other flats or lettable apartments (between 2-3 or 3-4 bedrooms) are relatively more expensive for the urban poor. Despite this, room density in the Erekesan area of Akure urban core is still relatively low when compared with the entire urban core.

Akinbamijo (ibid.) observed that the entire urban core (comprising of Erekesan, Obanla, Okegan, Idiagba-Ijemikin) has a room density of > 6 which indicates a minimum of six persons per room.

Table 2: *Showing the frequency distribution and cumulative percentage of stated variable*

s/n	Building Type	Freq.	Cum. %	House-hold Size	Freq	Cum. %	Rent	Freq.	Cum. Freq.	No of rooms	Freq
1	Simple bungalow	28	19.5	1 person	32	32	Low	28	28	1-2	16
2	Semi-detached	08	25.1	2-3 persons	32	64	Fair	28	56	2-3	16
3	Face to face	40	52.9	4-6 persons	52	116	High	20	76	3-4	12
4	compound-houses	12	61.2	6-8 persons	16	132	High	04	80	4-5	16
5	Brazilian style	32	83.4	>8 persons	08	140	Total	140		5-6	04
6	Others	24	100	Total	140					Others	76
7		144		Missing	04						
8				Total	144						
9				Mean Mode	2.54 4-6					Total Mean Mode	144

Source: Author's field work.

Rent per annum

The next significant factor to household size according to the model is the rent paid per annum. In this research, it was observed that rent is relativity lowest in the urban core. From Table 2, a cumulative of 82.9 percent of urban core dwellers lives in low rented houses. These low rent houses are usually characterized by poor ventilation and usually lack toilets and bath facilities. In most cases, the environment is littered with human waste (both solids and liquids) and housing condition is generally very poor. This condition dovetailed into poor spatial character and a state of planlessness and unsightly environment lacking all features that induce environmental pleasure. In fact, these reasons account for the low rents. Other buildings such as simple-bungalows and semi-detached houses which accounts for 28 and 8 percent of housing stocks respectively, (Table 2) are usually beyond the reach of the urban poor because of the high rents. Thus, rents influence the extent of utility derived in housing at the level of the urban core.

Distance from work-station

From the regression model, the distance of the core dwellers from homes to their places of work is next in importance to rent. Although Olotuah (op. cit:) observed that in most cases, urban core dwellers prefer live close to their work-stations in order to reduce mobility cost, as most of the core dwellers are traders or artisans (Table 2). Nevertheless, the regression model showed that this work-station to home relationship is not as important as rent and household size in determining housing satisfaction or derivable utility among dwellers the urban core. This observation is an indication that the number of commercial outfits in the urban core is most probably over bloated and the observed result shows a diminishing return. Thus, utility in the core has become (of recent) more easily perceived in terms of environmental comfort than pecuniary benefits.

Number of rooms per house/building

From table 2, 61.2% of buildings in the Erekesan urban core area are compound- houses, face-to-face rental buildings and the Brazilian styles. These buildings are often characterized by large number of rooms (often more than eight bedrooms) as shown also in Table 2. Moreover, due to the preponderance and the nature of these house types in the urban core, most of the rooms are available as one bedroom or 'room and parlor arrangements'. This condition is responsible for high room density, hence poor environmental character and low rents at the urban core. However, the model indicated that the number of rooms per building is

inversely related to derivable utility. Moreover, in the urban core buildings with umpteenth number of rooms such as the Brazilian style, and Compound-houses are usually old buildings (more than 50 years) and lacking conventional facilities and infrastructure (Olujimi et al. 2005). In most cases, such buildings are constructed in adobe blocks, with poor fenestration (often with very small windows) and without proper waste or refuse disposal system. As a result, buildings of this variety (with high number of rooms) reflected negative value in the regression model, indicating that the more these stocks of building exist in the urban core, the lesser the quality of the environment and utility enjoyed by the users.

CONCLUSION

From analysis in this section, the following are the summary of findings.

1. Rent influences the utility derived among residents of the Erekesan area of Akure urban core. This is because most of the residents do not have the pecuniary means decent home.

2. Rent is relatively low throughout the Erekesan area of Akure urban core owing to the preponderance of poor housing which is affordable at low rents.

3. Despite the preponderance of umpteenth numbers of face to face rental housing and Brazilian style usually characterized by large numbers of room at Erekesan area of Akure urban core, housing density is still high (between 4-6). This is because, most of the core dwellers have a household size of 4-6 and live in 'one room and parlor' apartments (Table 2). In fact, in a similar study, housing density in Akure urban core (comprising of Erekesan, Obanla, Okegan, and Idiagba-Ijemikin) is observed to be > 6 (Akinbamijo 2003).

4. Housing need in the urban core is still high. This is explained by the regression model which showed household size as the most important factor determining derived utility in the urban core housing. This is an indication that majority of the households do not find satisfaction in housing. Moreover, since the household is defined by household number, it follows that the room density is high, thus the utility derived is modicum (Akinbamijo 2004). Therefore, it can be inferred that housing need in the core is high since most of the residents find dissatisfaction in their dwellings, but have nevertheless stayed in the same building for more than 5 years in most of the cases (Olujimi op. cit:).

5. At the Erekesan area of Akure urban core, the number of commercial outfits (placed in moderate distance from their home base) is not considered to be as important as the influence of household size and rent. Although authors have attested to the importance of distance of homesteads to workplaces in the urban core, yet this research showed that this factor is not as important to the core dwellers as housing condition and housing satisfaction which is dependent on rent and household size respectively. Moreover, this is also a pointer to the fact that shops|commercial outfits at walking distance from home-base is sufficiently available at the urban core. In fact, the effect of these commercial facilities (shops and other commercial outfits) is now following a downward toll resulting from diminishing returns, especially now when the extant Government of Ondo State is beginning to build shops and other lettable markets at moderate distances from home-base. Moreover, the spontaneous development of these outfits (often as a result of unauthorized building transformation) amounts to urban densification, urban blight and squalor thus resulting to poor housing environment.

6. Housing condition is generally poor in the urban core.

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UNDERSTANDING URBAN FORM AND SPACE PRODUCTION IN INFORMAL SETTLEMENTS: THE TOI MARKET IN NAIROBI, KENYA

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Abstract

Several authors argue that a better understanding of urban informality is required to create inclusive urban policies and projects. Whereas studies about slums are copious and date back to the sixties, informal urbanism is receiving a new emphasis and has become an unavoidable subject in urban and development debates. This three-part paper develops an analytical framework of urban informality with a focus on the production of space in informal settlements. First, a literature review on the domains of informal urbanism and planning provides a preliminary theoretical framework. Second, a case study is analyzed and compared with findings from the literature review. The case-study explores processes of space production in one of Nairobi's informal markets, through direct observation, structured and semi-structured interviews and mapping. Third, an analytical tool is created to highlight the main approaches, limits and gaps in the existing literature.

Considering the production of space in terms of processes and outcomes, the literature review identifies three theoretical approaches: the functional approach, which focuses on space organisation and form and the concept of order; the anthropological approach, which investigates everyday practices; and the process-oriented approach, which considers informal settlement formation and evolution processes. The case study illustrates how the poor give significant attention to the production of space and site organisation; which directly affect, and are affected by, economic, socio-political and cultural circumstances, providing opportunities for significantly improving living conditions. Although the case study findings cannot necessarily be generalized, the complex and specific experiences that emerge from it suggest that most common definitions cannot efficiently and fully describe informal realities. A bottom-up approach and willingness to learn are fundamental to identifying practical lessons from the slum dwellers' perceptions and use of space; these must simultaneously challenge and complement top-down planning approaches.

Keywords: informal urbanism, informal settlements, space production, Nairobi.

INTRODUCTION

Slums and other forms of informal settlements in the global south have been growing continuously since the 1960s (UN-Habitat 2012). Yet, urban studies still lack adequate tools for fully understanding informality and enhancing sustainable urban development. This knowledge gap today represents one of the main causes of poor urban policies (Elsheshtawy 2011, Samper 2010) that over the past decades have failed to reduce the proliferation of informal settlements, while often encouraging their forced eviction and demolition (Dovey and King 2011). Unsurprisingly, being 'secure from eviction' is an important indicator of Millennium Development Goals (UN 2000).

According to the Lefebvrian concept of social space, "every society produces its space [...] (and) the city had its spatial practice; [...] Hence, the new need for a study of this space that understands it the way it is, into its genesis and form [...]. Programmatically every society having its own space offers it to an analysis" (Lefebvre 1991, p. 40). According to this perspective, understanding urban informality in order to improve the slum dwellers' living conditions requires a systematic investigation of how the poor perceive and experience space, and make decisions in the process of space organisation.

Research about informal urbanism dates back to the 1960s; yet, it has recently gained new emphasis (Elsheshtawy 2011) and remains a critical topic in urban and development studies. The dichotomy of formal versus informal, however, still prevails, despite it being widely accepted that a binary distinction oversimplifies the complex reality of contemporary cities and economies (Doherty and Silva 2011, Simone 2008).

This paper proposes an innovative theoretical framework of urban informality with a focus on the production of space in informal settlements. It is divided in three sections. First, a literature review considers qualitative research in the domain of urban studies and proposes an analytical background. Second, a case study exploring processes of space production in one of Nairobi's informal markets is analyzed and compared against this conceptual background. Finally, an analytical table is created to resume and compare different theoretical approaches and the limitations and gaps in the existing literature. However, before considering the results, let's explore in detail the methods used in the study.

METHODS

The paper is based on a literature review and a case study that simultaneously challenges and enriches conceptual interpretations of the main bodies of knowledge. An analytical table becomes both a tool and our main research outcome. The literature review explored a large number of studies on contemporary informal urbanism and planning. This includes journals and books produced between 1990 and 2014; however, seminal work dating back to earlier studies of informality provided key conceptual insights. Publications were found through keyword searches in scientific databases (Google Scholar, Science Direct and publishers such as Taylor & Francis). Keywords included: informal planning; informal urbanism; slums; and space production in informal settlements. The definition of spatial organisation, drawn from geography and urban studies, considers the process of perception and production of space (Lefebvre 2000), and the configuration that result in a more or less established form. Literature was later organised according to three main approaches: the functional, anthropological and process-oriented approaches.

The case study was conducted during five visits in 2004, 2006, 2007, 2008, and 2011.   It aimed at understanding the market history and formation, its physical structure, the members' participation in projects involving site organisation, and the role of 'informal design'. The approach was qualitative: information was collected through twenty structured and semi-structured interviews with vendors, five conversations with market leaders, six site visits, and several mapping techniques. Informal conversations played a critical role in facilitating the dialogue. Semi-structured interviews with community leaders provided information about the market formation and the challenges and projects undertaken over decades. Pre-established forms were used to interview marketers and map their stalls, through photos and notes describing economic, social and physical conditions. In total, 31 activities were mapped, located in different areas of the market. This allowed for gaining insights about different vendors, activities, and roles inside the market. Interviews targeted an equal number of men and women, representatives of different groups, new and established activities. Semi-structured interviews investigated existing projects, the traders' perception of design activities and the community's expectations for the Toi market. Results were also drawn from more than twenty drawings of the market and its stalls. A comparison of the market's maps before and after the reconstruction occurred in 2008 helped in understanding its evolution. The old market (from 1989) was fully documented through graphics and photos.

FIRST RESULT: ANALYTICAL FRAMEWORK

Informal settlements are typically studied in informal urbanism and planning from two perspectives: a significant number of studies emphasize their potential to provide affordable housing solutions for millions of poor people (Turner 1972, de Soto, 1989), while others highlight the extreme conditions of constraints and deprivations (UN 2003). Whether informality is considered an alternative to neoliberal economic systems or its natural result, overall, the formal/informal dichotomy has dominated since the anthropologist K. Hart (Hart 1973) introduced it five decades ago. Recently, several authors (Dovey and King 2011, Doherty and Silva 2011, Mehrotra 2010, Donovan 2008) have recommended moving beyond this binary opposition that oversimplifies urban phenomena. Yet, informality is still defined and considered as the negative counterpart of formality. In fact, the UN-Habitat definition of slums (UN-Habitat 2003) measures a household's degree of poverty partially by a list of household deprivations.

In establishing a theoretical background to informal urbanism, Elshestawy (2011) identifies three perspectives by which urban informality is explored in cutting edge research: underlying order in informality, socio-economic factors, and strategies of survival. Duminy (2011) also distinguishes three themes in planning literature: informal planning (as modes not officially regulated and including quasi-legal

ways of land transfer and negotiations); informality as income-generation, typically services and practices significantly unregulated and uncontrolled by formal institutions (responding to socio-spatial marginalization and survival conditions); and informality in relationships, city governance processes and urban social formation. This article focuses on spatial production, clustering research contributions into three major theoretical approaches: a) the functional approach, studying space organisation and form, planning processes and legal frameworks; b) the anthropological approach, investigating everyday practices; and c) the process-oriented approach, considering informal settlements formation and evolution processes (Figure 1). Let's consider now each of these approaches in detail.
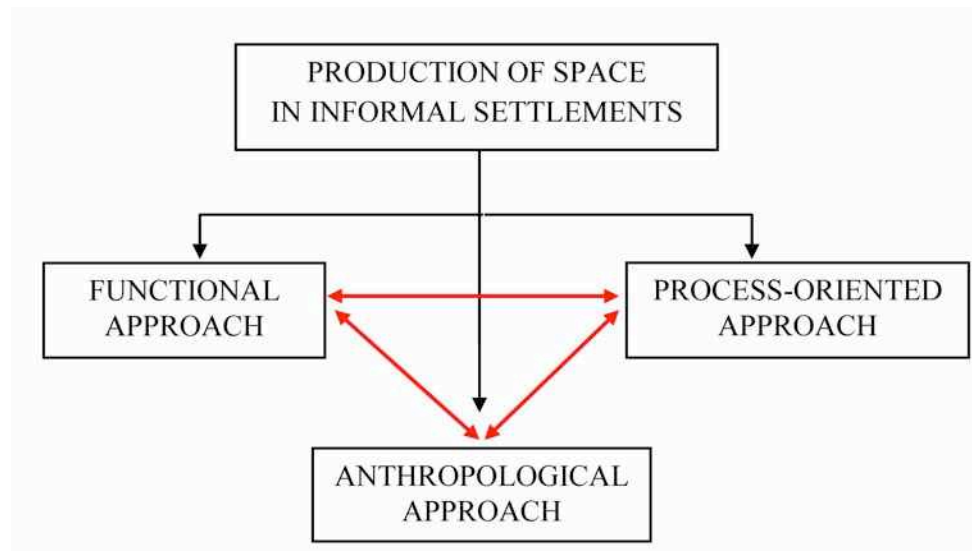

Figure 1: *Theoretical approaches identified in informal urbanism.*

The functional approach
This approach includes studies about spatial arrangements, form, and the concept of order.   It claims that, although informal settlements may look chaotic and unstructured, their physical structure responds to specific rules and logics; hence, it is necessary to identify tools for effectively reading and recognising informal fabrics and structures. Turner (1972), for instance, first promoted the importance of understanding informal housing standards as a prerequisite for implementing affordable housing programs (Turner 1972). Similarly, the interest in informal housing performance led Rybczynski to map patterns of use of public spaces based on rooted cultural practices in Indian unplanned settlements (Rybczynski et al. 1984).

More recently, common analyses have focused on physical patterns and order, aiming at understanding informality in relation to territorial spaces and distribution. In describing 'subaltern urbanism' as a mode of space production defined by the territorial logic of deregulation, Roy (2005) identifies urban informality as one of four categories of subaltern spaces: peripheries, zones of exception, gray spaces, and urban informality. They are produced as state of exception to the formal order, where the ownership, use, and purpose of land cannot follow an established set of regulations.

Dovey (2011) regrets that there is very little research on the morphologies of urban informality and identifies eight territorial typo-morphologies within which informal settlements and slums develop in South-East Asia: districts, waterfronts, escarpments, easements, sidewalks, adherences, backstages and enclosures (Dovey and King 2011). Arefi (2011) draws from Marshall's (2009) distinction between 'systematic' (visible), and 'characteristic' (implicit) order; and from Mandelbrot's (1983) concept of 'scaling', which refers to the different levels of informality that may exist in a given context. Exploring Istanbul's informal settlements, he describes five distinctive types of order: social organisation, conflict resolution, local politics, and planning and land use. These studies have somehow informed the public mind-set, yet, they have largely failed to acknowledge the presence of order in informal settlements (Arefi 2011).

The literature about processes of enumeration and mapping is also critical for understanding informal settlements (Karanja 2010, Pamoja Trust 2008, Weru 2004). It offers significant insight about slums' socio-

economic and physical structures. Enumeration activities can reveal existing or missing infrastructure and services, settlement boundaries, houses and typologies of business structures in informal settlements. In Kenya, for example, these physical features are described in terms of how people live and use them (Karanja 2010, p. 233). The enumeration process, aimed at creating awareness among slum dwellers about the socio-spatial characteristics of their communities, has enormous practical implications, such as allowing for local planning and upgrading implementation, but also suggesting reliable methods to gain and build specific, contextual knowledge about informal urbanism.

The anthropological approach
This approach investigates everyday practices of land occupation and the concept of marginalization. It emphasizes the character of transition and impermanence of informal settlements, but also the various opportunities provided by them. Informal urbanism is considered here as "everyday practices of ordinary citizens, forcing a reconfigured relationship between those in power and the inhabitants of the city" (Elshshstawy 2011).

Adopting this approach in her analysis of Brazilian favelas, Perlman (2010) describes, for instance, the atmosphere of diversity tolerance in informal settlements, presented as a way of life. Perlman criticises the theory of marginalization that depicts favelas as places of loneliness, disorganisation, criminality and anti-social behaviour. Rather, she describes their symbolic and physical attributes, providing extensive data about inhabitants and their trajectories from informality towards better living conditions. This is expressed in a number of ways through the concept of transition, depicting informal settlements as impermanent realms in which people can benefit from a dense social infrastructure (Simone 2008).

The characteristics of temporality in relation to the configuration and use of urban space also emerge in the narratives of rural-urban migration occurring in developing countries. Here, the poor are in constant search for ways to better integrate into cities, using informal settlements as 'arrival cities' (Saunders 2010). This transitional character of informality favours the flow and exchange of goods, cultures and ideas, particularly in informal marketplaces (Mortenbock et al. 2008). Defenders of this approach typically reject the notion that slums are poverty traps that limit household development (Marx 2012); although, recent economic studies reveal that risk of economic and social traps exists for slum dwellers (Duflo 2011, Sachs 2005).

Informal settlements and marketplaces represent the places where meanings transform in the modern urban life, as the concept of black urbanism explains. Black urbanism accounts for the "more invisible modalities of socialities that circumvent normative mechanisms of social exchange" (Simone 2008, p. 88). Informality is not placed in the background, rather brought into the very center of spaces that concretize the contemporary urban life. Simone stresses the particular condition of double affiliation with the formal and the informal, exclusion and inclusion, precariousness and opportunity. The physical space becomes the arena for such invisible practices and as such, conditions the day-to day negotiation of 'doubleness'. Thus, according to Simone (2008), conventional discourses of urban development fail, while architects should "extend their skills to do something more provisional rather than wanting to solve the problem once and for all" (Simone 2008, p. 91).

Referring to cities in Latin America, Africa and Asia, Mehrotra (2010) elaborates on ways to represent informality, thus developing the concept of 'Kinetic city': the informal city characterized by an "ever transforming streetscape made of processions, festivals, street vendors and dwellers". It is also a three dimensional entity perceived through patterns of space occupation rather than through architecture. Contrasting it to the static city (the formal, two-dimensional entity made of permanent materials), Mehrotra proposes a new binary distinction.

The process-oriented approach
The process-oriented approach considers the informal settlements' historical formation and evolution, including aspects related to planning processes and legal developments. Relationships between informal development and global pressures such as colonialism, post-colonialism, liberalisation and international economic policy are often brought into light. This approach also focuses on the relationship between informal urban processes and work and production. While underscoring that informal urbanisation "has become the most pervasive element in the production of cities in developing countries" (Anyamba 2011), it focuses on the origins of informal urbanisation. De Soto, for example, provides an analysis of the political-historical evolution of informal housing in Peru. He identifies ten successive historical stages showing how

the formal structure has developed the basis for the growth of informal housing. Similarly, Anyamba refers to Nairobi's informal processes as moments in which Africans built villages on the periphery of the town in three waves that embodied a search for modernisation and a departure from local indigenous practices (Anyamba 2011).

Kellet (2010) attempts, through the analysis of Latin American cities, to redefine the terms 'formality' and 'informality'. He highlights bottom-up processes of city transformation, processes of collective appropriation of spaces and formation of informal settlements, stressing that new and more dynamic methods of analysis and intervention need to be developed in order to deal with the conditions of informality in contemporary cities. Similarly, Abbott and Douglas (2010) in a longitudinal study of informal settlements in Cape Town over a five-year period, show how informal settlements in the city grow faster than new housing can be provided, thus calling attention to the need for a radical shift in current housing policies. The possibility to determine distinct trends in the growth pattern of informal settlements can enable such settlements to be integrated into the city development planning process. Finally, Samper, a defender of this approach, complains that the discipline of urban design lacks a comprehensive understanding of the phenomenon of informality and therefore, effective intervention tools (Samper 2011).

SECOND RESULT: THE CASE STUDY OF TOI MARKET IN NAIROBI, KENYA

Location and context
With a total of three million inhabitants, Nairobi is home to about two hundred informal settlements and slums and one and a half million slum dwellers (Pamoja Trust 2008). Furthermore, its population is expected to reach 8 million by 2025 (UN 2001), and the informal sector is believed to represent about 70% of urban economy. The poor's needs are, if anything, satisfied by informal practices, commerce and marketplaces. Kenyan slum dwellers have thus organised in a national federation (Muungano Wa Wanavijiji), whose members come from various communities. The federation works in several communities to mobilise and create awareness, leverage social networks to favour socio-economic assistance, advocate for political and human rights, negotiate with local authorities, and improve local conditions through upgrading and sanitation projects. Nevertheless, slum dwellers in Nairobi still live in conditions of mass poverty, contagious diseases, conflicts, and many social, economic and environmental hazards (Mutisya 2011).

There are about six important informal markets in Nairobi. Toi market is one, located four kilometers south-west the Central Business District, at the northern border of Kibera (Figure 2) - one of the largest African slums (Umande Trust 2010). Kibera covers 250 hectares and has a population estimated at 700,000, of which about 49% lives below the poverty line (Umande Trust 2007).

Figure 2: Toi market location in Kibera.

As an urban entrance for agriculture products and a food supply center for Kibera and surroundings, Toi market offers employment and livelihoods to over 2,400 traders, largely affecting the living conditions of thousands of households. It provides a huge variety of wholesale and retail goods and services. Fruit and

vegetables, cereals, meat and fish, spices, textiles, second hand and new clothes, charcoal and firewood, household and handcrafts can all be found at the market. Services vary from food kiosks and water vending, to tailoring and ironing, laundry, vehicle repair, chemists and herbal clinics, hairdressers, furniture and pool tables. Some vendors specialise in bone recycling, rabbit and chicken rearing, and maize growing. Some services extend beyond the market's area such as catering for weddings and funerals, tree planting, and transportation. Briefly, Toi market provides almost everything, though groceries and second hand clothes predominate.

Toi market was completely destroyed in 2008 during the political conflict that followed the presidential election, but was quickly rebuilt. The market has been affected by this major physical transformation, and we will thus refer to the 'old' and 'new' market, to distinguish between the conditions before and after the disaster. The market will be now described through the lenses of the three approaches found in the analytical framework.

The functional approach
Our study provided insights about the physical layout of the market in terms of accesses and paths, landmarks, public spaces and community services, and a typology of the stalls. Toi market extends over about 3.5 hectares of government land. According to the Ministry of Land's records, improvements of the area have been planned several times, but have never actually been translated into specific projects on ground.

The area is not directly accessible from the main road system. The main access is at the South-East, off Kibera Drive. Another five access points open to small pedestrian alleys on the East, North, West, and South sides. The layout presents four legible spatial categories: 1) accesses and paths system; 2) public spaces; 3) community services; and 4) stalls. The stall represents the module defining the entire configuration. In the old market, stalls were irregular and generated a heterogeneous layout. The new market is based on a rectangular, standardised module (Figures 3, 4).

Figure 3: *Distribution of sections and paths' system in the new market.*

Figure 4: *The new market layout.*

Stalls are made up of temporary, wooden structures, polythene or cardboard partition walls, metal sheet roofs and are not paved. Structures often burn or collapse under strong winds. There are three sizes of stalls: 2x2 meters (Figure 5), 3x2 meters (Figure 6), and 10x12 meters, the large ones usually being used for community services. Their combination allows for additional configurations. In the new market, roads have been well planned to accommodate people and handcarts. The major roads are 5 meters wide (Figure 7), while inner roads have a width of 2 meters (Figure 6, 8). All dimensions were established in order to accommodate all traders. The use of modules varies depending on the kind of activity and the economic potential of the traders. In some cases, merchants occupy more than one stall; in other cases, they have created roof extensions (Figures 5, 6, 7) or occupied public passageways with goods, sittings and tables (Figure7).
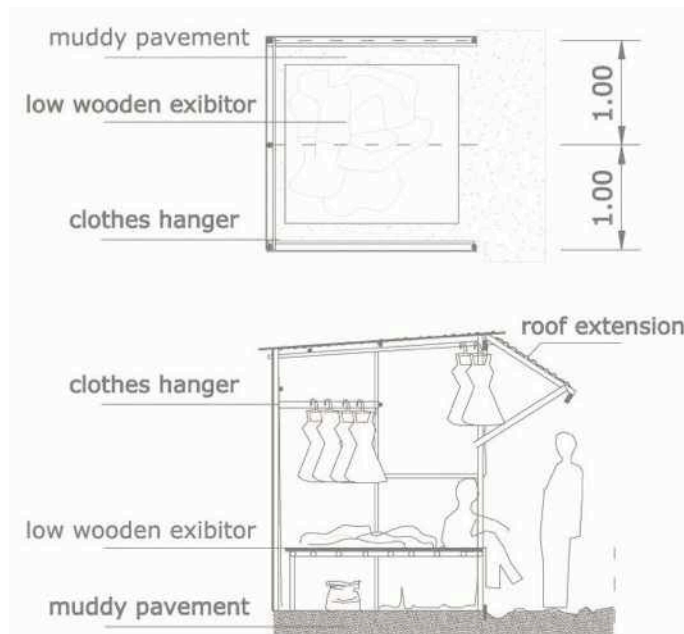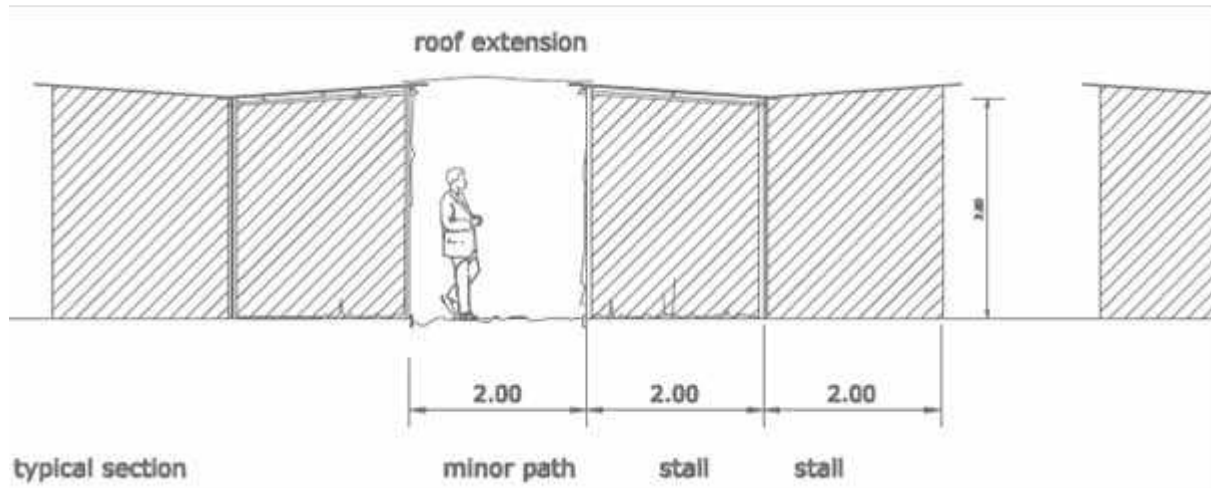

Figure 5: *Small module. Roof extension.*

Figure 8: *Stall's distribution along minor passageways.*

The anthropological approach

The Toi market community lives in extremely difficult socio-economic and environmental conditions. Since the beginning, in 1989, both structure owners and tenants have been faced with insecurity of land tenure, lack of trading licenses, low income, lack of access to credit and banking, besides constant threats of eviction and demolition. Moreover, the market area presents poor infrastructure, insufficient water and sanitation provision and temporary, fragile structures. The situation has worsened over the years with the increase in population, though the community has steadily tried to improve its conditions. Despite this precariousness, Toi market has always been a magnet for a new and tremendously diverse population looking for opportunities for integration in Nairobi.

In this context of high constraints and uncertainty, there is almost always only room for short term planning. Nevertheless, the community has undertaken different levels of planning and design over the years. Appropriation and distribution of space are critical issues requiring long decision making processes, political negotiation with local authorities, and inner conflicts resolution - mainly related to land issues. Yet in such a climate of day-to-day subsistence, some merchants have become efficient planners. Since the reconstruction of the market in 2008, merchants have learned to accommodate businesses to include all groups, design stalls, toilets and other structures, and to locate services, wholesale and garbage. Solutions have had to respond to a very complex set of long-term and immediate needs.

In subsistence marketplaces, people have physical needs, but also aspirations related to their visions of the future and expectations to overcome poverty (Viswanathan 2009). Despite its precarious conditions, Toi market has existed for over thirty years. Traders now count on it for their children's future and have developed a sense of belonging to this site. All interviewees, in fact, identified themselves as Toi market traders rather than by tribe. Some vendors are willing to invest in improving their stalls and some plan to extend their business adding more modules, but these objectives are often affected by misfortunes and hindered by insecurity of tenure. The vendors considered activities of planning and design positive in different ways. They considered the reconstruction as a positive opportunity to improve accessibility to all the sections of the market. The new market, they say, is working better than the old one: spaces are well defined and recognisable, security and accessibility have improved. Nevertheless, according to some traders, there is less flexibility in the use of space and increased control on businesses by leading groups.

All traders agree that the process of formalisation and an appropriate design for a modern market would increase investments and economic stability. A good design of the stalls with higher quality materials, partition walls and locked doors would reduce the need for a security system (now provided by the Masai people) and increase investments in stocks, improving businesses and economic growth. Over the years, the merchants have imagined solutions for the use of the land, such as the densification of the area by building houses over the stalls and developing new income generating activities, such as renting rooms for tourism

to increase the flow of people and business. There is thus a clear need for multi-functional structures capable of concentrating opportunities in strategic places.

The process-oriented approach

Toi market began in the 1980s in a bush area, with a small group of women selling green vegetables along Kibera Drive. It developed naturally along paths connecting different residential areas; these paths became characteristic of the market structure (Figure 9). Evictions started soon afterwards, to allow for the construction of two formal markets nearby: the Makina market and the Hawkers market. Initially conceived to accommodate the Toi market traders, the two markets ended up being occupied by external entrepreneurs. The original market traders, who were forced to leave, returned to the area, despite constant risk of eviction. In 1996, several informal settlements and markets in Nairobi were demolished. A formal protest against such forced measures turned into a political issue for the provincial administration. The traders lost the case in court because the land was officially owned by the government and the allocation could not be revoked. The number of traders in the area increased, and by 1999, the market was full. The same year, the department of Public Health took traders to court due to lack of adequate sanitation in the market. The Public Health officials gave the Toi market committee one month to build permanent toilets and pour cement on the floor of the food kiosks, but the deadline passed without effective results due to lack of funds. Three representatives of the Toi market committee were taken to court, and then released with a fine. They subsequently began mobilising the community to start a sanitation project. In 2005, a private developer forced the eviction of eleven traders, so the officials of the Toi market came together to support their members and the case was continuously deferred in courts.

Before 2008, the market was organised in sections, but stalls had irregular shapes and sizes. It appeared as a chaotic and dense labyrinth of cardboard, polyethylene, and iron sheet structures (Figure 10). Roof extensions created narrow, dark and poorly ventilated passages, difficult to recognise by pedestrians. Feeble landmarks existed in empty spaces, including the main road, a dump, wholesale area, garages, the church, and the formal buildings surrounding the market. The path system in the old market was comprised of four major passages (3 meters wide) and a series of very narrow paths (50 centimeters wide). Stalls were not easily recognisable by shoppers or accessible for the delivery of goods. Walking in the market was difficult due to overcrowding, lack of roads, pavement and drainage, and sewer flows from nearby formal estates. Environmental conditions worsened during the rainy seasons.

In 2008, the Toi market was destroyed by a fire. Its reconstruction was an opportunity to change its internal structure and spatial configuration. A planning team was established in the community for this purpose, focusing on stalls' accessibility and visibility.
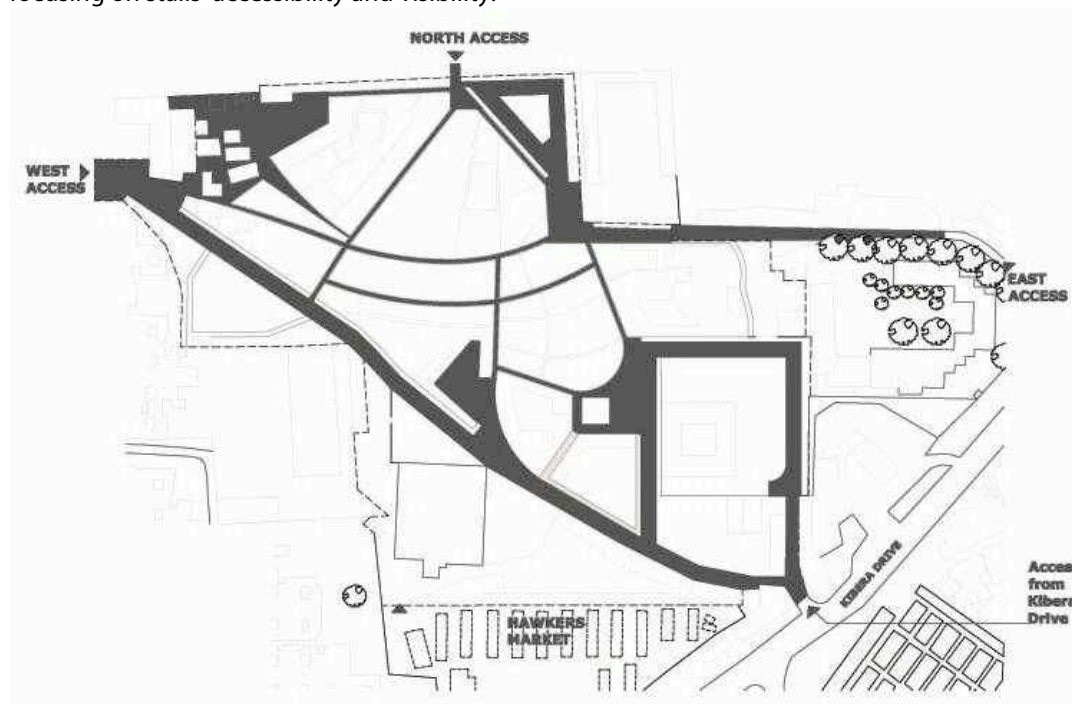
Figure 9: *Old Toi market's path system.*

Figure 10: *Old Toi market.*

The old path system had become overcrowded and inefficient; therefore, despite the huge losses, the community saw the destruction as an opportunity to build a 'modern' market.

The new market looks like a conventional, formal one (Figures 12, 13). It is still organised in sections, but these are accommodated in rows of stalls (Figure 11). The local association Jami Bora provided technical assistance to design the layout and the construction materials that were bought thanks to American funds. Decisions were made through a committee established for the reconstruction, in tandem with Jami Bora and the market committee.

Sections and stalls are now identified with letters and numbers. Activities are registered on the map produced by Jami Bora. Every activity is accessible, customers can recognise traders and goods, and collecting for saving schemes is much easier. On the other hand, the market committee has greater power and control over all activities. The market has maintained six points of access. The northern and eastern points have become linear extensions, adding new activities along the way. The new market has kept the most important inner passageways, while strengthening the north-south and the east-west axes as major ways (approximately 5 and 3 meters wide) of distribution. The northern area, where the Toi market office and the church are located, is used as public space. Indeed, some spaces have changed function: the church in the southern area has been transformed into a mosque, and Muslims maintain rigid control over the structure and the surrounding garden; the old, one-storey, Toi market office was rebuilt, by some members of the Toi market committee with their savings, into a two storey structure that has become a new landmark in the market. Food kiosks once located only along the external roads are now also inside the market. However, merchants still lack land tenure security and basic infrastructure. Public lighting is now provided by the Nairobi City Council (NCC) through five new poles located along the major roads, but most stalls remain without power, while others steal it. Garbage is disposed of in the wholesale area but collection from the NCC is rare, thus a dangerous dump has formed that attracts children and the very poor who scavenge for food.

Figure 11: *The new Toi market layout; identification of the community services.*

Figure 12; 13*: Comparison between the old and the new Toi market.*

ANALYTICAL FRAMEWORK: FINAL TABLE

The three identified approaches are summarized in Table 1. For each approach, different perspectives from the literature are emphasized. The table allows for identifying some of the emerging concepts and gaps concerning the recent literature on informal urbanism, sparking further reflection and research on the production and organisation of space in informal settlements.

Approach	Subcategories	Author	Concepts - Gaps
Functional approach	Informal housing standards	J.Turner (1968)	Investigation about informal housing standards and relationship with formal housing policies. Housing is considered as a process.
	Informal housing performance	W. Rybzinsky et al. (1984)	Physical characteristics of public spaces and plots. Understanding of the cultural aspects of the use of the space. Search for new design methods for user responsive housing for the poor.
	Epistemology and methodologies of urban studies.	A.Roy (2005)	Informality as a mode of production of space defined by the territorial logic of deregulation. Informal spaces produced as states of exception to the order of formal urbanization.
		A.Roy (2011)	Emergent analytical strategies for subaltern urbanism. Four categories of subaltern spaces: peripheries, urban informality; zones of exception and gray spaces.
	Concept of order	M.Arefi (2008)	Identification of five distinct types of order in Pinar (Istanbul) informal settlements: planning; land use; social organization; conflict resolution and local politics.
	Morphologies of Informal settlements	K.Dovey and R.King (2011)	Eight territorial typologies of informal settlements in South-East Asia: Districts, Waterfronts, Escarpment, Easements, Sidewalks, Adherences, Backstages and Enclosures. Lack of studies about informal settlements morphologies.
	Socio-spatial characteristics	I.Karanja (2010)	Methods of enumeration and mapping to understand the socio-spatial structures of slums. This bottom-up process has enormous practical implications and suggests reliable methods to gain and build real knowledge about informal urbanism.
Anthropological approach	Informal urbanism	Y. Elshestawy, (2011)	Informal urbanism is considered the subject of urban studies focusing on 'everyday practices of ordinary citizens, forcing a reconfigured relationship between those in power and the inhabitants of the city.
	Urban space representation	R. Mehrotra (2010)	Kinetic city: the informal city in constant motion. Three dimensional construct perceived through patterns of occupation of spaces rather than through architecture. Static city, the formal one. Lack of ways to represent informality.
	Urban space and ethnography	J.Perlman (2010)	Favelas provide a free space, tolerant of diversity, oppositional behaviours. They represent a way of life, a state of mind. Demystification of the stereotypes about favelas. Critique of the theory of marginalization.
	Black Urbanism	A.M. Simone (2008)	Black urbanism: condition of double affiliation to the formal and the informal. Invisible modalities of socialities that circumvent normative mechanisms of social exchange. Conventional urban development fails. Architects are called to do something more provisional.

Process-oriented approach	Formation processes of Peruvian informal settlements	H. de Soto (1989)	Historical evolution of Informal housing in Peru. Identification of ten successive historical stages showing how the formal structure has gradually yielded the ground necessary for the growth of informal housing.
	Processes of informal city making in Colombia	J. Samper (2010)	Lack of knowledge about informal cities formation processes. Urban design lacks a comprehensive understanding of the phenomenon of informality and effective intervention tools.
	Historical origins of informal settlements in Kenya	T. Anyamba (2011)	Informal urbanization is made by not homogeneous processes. Informality is not illegal. Origins and historical-political causes of informal settlements formation in Kenya
	Historical formation of informal settlements in Latin America	P. Kellet (2010)	Processes of collective appropriation of spaces and formation of informal settlements. New and more dynamic methods of analysis and intervention need to be developed in order to deal with the conditions of informality existing in Latin American cities.
	Patterns of growth	Abbott and Douglas (2010)	Longitudinal study in Cape Town. Informal settlements will grow faster than new housing can be provided. Discernible trends in the growth pattern of informal settlements enable the settlements' integration in the planning process.

Table 1: Analytical framework about informal urbanism according to the three approaches.

DISCUSSION AND CONCLUSIONS

The Toi market case-study provides important insights about the production and organisation of space in informal settlements. It allows for validating the three categories of analysis: the functional, anthropological and process-oriented approaches.

Generally, the case-study shows that the poor pay significant attention to spatial organisation. It is a long and complex process affected by socio-economic constraints, lack of resources, political and cultural issues. On the other hand, organisation of space largely affects social relationships and conflict resolution, occupation, business and income, environmental and health conditions, ambitions of growth and vision of the future. The case-study also confirms that issues of functionality, human and power relations, and development processes influence the way stakeholders perceive informality and its relationship with urban space creation.

The functional approach recognises informality as a contextually-based urban form, emerging through different morphologies. According to Dovey (2011), Toi market may be considered a district: 'large mixed use districts incorporating major retail and industrial functions'. However, his classification concerns large settlements and does not mention marketplaces. Morphologies are critical to read the relationship between informal settlements and cities; yet they are in their early stages and further research in this area is needed. Seemingly, logics and patterns of informal settlements also exist, as the case-study widely describes, but they remain, for the most part, unidentified. Finally, the functional approach seems to neglect significant aspects of decision making concerning space organisation. Generally, there is a lack of bottom-up approaches capable of linking informal decision-making mechanisms to the informal planning and design of space. Recent approaches to the economy of poverty and development (Duflo 2011, Yunus 2006) advocate an empirically based analysis of poverty that explains how the poor cope and adapt to challenges and how they envision the future and make decisions. They can be considered a source of knowledge, as well as experts in overcoming challenges and crises. A top-down approach to planning and design for slums must be combined with a bottom-up understanding of locally adopted solutions for spatial organisation.

The case study confirms that anthropological approaches serve to highlight gaps in the debate about informality and in the ways of representing it. Though informality is seen as provisional and a temporary state of peoples and cities in their path towards development, it can become a permanent status. The Toi market vendors have been striving for thirty years to survive in subsistence conditions. Informality cannot, in any case, be idealized as a poetic alternative to the formal city. Slum dwellers, in our case marketers, aim at being recognised and integrated, and at having modern and efficient facilities. However, Simone's concept of '*doubleness*' is critical to reading the dynamics of space production in informal settlements. As in Toi market, slum dwellers mainly invest in short-term solutions (for instance, temporary structures), but they have hopes and aspirations for future permanent ones, which often reflect a 'modern' view of infrastructure, services, legalisation and secure tenure. This contradicts the vision of impermanence and temporality that often pervades the narratives about slums. Space organisation is intertwined with the concept of inclusion at political, economic, and social levels. It allows community members to create connections with the formal realm in multiple sectors. Confirming Simone's notion of condition of 'doubleness' lived by black residents, the case-study tell us that space organisation plays an important role in such condition. And the relationship with modernity is a critical factor to be explored in the production of new urban spaces such as informal settlements.

The process-oriented approach provides an insightful reading of the historical causes of informal settlements formation, with emphasis on the influence of legal and economic frameworks. The role of official planning in the informal city 'making' and 'solving' is questioned, as well as the relationships between informality and globalisation. This approach explains that informal urbanism is formed through temporal waves of adaptation to processes of modernisation, and that responses and relationships with governments vary enormously. Toi market formed nearby Kibera, a slum that emerged in the first wave of 'informalisation', and mostly serves its own population. Its spatial evolution reflects the significant political and socio-economic events that occurred over the years. As in other informal settlements, the market physical features are extremely vulnerable to political events and changes: elections, conflicts, political occurrences, and transformation in the leadership. The analysis of its historical evolution shows patterns and logics of physical development and growth. More importantly, it shows that planning logics and principles can survive in moments of crisis and be applied to better environmental and economic conditions, as in the case of the market reconstruction.

Generally, determining trends in informal settlements growth is a prerequisite for enabling settlements to be better integrated in the development planning process. According to this perspective, the discipline of urban design lacks an adequate comprehension of the urban informality phenomenon and its evolution processes. New and more dynamic methods of analysis and intervention are required in order to deal with the conditions of informality.

Finally, the existing literature on space production conceptualises informal urbanism in a way that rarely challenges the informal/formal dichotomy, through contextually based analyses. This dichotomy can and should be eliminated/ overturned / invalidated. Rather, what should be explored more deeply are the complex combinations of 'informal' and 'formal' as a new reality and the most pervasive way of producing urban spaces and cities in the coming future.   Space organisation and 'informal design' must be seen as a process, the same way Turner considered Housing as 'a verb' rather than a product. And the outcome, the more or less established form, the design, must be seen as the *temporary result* of this process, through which we can gather important insight about the poor's immediate needs, long term objectives and aspirations.

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THE FORECAST OF THE DEVELOPMENT TREND ABOUT EFFECTIVE ARCHITECTURE

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Abstract

Along with economic development and population growth in the world, great changes have taken place in our living space. A lot of buildings have been built, and now energy saving ideas has been transformed into architectural drawings. But a lot of architecture has exposed the problem, mainly reflected in three aspects of waste: technical measure, architectural material, and architectural space. With the globalized steps of world cities, waste is not only architectural funds; more important are the world's available resources. I hope to draw the correct conclusions through this research, and this article can present effective architectural development to provide effective instruction direction.

Keywords: Technology, form, validity, user.

INTRODUCTION

The development of world architecture has been beyond the imagination of the modernism masters, and I want to put forward the topic today: let buildings become effective. What is effective architecture? Energy-saving architecture is effective? Green building is effective building? Organic architecture is effective in building? The answer is very difficult from this level.

From a different angle, what does the effectiveness of the proposed architecture embody? The effectiveness of the building mainly reflects these three aspects: the space of building, building materials, architectural technical measures. Building the eyes of scholars, the effectiveness of the space is in the first place. That's what I was looking at before. But the area of new buildings grows to double in every year.

Waste more and more in architectural space, architectural material, and technical measures for architecture of the three aspects. The wastes are not only architectural funds, more important are the world's available resources, and if we had not realized that in the future we will waste more than these prices.

THE CAUSES OF ARCHITECTURAL WASTE PHENOMENON

Along with economic development and population growth in the world, great changes have taken place in our living space. A lot of buildings have been built, and now energy saving ideas have been transformed into architectural drawings. But at present, a lot of architecture has exposed the problem, mainly reflected in three aspects: Technical measures, building materials, the space of building.

The waste of technical measure

Technical measure has become the decoration on the blueprint; in fact, it has not played the role. The New York Times noted that, commonly used in expansion design of glass curtain wall components, exterior walls away from most of the available space, forcing more reliance on artificial lighting and ventilation systems (3 July 2014). Statistics have indicated in China, in the newly built, nearly 2,000,000,000 □ construction, high energy consumption architecture has surpassed 95% every year. But in 21,500,000,000 □ public buildings which we already have in our country, the energy conservation success rate still was insufficient 10%.

Energy efficiency is on the software of calculus

Many of the energy-saving building software are dazzling. Basic data is inaccurate, or is not there. Many of the projects and not the budget, or excessive dependence on computers, and on-the-spot survey also shows data for the budget.

Energy saving is an expression in drawings

Prior to its cancellation, Anara Tower was planned as one of the tallest buildings in Dubai, one of the icons and sustainability-in spite of its west-facing glass, and high amount of energymaterials, and worth noting is

huge non-functional (decorative) wind turbines. Real obvious expense of building sustainability sustainable development provided an "image" of consumer goods packaging.

Figure 1: Anara Tower (Picture by Atkins Design Studio).

In the analysis of energy saving measures for map, we often see a lot of arrows floated. Dr. Xiao Song's survey found that of the approximately 43 billion square meters of existing buildings, only 4% of the buildings use advanced energy efficiency improvement measures.

Energy saving measures energy support is needed to operate
Or so-called energy saving measures is not really in the sense of energy conservation. For example, the addition of active energy more effective systems tends to reduce the amount of energy use, and therefore reduces the overall cost. But, in turn, lower costs often make households less careful in their energy use - "Jay Vince paradox" the phenomenon is known to improve efficiency, reduce costs, and improve and enhance the rate of consumption demand, and destroy the original savings. The lesson is, we can't have energy consumption in the process isolation. In the Financial District of central London, St Mary Axe Street, a building like a cucumber Touch the Sky, this is known as the "cucumber" Swiss Reinsurance Company headquarters building (Foster & Partners office 2003), in which buildings and open floor of ventilation system, security awareness of tenants create glass separations. The Windows, the specifications have been reduced due to natural ventilation features in fact from the start building, which had to be permanently closed. More complex natural ventilation systems of the grand objective contradictions lead to poor ventilation.

Figure 2*: The Swiss Re building by the Forster firm, also known as "the gherkin" (Picture Wikimedia Commons Aurelien Gishall's politeness).*

The waste of construction materials

There is no need for specific architectural material waste, because the aim of the analysis is to find the cause of waste building materials. This section has mainly three reasons to expand: non-qualified materials processing methods, strategies for using building materials are reversed, which are closely related construction and building structure.

Non-qualified materials processing methods

Global air pollution, green reduced soil erosion have accelerated in today's world In addition to natural disasters, destruction of architectural activity is greatest. Especially in the production of construction materials, we have gone astray. Solid brick production requires a lot of fuel and dirt; this is what we all know. In order to protect the environment, to switch to liquefied petroleum gas concrete and fly ash hollow brick.

However,these practices had not improved the natural environment, but more serious pollution problems. Not pausing to produce building materials all over the world, because everywhere is a construction site.

In order to protect wood from insects, plants using formaldehyde, which is a fact obvious to, formaldehyde, is harmful chemicals. There are many things we don't see practice: stone of radioactive elements, life of the PVC pipes, seawater on the corrosion of concrete and steel, and so on. Those not qualified in the factory or in the production of building materials in construction site examples, from the outset, kills the life of the building.

Strategies for using building materials are reversed

Have the order reversed timber strategy. Outdoor engineering, landscape engineering, municipal engineering, are a large number of materials used in wood, bamboo and otherorganic architecture. And curb was made of solid stone. Floor type multi-purpose precast paving materials.

Figure 3: landscape engineering.

A durable material service life is reduced, while the lighter and more fragile material service life is prolonged. Is this a joke? If only in order to reduce the architectural cost, the main structure of part of the building is no longer used stone also can barely be understood, those who use precast concrete decorative parts, why the luxury into stone? From the cost is not hard to see why, stone is twice that of precast concrete products. The same function can obtain different profits. The material is more expensive, labor cost is also higher. The building is a commodity; this positioning allows the production of building materials to be wrong. Architecture is the commodity demand for architectural materials, more expensive, will stimulate more output of the factory, so they get more profit. In the global economic level are reflected in the figures, but also has the use method many people focus on building materials?

Which are closely related construction and building structure?
Think of all those years architectural materials where concrete was used, which is a one-time construction materials. Snack -style building, since the birth of modern architecture, go hand in hand with the architect .What is the purpose of the disposable tableware? This container is convenient, cheap, filled with food to feed our stomach. Cannot use second time, this is the characteristics. And they are very thin. For instance, the civil construction use jurisdiction may amount to 70 years. In the process of civil building, wall, beam, column, wall was reinforced concrete into a whole, like a snack box as complete. Blank room decoration has damage to the hidden engineering and equipment pipeline, and this damage is hard to repair.

But in the decoration engineering and redecoration process, the workers labor will tear such as fast food box like structure, and the spatial updating dream never ceased, comfortable, convenient, and even reached grade environment, is the transformation of the non-stop. Transformation mentioned here does not include the history of heritage buildings.

Compared with the method of cast-in-place architecture, assembly type RC structure is beneficial to green architecture, because the assembly type construction can meet the green construction land, energy saving, material saving, water saving and environmental protection requirements, reduce the negative impact on the environment, follow the principle of sustainable development. Moreover, the assembly structure can be continuously in order to complete the works of many or all processes, thereby reducing the approach of engineering machinery types and quantities, eliminate process connection worker's time, realize stereo cross operation, reduce the architectural personnel, which can improve efficiency, reduce material consumption, reduce environmental pollution, to provide protection for green construction. In addition, the assembly type structure building rubbish is reduced to a large extent (about 30% - 40% of the total city garbage), such as scrap steel, scrap iron, scrap wood and bamboo, waste concrete etc.

But now it needs a new architecture of cast-in-situ architecture far more than the assembly type structure needs. Although as everyone knows, the assembly type structure or structure is easier to maintain, and even buildings built after the demolition, the operation will be very simple. Removed components can also be used in other parts. But why, now the site using cast-in-place architecture has become the mainstream? The

production component production to meet new projects needs? But judging from the cost of production, the assembly type structure is more expensive. Each component must have the exwork certificate. The prefabricated component output is unable to meet the new architectural project needs quantity.

The waste of architectural space
Waste of building space referred to in this section are from the following three aspects: Useful space is rarely used, useless space exists only for modeling, architecture is real, is storage space.

Useful space is rarely used
A lot of building activity around the area of growing each year, for more and more building space to survive. But the problems caused by architectural space are becoming increasingly visible. With the improvement of people's living standards, a lot of people have their own house or villa. But with heavy work or work place too far and other reasons, usually they are not living at home and travel during the holidays. During the Chinese New Year, more and more people prefer to live in a hotel, book in a restaurant on New Year's Eve. Demand for building space now, actually, standards have changed considerably in the past. Demand for public space is greater than the demand for private space, this is the actual trend. Although many people have a lot of pride in architectural space, but if the space is not being used or seldom used, waste substantially. The excessive diverse architectural form, and causes the building costs to dramatically rise.

Useless space exists only for modeling
More and more non-linear architectural forms have emerged in all corners of the world, as a landmark of the city stand out. Unused space is not uncommon, devoted to the art of building space, maybe when designers start thinking about space, there can be no thought of a use for it.

While the useless space for rules, but people cannot forgive. Original purpose is to gain more space. For example, some office buildings, nuclear, placed in the middle of traffic, all at common areas of the smallest and most extreme. Such traffic in nuclear architecture in high-rise buildings application was more extensive, and also won the super high-rise building's favor. Entire floors are designed to be very depressing, so that space could have been used to relax becomes so that you just want to flee.

Architecture is real, is storage space
Historically, building is a treasure, is the immovable property. Because of this, a lot of people spend a lifetime to have their own home. Also because more emphasis is on the value of money, makes people feel inferior. As all the people engaged in design work, must feel its currency's value is not so important. It is important to the space, the building, carry how many designers work and dream. This can't be measured by money. However, this kind of work eventually exchanges is the currency, this is our very helpless things. We continue to finish building the dream.

Immovable property of architecture is destined to its shortcomings, but not death. As early relocation of building technologies, there is a variety of RV. Relocation technology needed is laborious and time consuming, and RV needs correspond to the trailer base and a full fuel tank.

Storage function of architecture is why people miss home. Storage of things is not just objects, as well as memory and emotion. Now the high-rise buildings, high-rise buildings weakened the storage. In living space, for example, the same or similar plane constraint storage functions of the architecture. Unified property management mode to weaken the personality of residents, nurtured a lazy, greedy way of life. Most city people don't work in the plow a tiller of the ground, physical labor gradually transformed into the form of mental work mode.

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In the future, if the architectural methods, materials, space utilization, etc., or cannot be effectively improved, so more and more buildings will become the world's largest waste.

Figure 4: *In the beginning of construction of a building site in Shenzhen.*

With the globalized step of world city, we discuss the question that how to design the effective building has become extremely urgent. This text will launch predicting five respects from the technology, the form, the area, the fabrication cost, the user. I hope to drawthe correct conclusion through this research, this article can present the green architectural development to provide the effective instruction direction.

Embark from user's angle
Architectural waste, I analyzed from three aspects: technologies, materials and space. We cannot avoid many problems that currently exist, but we can learn experience and lessons. We can't correct the errors of the past, but from now on, we can hold the valid construction development. From a consumer perspective, we are as a guide for the effective use of architecture workers.

Recommended the drafting of an effective construction specification
It's my great honor to speak my suggestion at the World Congress of architecture, discussing and drafting effective building instructions for user. The outline of mere personal power is not perfect. I have tried to write this program, the current results, only completed a form (See table). I am very ashamed. I hope to get your help, with the hope that the experts and scholars cooperation put together the complete specification. I desire to the world each building can have a book of effective construction specification. Building is easy, designing is difficult, and more difficult is how to use it effectively.

Table: an outline on the effective architecture of the statement

Way Process	Effective architectura	Effective architectura	Effective technical	energy saving measures
Effective architectural design	Rational design of public space Rational design of private space Effectively adjust the architectural	Prefabricated component Composite wood Recycled materials Avoid disposable materials Avoid concrete	Assembled expression constructs Removable construction technology Transfer, remova	The reduction consumes energy the space Reduces the quadrangle Using
Effective architectural management	Scheduled maintenance system Oversight responsibility that corresponds to the person Corresponding rewards and funding	Scheduled maintenance system Oversight responsibility that corresponds to the person Corresponding rewards and funding	Regular maintenance system Responsible for supervision of the corresponding The corresponding incentive funds To reduce or	Regular maintenance system Responsible for supervision of the corresponding The corresponding incentive funds To reduce or
effective guidance for using	How to effectively guide the designers and users use the	How to effectively guide the designer to use building materials	How to effectively guide the designer to use technical measure	To guide the designer and the user how to effectively use

The effective architecture is not merely construction itself, moreover it is a sustainable social system

Effective architecture is a collection of social behavior, not only refers to the building itself.

In considering the architectural effectiveness point of view, building more suitable for the sustainable way, control of building energy and assembly technology more. Processing and building materials, the establishment of an effective architecture supervision and management organizations, to promote the development of effective architecture of public ownership, this is the inevitability of its beginning, but also guide the benign development of
the channel architecture.

The new building is to promote the necessary public policy assembly building. Prefabricated architecture of privately owned the maintenance of the social supervision; and have great difficulty for the recovery and

assembling, it will re utilization, it should take into account the economic capacity of individual.

For an established fact of the old building and architecture, we are unable to discuss how their building materials. But we can use the new architecture technology to transform them, so that they become more useful space. The effective architectural manual will be necessary to use for them. In addition to effective maintenance and use them, I can't find a better way.

I have a bold imagination come to mind: architecture can successfully resist natural disasters In the future, can safely migrate, more can let the average person in the outer space of life!

The value of the building is of secondary importance, how to let building be effective is an imminent event!

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URBAN POVERTY AND HOUSING INADEQUACIES IN NIGERIA: NEED FOR INTERVENTION IN THE CORE AREAS OF CITIES

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Abstract

Against the background of increasing poverty and housing inadequacies in Nigeria, this paper appraises the housing situation in the core areas of cities with a view to upgrade the standard of living in order to meet the present day requirements and estimated future needs of the residents. It uses Ibadan, a city in the southwestern part of the country as a case study and a simple random sampling technique was used in selecting 252 houses in the area while questionnaire and direct field observation form the instrument for data collection. The paper found out that accommodation density in the area is as high as 31 – 40 persons per house while the household size is above 20 which are good indicators of poverty. Also, 11.79% of the buildings in the area are in good condition while 27.64% buildings are fair and poor and fallen buildings constitute 36.56% and 23.98% respectively. Recommendations were therefore proffered based on the findings above, in order to achieve housing sustainability in the area.

Keywords: Poverty, housing inadequacies, housing situation, core areas, upgrade.

INTRODUCTION

There is no commonly acceptable definition for poverty. The definition is difficult, cloudy and cannot be pinned down (Fadamiro et al., 2005). In recent times however, it has become conventional to examine poverty in broad terms. For instance, Tobi and Prado (1992) observe that poverty is a multi – dimensional phenomenon with few commonly agreed definitions across the characteristics of the urban poor. These include excessive labour flow, undifferentiated/unskilled persons who cannot readily be integrated into the production system; a subculture of personalized ethical codes in contrast to the norm of kindred or community behavior, scarcity of essential commodities (food, housing and clothing), growth of slums, unemployment, under-employment and crimes or deviant behaviors. It also diagnosed poverty as having limited and insufficient food and clothing; people living in crowded, cold and dirty shelters, and people living painful and comparatively brief lives.

Similarly, Olowu and Akinola (1992) point out that poverty is characterised by the lack of, or inadequate access to infrastructures among others, while the urban poor can easily be identified from the type of food they eat and the environment in which they live. In the same vein, Onibokun (1995) perceived urban poverty as living in sub–standard and sub–human environments plagued by slums, squalor and grossly inadequate social amenities like health facilities, schools and recreational opportunities. The most common attributes of poverty include, but are not limited to the following: low income resulting from unemployment and under–employment, poor state of health and living conditions, low levels of literacy, political apathy, sub–standard dwellings, absence of, or inadequate buildings and social infrastructural facilities, high levels of crime and juvenile delinquency and subsistence living.

Poverty leads to urban decay which is a global phenomenon and is experienced in cities of developed and developing countries. It is found in different degrees in the central and inner parts as well as the suburbs of the world. The history of urban decay dates back to the early period of human existence in many cities. However, the problem featured prominently in the 1970s and 1980s in developed countries as a result of change in global economies and development of transportation which promoted suburban living. Today, urban decay is a major problem that threatens the sustainability of urban basic services and hampers the efficient functioning of 21st century cities.

The urban landscape in most developed countries is characterized by precarious housing conditions, poverty, overcrowding, crime, deplorable sanitation, inadequate water supply and substandard health

facilities (Lloyd, 1979). In Nigeria, urban decay is a major feature of the cities' centres and squatter settlements in the suburbs. Abumere (1987) observed that 51.8 per cent of slums are found within a 0.5 kilometre radius of city centres, while as high as 68 per cent are found within a 1 kilometre radius of city centres in Nigeria.

Thus, the built environment in many developing countries, particularly Nigeria is fast decaying. The factors responsible for this can be attributed to rapid urbanisation, rural-urban migration and decades of steady economic downturn, decay of urban infrastructure and negligent urban housekeeping (World Bank, 1996). There is no doubt that Nigerian cities are facing a crisis of urban decay. Documented facts are visible evidence and abound in all settlements. In the analysis of urban decay in forty settlements in Nigeria, Abumere (1987) found that urban decay is a feature of both small and big cities and is irrespective of size. The seriousness of the problem is vividly expressed in the writing of Paulson (2001) who observed that, flying into Lagos, Nigeria – the biggest city in Africa's most populous country: "The first indications that, all is not well are visible signs of chaos and urban decay that fly at visitor like paper swaps in a windstorm".

However, the core areas of cities are the worst. These areas no longer encourage people to live in them, because of the deteriorating condition of buildings, environmental pollution, unsanitary environment, lack and poor supply of facilities and amenities, and poor disposition of buildings with poor ventilation and day lighting. In Yoruba, the core of cities are in most cases dominated by old buildings, some of which are either dilapidated, unmaintained or abandoned.

These areas are mostly inhabited by low income earners and the unemployed who are otherwise known as the urban poor who cannot afford to pay rent for better housing when they are available. The core of cities also suffer from high rates of out-migration of the productive youth.

The deteriorating condition of these areas is however, not the fault of the inhabitant alone, simply because of poverty, ignorance and lack of willingness to maintain or invest in them; but partly due to government neglect, of the provision of infrastructure, the formulation of appropriate development control measures for buildings, as well as failure to formulate a National Urbanisation Policy within the framework of the National Development Plan to alleviate poverty and social isolation of the majority groups in the core and old areas of cities. Consequently, there is an urgent need to relieve the old, core areas of cities of these problems, particularly if housing problems are to be ameliorated in the urban areas as well as blending them with other parts of the city. For instance, it is important to retain and protect the architectural values, cultural heritage of the people and their original values as the centre of life, including trading activities in the cities. The aim of this paper therefore, is to appraise the present situation of the core areas of cities in Nigeria using the Itamaya area of Ibadan as a case study, with a view to upgrade the standard of living of the area to meet the present day requirements and estimated future needs of the residents.

THE STUDY AREA

Itamaya area is located at the core of Ibadan, the largest city in south-western Nigeria. It is bounded in the north by Agbeni, in the south by Oke Foko, in the west by Oke Bola and in the east by Mapo. The area is chosen because it is characterised by the problems described above. Coupled with this is the fact that residents do not want to leave their roots and if these conditions are allowed to continue unchecked, the core of the city may, one day, show a total functional and physical collapse. Hence, there is a need for upgrading. The objectives of the study are to:
- Assess the socio-economic characteristics of the people
- Assess the conditions of buildings in the area
- Determine the potentialities of the infrastructural facilities in the area for meeting   future   roles and responsibilities.

RESEARCH METHOD

Questionnaire and direct field observation form the basis of the research. The questionnaire was divided into two parts: socio-economic characteristics and an environmental survey.

- **Socio-economic characteristics**: Questions were asked on the socio-economic characteristics of the residents of the area. Such information includes age of respondents, marital status, income level, demographic characteristics and size of household.
- **Environmental survey**: This covered the physical characteristics of buildings in the area. Information was collected on facilities provided within, the percentage of derelict and near derelict buildings taking into account such indicators as condition of the walls, floor, roof, age of buildings and general outlook of the building as well as the extent of deterioration. Assessment of all these variables was made by visual observation.

Thus, a simple random sampling technique was used in selecting 252 houses in the area and the household head was investigated using the questionnaire. In a situation where there was more than one household head in a building, a household head was randomly selected. However, 246 household heads responded effectively giving 97.61%, sufficient for a valid assessment of the situation under study. The statistical analyses used include descriptive statistics such as percentage and frequency counts.

FINDINGS AND DISCUSSIONS

Socio-economic characteristics of the area
- Age of the Respondents

15 (6.1%) of the respondents are between 18 – 29 years, 41 (16.7%) fall between 30 and 40 years of age, while 79 (32.1%) are between 41 and 50 years of age. 51 to 60 years is 101 (41.1%), while 10 (4.1%) respondents are between 61 years and above as shown in Fig 1. The implication of this is that the modal age is 51 to 60 years; therefore, the majority of respondents are adults, mature and are mentally aware of the basic necessities of life and the effects such could have on their standard of living. However, they are unable to attain this, because farming, petty trading and artisanship are the major occupations; thus, a lot of them depend on the little amount of money that comes their way, while some are unemployed and rely on other people like their children to give them money occasionally and hence cannot afford decent living.
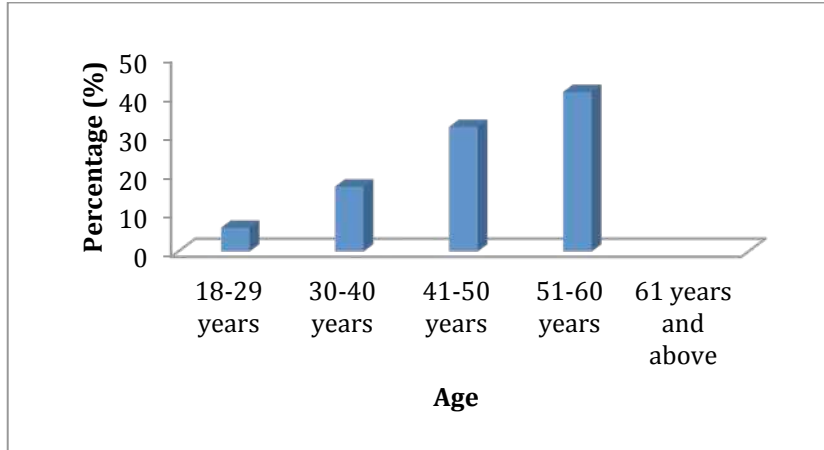
Figure 1: Age of respondents in Itamaya area of Ibadan

Marital status of the Respondents

The results of analysis show that the bulk of the respondents are married (168 or 68.3%), followed by widows/ widowers 19 (7.7%); single or not married constitute 13 (5.3%) and divorced are 29 (11.8%), with the separated respondents being 17 (6.9%) as shown in Figure 2. This result confirms one major characteristic of cities, in which most residents have been shown to be mainly married (Barbara and Christine, 1969). It also confirms the submission of Statistics South Africa (2011), that the bulk of a set of population is married.
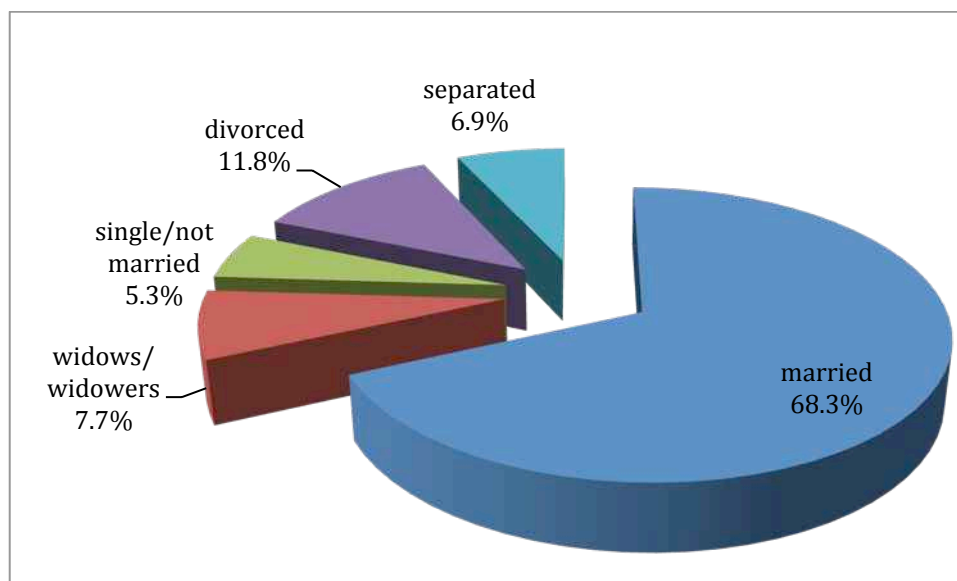
Figure 2: *Marital status of the respondents of Itamaya area of Ibadan*

Income level of the respondents

183 (74.4%) of the respondents get below N20,000 (US$167) annually, while 63 (25.6%) get N21,000 to N40,000. The implication is that the majority of residents of the area are poor and low income workers by Nigerian standards and this is due to the fact that they had no formal education. This therefore supports the submission of the National Population Policy (2001) that 70% of Nigerians are living below the poverty line with an income of less than one dollar per day. It is also confirmation of the United Nations Development Programme (UNDP) in the Human Development Index (2000), in which Nigeria was ranked as one of the twenty five poorest countries in the world, representing 151 out of 174 countries.

Demographic characteristics

31-40 persons per house has the highest frequency which is 120 (48.8%) as shown in Table 1. This was followed by 21-30 persons, while 1-10 persons per house has no frequency. The implication of this finding is that houses are highly congested and overcrowded, which is a visible feature of housing in Nigeria. This is symptomatic of housing poverty that often leads to irritation, unproductiveness and fatigue. Studies have shown that overcrowding could be a determining factor for deleterious social behaviours such as prostitution, juvenile delinquency and certainly is a hazard to health (Bernstein, 1968 and Stockols et al., 1973). Thus, the fact that the houses are congested points to the rapid deterioration of the housing units.

Persons per house	Frequency	Percentage
1 – 10	0	0
11 – 20	30	12.2
21 – 30	95	38.6
31 – 40	120	48.8
> 40	1	0.4
Total	**246**	**100.0%**

Table 1: *Accommodation density in Itamaya area of Ibadan*

Household size

The household size of respondents is shown in Table 2. The highest household size is 6–10 persons with 20-25 persons as the lowest. Thus, the respondents generally have a large family size which may compound their ability to afford decent accommodation and not wanting to leave their roots.

Household size	Frequency	Percentage
1 – 5	92	37.4
6 – 10	105	42.7
11 – 15	32	13.0
16 – 20	15	6.1
21 -25	2	0.8
Total	**246**	**100.0**

Table 2: *House size of the residents of Itamaya area of Ibadan*

Conditions of buildings in the area

The quality of each house in the area was assessed based on the assessment of variables such as availability of water, toilet, accessibility to house etc. Each variable was scored and later summed up. Then, a different range was arrived at, for the classification of the houses into fallen, poor, fair and good. Table 3 shows the criteria for classification of buildings in the area, while Table 4 shows the range of classification of housing conditions, with Table 5 showing the housing conditions.

S/No	Item	Building		Conditions	
i	Structural condition	Good	Fair	Poor	Fallen
ii	Accessibility to building	Tarred road	Un tarred	Footpath	Undefined air space
iii	Wall condition	Uncracked	Cracked	Dilapidated	Part fallen
iv	Roof condition	No defect	Rusty	Leaking	Part missing
v	Ceiling condition	No defect	Rusty or leaking	Sagging	Falling off
vi	Kitchen facility	Kitchen within building	Kitchen detached	Temporary structure	Passage and in the open
vii	Toilet facility	Water closet	Pit latrine shared	Pit latrine shared	Public or not available
viii	Parking facility	Built-in garage	On – street parking	Not available	Not available
ix	Drainage facility	Open	Not available	Not available	Not available

Table 3: *Criteria for classification of buildings in Itamaya area of Ibadan*

Range	Classification
Above 45	Good
35 – 45	Fair
25 – 35	Poor
< 25	Fallen

Table 4: *Range of classification of housing conditions in Itamaya area of Ibadan*

Classification	Number of buildings	Percentage
Good	29	11 .89
Fair	68	27 .6
Poor	90	36 .6
Fallen	59	24 .0
Total	**246**	**100.0**

Table 5: *Housing conditions in Itamaya area of Ibadan*

As shown in Table 5, 36.6% of the buildings are in poor condition. The quality of the houses is generally very poor, often manifested as a general dearth of internal facilities and conveniences. Urban services such as water supply and electricity are inadequate. Thus, the inadequacy of the houses stems from the poor physical state of the buildings. The buildings are often unsafe and insecure (from fire and collapse) and do not provide adequate shelter from the elements. The environment in which the buildings are located is squalid in most cases. This generally leads to slum conditions through combined effects of natural ageing of the buildings and increasing deterioration of the natural landscape (Olotuah, 2005).

However, 27.6% buildings are in fair condition which is low when compared with others. The majority of the fair buildings are structurally sound as revealed by the wall perimeters, ceilings and roof. These buildings only lack facilities attached to houses such as toilet, kitchen and bathrooms and in a situation where these are provided, they are substandard. This lowered their scores and made them fall within the range of fair buildings. These buildings need either minor or major repairs to upgrade their standard and this will involve mostly the provision of adequate facilities, while the fallen ones are beyond repair and require demolition to pave way for new buildings.

POTENTIALITIES OF INFRASTRUCTURAL FACILITIES IN THE AREA FOR MEETING FUTURE ROLES AND RESPONSIBILITIES

There are utilities and services very close to the area, which can serve as a base to build upon. For instance, there is a public tap which could be extended to individual houses or there should be construction of boreholes and a deep well in order to serve the houses without water.

There should also be provision of electricity and street lights as well as the provision of public toilet and bathrooms at strategic locations by government in order to improve the standard of living of the residents. This will go a long way in alleviating the suffering of the people and stop them from bathing in open spaces or defecating, which poses a danger to their health. For the dumping of refuse, each house should have a dustbin and a space should be provided as a collection point by the Town Council. Moreover, there are some aspects of the area that could be considered as opportunities. One of these is the topography e.g., the western part has a gentle slope towards the north and thus should be incorporated to promote natural drainage.

RECOMMENDATIONS

Generally, the problems in the core areas of cities in Nigeria call for the need to formulate a National Urbanisation Policy. This should be provided within the framework of the National Development Plan to attack poverty and social isolation of people in the core and old areas of cities. This is because the majority of residents of the area are old people who are in the low income group, while young residents are unemployed and hence cannot afford decent living.

In order to upgrade the status of fair and poor buildings in the area, there should be provision of facilities like toilets, kitchens, bathrooms and wells at a convenient location by the landlords or owners, while renovation work should be carried out on rooves and the changing of small windows and doors. In order to do this, government should help with housing finance, by giving financial assistance to the people through loans from financial institutions for house repairs and renovations as well as encourage private agencies and non-governmental organization in the renovation or conversion/ alteration of existing buildings.

However, in the area, there is a concentration of dilapidated buildings at the centre. It is recommended that this be taken over by new roads, new buildings or open spaces and in order to ensure road safety and convenience in the area, general road rehabilitation is recommended. Any new development should conform to the existing satisfactory provisions for achieving effective development control and regulation of buildings. Also, there should be a good network of roads or footpaths to link the buildings in the interior of the area.

CONCLUSION

Most people in the core areas of cities in Nigeria live in substandard houses and subhuman environments plagued by slums, squalor and a dearth of facilities necessary in houses like potable water, toilets and bathrooms. This is because the majority have no formal education and fall into the low income group; thus, this is an obstacle to sustainable development and leads to poor environmental quality. There is a need to upgrade the area to meet present day requirements. This should be done through the collective efforts of the individual house owners, public agencies, private agencies and non-governmental organizations.

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FESITVAL CITY AS A TOOL FOR URBAN CITIES DEVELOPMENT – EL MULID CASE STUDY IN EGYPT

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Abstract

Mulid as an event means exaltation and praise of one of the household of the prophet (peace be upon him), or one of the crown or sheikh. The real old event was about praising his or her life and how they spend their lives for the sake of delivering the message of Islam, by time, this event turned to be more folkloric and cultural than showing its religious value.

 There are different means of celebration whether by music, food manufacturing and even by performing specific shows, some of which are Sufi praising GOD and Prophet Muhammed (peace be upon him). The ultimate uniqueness of this event could be its touristic economic historical value, in which the urban space changes to be a dynamic urban space all day long during the period of the Mulid. This paper will focus mainly on the household of the Prophet Muhammed (peace be upon him) mosques and mausoleums in old Islamic cairo, which could be presented as a green path way telling a story of one of those ionic Islamic pioneers. The richness of actions and values of these places is not about the story of the behavior only, its also about its historic value that confirms and represents the present time and future urban planning aspects for such types of places.
Mulid event gather people from different sectors and countries, the beauty of this event lies in making all people united in one single street or zone for a complete week or even more, during this period, they live together, eat together and share all street functions together. Also, it creates seasonal functions. The urban fabric during this time becomes more complicated, this part of the city becomes the focus of festivals during the date of celebration. Mulid could be the top folkloric event taking place, if some of its functions become more organized, we could consequently add some other functions to adapt with the new challenges, meanings and values.

Keywords: celebratory urban events, cultural festival, green path way, future urban planning, city festival.

INTRODUCTION

Festivals are an important sub field of study, and of particular interest to scholars in many disciplines because of the universality of festivity and social festival experiences. Within event studies, festival studies is also emerging as a distinct sub field, in large part because festivals occupy a special place in almost all cultures and have therefore been well researched and theorized by scholars in the disciplines of anthropology and sociology.

There is also a special appeal in festival studies associated with scope for inspiring creativity, attracting large crowds, and generating emotional responses. In this way festivals are part of the entertainment business and often featured in place marketing and tourism and have become permanent elements in both popular and high culture.

Festivals have been defined by Falassi (1987), in the classical cultural anthropological perspective as "a sacred time of celebration." Festivals celebrate community values, ideologies, identity and continuity.

The reflection of the modern approach to naming events as festivals, Getz (2005), defined them as "themed, public celebrations". Pieper (1965) believed only religious rituals and celebrations could be called festivals. Numerous forms and themes of festival are possible.

Festivals have occupied an important place in the event literature, but have not previously been assessed separately. Prior to 1993, when the research journal *Festival Management and Event Tourism* was established, there were only sporadic research based papers dealing with event tourism and festival. As confirmed by Formica (1998) there were few articles related to event management published in the 1970s. Formica quantified the topics explored by festival and special event research articles from 1970 through 1996, descending order of frequency economic and financial impacts, marketing, profiles of festival events, sponsorship, management, trends and forecasts.

The first set of journal papers to deal with festival and event management and tourism was published in a special issue of the Canadian Journal of Applied Recreation Researchin 1991. Cousineau (1991) wrote the

editorial entitled "Festivals and events: A fertile ground for leisure research", and the papers covered a geography of festivals in Ontario (Butler and Smale, 1991), a history of festivals in Quebec (Leduc 1991), a critical analysis of ethnic and multicultural festivals (Dawson 1989), a methodological review of event assessment (Getz 1991). Robinson and Noel (1991) discussed research needs for festivals, taking a management perspective.

More recent reviews of event management and event tourism have ben compiled by Getz (2000; 2008), Harris, Jago, Allen, Huyskens (2001), Hede, Jago, and Deery (2002, 2003), and Sherwood (2007). Getz (2000) reviewed articles published in the journal *Event Management* from 1993 up to 2000, concluding that the most frequent topics were economic development and impacts of events, followed by sponsorship and event marketing from the corporate perspective. In 2000, the Events Beyond 2000 conference in Sydney, Harris reviewed Australian events related research. They determined that the most frequently examined topics were economic development impacts of events, other management topics, and community impacts. However, most of the research literature on impacts was related to sport events, not festivals.

Hede, Jago and Deery (2002) reviewed thirteen tourism, hospitality and leisure journals and conference proceedings in identifying more than 150 publications focused on special events during the period 1990-2001. Both community/cultural and sporting events more commonly provided the context, while very little academic research was published on commercial, political or religious events. Impact evaluation was dominant, and event operations and management was revealed to be a small component in the studies they found. Particular research gaps included: planning, human resource management, risk management, quality perceptions and management, social, cultural and environmental evaluation, value profiling, choice modeling, recommending behavior, repeat visitation, and attitudes.

METHODOLOGY

The paper will provide a detailed description on how the Mulid can act as a celebrity urban space. Besides, how the place hosting these events is converted from a static ordinary place into a dynamic one reflecting the identity and culture of Egypt which consequently develop the urban spaces.

FESTIVAL PHENOMENON

- Festival actions and types.

Etymologically the term festival derives ultimately from the Latin festum. A **religious festival** is a time of special importance marked by adherents to that religion. Religious festivals are commonly celebrated on recurring cycles in a calendar year or lunar calendar. Hundreds of very different religious festivals are held around the world each year, types of festivals could be categorized according to activities practiced within to: artistic festivals, touristic festivals, marketing and shopping festivals, religious and cultural festivals.

- Festival urban spaces:

An open urban space where the action is taking place, a new terminology has raised to mark a festival space by a third place.

URBAN SOCIAL INTERACTIVE DEVELOPMENT
FESTIVAL SPACES AS THIRD PLACES

Third places is any place other than work or home where we spend time, a place that has become a non negotiable part of the workplace experience. They play a critical role in attracting and keeping the creative an innovative workforce that community needs to compete in the very near future.

Developing the third places in community is not a matter of accident or serendipity, but a matter of intended social researchers designed to place communities in a position to attract exactly the workforce that is required.

This is a multi faceted process, designed to enhance the lifestyle experience throughout the community, from dining, nightlife, music and performance to exercise opportunities, environmental commune and far more. Responsibility for the development of these third places is also a diverse process. Municipal and regional authorities will be tasked to create the environment and infrastructure, private enterprise will, in many cases, provide the actual grass roots efforts.

THE THIRD PLACE AND ITS IMPORTANCE

In a way, we've always had third places. Third places are simply places where we spend time when we are not at home and not working. Today, however, third places take on a much larger role in our lives and, subsequently, in defining our places. They have become an incorporated part of our overall lifestyle.

Third places are also somewhat unique in the concept of place development because they cross the generations a great deal more than other place characteristics. Communities can be significantly impacted as population centers as much by senior centers and activities as they can be trails to entertainment facilities.

But what has really made third places significant in today's world is the extent to which they have incorporated themselves into the everyday lifestyle. A generation ago, an skier, for example, would relish a job opportunity which put them an hour away from the slopes. Today, an skier doesn't relish such an opportunity, they demand it. An opportunity without access to a ski resort nearby is no longer considered to be an opportunity. To that skier, their access to that third place directly impacts their ability to have a totally fulfilling life.

Once we begin to understand these aspects of third places, that they have become significant aspects of living a fulfilled life, we begin to understand how important they have become in the establishment of the concept of place. A community that does not recognize this does so at their own peril, because they are limiting the influx of talent that will drive their own future.

FESTIVAL SPACES AS HOSTS FOR CULTURAL ACTIVITIES

The first thought that comes to mind when considering third places is entertainment opportunities, and for good reasons. Entertainment options define so many characteristics of place, from the authenticity of the community to diversity to the ideal of acceptance.

Characteristics of festival spaces:
Place development involves designing a place that draws the kind of creative and innovative workforce that fills the community's needs in becoming an economically prosperous community. To be able to set festival spaces characteristics many specifications need to be identified:

Third Places represent a personal experience
People have a variety of third place needs that must be fulfilled. More is better, and variety acts as a multiplier that enhances the community's image as a desirable place.

Third places are personal, but not necessarily on an individual basis. It's the third place experience that is personalized, and that requires a variety of options.

Figure 1: Third places as personal experience

Third Places fulfill an individual need
Sometimes that need is social interaction. Sometimes that need is creative. At other times, it may revolve around personal well being. It may be a need to perform or just a need to unwind. More often than not, it fulfills a variety of the above, plus others.

Figure 2: *Third places as creative solutions*

Third Places take us away from home and work:
They are as important as either of those for defining who we are and what we do.More than any other characteristic, this describes the difference of the importance of third places today as compared to a generation ago. We allow our third places to define us today.

Figure 3: *Third places as break out areas from home and work*

Third Places are personally functional to us.
What does that mean? We need what our third place experiences give to us. If we enjoy the freedom of bicycling and hiking, it is likely that the fitness benefits we enjoy as a result are very important to us. If we enjoy playing in a blues band, the creative performance outlet is something we personally need. The role of third places in defining the desirability of place has become nonnegotiable and This is why.

Figure 4: *Third spaces as necessary spaces*

Third Places are there when we need them
A simple statement with huge implications. As schedules become less important "on demand" third place experiences become proportionally more important.
When we look at these five characteristics of festival spaces as third places in the light of the current community needs, it becomes apparent that the active design of third places is an important aspect of society when it comes to planning the community we want to develop. In many as we plan third places development, we are choosing the "bait" we will cast to "catch" the talented and creative workforce.

RELIGIOUS ACTIONS AND CULTURAL BELIEVES

A **religious festival** is a time of special importance marked by adherents to that religion. Religious festivals are commonly celebrated on recurring cycles in a calendar year or lunar calendar. Hundreds of very different religious festivals are held around the world each year.

Is 'El Mulid' celebration a cultural or religious believe?

Shia as well as some Sunni scholars mostly approved celebration of Mawlid, while the Wahhabi movement oppose the celebration.("Mawlid", Encyclopedia Britannica)

In the Muslim world, the most of Islamic scholars are in favor of Mawlid. They consider observing Mawlid permissible in Islam, and see it as a praiseworthy event (Kaptein, Schussman (1998)), whilst the Wahabis say it is an improper innovation and forbid its celebration. One leader of Ahl al-Hadith, IbnTaymiyya forbade Mawlid celebration as it is not in any of the Haditn nor the quraan itself. (Mawlid According to the Salafi "Ulama",2013). Mufti Ali Gomaa, Chief Mufti of the world's oldest and largest Islamic university, Al Azhar in Egypt subscribe to Sunni Islam, has given his approval for the observance of Mawlid. For the first in English Shaykhul Islam Dr Muhammad Tahir-ul-Qadri has published a book Mawlid al Nabi Celebration and Permissibility defending the legality of Mawlid on more than 700 pages. ("Mawlid al Nabi: Celebration and Permissibility", Minhajul Quran Publications).

From all of the above, its correct to say that El mulid is a cultural festival under a religious umbrella or cause and to be able to understand the cultural/religious side of el mulid celebration a layer analysis for the practiced activities & actions must be mentioned:

Some of the Religious/cultural actions:

- **Al "Zekr"**: its held in evening till sun rise accompanied with religious music and songs.

Figure 5:Al Zekr & Al Maddeh ation.

- **Al "Madeeh"**: singing and repeating the good features and description for prophet Mohammed.

- **Al "massera" el "mohamadiya":** A March after el "zekr" in old cairo from its main mosques to the gathering grand piazza in el Hussein & el Azhar locations.

Figure 6:Al massera (march) el mohamadiya

- **Children's playing ground and celebration**: multiple spots are equipped and established for welcoming children to celebrate the occasion by many games and sweets.

- **El "mulid" sweets**: special type of sweets that is baked only in el mulid day, its distinguished by colours and shapes, especialy the horse shape for boys & "el Arossa" for girls.

Figure 7:El mulid sweets, El Arossa for females.*

- **El "mulid" custumes for el "monshid"**: special costumes are knit and worn with multiple bright colors and designs.

- **El "Tanora" Dance**: special cultural dance that represent the centricity of Islamic rituals and directing it toward the sky as a symbol for God and after life.

Figure 8:El Tanora Dance with its colordul costumes.*

- **El "baraka"**: to read el 'Fattiha' from Qur'an and wishing the best in life and after then touching a holly place, feature or kissing 'Sheikh' hand as a symbol of respect and 'baraka'.

Figure 9:El baraka (blessing) from ul el beit.*

"EL MULID" AS A RELIGIOUS CELEBRATION EVENT

Mawlid (Arabic: مَولِد النَّبِي , "Birth of the Prophet", sometimes simply called mawlid, el mulid, el mulud among other vernacular pronunciations; sometimes milad) is the observance of the birthday of the Islamic prophet Muhammad which occurs in Rabi' al-awwal, the third month in the Islamic calendar. Mawlid is derived from the Arabic root word (Arabic: ولد , meaning to give birth) according to Arabic English Dictionary, In contemporary usage, Mawlid refers to the observance of the birthday of Muhammad. (Arabic: قاموس المنجد   Moungued Dictionary).

Other terms, synonyms, used for this event include:
- **BarahWafat**: The Prophet was born on the twelfth day of Rabi ulAwwal, the third month of the Muslim year. His death anniversary also falls on the same day.
- **elMūled (en Nabawi)/Mūled en Nabi**: The birth of the prophet. (Egyptian Arabic).
- **Mawlūd e Sharif**: The Blessed Birth (Urdu)
- **Yawm an Nabi**:The Day of the Prophet (Arabic)

HISTORICAL BACKGROUND

The oldest Mawlid text is from the 12th century and likely is of Persian origin. However The first mention ever made of the Mawlid celebrations in any historical work comes in the writings of Jamal al Din Ibn al Ma'mun, who died587 AH/1192 CE. His father was the Grand Vizier for the Fatimid Caliph al Amir (ruled from 494 to 524 AH/ from 1101 to 1130 CE).

The earliest observation of the Prophet's birth as a holy day was arranged somewhere in the late twelfth century. The difference from before was that there was an increased number of participants to the Mawlid house that was opened specifically for this celebration. This particular event took place on Monday, 12 Rabi'i, which is the third month of the Islamic calendar that is associated with the beginning of Spring. This celebration was introduced into the city Sabta by Abu Abbas al Azafi as a way of counteracting Christian festivals and to strengthen Muslim identity.

Al Maqrizi writes in his Khiṭaṭ, manual script:

The Fatimid Caliphs had, throughout the year, a number of festivals and celebrations. These were: New Year's Eve, Beginning of the year celebrations, The Day of "Ashura", **The birthday of the Prophet sallaAllahualayhiwasallam**, The birthday of Ali, The birthday of al Ḥasan, The birthday of al Husayn, The birthday of Faṭima al Zahra', The birthday of the current Caliph, The first day of Rajab, The fifteenth day of Rajab, The first day of Sha'ban, The fifteenth day of Sha'ban, The festival of Ramaḍan, the first day of Ramaḍan, The middle of Ramaḍan, The end of Ramaḍan, The Night of the Khatm, The Day of Eid al Fitr, The Day of 'Īd of Sacrifice, The Day of Eidd al Ghadir, The 'Cloth of Winter', The 'Cloth of Summer', The Day of the 'Conquest of the Peninsula', The Day of Nawruz, The Day of Veneration, Christmas and Lent. (Khiṭaṭ, vol. 1, p. 490 & "Mawlid", Encyclopedia Britannica).

The early celebrations included elements of Sufic influence, with animal sacrifices and torchlight processions along with feast and public sermons. The celebrations occurred in contrast to modern day observances, with the ruler playing a key role in the ceremonies.Emphasis was given to the Ahl al Bayt with presentation of sermons and recitations of the Qur'an. The event also featured the award of gifts to officials in order to bolster support for the ruling caliph. In early Cairo, this holy day was celebrated by the court and the ruling class, not the common people.

CHARACTERISTICS OF CELEBRATION AND OBSERVATIONS

Mawlid is celebrated in most Islamic countries, and in other countries that have a significant Muslim population. Most Arabian countries the Mawlid is not an official public holiday. Participation in the ritual celebration of popular Islamic holidays is seen as an expression of the Islamic revivalism. There is no one clear motive for people celebrating Mawlid, for the celebration itself appears to have sacred elements.

Mawlid is celebrated in a festival manner, large street processions are held and homes or mosques are decorated. Charity and food is distributed and stories about the life of Muhammad are narrated with recitation of poetry by children. Scholars and poets celebrate by reciting Qaṣida al Burda Sharif, the famous poem by 13th century Arabic Sufi Busiri. A general Mawlid appears as "a chaotic where numerous events happen simultaneously, all held together only by the common festive time and space". (Schielke, Samuli, 2012). These celebrations are often considered an expression of love for the Prophet.

Along with being referred to as the celebration of the birth of Muhammad, the term Mawlid also refers to the 'text especially composed for and recited at Muhammad's nativity celebration'. These texts contain stories of the life of Muhammad briefly summarized below, (Knappert, J, "The Mawlid"):

- Abu Talib's nephew's first caravan trip
- Arrangement of Marriage between Muhammad and Khadija
- Al Isra'
- Al Mi'radj, or the Ascension to heaven
- Al Hira, first revelation
- The first converts to Islam
- The Hidjra
- The Muhammad's death
- The Ancestors of Muhammad

- - The Conception of Muhammad
  - The Birth of Muhammad
  - Introduction of Halima
  - Life of Young Muhammad in Bedouins
  - Muhammad's orphan hood
- These text are only part of the ceremonies. There are many different ways that people celebrate Mawlid, depending on where they are from. There appears to be a cultural influence upon what kind of festivities are a part of the Mawlid celebration
- **Celebrations:**
- Mawlid cavalcade as celebrated by the Malaysian Muslims **in Putrajaya, Malaysia**, The jubilee is known locally as MaulidurRasul.
- During **Pakistan's Mawlid**, known in Urdu as EidMilad un Nabi celebrations and processions, the national flag is hoisted on all public buildings, and a 31 gun salute in Islamabad, capital of Pakistan, and a 21gun salute at the provincial capitals are fired at dawn. The public and private building are illuminated with Fairy lights. The cinemas shows religious rather than secular films on 11th and 12th Rabi ulAwwal. This is the worlds biggest gathering for Mawlid celebrations.
- Among non Muslim countries, **India** is noted for its Mawlid festivities. The relics of Muhammad are displayed after the morning prayers in the Indian state of Jammu and Kashmir at the Hazratbal Shrine. Night long prayers held at the Hazratbal Shrine are attended by thousands.
- Other non Muslim countries noted for their Mawlid festivities are **Kenya and Tanzania**, where it is known as "Maulidi". In Kenya, the most famous place is the coastal island of Lamu and Malindi. In Tanzania the largest celebrations are on the island of Zanzibar.[]
- In Qayrawan, **Tunisia**, Muslims sing and chant hymns of praise to Muhammad, welcoming him in honor of his birth.
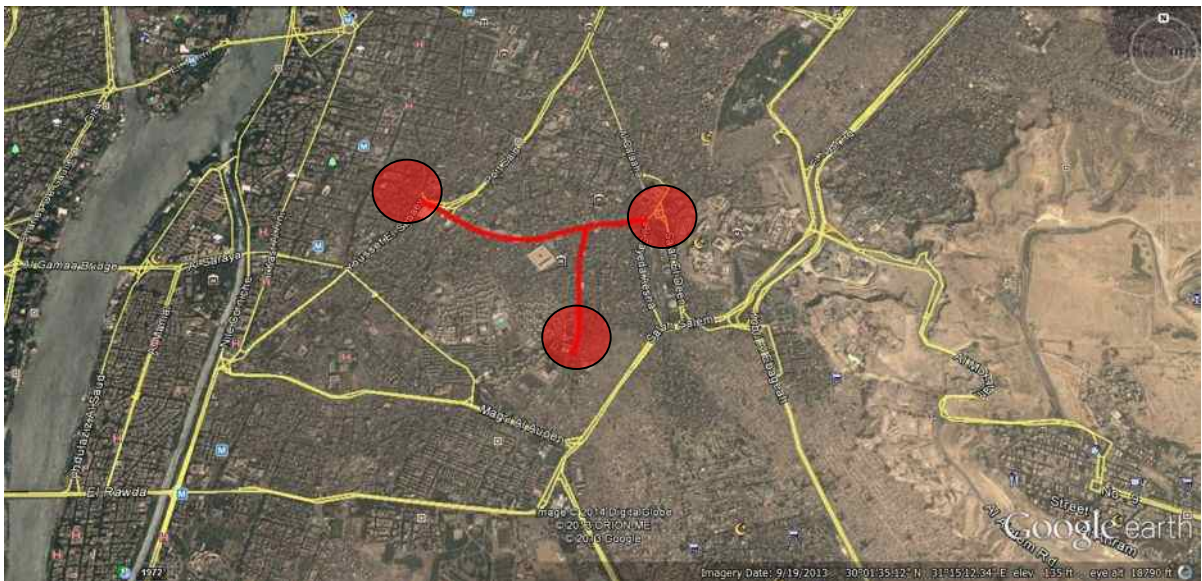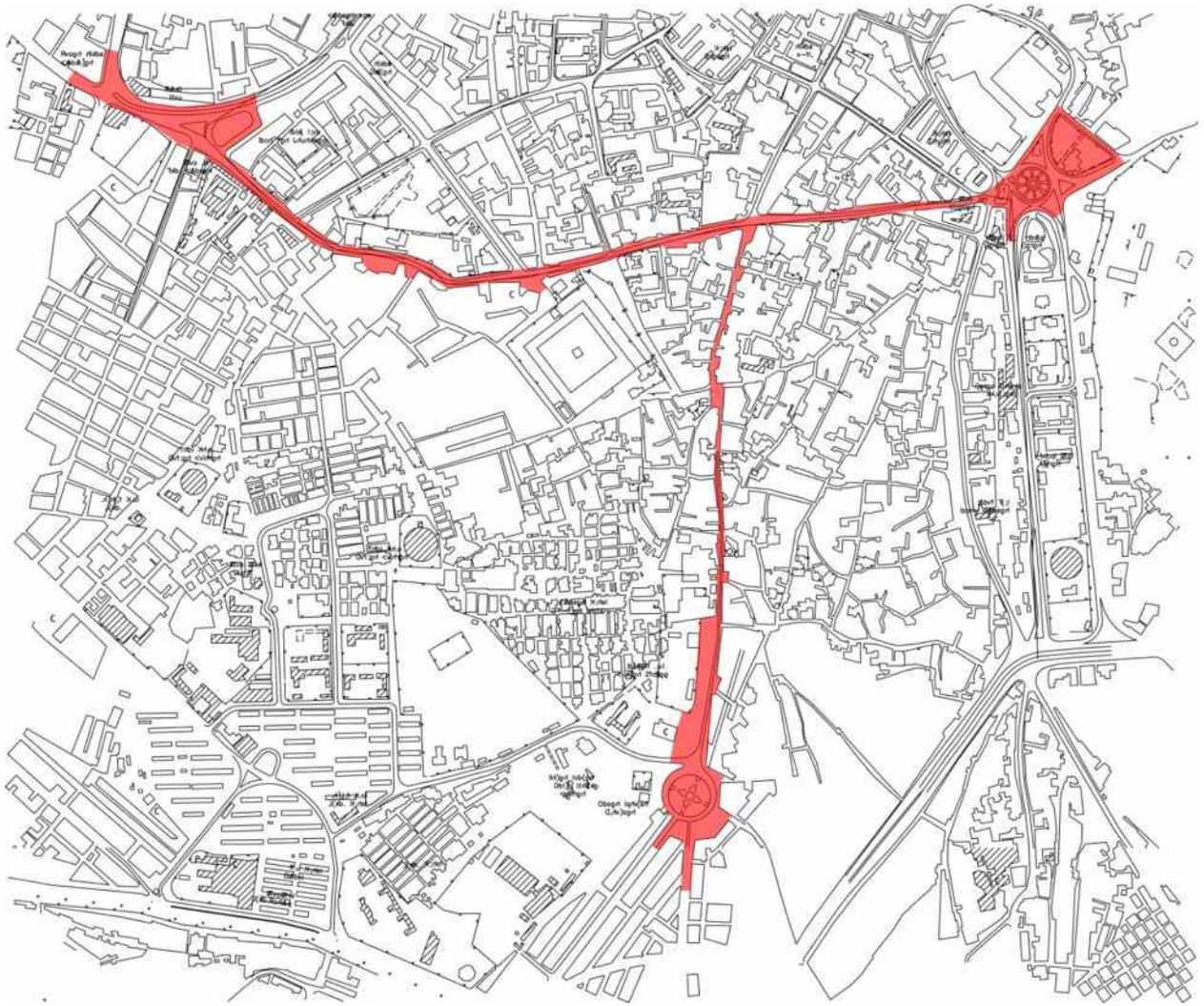

Figure 10: shows the site of the Mulid prophet Mohamed path through old Cairo urban fabric which include most of the Islamic monuments all around the world

Figure 11: shows the path direction from Sultan Hassan mosque all along to Sayeda Zeinab Mosque down to Mosque of Sayeda Nfisa

Map of the Prophet Mohamed family Moulid trail in old Cairo. All these streets have different pattern, sometimes it act like parking and overlapping pedestrian and vehicles path. Another time it act like public market and most of time it acts like daily activities hub which include commercial, religion, social network for residents and daily visitors. This trail has 17 main historical mosques and schools Islamic monuments other than old historical houses and remaining fringes in the middle of this complicated urban fabric. During Mulid time all these streets closed from vehicles and turn to be like a motel which has the activities like accommodation, cooking, dancing, singing, zekr circles, and trading. This tinny path turns to be like tool for expressing in different means of people from different places and sometimes countries, all the streets turn to have shading device from cloth fabric to allow the accommodation of people and protect them from sun and sometimes heat.

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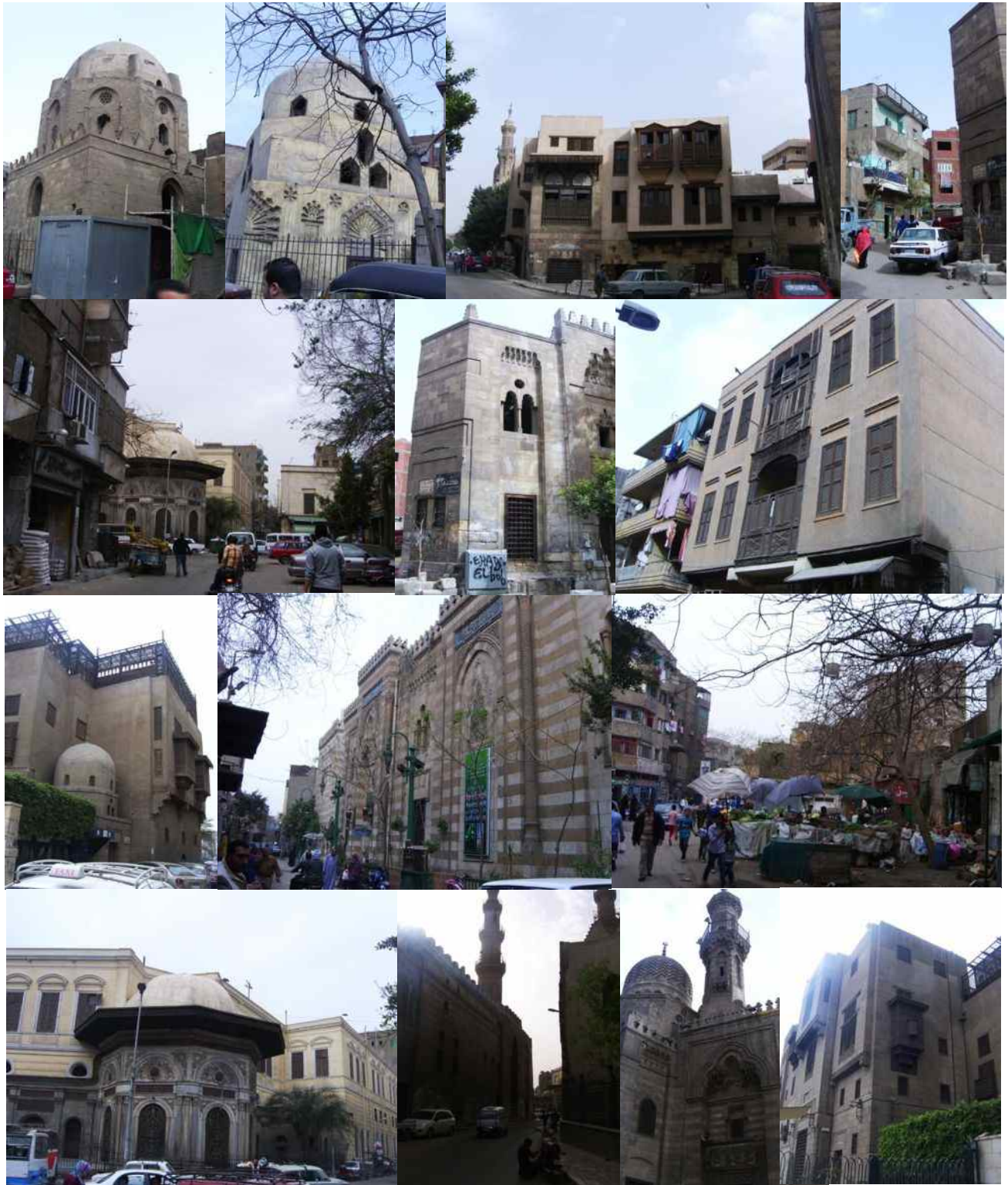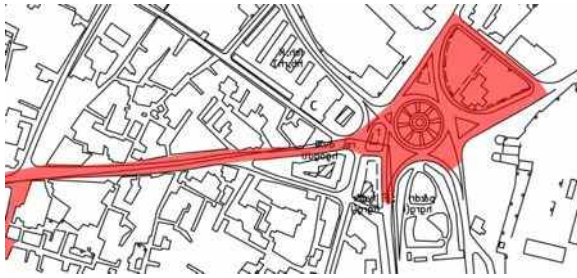
Figure 12: shows Sultan Hassan square, the start of the trail which include Mosque of sultan Hassan and Elrefaay Mosque too, with urban fabric around.

Figure 13: shows some of the activities that happen in the trail, like marketing for some materials

that express about the Moulid and games like small simulation for gun shooting, and eating.

Figure 14: shows second part of the path arrived to Sayeda Zeinab Mosque

Figure 15: shows third part of the trail passing through Tolon Mosque down to Nfisa Mosque
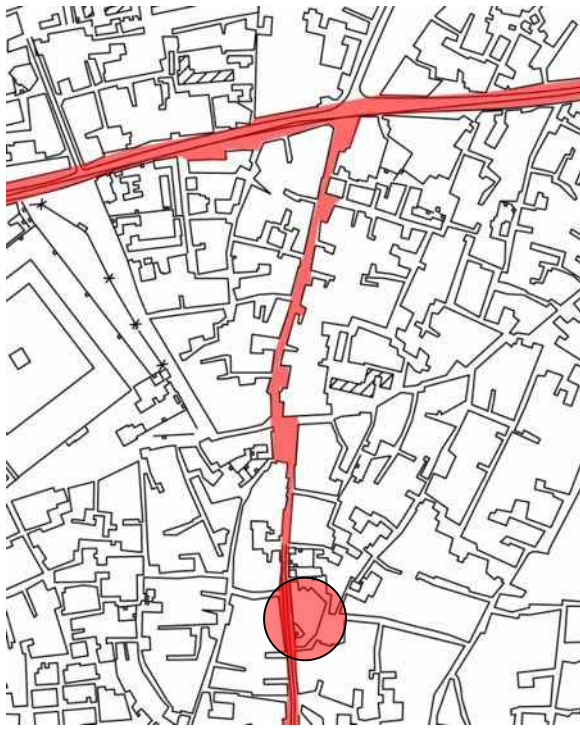
Figure 16: shows 4th part of the trail passing through Sayeda Sakina Mosque

Figure 17: shows 5th part of the trail reaching down the Mosque of Sayeda Nafisa

The Photos below show the streets and their width and the density of users everyday and after them, photos of the same streets while hosting the Mulid describing the events and activities held on that special occasion.

CONCLUSION

After offering a comparison between the urban space with and without hosting a Mulid, and describing how it is converted into a dynamic festive place with its activities and events, we can conclude that these Mulids are considered from our cultural heritage that has been moved from generation to generation throughout hundreds of years.

These events must be preserved and repeated on regular basis in order to preserve the cultural events – our heritage – as they reflect our identity and character that make us special amongst other cultures.
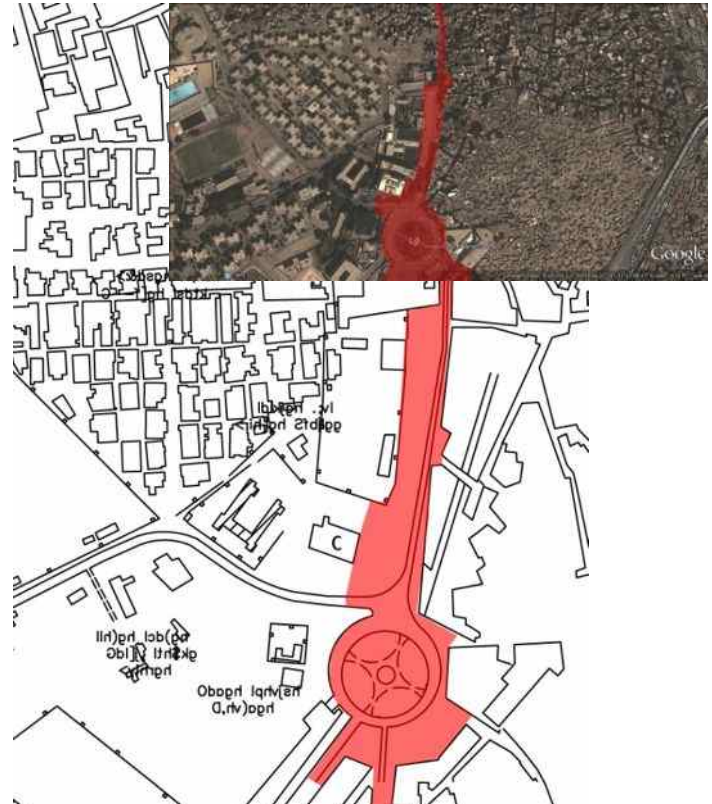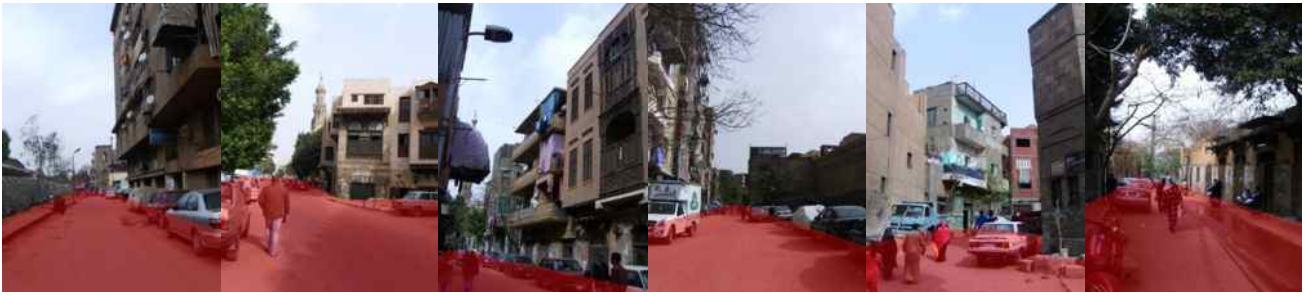
The streets during the Mulid are full of life and colors and thus become active rather than passive and dead, therefore streets during these events could be considered as a tool for urban development and reforming of urban cultural image towards new era that consider this city at that moment as festival city.

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STUDY ON THE INNOVATIVE APPLICATION OF BAMBOO-CABLE COMPOSITE STRUCTURES

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Abstract

In 2010 Shanghai Expo, people were deeply impressed by the Sun Valley. However, due to large energy and labor consumption, the Valley is not consistent with the Expo slogan of sustainability. What if the steel is replaced with bamboo? Possessing excellent mechanical properties, bamboo has been nowadays recognized as one of the most sustainable potential structural materials. However, the irregularity in cross sections and the inefficient joint configuration could be bottlenecks in developing future large span bamboo structures. A novel spatial composite structure is proposed with the methodology of bamboo-cable structural systems which consist of bamboo, steel elements and adhesive construction materials. Meanwhile, key technical difficulties involved with this application are carefully investigated and analyzed, which we target to address in the near future. Additionally, several tentative structural styles are presented in order to explore the application of this bamboo composite structure. Hopefully, fabrication of bamboo can be standardized and large-span bamboo structures can be realized.

Keywords: bamboo-cable member, bamboo joint, composite structure, sustainability.

INTRODUCTION

2010 Shanghai Expo was teeming with large-span structures characterized with ecological and sustainable ideas. However, some typical buildings, such as the Sun Valley, left much to be desired for its large energy consumption and much pollution during fabrication and complicated construction (Figure 1). What if the steel component of the Valley is replaced by bamboo tubes?

(a)   *(b)*
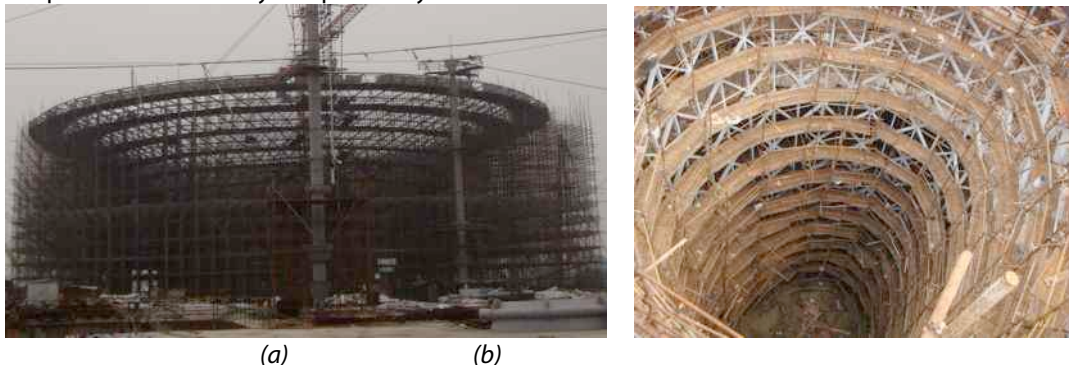
Figure 1: *Construction of the Sun Valley.*

On a global scale, due to over consumption of natural resources and relevant severe pollution from traditional constructions, concerns have been raised about green building materials which are sustainable for future life. And bamboo, which is once merely popular in Southeast Asia and in Latin America, is nowadays recognized as one of the most sustainable potential structural materials in the world. It has the following characteristics: light weight, high strength, excellent seismic performance, environmentally friendliness and so forth (Sudhakar et al. 2010). Moreover, it has a maturity cycle of 3-4 years, and it takes little energy consumption and produces little pollution in the process of both material fabrication and building construction (Austin and Ueda 1972).

Recently, several key technologies of bamboo have been developed. Glue laminated bamboo (glubam) has been studied thoroughly and it appears to be more homogeneous than traditional bamboo members, making it possible to realize standardized fabrication (Sun and He 2012). Traditional bamboo joints have been updated with cement, bolts, or gypsum to improve mechanical performance (Chen and Zhao 2009, Velez 2000). However, bamboo is still applied traditionally as columns or beams. Few researches have focused on excellent bending property of bamboo materials. Actually, due to crucial drawbacks such as non-

uniformity of mechanical property and inefficient connections, the application of bamboo structures is not quite wide. Though design of modern bamboo structures develops rapidly, bamboo materials are still used as either small houses or temporary constructions, such as some pavilions in 2010 Shanghai Expo.

In this paper, a novel structural system named as bamboo-cable composite structure is introduced and fully analyzed. This system consists of bamboo, steel elements and adhesive construction materials. And it can help to realize bamboo large-span structures which are based on bamboo-cable structural members. Key technical difficulties involved with this application are carefully investigated and analyzed. Some potential approaches to address the challenges are evaluated, including discussion on configurations of special bamboo connections. Finally, five structural forms have been illustrated with several examples of application. In the near future, our research team will try to realize this novel idea in a pilot bamboo structure.

ORIGINAL IDEA OF BAMBOO CABLE COMPOSITE (BCC) STRUCTURES

Figure 2 shows Sun Valley and the model of a special kind of bamboo-cable composite (BCC) structure. The idea of BCC structures origins from transformation of the Sun Valley. With the same functions and configuration, the BCC version of Sun Valley is made of bamboo, cable and membrane materials. Specifically, its framework is mainly composed of several bamboo-cable members (Figure 3). As the figure illustrates, it is a member in which bamboo is bent like an arch, supported by a cable at both ends. Figure 4 shows the loading mode of a bamboo-cable member. Under tensile force from cables, bamboo is pre-stressed to possess stiffness, and its bearing capacity can be fully utilized. Accordingly, it can be quite possible to design large span bamboo structures with these novel structural members.

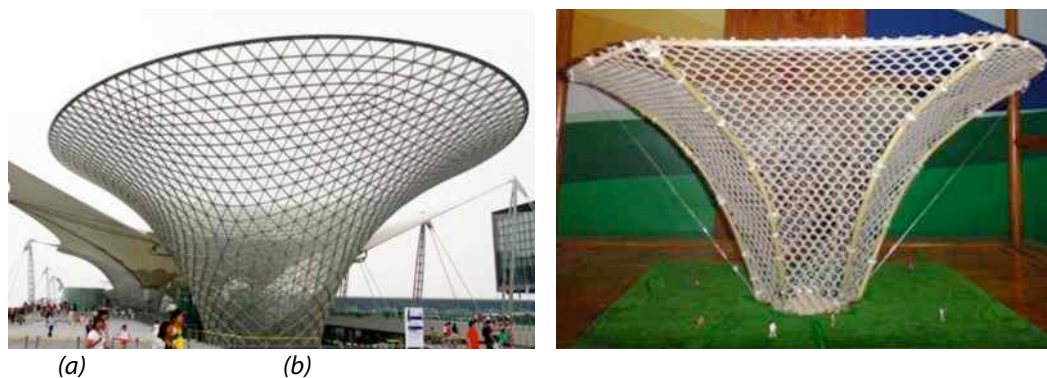*(a)   (b)*

Figure 2: *Comparison of the structures: (a) the Sun Valley in Shanghai Expo,*
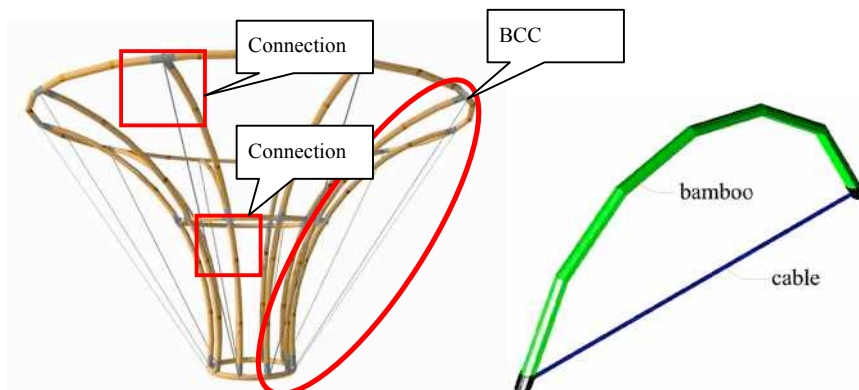*(b) the model of bamboo-cable composite structure.*

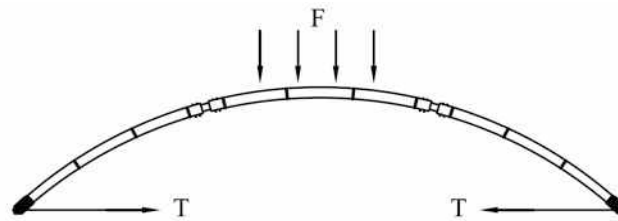**Figure 3:** *Schematic view of bamboo-cable composite member.*

Figure 4 Loading mode of bamboo.

Based on previous illustration, BCC structures can be defined as a special structural system in which bamboo-cable composite members build the framework. Combined with membrane and auxiliary members, several bamboo-cable composite members can become large-span structures. And Sun Valley (Figure 3) is a typical style of BCC structures.

By comparing Sun Valley and the BCC version, one can find that BCC structures are more sustainable on the basis of the following reasons. First of all, BCC structures are mainly made of green materials, while Sun Valley is made of steel which requires a lot of energy and produces much pollution. Secondly, BCC structures are simple and reliable, because BCC members can be prefabricated in the factory. However, Sun Valley has more than 3000 steel joints and should be constructed by on-site welding. Thirdly, BCC members can be reused and reassembled to build another structure, which meets the requirements of sustainable development.

KEY CHALLENGE AND POTENTIAL SOLUTIONS FOR BCC STRUCTURES

To build BCC structures, the key challenge is to realize the bamboo-cable composite members and to connect them together to fabricate structural skeletons. Specifically, non-uniformity of bamboo dimensions and traditional inefficient connections are two major technical difficulties. In order to address the problems, potential solutions are analyzed as follows.

A. Realize bamboo-cable members

As is well known, dimensions of bamboo material are irregular even among the same species and part of one intact bamboo tube can be used as building material. Meanwhile, long bamboo tubes are required to build bamboo-cable members, so as to realize large-span structures. Consequently, it is suggested that people should take the suitable part of bamboo tubes and connect the qualified tubes with special connections to extend the length of structural members.
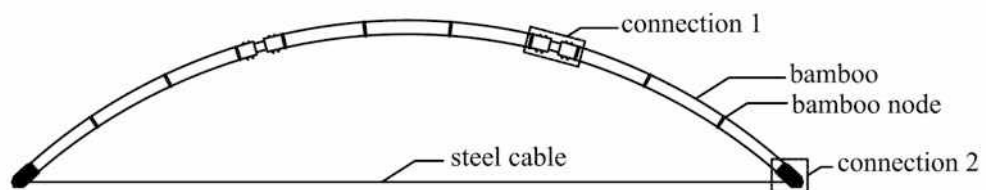
Figure 5: An example of multi-bamboo tubes structural member.

Figure 5 shows an example in which three bamboo parts are combined with connection 1. Similarly, four and more bamboos can be connected and the span of structural members can reach over fifty meters. And another requirement should be satisfied, that is, the reliability of special bamboo connections. Therefore, our team has conducted research on novel bamboo joints first and two types of bamboo joints are proposed for their excellent mechanical properties (Fu et al. 2012 , 2013), as shown in Figure 6.

(a)

(b)
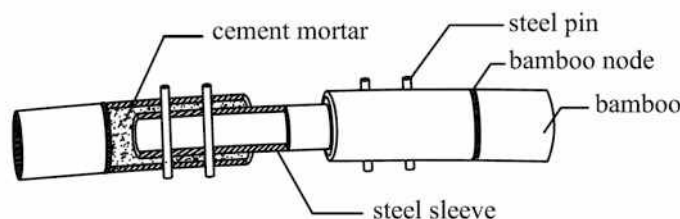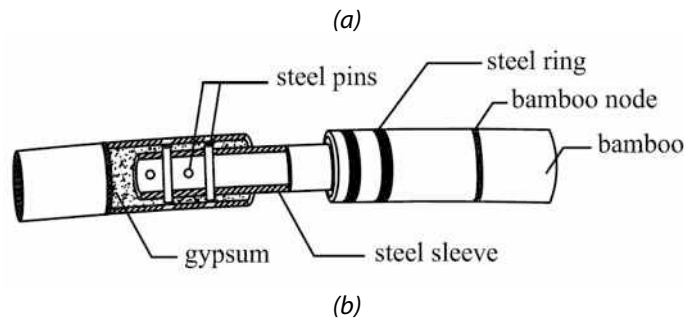
Figure 6: *Connections between different bamboo parts:*
(a) sleeve-bolt-cement (b) sleeve-modified-gypsum.

Though bending moments exist, these connections are mainly under compression load. The mechanical properties of these connections are proven to be excellent in literature for their bearing capacity. Type a, named as sleeve-bolt-cement, is a joint where a steel sleeve is embedded into the bamboo ports, being fixed to the bamboo using two bolts, which are put through the predrilled holes in the sleeve and in the bamboo panel and then cement mortar is filled into the cavity to fix the steel sleeve and reduce stress concentration. Type b, named as sleeve-modified-gypsum, is a joint in which the prefabrication steel connections are embedded in the bamboo tube where the bamboo's inner wall is notched and roughened. Then modified gypsum is filled into the cavity, with two steel rings strapped outside the wall. The difference between these two types is that the bearing capacity of the first one is governed by shearing resistance and the other is not. And the second one is preferred since it behaves much more ductile than the first one.

Another connection, as highlighted as connection 2 in Figure 5 is that it should be carefully designed. And Figure 7 provides two choices to combine bamboo and cable. The first one is a joint where the end of bamboo is embedded to a prefabricated steel sleeve, fixed with two bolts. And the cable, under a suitable tensile load, passes through the predrilled holes in the sleeve, fixed with special pre-stress anchorage devices at both ends. Cement mortar is filled into the cavity. The second one is a similar joint where modified gypsum is filled in the cavity and the sleeve has two rings of protrusion inside to enhance the anchorage force between the gypsum and the sleeve. Meanwhile, the outside surface of bamboo is roughened. The comparison of these two joints will be conducted in the near future.

(a)

(b)
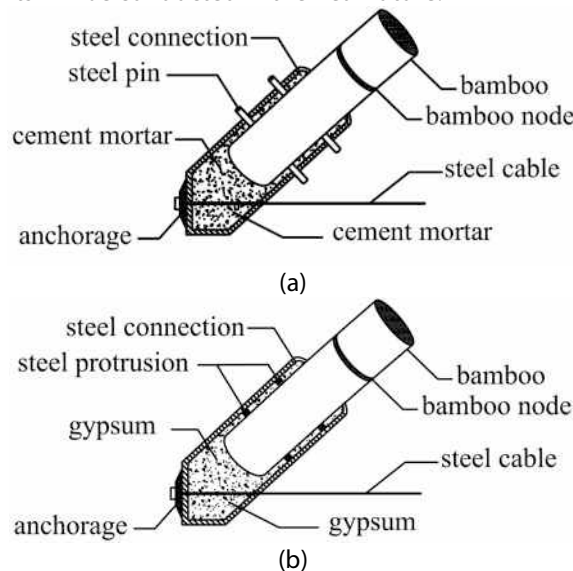
Figure 7: *Connections to combine bamboo and the cable:*
(a) sleeve-bolt-cement (b) sleeve-modified-gypsum.

B. Connect different bamboo-cable members

As is marked in Figure 3, it is also crucial to design special connections, such as connection 3 and connection 4, to combine different bamboo-cable members. Similar to the connection 1 and connection 2 in Figure 5, two types of bamboo joints are proposed, that is, the sleeve-bolt-cement and the sleeve-modified-gypsum. Figure 8 (a) illustrates the second type of novel bamboo joints for connection 3. Specifically, the green parts

are the bamboo tubes of nearby members, and the pink part which is made of steel, is specially fabricated to connect the bamboo-cable members. Figure 8 (b) shows the configuration of steel components of the joints. In a similar way, connection 4 can be realized by modifying the pink steel part to combine 4 relevant bamboo structural members.

(a)   (b)
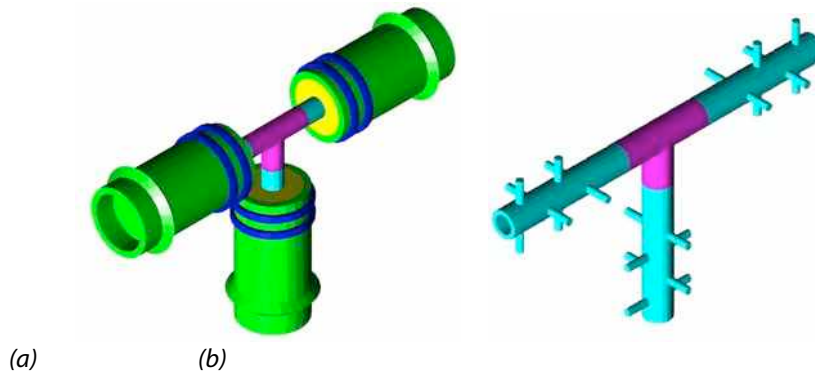
Figure 8: *Connections to combine bamboo-cable members: (a) overall joints, (b) steel components.*

STYLES AND APPLICATIONS OF BCC STRUCTURES

Some special styles of BCC structures are explored from Figure 5 to Figure 9. Each type can be designed for different spans and scales, as well as different applications and functions. In order to illustrate these styles, one example is described for each style respectively.

A. BCC tube structure
In Figure 3, the skeleton of a BCC tube structure is presented. In this structure, several up-standing bamboo-cable composite structural members are arranged around a center, circumferentially connected by bamboo. It is similar to the Sun Valley in 2010 Shanghai Expo. Tall and straight, the tube-cable structure has a beautiful appearance and occupies little floor space, which is suitable for interior and outdoor independent or auxiliary structures. Figure 9 shows two examples of application which includes rest pavilion and atrium of a big shopping plaza, which are covered by glass or transparent membrane for natural lighting.

(a)   (b)

Figure 9: *BCC tube structure: (a) rest pavilions on the square, (b) underground Sun Valley.*

B. BCC arch structure
As Figure 10 (a) shows, a BCC arch structure consists of several bamboo-cable composite structural members that are longitudinally arranged in a line. This structure has not only high space utilization but also good flexibility because its width and length can be adjusted by controlling the member's span and number, for various buildings of different functions. Figure 10 (b) shows the example of application which includes public buildings like auditoriums or assembly halls. The Arched space and bared bamboo member display a unique structural beauty.

(a)   *(b)*
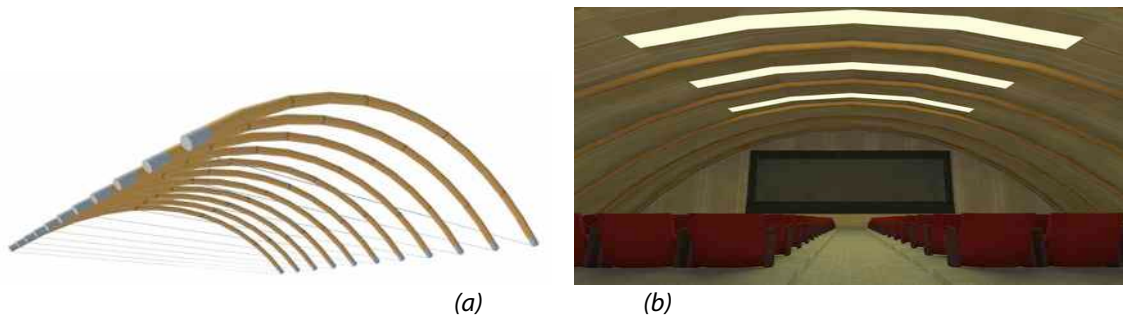
Figure 10: *BCC arch structure: (a) architectural skeleton, (b) assembly hall.*

C. BCC dome structure

Figure 11 (a) shows a BCC dome structure in which several bamboo-cable composite structural members join together by a cable at both ends of all the members to form a semi-globe frame. This structure can actually present new types of exhibition halls. Figure 11 (b) shows the example of application which includes theater with half-sphere frame. Specifically, it can be used as a shell roof of gymnasiums or theaters. Meanwhile, the special roof can also be designed to either open or close by mechanical equipments.

(a)   *(b)*
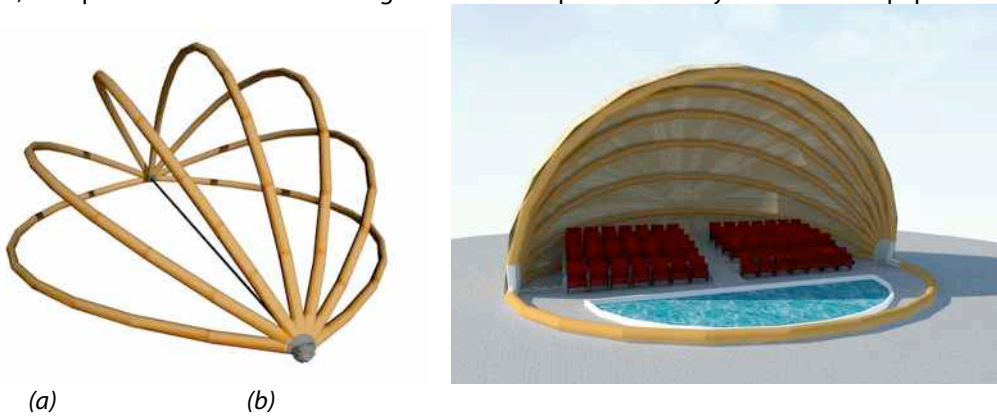
Figure11: *BCC dome structure: (a) architectural skeleton, (b) amphitheater.*

D. BCC radial structure

As Figure 12 (a) shows, a BCC radial structure is made up of many bamboo-cable composite structural members arranged around a center. With the load being well-distributed and the whole structure being quite stable, a radial structure is good for circle-planed or ellipse-planed buildings. Figure 12 (b) shows the example of an application which includes art galleries or museums. The courtyard-centric annular flowing space fully presents the dualistic-unified logicality between structure and space as well as the unique structural beauty.

(a)   *(b)*
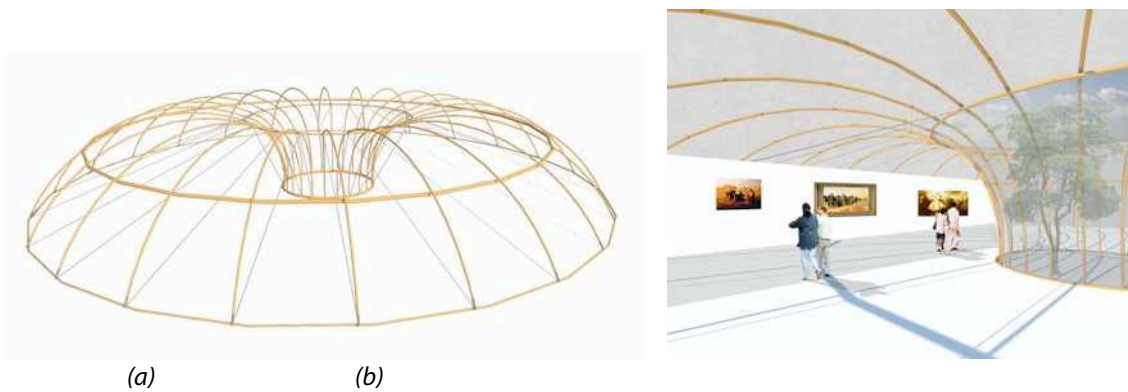
Figure12: *BCC radial structure: (a) architectural skeleton, (b) art gallery.*

E. BCC cantilever structure

As Figure 13 (a) shows, a BCC cantilever structure is a group of up-standing bamboo-cable composite structural members which are arranged in a line. Load is transmitted along the member to the ground vertically. Because of easy construction and simple form, a covered cantilever structure can be a good shelter and widely used in daily life. Figure 13 (b) shows the example of application for rest pavilions and bus shelters.

(a)   (b)
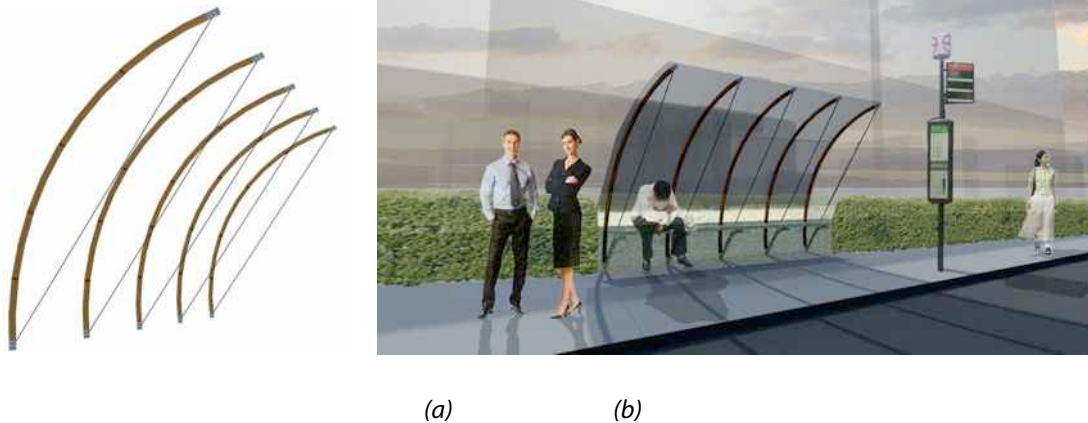
Figure 13: BCC cantilever structure: (a) architectural skeleton, (b) bus shelter.

CONCLUSION

A novel bamboo-cable composite (BCC) structural system has been presented and analyzed in detail. Special connections are designed for the bamboo-cable members which are made of bamboo, steel and adhesive materials. These members are reliable and flexible, utilizing strong resilience and excellent properties of bamboo materials. Based on such structural elements, large-span bamboo structures are highly possible to be realized, and different bamboo structures can be explored. Typically, five bamboo-cable composite structural styles are designed and illustrated with several examples of applications. Since these structures are mainly made of bamboo materials, which can replace traditional steel structures in some situations, one can conclude that this structure has less energy-consumption and little pollution. In brief, it is sustainable, low-carbon, and potentially applicable in the future. Our team plan to study further detail of BCC structures and try to realize a pilot structure to verify this novel idea.

ACKNOWLEDGEMENT

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CONTRADICTIONS OF DESIGNING "GREEN" CITIES: INTEGRATION OF THE TERM "GREEN" TO UNLIMITED GROWTH IN ISTANBUL

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Abstract

It is essential to reinterpret the built environment in the context of environmental conscience to deal with global climate change and environmental destruction. However, in this sustainable environment design process, the attempt of different disciplines to apply the ideal and theoretical concept -social, economic and ecological sustainability- to practice leads to conflicts between these concepts under competitive market conditions. On the one hand, green cities seek to create more habitable environments with environmental concerns, on the other hand, as a result of methods to obtain this goal; it requires integration of innovative technologies directly related to capital investment. Unless governments fund these settlements with support policies and legislative regulations, these green settlements shall inevitably become sites with lack of social equity and therefore be areas of focus of capital projects using the term 'green' as a brand. The aim of this paper is to describe the contradictions of the concept of 'green city' within market relations, through the case of Istanbul and discuss the term green within its commodified meaning, which has more popular in the urban transformation of Istanbul. In this context, the contradictions of green settlements in terms of social, economic and environmental perspectives are defined primarily. Then these contradictions are exemplified by green cities (unlimited growth in a megacity) planned for construction in Istanbul and also through projects underway that pretend to be green, on the European side of Istanbul. Following a discussion on the way this term relates to the built environment and on its contradictions, suggestions are finally made to understand the city as an organism with the requirement of balance in every subsystem.

Keywords: sustainable urbanism, green city contradictions, green city.

INTRODUCTION

For nearly thirty years, sustainable development concept has been discussed in detail through its most frequently cited definition mentioned in the Brundtland Report (United Nations 1987). To comprehend the contradictions of sustainable development nowadays, the discourse of "the needs of the present without compromising the ability of future generations to meet their own needs" needs to be reconsidered. It is essential to be able to solve the gap of sustainability in real practice by drawing attention to the distribution of resources and by criticizing the percentage of today's generation having access to the facilities that the economic, environmental and economic sustainability offer.

The primary task of architecture is to define and design using solutions stemming from site, utilizing passive design criteria for the environmentally sustainable built environment. However, especially in developing countries where neoliberal politics rule capital flow, occupant needs are not taken into consideration while standardized spaces are constructed as mass production in order to answer needs of the market as quickly as possible.

In particular, the terms green, ecological, sustainable, energy efficient have been promoted in the way that they all correspond to the same meaning in social perception and such terms have been turned into a marketing factor by green investors. Ecological factors have not been taken into account in settlements called green in the promotions using these terms and technological integrations that maintain continuity of capital flow have been prioritized. Problematic issues arise from lack of consideration of the ecological relations between local and regional issues in designing the built environment for sustainability.

This article seeks to put forth the contradictions of designing for sustainability by prioritizing neoliberal policy approaches under competitive market conditions in developing countries through the case of projects in Istanbul that use the terms green, energy efficient, sustainable and ecological for promotion. In this context, the study consists of three sections; first the paradigm shift of the term ecology within approaches for built environment are described and the contradictions of designing green are defined; in the second section, social, environmental and economic contradictions of design approaches called green are exemplified through projects in Istanbul and in the conclusion, inferences and suggestions are made for creating a balanced built environment from the ecological point of view.

PARADIGM SHIFT OF ECOLOGY IN ARCHITECTURE

Since German biologist Ernst Heinrich Haeckel introduced the term ecology in 1866, the meaning of "relationships and interactions between living organisms and their environments" has been forming relations in our built environment, thereby causing new paradigm shifts.
As of mid-20th century, environmental consciousness has been rising with a consideration for depletion of nonrenewable resources. Therefore, approaches to design our built environment in the context of its ecological system have been evolving. The term ecology in built environment context has broadened its meaning by reaching significance in different scales and receiving new paradigm shifts. The ecology paradigm could be analyzed with three shifts within the development process of our built environment. These shifts could be defined as follows, respectively;

- shift to the environmental movement,
- shift to the sustainability revolution,
- based on sustainability revolution, shift to commodity based sustainability in the context of the neoliberal city.

During the environmental movement of the late 1960s and 70s, the term ecological was accepted to refer to anything related to the environment. Also, in the 1970s, some studies examined sun, wind etc. as passive solar design principles that could be defined as ecological design today. This was the first substantial paradigm shift that has gained a new perspective for ecology in the built environment.
The environmental movement had shifted with solutions to the sustainability revolution in the 1980s. Thus, sustainable design was defined as a paradigm shift, where solutions were plugged into natural resources, renewable energies, and site-based knowledge (Williams 2007).
The last paradigm shift related to the sustainability revolution, which basically took its source from the term ecology, could be defined as commodity based, as sustainability rises from the urban environment from which the construction sector benefits, especially in developing countries. According to this paradigm shift, designing for the sustainable built environment in a neoliberal city involves several social, economic and environmental contradictions.

METHODOLOGY

The main aim in this study is to investigate the contradictions of designing cities called green, through projects that pretend to be green, sustainable, energy efficient or ecologic, by causing a terminological ambiguity in Istanbul. In this context several projects, some of which are in the process of construction and others are in the conceptualization phase, on the European side of Istanbul, have been chosen for the review. These projects are classified according to temporal, spatial, qualitative characteristics, besides the main stakeholders in the construction process, as indicated in the following table.

Project main stakeholder	The name of the Settlement	Functional Characteristics	Construction status
The Ministry of Environment and Urban Planning	Kayabaşı (Kayaşehir)	Residential	Bidding process
	Bio İstanbul	Health, Commerce, Innovation, Technology, Research Centers and Residential	Bidding process
	Sağlık City	Conference and Culture Center, Health Facilities Trade Units	Bidding process
	Magnet City	Residential, office, education	Bidding process
Investor Construction Firm	Maslak 1453	Mixed-use	In construction process since 2012
	42 Maslak Offices	Office	In construction process since 2010

Table 1: *Criticized projects in terms of sustainability manipulation.*

The criticized projects have been chosen from among those promoted with the terms green, energy efficient, sustainable or ecological as a manipulation. The criticisms are empirical, based on data about the projects and also social indicators. The study seeks to present the current situation of ecology and built environment relations in Istanbul by drawing attention to neoliberal policies in decision making mechanisms and to emphasize the influence of these mechanisms on the built environment.

Especially in Istanbul, real estate investments have dominated the flow of capital through neoliberal economic approaches in urban areas. According to the Emerging Trends in Real Estate Europe 2013 report, Istanbul is the fourth city that has become prominent with real estate investments in the market, among 27 European cities (ULI 2013). The growing construction market seeks new promotions, with huge projects comprising green innovative technologies that lack basic principles in designing for sustainability. The projects proposed by the Ministry of Environment and Urban Planning and by various investor construction firms have all remarkable social, environmental and economic contradictions in terms of ecology and built environment interactions.

CONTRADICTIONS OF DESIGNING "GREEN" CITIES: THE CASE OF ISTANBUL

There has been a radical shift in the governance of urban land and housing markets in Turkey, from a 'populist' to a 'neo-liberal' mode since 2001, through large urban transformation projects which are the main mechanisms through which a neo-liberal system has been instituted in incomplete commodified urban areas (Kuyucu & Ünsal 2010). Once again, on a larger scale, urban transformation had been launched in October 2012 in several cities of Turkey particularly in Istanbul. Parallel to this large scale urban transformation, in February 2012, The High Planning Council of Turkey intended to determine a roadmap for energy efficiency in Turkey with the Energy Efficiency Strategy Document for 2012-2023, prioritizing housing production thereby reducing CO_2 emissions as well as integrating renewable energy technologies to buildings (The High Planning Council 2012). It is obvious that in this context, the enterprise for designing sustainable built environment is not well-intentioned.

As mentioned above, the commodity based sustainability paradigm shift has been leading capital flow in focus areas of the construction market in developing countries as it has in Istanbul. However, this paradigm shift causes urban conflicts to arise from social, environmental and economic contradictions of the term. A lack of perspective among numerous stakeholders for the integration of sustainability and community, prompted the struggle for city rights. For instance, the Gezi Park protests of June 2013 drew the attention of the world to a very urban conflict in Turkey's most populous city that arose from the government's commodity based decision mechanism for urban land.

Integration of sustainability and community encompasses ecology, economy and equity that require a long term systemic approach by addressing sustainability issues at all levels (Edwards 2010). If a well-designed project at a regional scale lacks planning decisions at an urban scale, then problems arise.

In order to comprehend market-driven redevelopment of the construction sector, it is essential to criticize the chosen projects that have tendency to use innovative technologies and popular trends to boost the market, under three sustainability indicators such as social, economic and environmental, by comprising contradictions.

Definition of the sample projects

Before the launch of urban transformation in 2012, the flow of capital through urban land was processed through several projects in Istanbul. Mega projects such as Canal Istanbul, the 3rd Bridge, the 3rd Airport, the Northern City with a million population, have been proposed by the government one after the other, ignoring scientific studies and academic discourses.

One of the other mega-projects proposed by the Ministry of Environment and Urban Planning in 2011 has been two new cities on each side of Istanbul. One of these cities was named Kayabaşı (Kayaşehir), with the proposed center of the new city Basakşehir located on the European side of Istanbul. The aim of this project is to design a satellite town with over 1.5 million inhabitants. The first stage of settlements were completed

and offered for sale in 2008 by the Housing Development Administration of Turkey (TOKİ 2014). Since then, the number of housings has been 20,000 with approximately 60,000 inhabitants.

Bio Istanbul, Sağlık City, Magnet City projects have also been integrated into the new city called Kayaşehir, offering several facilities. Bio Istanbul project has been promoted as an 'intelligent city and center of ecological life' where a children's hospital, innovation campus, research foundation and residential zones are included. Sağlık City, meaning 'Health City' has an integrated health center, cancer research foundation, conference and culture centers and residential zones. Magnet City has been proposed for construction over a total area of one million square meters, with accommodation, education and working facilities. All these proposals pretend to be green and to have sustainable, energy efficient or ecological approaches.
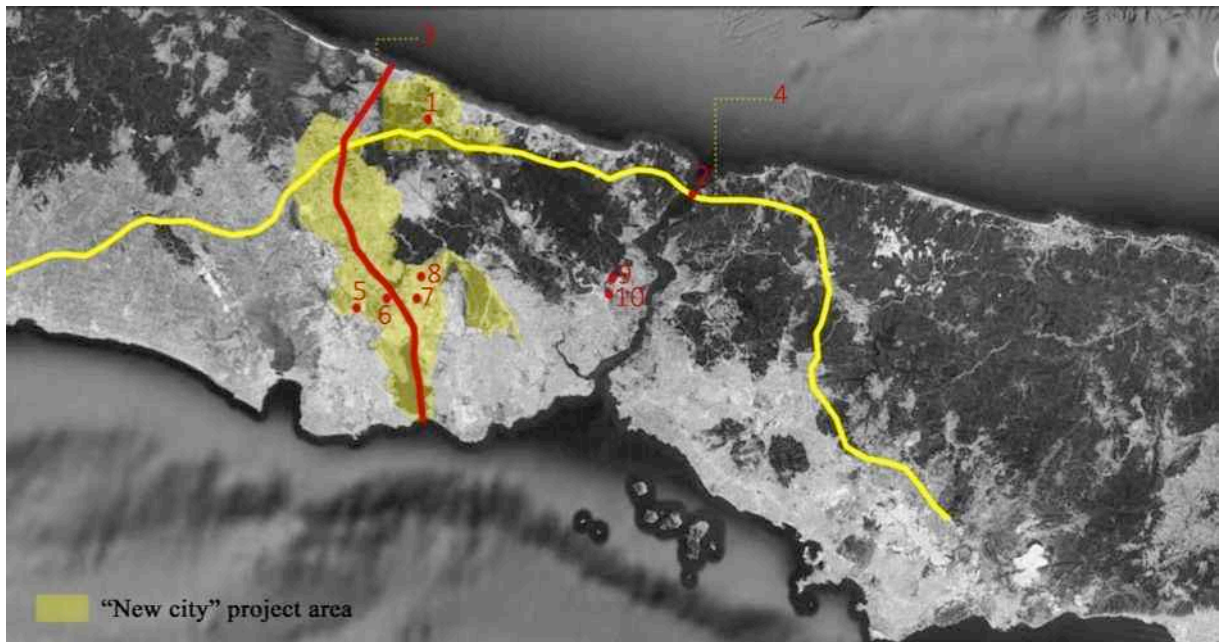
Figure 1: New city project area (Official Journal 2012), mega-projects and criticized sample projects, 1-3rd Airport, 2-3rd Bridge, 3-Canal Istanbul, 4-North highway route, 5-Magnet City, 6-Bio-Istanbul, 7-Sağlık City (Health City), 8-Kayabaşı (Kayaşehir), 9-Maslak1453, 10-42 Maslak.

Other sample projects still under construction have been projected by investor construction firms. The Maslak 1453 project is on the European side of Istanbul, in Maslak/Sarıyer. It has a total area of 320,000 square meters, with shopping centers, residential and office areas and pretends to inhabit sustainable resources and environment-friendly green building systems thereby being a LEED Gold certificate candidate. The 42 Maslak project with a total area of 220.000 square meters, is also located in Maslak/Sarıyer where high-rise office buildings with high investment values take place. This project has office areas which have LEED Platinum Certificate, residential towers, shopping areas, as well as a hotel.

Social contradictions

Three pillars of sustainability based on human needs are not only to provide an ecologically stable and healthy built environment, but the equally legitimate social and cultural needs also ought to be taken care of.

Based on sociological considerations, a set of three core indicators to assess the social dimensions of sustainability have been suggested as dealing with the fulfillment of basic needs and quality of life, which should relate to individual income, poverty, income distribution, unemployment, education and further training, housing conditions, health, security, as well as subjective satisfaction with work, health, housing, income and the environment; which are the claims of social justice within the sustainability discourse as well as social coherence (Littig & Grießler 2005).

Understanding social processes that dominate urban centers is a key factor and a prerequisite to guide urban development and sustain community dynamics. Therefore, politics and policy making mechanisms are directly related to provide social sustainability. Environmental sustainability superposes social sustainability, so it is not possible to rely on environmental sustainability without social concerns. The main question is also whether or not projects designed with consideration of environmental approaches deal with any social issues. Otherwise it is just a naive implementation that provides profits to green investors, as seen in the criticized projects in Istanbul.

The intention to provide green, energy efficient, sustainable and ecological settlements is questionable in such a populous city as Istanbul, due to the penetrating policy making mechanism on urban planning decisions. The contradictions of green enterprises in such projects could obviously be seen, if the interlinked relation between ecology and built environment is taken into consideration in a longer term or decision making is perceived as crucial by policy making. It is essential to analyze sociological considerations that the criticized projects involve in order to comprehend the social contradictions of these green, sustainable, ecologic promoted projects.

The name of the Settlement	Sociological issues						Social coherence outcomes
	The quality of life in terms of facility	Poverty	Income distribution equity	Unemployment	The claim of social justice	Satisfaction with work, health	
Kayabaşı	-	✓	-	✓	-	-	Urban disintegration, outer city replacement of low-income, satellite town
Bio İstanbul	✓	-	✓	-	✓	✓	Gated community of high income, Urban disintegration, satellite town
Sağlık City	✓	-	✓	-	✓	✓	Gated community of high income, Urban disintegration, satellite town
Magnet City	✓	-	✓	-	✓	✓	Gated community of high income, Urban disintegration, satellite town
Maslak 1453	✓	-	✓	-	✓	✓	Gated community of high income, Urban disintegration, satellite town
42 Maslak Offices	✓	-	✓	-	✓	✓	Gated community of high income, Urban disintegration, satellite town

Table 2: *Social contradictions of ecologically-friendly manipulated projects.*

As indicated in the Table 2, sociological issues integrate to settlements independently from the conditions of the society. This approach results in urban disintegration or it forms a gated community for high-income, starting from the very beginning of the design process.

After 2008, TOKİ and Middle East Technical University (ODTÜ) Built Environment and Design Implementation & Research Center (Matpum) collaborated to design energy efficient buildings by integrating renewable energy technologies for Kayabaşı (Kayaşehir) settlement. Accordingly, in October 2010, a study titled "An

evaluation for urban environmental standards in mass housing areas" was presented (Pamir & Pınarcıoğlu 2010). This study consists of nine sections that mention ecological settlements in natural environments, ecological settlements in terms of society, design principles for safe environments, accessible housing settlements, energy efficient housing, built environments with E-communication, economic and sustainable housing, planning mass housing settlements for ethical governance, mass housing as aesthetics living environments. The construction stage integrated with energy efficient technologies, such as water recycling systems and solar collectors, though it is obvious that implementations alone could not provide a sociologically sustainable environment in an urban disintegrated area.

For the proposed projects Bio-Istanbul, Magnet City, Sağlık City, as it is distinctly mentioned in the project presentations, these three projects in the new city are to be regional destinations for defined facilities. Therefore, the labor force is to travel through several places to this region every day. This traffic is to support the living environment and also highways, as there is no directly available public transportation axis to this region. The sustainable, ecologically friendly life, energy efficient buildings discourses are not eligible from the point of view of built environment and ecology relation/integration. Accordingly, these projects lack social sustainability issues.

The Maslak 1453 and the 42 Maslak projects offer facilities such as residential areas, working and living places and both projects also provide accommodation for high-income groups. Despite the fact that the 42 Maslak project's office spaces have already acquired the LEED Platinum Certificate, a space with an identity in a plaza investment settlement area and intended only for working space requirements should be criticized in terms of quality of life of workers and the social justice they offer, compared to the people who are accommodated in the project area. It is obvious that LEED certificate does not change social injustice among building occupants. Besides, the promotion slogan of the Maslak 1453 is a 'new age to happiness', offering sustainable and green built environment for people.

All of these criticized projects are related as a part of the ongoing urban transformation in Istanbul. The perpetual need to find profitable fields for capital-surplus generation is the way of neoliberal politics, through urban transformation and this creative destruction process always has a dimension of class struggle (Harvey 2012). Thus, in a populous city such as Istanbul, designing green cities by integrating renewable technologies and using the referenced terms related to ecology and the built environment could only be a promotion or just a brand to market such buildings, unless the term sustainability is accepted in a holistic approach and supported by legislative regulations of the government.

Environmental contradictions

Environmental sustainability is a multidimensional phenomenon, the measurement of which is challenging and requires a comprehensive set of indicators that show developments in their various dimensions (Eurostat 2011). The term means maintaining and improving the quality of natural ecosystems so they can provide essential goods and services for human life, such as clean water and food, as well as conserving biodiversity and regulating the climate and it is an assessment that shows how far the built environment is pushing the biological and physical limits of the natural environment (Moldan, Janouskova & Hak 2012).

Green as the buzzword of the 1980s is nowadays the buzzword of the construction sector of developing countries. These projects show environmental concerns with an identified specific color but unfortunately not more than a ready-made symbolism and a showing-off of the construction sector, without genuine ecological concerns. The criticized projects are pushing the biological and physical limits of the ecosystem in Istanbul.

The name of the Settlement	Environmental/ecological considerations						Environmental Outcomes / predicted results
	improving the quality of natural ecosystems	clean water and food	conserving biodiversity	Regulating the climate	reducing deforestation	Integrated renewable technologies	
Kayabaşı	-	-	-	-	-	✓	High amount of soil excavation-caused stream bed flow
Bio İstanbul	-	-	-	-	-	✓	High amount of soil excavation
Sağlık City	-	-	-	-	-	✓	High amount of soil excavation
Magnet City	-	-	-	-	-	✓	High amount of soil excavation
Maslak 1453	-	-	-	-	-	✓	Extreme deforestation*
42 Maslak Offices	-	-	-	-	-	✓	High density settlement

Table 3: *The contradictions of ecologically-friendly manipulated projects in terms of environmental sustainability.*

Constructed settlements in Kayabaşı (Kayaşehir) are already a scientific disaster, with a lack of social and environmental concerns. In any case, integrating green technological systems in a new stage on a new site does not change the wrong planning decisions of the settlement that is not integrated with the whole urban system. The project stakeholder TOKİ pretended to design sustainable built environments in the other provinces in Turkey in many projects. As a result of the constructed projects, it was analyzed within the evaluation of physical environment that climatic factors, topographical issues, design solutions of the site and consideration of the urban context have not been taken into account as a basis of a sustainable and energy efficient built environment (Karaca & Varol 2012).

Figure 2: *Kayabaşı (Kayaşehir) housing settlement (Source: Azem 2011).*

The Bio Istanbul, Magnet City and Sağlık City projects intend to offer green, ecological and sustainable living environments with discourses of the center of life, perfect life, green life as subsidiary settlements of the new city, with Kayaşehir as the center of the city. However, using these terminological words requires consciousness, as putting ecology in the foreground of design is a critical condition. And the question would be whether or not Istanbul needs to have more construction sites and huge projects.

The biggest contradiction about the Maslak 1453 project is that a large amount of deforestation has already carried out, but this project pretends to be green and is promoted as ecologically friendly architecture. Besides, the 42 Maslak project, which holds LEED Platinum, also lacks environmental sustainability indicators.

Figure 3: Deforestation proof of "green" and "ecologically friendly"called Maslak 1453 project (Source: TMMM 2012).

Economic contradictions

In developing countries, Adam Smith's invisible hand metaphor corresponds to the individuals' hand making effort to sustain their income against governments' economic policy implementations. Social considerations mentioned in Table 2 are also related to economic considerations, which should be taken into account in designing a sustainable built environment. Income distribution, unemployment rate and the claim of social justice are related to capital distribution in society.

The criticized projects are based on neoliberal economic investments and it is obvious that the new city and other huge investments are for redistribution of capital flow through the valuable land of Istanbul. Main aspects of accumulation through dispossession in the modern neoliberal economy are privatization, commodification, financialization, state redistributions through urban environment (Harvey 2005). As long as ecology and built environment relations are not based on a sustainable socio-economic system network, ecological enterprises are obliged to fail. In the neoliberal system, there is a sustainability gap due to contradictions of green investments. In order to solve the sustainability gap, it is suggested to combine market-rate and socially or environmentally responsible capital by replacing unsupportable levels of financial return with supportable blended financial, social, and environmental returns (Ryn & Cowan 2007, p. 29). As it is understood, integrating the phrase green to the built environment is a whole system which is not considered in the criticized projects.

CONCLUSIONS

Economic approaches based on neoliberal ideology that define the dynamic of daily life as well as the built environment, ensuring sustainability in all sub-systems -environmental, economic and social components- is too assertive to be implemented in real life practice. The buzzwords green, energy efficient, ecologic, sustainable are used to take advantage, as profit-oriented by the investors of the construction sector. Even if some of these investments pretend to offer better living environments in terms of lesser impacts on the natural environment in some ways, in comparison with investments that do not have ecological approaches; the contradictions of designing cities or settlements called green increase in developing countries.

As green, ecologically friendly or energy efficient pretended projects in Istanbul are overviewed from the point of social, environmental and economic concerns; it is obvious that these enterprises are to benefit

from urban land for surplus capital. These projects do not provide social equity under several subheadings of sustainability issues, they even do not improve the quality of natural ecosystems or conserve biodiversity. The most significant criticism about these green enterprises is that the architecture they offer is not for humans. On the one hand, projects invested by several construction firms, such as Maslak 1453 and 42 Maslak, propose privileged living environment for high-income groups, while on the other hand the proposed new city project on the European and also the Anatolian side of Istanbul accumulate population density as a result of urban transformation, thereby causing urban disintegration.

In social sciences, many academics do not have adequate scientific knowledge about the other fields of science and this lack of knowledge causes a gap in evaluating science as a whole (Wallerstein 2013). The criticized projects show that in the field of architecture, there is a gap in integrating social considerations into the built environment in different scales of planning in practice. In Istanbul, building green new cities ironically in a city with a population of approximately fourteen million, is just a manipulation based on urban transformation in central places of the city, where sites have high investment values. It is a result of seeking new spaces for the resettlement process of displaced occupants. It is observed that the broadened idea of sustainability that includes social wellbeing, resilience adapted to ecology, economics, politics and culture, does not reflect into the real practice of architecture.

The basic perspective of social ecology was defined nearly twenty years ago, but not yet taken into account by policy making in developing countries. According to this definition, political ecologists fail to recognize that the roots of the problems they care about are not overpopulation or pollution, but the unequal distribution of resources and privilege, so that the few may consume to excess while the many suffer, their basic needs never met in the first place (McDonough & Partners 1995, p. 48). In this case, in Istanbul, innovative renewable energy technology integration is not only to provide energy efficient or green environments, but also equal distribution of resources and social justice for accessibility to healthy environments should be guaranteed in order to be able to refer to a relationship between ecology and the built environment.

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THE RURAL AREA AS AN URBAN DEVELOPMENT MODEL THAT DIFFERS FROM THAT OF THE MEGA URBAN AFRICAN TOWNS OF THE FUTURE: MATERI, BENIN

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Abstract

The plan for the development of the township of Matéri (Benin) was taken as the starting point for an experimental project by the Workshop for environmental sustainability of the University IUAV of Venice, the purpose of which is to find a solution to the growing problems caused by the demographic explosion in the country.

The objective is to propose an urban-rural model for the development of the contemporary African township that could be extended to other areas of Benin. This shifts the emphasis from the mega urban towns to rural areas, so as to propose a way of life linked to the community and its agricultural production, starting from the traditional way the land is used and occupied in Africa.

This is a way to deal with the lack of development in rural areas: creating a self - sufficient economy, reducing immigration from the countryside to the large towns and the consequent uncontrolled urbanization. But it is also a proposal of a development model that differs from that of western economies.

Central to this idea is the encouragement of sustainable agriculture by means of a distribution structure made up of small producers, food processers and wholesalers able to be self-sufficient, thanks also to the training carried out by European institutes and universities.

The sustainability of the strategy and the feasibility of the proposals developed by the Workshop will be verified in practice in April-May with a training program involving both Italian and Benesi teachers and students, the community and the city authorities of Materi. The objective is to produce a proposal which is both appropriate and agreed upon by those directly concerned, for the development of the contemporary African city.

Keywords: identity of the contemporary African town, new rural-urban model, sustainable agriculture, training.

INTRODUCTION

This attention towards the African continent arises from the years-long tradition of urban studies characterizing the University IUAV of Venice, which has always strived to perceive the transformations of cities in their development processes and in the translation of these changes into opportunities of reflection, research, education. Although nowadays Africa is still the least densely populated continent on earth, it is also one of the areas where the demographic pressure is stronger and growing steadily; however, the development schemes are generally not sustainable and are multipliers of negative factors.

While one of the characteristics of Africa has always been occupancy of the land that is more oriented towards dispersion than concentration, nowadays the push toward the cities is huge, and as a consequence the African megalopolis is expanding uncontrollably, engulfing the fertile soil that should guarantee their subsistence. The most noticeable expression of poverty at an urban level are the slums and the informal districts, which are so typical of the landscape of the African cities; their dimensions are such that one can only assume they are actually a consequence of urbanization, and the only way to build a city, the *forma urbis* of twenty-first century Africa. The general trend is migration toward the cities, but it is a slow evolution;

this does not mean that the urban population is decreasing; on the contrary, it is in continuous development but the same thing is happening in the rural zones.

In this scenario, the sustainable development of these urban agglomerates that are located in a dimension between city and countryside (*brousse*) is of considerable importance; on the one hand, it makes it possible to reduce migration towards the big cities and the consequent un-controlled urbanization; on the other hand, it is a means to keep spontaneous - unplanned - urbanization under control in the rural areas that could lead to problems of territory management (soil erosion during the rainy season, lack of water regulation, absence of sewerage infrastructure).

Sustainable development in which the subjects pertinent to housing and the required infrastructures are strictly interconnected with the management of the natural resources, the role played by family agriculture and the reciprocal relationship between the city and *brousse*.

URBAN DEVELOPMENT IN RURAL AREAS: CHALLENGES AND OPPORTUNITIES

Planning in countries in Africa requires the skill to assess practices and strategic intervention to redefine the actual word 'sustainability' in a land that is growing and developing on a very different scale from the West.

In fact, dealing with these territories means one must resort to the tools of different disciplines, from geography to anthropology, from architecture to climatology, assuming a complexity that overcomes the simple architectural artefact, and determining multiple connections both at a local and at global level.

Designing requires first and foremost knowledge of the customs and the ways in which the land has been occupied, with the typical characters of the traditional African dispersion that reflects the way of living within the community. In Benin, and in general in Sub-Saharan African countries, where the informal self-made settlement represents the standard, the strategies of forced control typical of western planning are losing their effectiveness.

On the contrary, this freedom of aggregation must be assumed as a component in the shape of the new housing agglomerates in order to propose an idea of 'modulated densification' that can be applied to the African rural context.
The result is the development of independent districts that are formed like buds from the central core and existing agglomerates that will go on to multiply in time in both dimension and identity.

The interest shifts from the megalopolis to the rural agglomeration, in order to suggest a way of living that is linked more closely to the community, and to the controlled exploitation of available resources, in contrast to the disastrous growth model of the big metropolis with shantytowns and suburbs that are full of social degradation and misery.

This is a way to tackle the issues related to the lack of development in the rural context, starting a self-sufficient economy, and curbing the migration process in progress from the countryside with the consequent phenomena of overpopulation and uncontrolled development of the big conurbations, but it is also a proposal for an alternative planning model, compared to the one imported from other worlds.

Caused by the attraction of the urban settlements and by the rural exodus, and sharpened by the recent desertification phenomena, the rapid change of the traditional society results in the appearance of new life and habitation models. As a result, the transformation of territory does not often take consolidated traditions into consideration; they do not respect the sacred places of familiar and collective customs; they do not take into account the cosmogonies that were translated into the physical shape of the traditional village.

Therefore, all too frequently new buildings keep reaping western dominant paradigms, proposing brutally technological solutions or relying on shoddy folklore taken from the local traditions. These phenomena not only target the structure of the traditional habitat but even more so the concept of private housing, which is more sensitive to changes and new needs.

Architecture should give voice to a different way of living, achieved with just few means, controlling the resources that, on the one hand guarantee the preservation of a unique environmental heritage and, on the other, the employment of natural resources, generating a variety of solutions that combine the rich original culture, which is still closely connected to nature, symbols, and myths, with the technological opportunities of nowadays, without renouncing the richness and complexity of new materials and technologies that can be adapted to a climatic, geographical and cultural situation that is totally different from that in the West.

However in this transition, many things happen, new shapes are added to the existing ones, redrawing the geography of the African territory. An African architecture, clearly definable as such, does not exist; this part of Africa is looking for its own identity both socially and architecturally. Different and remote cultures, such as African ones, must not be viewed as something from which one can only expect to take a few keywords, but rather they must be seen as equal protagonists in a common educational process that teaches how to deal with new codes, concepts, categories and cultural references. Being foreign in a world that is increasingly characterized by cultural pluralism means encouraging diversity, educating to use more languages without renouncing the richness of native languages in our work, being able to use aspects of a different culture, maintaining relations with it, whilst also avoiding being presumptuous enough to claim one has completely understood it.

Exploration is a research that allows us to move the attention from the project to the process, to the interpretation of the non-stop changing relationship between subjects and places, between society and contexts. Particular attention is paid to these transformation places, where the change and the mutation in other ways of cohabitation, which are more balanced and sustainable thanks to the experimentation of new methods of knowledge and design, can come true.

Interest in the research of new models of urban development in a rural context has been, in addition to the exploration of the research topics with strong spatial implications, the verification of ways in which such interventions could become the engines of a sustainable transformation of the territory, generators of new centralities and of the quality of living.

The research is supported by broader paradigms within which the relationship between urban-rural, density-dispersion and tradition-innovation are located.

THE CASE STUDY: MATERI

The city of Matéri was chosen as the pilot project. Matéri is located in the northwest of Benin, in the Atakora department - 600 km north from the capital Cotonou. The city is divided into 6 districts, composed of 55 villages. The population is now around 100,000 habitants, and it is expected to grow to an estimated 200,000 inhabitants by 2030.

This area is characterized by agricultural functions and activities based on a rural type of social, economic and cultural background.

From the satellite picture of Matéri (Figure 1) the following elements are recognizable: the urban agglomerate where the institutional buildings and the market are located; the agricultural areas *(savane à emprise agricole)* spreading in the small villages into the central part of the territory; the wild-pastoral areas concentrated in the west; the naturalistic emergences of the Park of Pendjari in the north. The territory, covered by a savannah of shrubbery and trees, is crossed by many water courses, most of them seasonal.

Figure 1: *Satellite view of Matéri (reworked version from Google Maps - ©2014 Google).*

The main street that crosses the urban centre in the west-east direction converges into the axis connecting Matéri with the South and the Central part of Benin and - in the North - with Burkina Faso.

The main points of the Development Plan (Plan de Developpement de la Commune) adopted in 2010 by the local government are basically as follows (Figure 2):

- development and concentration of new settlements - in a strip of expansion around the present nucleus of houses - following a controlled plan of soil occupancy and providing them with the basic services: (drinking water, electricity, sanitation facilities);
- strengthening the urban settlement along the main itinerary with the addition of: aggregation places (urban youth centre, centres devoted to sport and young people associations) and new facilities (schools, sport places, agricultural warehouses, markets, laboratories for the production/transformation of agricultural products, laboratories and centres for professional education and startups);
- concentrating the administrative buildings in the area located in the north of the existing residential nucleus;
- developing a commercial area in the south part of the settlement in order to grant continuity with the existing market;
- contributing to an improvement in the life style in the existing districts with their inclusion in a holistic project of sustainable development of the territory;
- development of new touristic structures respecting the presence of the natural Park of Pendjari - a UNESCO heritage site - and following the criteria of sustainable management in order to control the development of this precious part of the territory and of its natural resources.
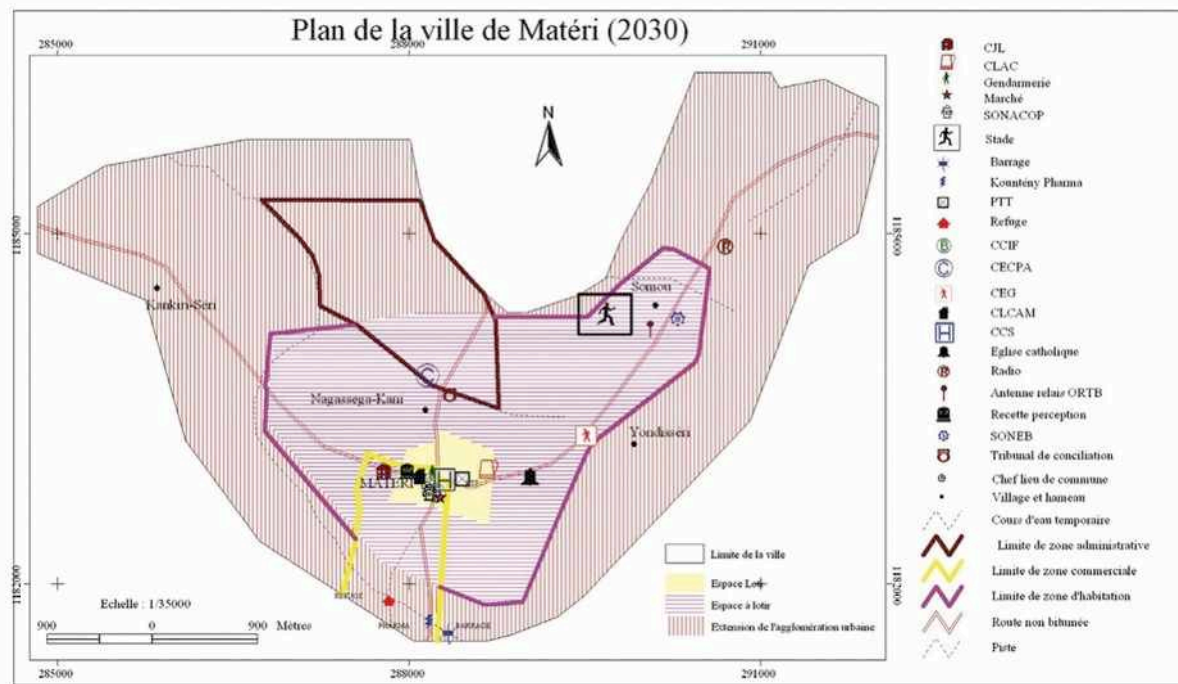
Figure 2: *Matéri: development scheme 2030 (Source: SDAC 2010, p. 132).*

FROM PLANS TO PROJECTS: EXPLORATIONS FOR A SUSTAINABLE DEVELOPMENT

Starting with the general guidelines contained in the development plan of Matéri – in the form of a case study - the Atelier experimented new settlement models (Figure 3) able to assimilate the culture of the place in their configuration and to recover and consolidate the local know-how, enriched by technological innovations and the exploitation of the natural renewable resources (biodiesel, biogas, photovoltaic panels). This required the adoption of processes that were suitable to the context and could be repeated by local communities.

The main objective of this approach was to contribute to the translation of the contents of the Matéri Development Plan whilst also giving an image of the places that were the object of this transformation in order to start a debate with the local community on the issue.

The internship/trip to Matéri that is foreseen in the second phase will be an opportunity to work together with the local community and technicians. There are two main goals: first to discuss the selected proposals in advance and last but not least, but to verify the possible benefits with the participation of the population and the degree of acceptance of the proposals. The opportunity of this 'participated atelier' opens new scenarios for the education of the local technicians who, in their professional role, will have to face the problems connected with the realization and reproducibility of the projects, personalizing them each time according to their own particular context. Seen as urban explorations for the development of Matéri, the resulting projects offer an answer to the general topics hitherto evoked, proposing expansion strategies through the construction of autonomous residential districts from the existing central nucleus. These districts will increase in dimension and identity in the near future, whilst taking into account the context, and without setting aside the collective memory and immaterial dimension of the local myths and sacred spirits which still are integrative elements of African architecture.
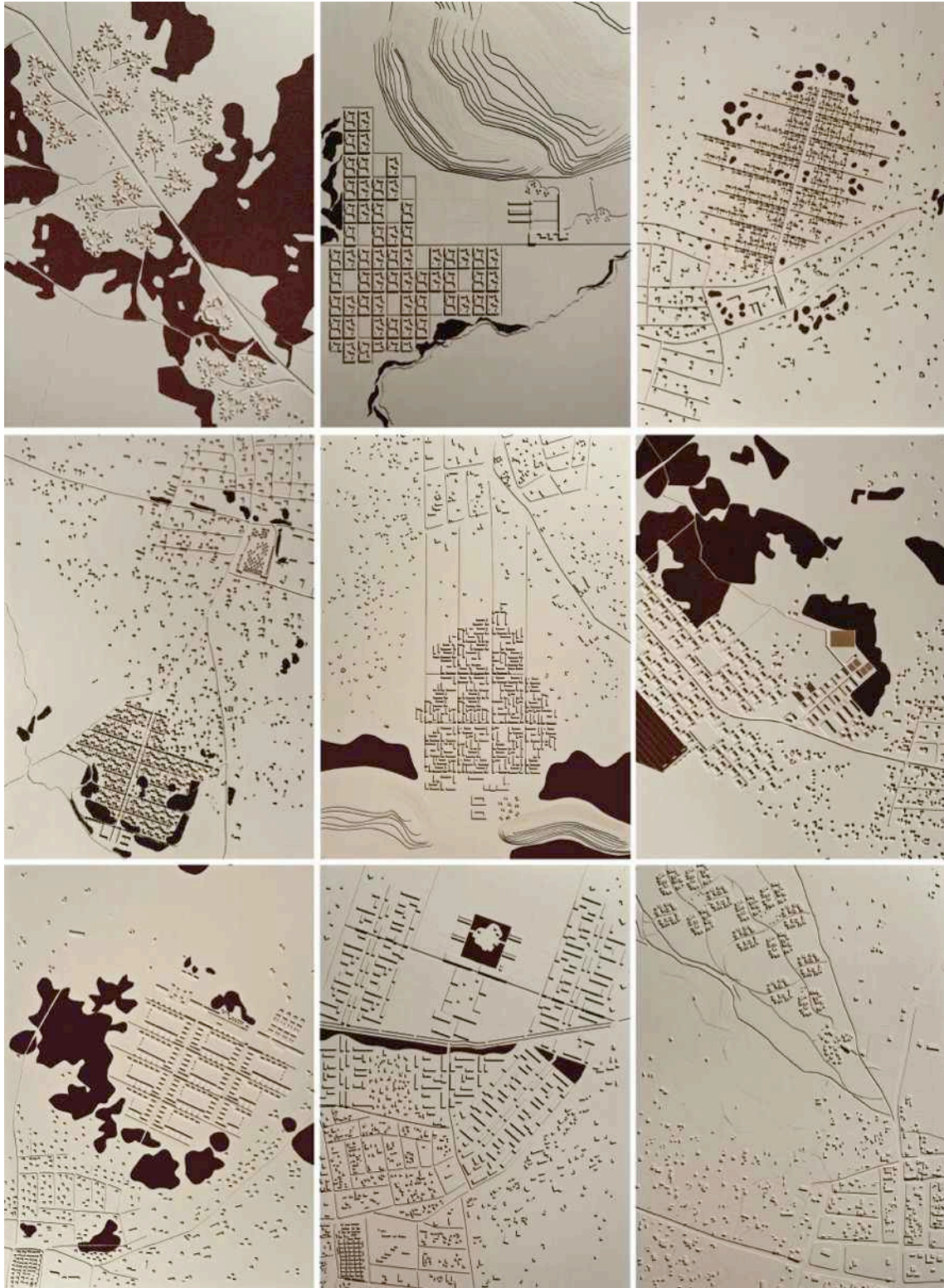
Figure 3: *Experimental urban/rural settlements: a selection of the planning projects developed by the students. The images submitted do not exhaust the illustration of the individual proposals but show the planning strategies adopted. All the projects reflect on the context with particular reference to the spatial relationships.*

The starting point for the creation of new districts is the minimum entity of the room/accommodation that composes the housing units. However, the consolidated concepts of western tradition must be overcome. In fact, in African culture, the house is never seen as a static concept; on the contrary, it is a dynamic process of

mono-functional rooms, which reflect the development and transformation of the people living there (Figure 4).
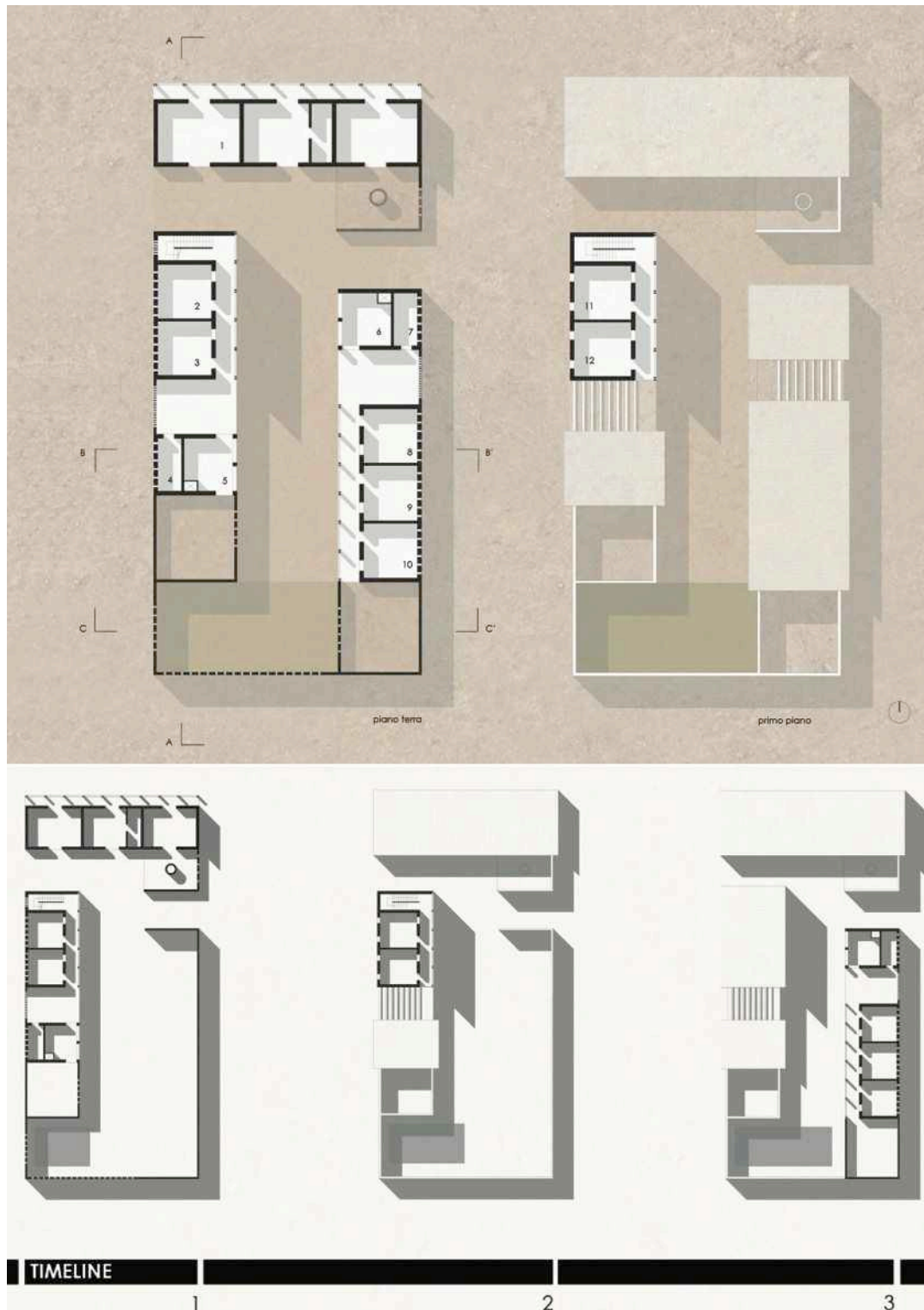
Figure 4: *Multi-purpose house: plans and further expansion and modification in use (project by P. Guidolin, F. Parolin, C. Sottana).*

Bearing in mind that most of the people that will live in the expansions come from the surrounding rural areas, particular attention was paid to maintaining some characteristics of the typical African house in the

aggregation spaces, such as the courtyard - an essential component for the environmental control and for the socio-cultural exchanges (Figure 5).

Figure 5: *House type: view of the inner courtyard and longitudinal section (project by M. Becevello, A. Calandriello, F. Zanibellato).*

In the strategies of urban expansion adopted, the public facilities and the collective buildings assume a very important role, each time giving a well defined character to the residential area: they are in fact the generating elements that create new recognizable places.

It is possible to speak of a settlement character of the new facilities which result in a design and hierarchy of the open spaces, introducing new centralities such as the urban centre, the market areas connected to the production, processing and sale of the agricultural products with the relative classrooms and laboratories for professional training (agricultural centres), accommodation facilities in order to stimulate the development of tourism thanks to the presence of the Pendjari Park.

The typology of the buildings is often the result of the hybridization of living places and collective spaces, since there is not much difference between domestic architecture and big complexes dedicated to sacred or civil uses in African culture.

At the end of the Atelier, of the 25 projects presented to the representatives of the local government, two projects were selected for the urban centre, two for the agricultural centre, and two for the hotel and accommodation.

Both the proposed solutions for the urban centre (Figure 6, 7), seen as a place for meetings and education, provide a complex of buildings, housing rooms for teaching, a library open to the city, educational workshops linked to the presence of vegetable gardens, places for the sale of products, and a canteen.
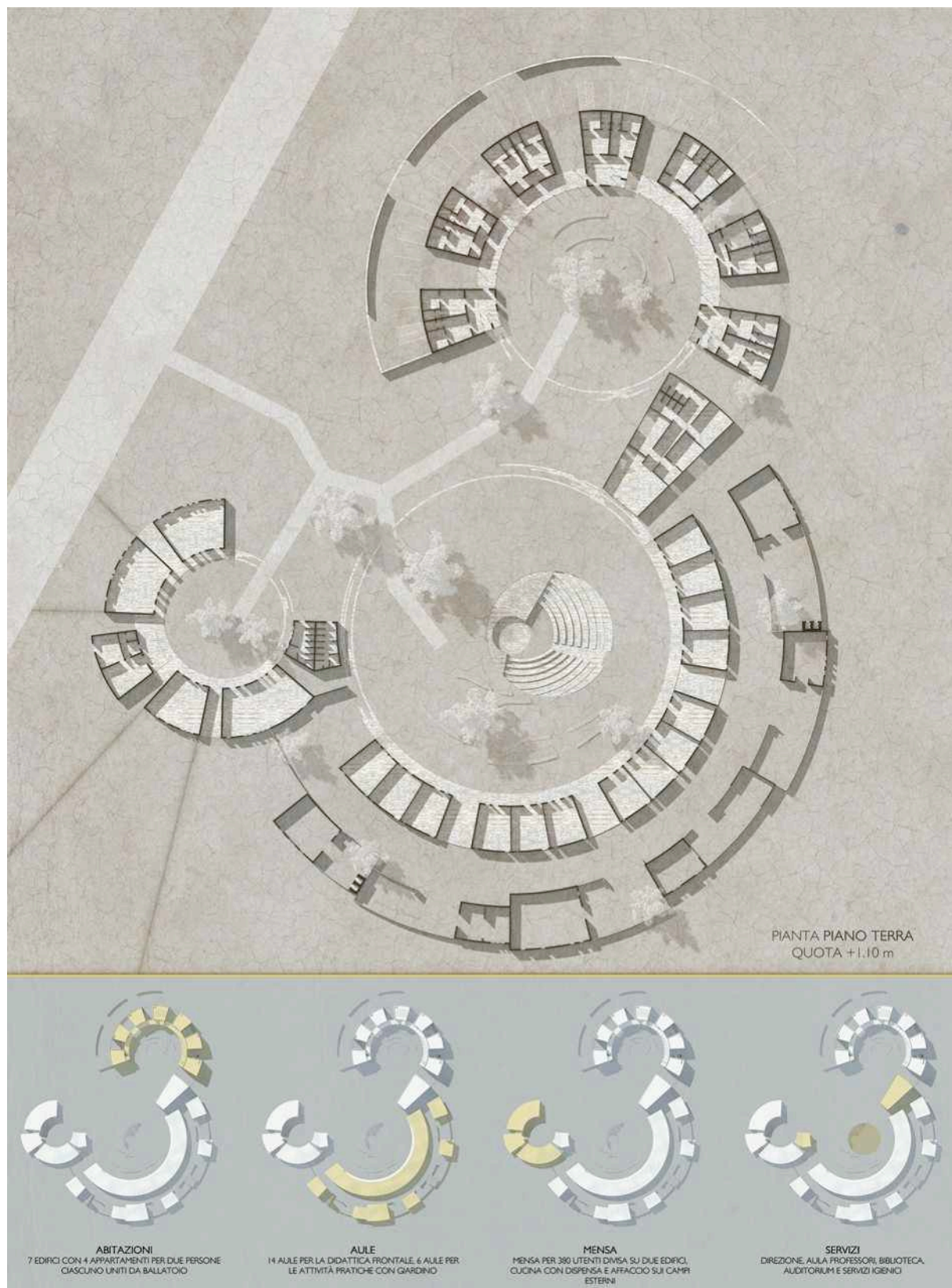
Figure 6: Urban centre: ground floor plan with functional scheme: accommodation for visitors, rooms for teaching, canteen, library and office (project by G. Bolzanella, M. Polato).

The most important aspect is the relation between the various parts of the buildings, since the shape of the complex, as suggested by the study of the traditional houses of Tatasomba, is secondary.
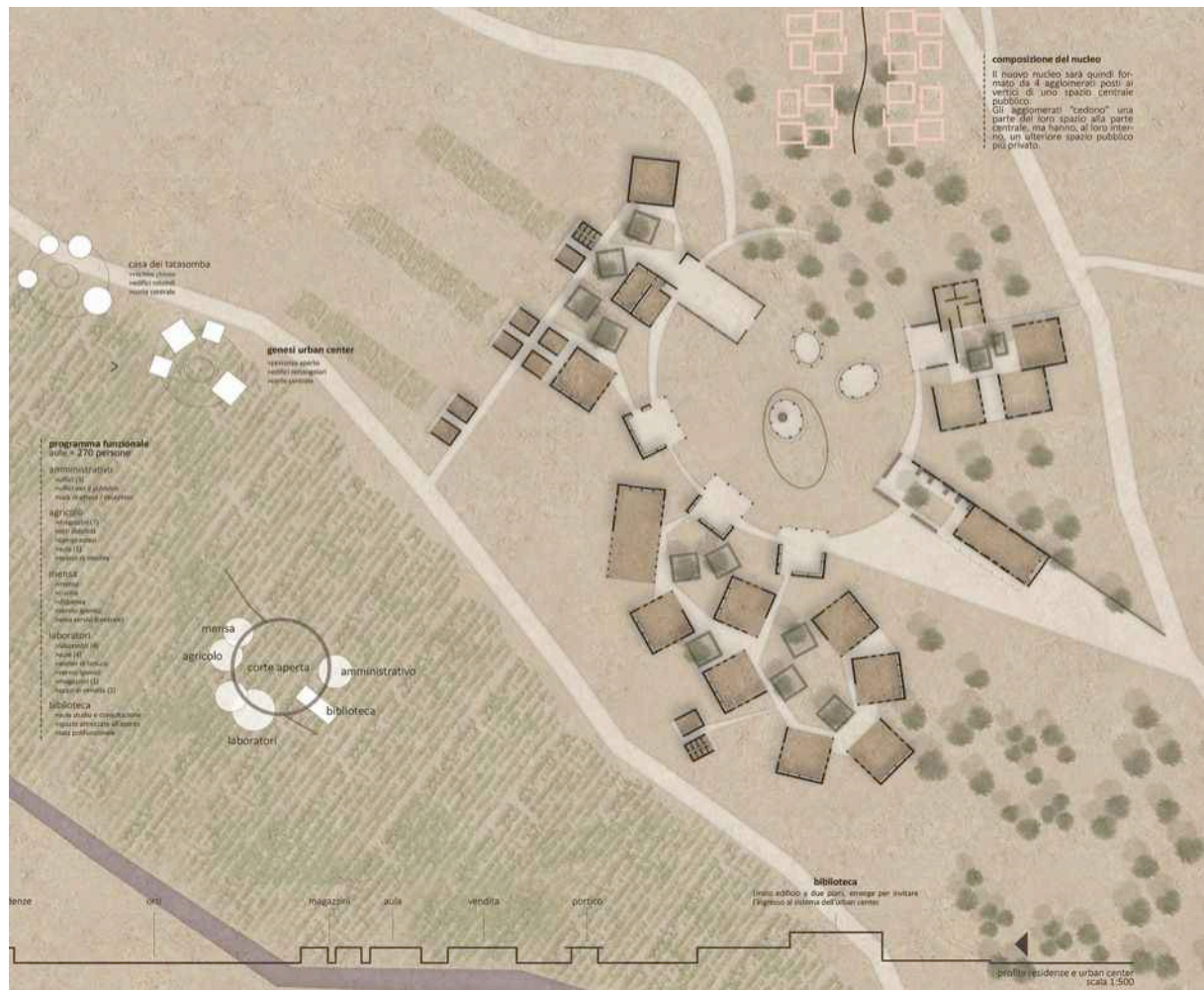
Figure 7: *Urban centre: general site plan with concept of Tatasomba house (project by G. Marchetto, G. Morrone).*

The presence in the work group of the Perenzin Company, adding an important element of training in the dairy field, also in developing countries, is linked to the projects for the agricultural cooperation centres (Figure 8).

The scale of these projects has to be urban: if the housing unit is the module of the settlement system, with its dimensions the field regulates the planning of the ground on a territorial scale; if the courtyard in the urban nucleus is the fulcrum for family life, in the public space of the agricultural centre, it becomes the meeting place where study spaces (training laboratories, classroom), and work spaces (greenhouses, craftsmen workshops, small craftsmen workshops for the transformation of products such as milk, sales points).

The space dedicated to the production, the processing and the storage of raw materials will be placed in an area near the field directly in contact with the market for the selling of agricultural products.

Both the projects have the objective of creating an agricultural plan that corresponds to African resources and requirements.
The common element underlying the accommodation projects is the attention paid to the ecosystem, to the different topics of the landscape and the territory and their interrelationship from small to large scale.
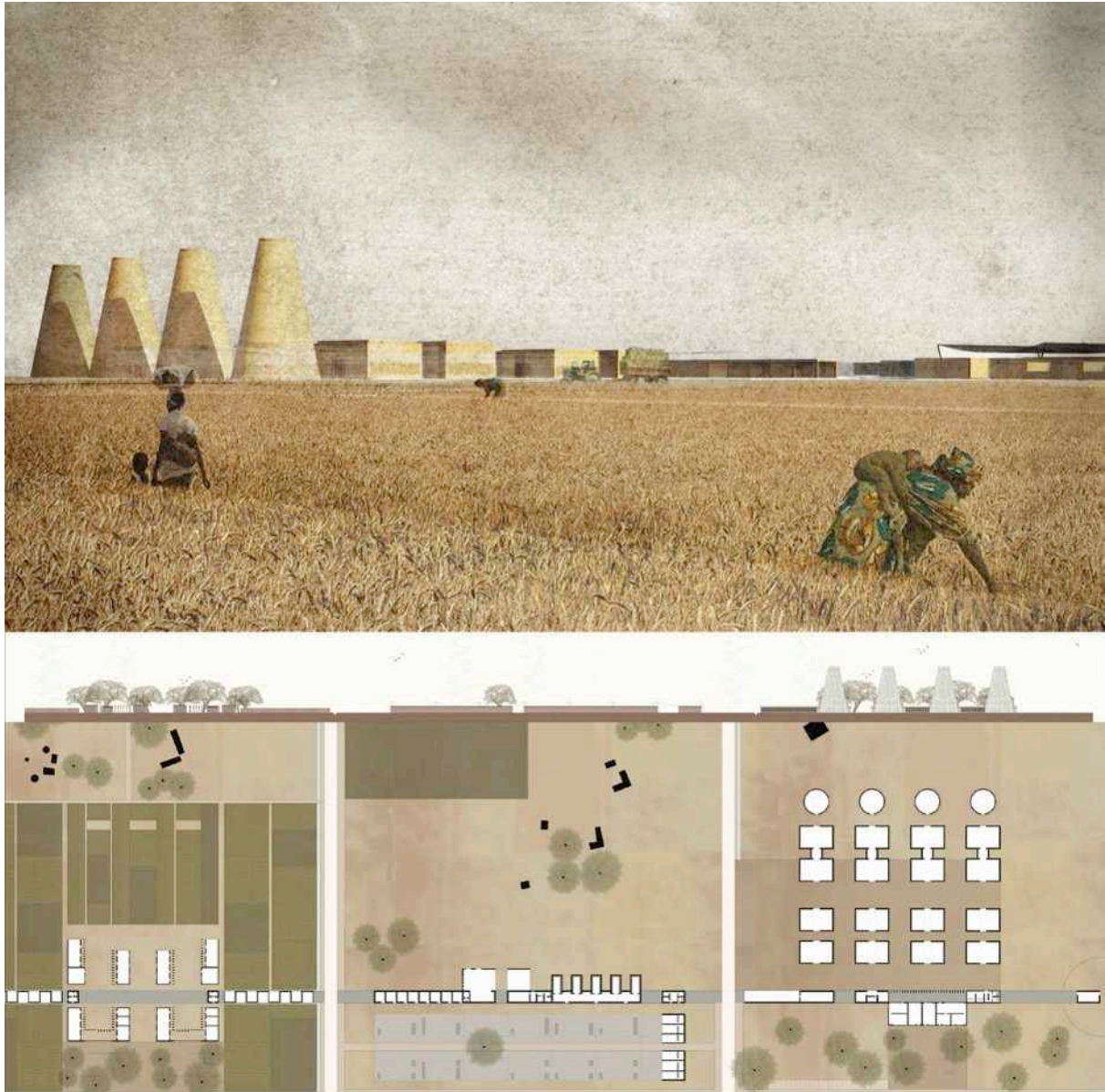
Figure 8: *Farm centre: general site plan and silos view. The complex presents itself as a production, training/human resource development and service centre (project by L. Dilorenzo, S. Tonetto).*

A functional and aesthetic architectural 'system' that consists in a network of paths organises the layout, integrating the accessory and service buildings as well (Figure 9).

The main strategy behind all these projects is the stimulation of an eco-sustainable agriculture and preservation of the rural characteristics - still very frequent in Matéri - integrating them with the emerging urban character.

The purpose of the integration of different forms of social-economics and spatial organization has two goals: on the one hand, to support the modernization of the urban structure, and on the other hand, through the creation of local micro-chains and the education of the new generations, to trigger a mechanism able to generate profit and guarantee the subsistence of the population.
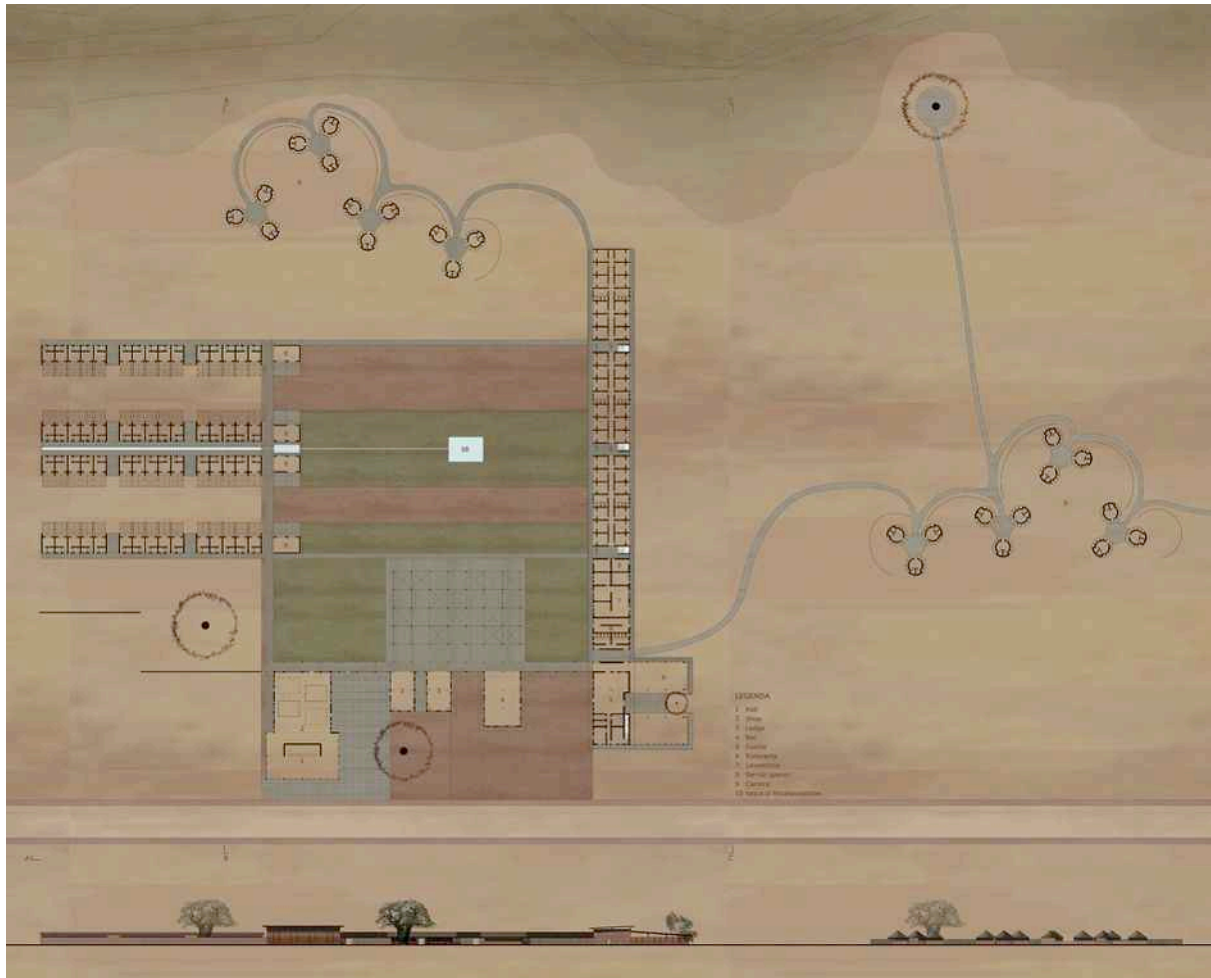
Figure 9: *Accommodation facilities: general site plan. The main building with reception area, shops, a café open to the public, the residences and the private bungalows (project by M. Becevello, A. Calandriello, F. Zanibellato).*

ACKNOWLEDGEMENTS

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UPGRADING HISTORICAL AREAS SURROUNDED BY INFORMAL SETTLEMENTS

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Abstract

In Egypt there are around 25 million people inhabiting informal settlements under extremely low standards of living.

The situation further induce other problem, due to the fact, that – unfortunately - several of these informal settlements surround and intermingle Cairo's numerous archaeological and historical areas where the poverty stricken population have settled in high density. As a result, significant architectural buildings of great historical heritage are now standing amidst drastically deformed environs as visual pollution ruins their original magnificent quality.

This paper proposes a twofold approach of heritage preservation and community development. It represents the outputs of a practical research and planning/design exercise which has been undergone by the author in collaboration with a team of ten post graduate students in the area of the very famous Al Sayeda Zeinab Mosque in the center of Cairo. This exercise, including physical, architectural and social surveys…etc. accumulated in generating a master-plan for upgrading/rehabilitation of the study area.

Keywords: informal settlements, community development, heritage preservation, visual pollution, upgrading historical square.

INTRODUCTION

In Egypt there are around 25 million people inhabiting informal settlements with very low standards of living.

The bigger problem is that unfortunately several of these informal settlements surround most of Cairo's numerous archaeological and historical areas where people under poverty line have settled in high population density. As a result, significant architectural buildings of great historical heritage are standing amidst drastically deformed environs where visual pollution ruins their original magnificent quality.

This research is trying to develop a twofold approach of heritage preservation and community development for the very famous square of Al Sayeda Zeinab Mosque in the center of Cairo.

THE AIM OF THE WORK

The main objective of this research is to develop a methodology for upgrading similar areas, especially in Egypt, in order to achieve two parallel goals as follows:
First: To develop and to upgrade living conditions of people living in informal settlements since these settlements negatively affect the whole society by being a source of crime and pollution.
Second: To create livable urban spaces surrounding historical buildings in order to preserve and maintain them as well as visually attractive for urban validity and Tourism.

THE LOCATION BACKGROUND: AL SAYEDA ZEINAB SQUARE

Al Sayeda Zeinab Square is considered one of the most popular ancient districts in Cairo. It is a congested area with high population density, and consists of many old buildings. In the center of the square, the great famous Mosque of Al Sayeda Zeinab is located. The square is full of local cafes and restaurants that represent the very pattern of special popular malls, where people are used to go to celebrate the month of Ramadan and the feasts (Wikipedia).

THE GREAT MOSQUEHISTORICAL BACKGROUND

Al Sayeda Zeinab Mosque is one of the most famous ancient mosques in Cairo, it stands in
the heart of the square named after Al Sayeda Zeinab, the granddaughter of Prophet Mohamed, May Prayers
and Peace be upon him. Al Sayeda Zeinab is also the youngest daughter of both Al Sayeda Fatima, the
Prophet's daughter and his cousin Ali Ibn Abu Taleb, and the sister of the two Imams Al Hassan and Al
Hussein. Her mosque was set up shortly after her arrival to Egypt. According to her will she was buried in the
same place where she had lived for about eleven months. Her mausoleum was built close to the northern
flank of Maslama Residence, overlooking the River Nile Bay near Al Sayeda Zeinab Square. The mausoleum
was orated by domes, niches, and inscriptions of Arabic calligraphy. The first actual innovations of the
mosque took place during the reign of Sultan Ahmed Ibn Tulun.

In the sixth century after the Hijra, Sultan Al Adel Ibn Ayoub repaired the mosque and built a smaller mosque
adjacent to it. The Mameluke Prince Abdul Rahman Katakhda reconstructed the mosque and furnished it
with a toilet for ablutions. In 1201 A.H. the mausoleum was repaired and glided with a layer of yellow copper
and the mosque area was expanded to cover three thousand square meters. In 1315 A.H. during the reign of
Khedive Tawfik, the then ruler of Egypt, the present mosque was re-built adjacent to the mausoleum. In
1946 A.D King Farouk, the last monarch in Mohamed Ali's dynasty, ordered that both the mosque and the
mausoleum be repaired. After the 23rd July revolution and during the era of President Gamal Abdul Nasser
the mosque was expanded to cover an area of 4000 meters. The mosque was again expanded during
President Hosni Mubarak terms of office to cover 18000meter with a capacity of 15000 worshippers, this
expansion and the repairs subsequent to it were executed in line with the architectural styles and designs,
implemented during Khedive Tawfik's era.

The main facade of the present Mosque looks over Al Sayeda Square with three gateways leading directly to
the mosque. The minaret stands high to the left of this section. The inside ceiling covering the whole area of
the mosque is erected on columns made of white marble.

A light shaft stands over the section located in front of the old niche. As for the mausoleum it lies to the west
of the mosque surrounded by a compartment glided with yellow golden copper and topped with a dome
(Memphistours). In spite of the highly crowded traffic in the square, the Mosque dominates its whole scene
and represents its visual focal point.

THE INFORMAL SETTLEMENT SURROUNDING THE SQUARE
HISTORICAL REVIEW

By the end of 60s, Cairo metropolitan area, the national capital and the epitome of centralized power and
intensive public investment, was witnessing an accelerated population growth due to rural urban migration
for job opportunities, real and marginal, and better living conditions. Demand for housing much exceeded
the public and private supply. This situation was further exacerbated following the 1967 Arab-Israeli war, up
to 1973 war, due to the influx of Suez Canal Governorates population who fled the war zone to the already
congested capital and other areas. For assimilation of this mass immigration the Government resorted to
emergency actions through establishing a kind of "make-shift" housing arrangements, mostly light wooden
structures, in some selected areas in Cairo. One of these areas was "Zainhom", a vacant stretch at the eastern
fringe of Cairo. Following the 1973 liberation war and immigrants were backing home, the area was
squatted by the very poor and marginalized population groups. Further settlement and expansions took
place with the same pattern of tin houses and scrambled building materials and methods. Eventually the
area turned to be one of the large spontaneous settlements in Cairo, with an area of about 50 Egyptian
feddan (20 hectares), and substantial high density.

The Negative effects of the "informal settlements' phenomenon":

The spread of informal settlements in most of Egypt's provinces reveal the scale of the problem and its
negative impact which affects the whole society. It represents not only an urban problem, but is also a
reflection of the society's economic and social circumstances as since such areas suffer from:
1-   A rapid increase in population.
2-   Poverty; for its dwellers suffer from Low income, unemployment, and deteriorated housing conditions.
3-   High rate of illiteracy and the number of school dropouts.

4-   Social disintegration.
5-   Shortage of infrastructure.
6-   Lack of health, educational, entertainment and security services.
7-   Pollution due to the presence of industries and burning of garbage within the living area.
8-   Poor life standards in general.
It's worth noting that all the above mentioned factors give rise to crime and vice.
(Rawia Hammouda 2011).

The current basic features of the area and population could be summarized as follows:
- Urban features:
  • Improvised construction of unauthorized buildings and streets that don't meet formal grid.
  • The spreading of unorganized urban fabric characterized by narrow, winding streets.
  • The presence of all forms of commercial and industrial activities side by side with residential buildings.
  • The absence of green areas and open spaces.
  • Variation in the heights of apartment buildings that mostly have unpainted facades.
  • Variation in the types of dwellings: multi-floor buildings, shanties and huts.
- **Demographic characteristics:**
- Overall Area: 7.04 km2, Inhabited Area: 0.83 km2, Density of Inhabited Area: 192000/km2 (1920 person/hectare), Tenure System: Not identified, Public land illegally squatted and sub-standard building with no permits (Cairo.gov).
  • High population density: Population: 159058.
  • High rate of residential crowdedness (4-6 persons/room).
  • Big average family size (6 or more).
  • 77 % of the inhabitants are within the category of "low income" (a monthly income ranging from 100 to 500 Egyptian pounds.
- **Social features:**
  • Poor education, widespread ignorance and bad habits. 53% of its dwellers are illiterate.
  • Rise in unemployment, crime, social and moral deviation.
  • Increase in the number of squatters and outlaws.

METHODOLOGY:

Planning for upgrading and rehabilitation of the area has proceeded into sequential phases and steps that could be summarized as follows:

First Phase: Surveying and analysis:
This phase embodied the following actions and activities:
-   Field visits, recording of observations recording, photographing and frequent encounters with residents, to allow for a comprehensive configuration of the realities and specific issues of the local situation.
- Conducting land and building survey. This included identification of land use, building types, (building materials, construction, state quality and safety assessment, date of building…etc.). Surveying activities extended also to other features; such as the state of roads, traffic, and their marginal occupation and uses…etc. Standard formats for data collection and coding were designed and applied.
- Conducting a social and socio-economic survey of a sample of 40 persons in households. A standard questionnaire was designed and applied.
Second Phase: Defining the problems:
- Analysis of above-mentioned layers of data and information, individually, and through
Multi-layer analysis – including projecting the historical/chronological sequence of land
occupation and uses – conduced a comprehensive and clear identification assessment of the area's characteristics and problems (physical, environmental, social, traffic, urban/visual etc.).
This also extended to identifying the potentials and positive aspects that could be handled for practical rehabilitation of the area and community.
- Conducting a literature review of the different rehabilitation experiences in similar
spontaneous settlements, and drawing learned lessons.
Third Phase: Developing a new Master Plan:
In this part a new master plan for upgrading/rehabilitation of the whole area was generated, taking into consideration all the social aspects that showed up through surveying process and further analysis.

THE PROPOSED METHODOLOGY CONTAINS SIX MAIN PARTS:

PART I: THE PLANNING SURVEY
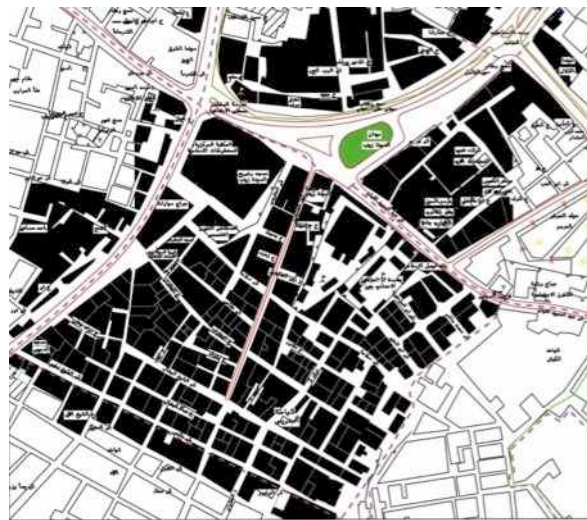
Spaces   Buildings

Figure 1: *The urban fabric.*

Main Roads   Minor Roads

Figure 2: *The Roads.*

Ground   Ground +2   Ground +3   Bad   Worse
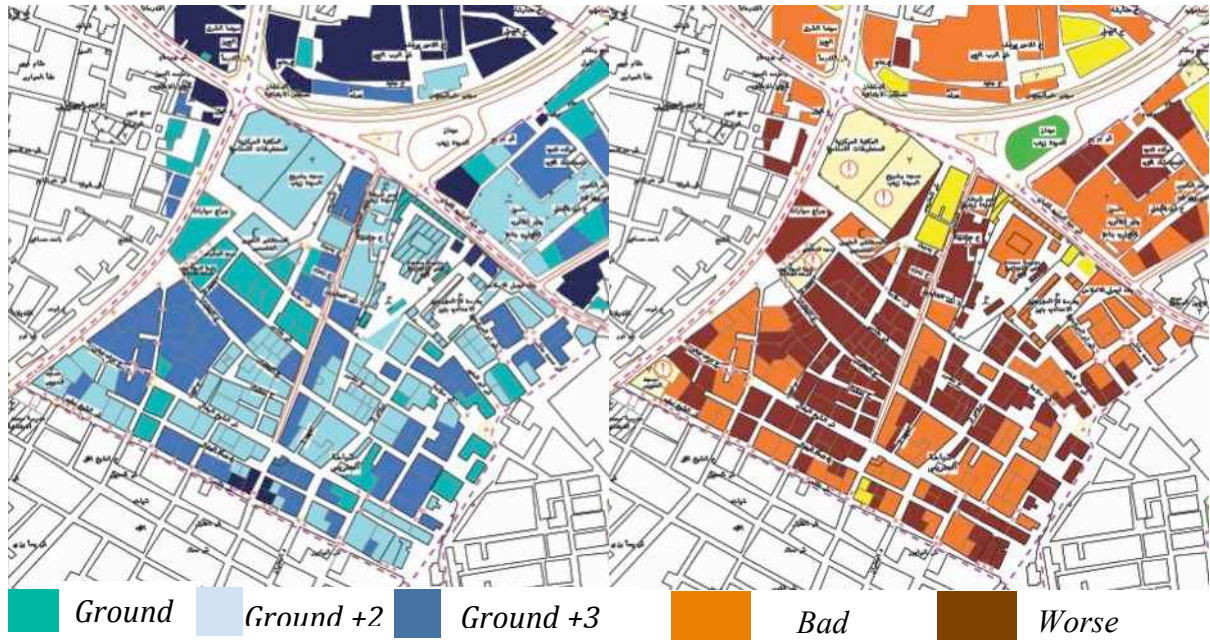
Figure 3: *Buildings Heights.*   ***Figure 4:*** *Buildings Quality.*

Residential   Commercial   Residential   Religious
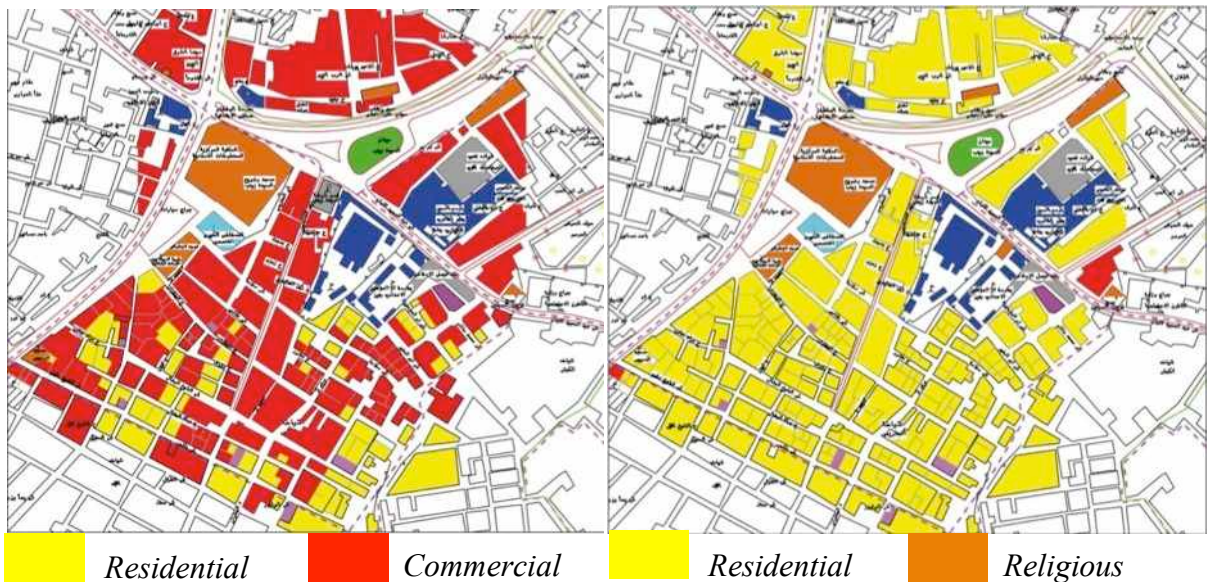
Figure 5: *Ground floor uses.*   ***Figure 6:*** *Typical floor uses.*

Figure 7: *Building Density.*

ARKWRIGHT TOWN AND THE ELDONIANS: EVALUATION OF SOCIO- ECONOMIC AND PSYCHOLOGICAL ASPECTS OF TWO DISPLACED COMMUNITIES IN THE UNITED KINGDOM

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Abstract

Located in Derbyshire England, Arkwright Town was a small coal mining community in decline during the late 1980's. In 1989 methane gas leaked from abandoned mine workings, resulting in the partial evacuation of the town and a plan to relocate the whole town and its community to an adjacent site. Throughout the design and relocation process, an independent longitudinal research project was undertaken by environmental psychologist Dr. Gerda Speller of Surrey University. This study highlighted the effects that the relocation had on the people of Arkwright and sought to define place attachment with individual and collective identity.

This paper highlights the background to and methods used by the Arkwright Town architects to engage the community in the design and relocation of their new village. The paper compares the goals and objectives of the architects' community consultation process with the findings of this longitudinal study to determine the success of the community engagement process and the resultant design and long-term social conditions that evolved from the relocation. In addition, the paper describes an alternative community project, the Liverpool Eldonian Community. This entrepreneurial community was established in the early 1980s and received a United Nations World Habitat award in 2004. Finally, this paper contrasts and evaluates the outcomes of both community models.

Keywords: displaced community, capable community, entrepreneurial community, environmental psychology, identity, place attachment, sustainable community.

INTRODUCTION

Community consultation sets out to encourage and empower people to be involved in shaping their own environments. The process can be liberating and is considered virtuous and of value. However does community involvement in design provide an effective and meaningful legacy that adds value to the outputs and longer-term outcomes? This paper focuses on a community consultation process undertaken 20 years ago for the relocation of Arkwright Town, Derbyshire, England. It will highlight the outputs of the design consultation process and relocation against the backdrop of a longitudinal socio-psychological study undertaken during the design, implementation and post occupancy stages. Finally, it will compare and contrast the New Arkwright Town outcomes with the displaced Eldonian community established in Liverpool, England in 1980 and recipients of a United Nations World Habitat award in 2004. The objective of this paper is to identify distinct socio-economic values and psychological aspects present and how they can influence the sustainability of displaced communities.

ARKWRIGHT TOWN: A COMMUNITY UNDER THREAT

Arkwright Town was built in the late 19thCentury. In 1989, it comprised 174 houses of mixed tenure with a population of over 400 people. Local services included a school, post office shop, miners' welfare club and pub. In the late 1980s, the community was slipping into a steady decline due to pit closures and divisions caused by the miners' strike of 1985. In November 1989, the demise of Arkwright seemed inevitable when methane gas seeped into homes from the disused mine resulting in partial evacuation. British Coal offered to rebuild the town nearby if they received planning permission for an open cast mine within the vicinity and offered all residents a new semi-detached 3-bedroom house or 2-bedroom bungalow built from the mining profits. There was very little opportunity for residents' private objections to be heard, as the British Coal offer was perceived by many as an opportunity to substantially increase personal equity. The offer received overwhelming support by a public show of hands.

Preparing for change

The Arkwright majority had chosen something that would offer a very different living experience to the simple straight terraces of the old town. Preparing for that change was an intrinsic part of the consultation process that began in 1991 with the appointment of Brock Carmichael Architects, the election of street representatives and the establishment of a permanently manned project office. A 2-year community consultation programme was designed to reach all residents. This involved 12 major public presentations, individual surgeries as well as home visits. All sessions were recorded and feedback data collected from questionnaires. The architects considered social continuity and cohesion to be crucial to the success of the relocation and developed a design consultation process using simple sketches and images of historic examples to convey the following key criteria.

Table 1 Community Consultation Process; Understanding Key Design Criteria

Figure 1: Old town	- The Old Town, - Terraced houses, - The rear yards, - Elevated aspect, - Permeability, - Hypothetical scenarios.	*Figure 2*: The site	- The New Site, - Site enclosure, - The open cast mine, - Footpath networks, - Rail embankment, - Ecology, - Site topography.
Figure 3: New town	- The New Town - Townscape character, - Semi-detached houses, - Location of the centre, - Neighbourhood clusters, - Location of elderly.	*Figure 4*: New centre	- The New Centre, - The new school, - Miners welfare centre, - The new hall, - The community school, - Amenities.
Figure 5: House types	- House options - External appearance - Internal plan options - Fixtures and fittings - Special needs	*Figure 6*: Neighbours	- Allocations, - Neighbour choice, - House compatibility, - Residents priorities, - Social relationships.

The design aims and objectives
The architects aimed to place community involvement and understanding at the centre of the design process. The objective was to transfer existing social structures and to deliver a cohesive community to occupy the new town. Residents were offered choices from a set menu of options including the 3 key aspects of location, house type options and who they wanted to live next to. The allocation of plots and neighbours was the most sensitive and difficult issue. There were no precedents that could be applied. A way forward was found in emerging patterns of social groups within the confidential data that prioritised and replicated existing neighbour relationships. Key individuals with across neighbour connections provided the link between neighbour clusters that influenced the form of the new town. This emerged through a three-month iterative process and delivered a solution that offered social continuity and reassurance. The allocation process was further facilitated by the architects using the key aspects of house choice and neighbour preference as a means of negotiation and compensation to counter disappointment over allocated plot.

The architects were able to offer most residents their first choice for at least 2 key aspects. Very few residents succeeded in obtaining their first choice on all 3 aspects. Following the release of allocated plots, the architects were able to report 95% residents' satisfaction with their allocated plot (Watson 2012, p. 9).

Shortly after the successful resolution of plot allocations, neighbour selections, and having obtained planning approval, British Coal decided to terminate the architects' appointment in order to reduce costs and limit community involvement. The new project managers established a cost cutting regime to the new building and relocation process.

Place identity and outcomes
Environmental psychologist Dr Gerda Speller carried out an independent study on Arkwright looking at the relationship between place and identity (Speller 2000). Speller interviewed a cross section of the community at 5 key time phases over a 6-year period that overarched the relocation. She tested theoretical concepts against acquired data to gain an understanding of how the relocation impacted on an individual's perception of their own identity in relation to their old and new environment. Speller's findings were revealing: "The Arkwright relocation provided an abrupt and clear incident of socio-spatial change affecting individual and collective levels of functioning. As part of the study of the relocation process it was discovered that there are five aspects of place attachment which when present play an important role in facilitating an emotional bond to place and when absent inhibit the creation of such a bond" (Speller 2000, p. 270).

The 5 identified aspects of place attachment are:

1. Security is defined as the perceived freedom from risk or danger on a physical and/or psychological level within the home and the community. It includes freedom from doubt, anxiety or fear and a sense of familiarity of place, belonging and feeling of permanence (Speller 2000, p. 183).
2. Autonomy is defined as self-determination and independence including a sense of ownership and the ability to control and initiate change (Ibid, p. 189).
3. Appropriation is the desire and ability to make something part of yourself often through the process of 'doing' (Ibid, p. 208).
4. Stimulation, an optimal level of internal and external stimulation is defined as an event to elicit or accelerate a physiological or psychological activity, or a change of environment that may motivate a person to reach for challenging goals (Ibid, p. 182).
5. Place congruence is the psychological belief that a place reflects your identity (Ibid, p. 183).

Speller also examined the 4 principles of Breakwell's Identity Process Theory (Breakwell 1986) and placed them in context with her findings. They are:

Distinctiveness
This is defined as the need to be unique as an individual or collective/group. Speller found that residents valued the collective identity as positive (we are all the same) which transformed into individual identity as a negative in the new town.

Self Esteem

This is a feeling of self-worth and social value. Residents experienced collective self-esteem in the old town with a change in emphasis to individual self-esteem during and after the relocation.

Self-efficacy

This is to feel competent and in control of life. This was not automatically transferable. Some people struggled with the many different demands of their new homes with a concomitant decline in identity.

Continuity of the self

This is the desire to preserve the past and present and the potential loss of social groups became the focus of concern for residents during the relocation process.

Speller describes the significance of these values and principles and their effect on the people of Arkwright during and after the move. She links the value of place attachment with the identity and concludes that: "Place is an integral part of identity, that it plays an important part in maintaining and/or enhancing the four principles of identity, and that attachment to place provides an important link between place and identity since it organises past experiences of individuals and/or groups over time and their subjective interpretations" (Speller 2000, p. 270).

Arkwright in 2012

In her writing, Speller refers to the beginnings of a change of emphasis from the collective distinctiveness of a close-knit community to the individual distinctiveness that did not exist in old Arkwright but which is now typical of British society (Speller 2000, p. 257). This view is supported by a resident during a focus group discussion in 2012, when she stated that 'the community spirit quickly vanished soon after the move'. The British Coal consultation strategy only delivered short-term goals and the relocation process left many of the social and cultural aspects behind. Indeed, Speller found that many elderly people felt isolated and disorientated due to the labyrinthine nature of the plan and the increase in physical separation between houses compared to simple straight terraces, a concern conveyed to the community during early consultations.

The relocation process had no mandate to enhance individual capabilities and nurture collective responsibilities depressed by the decline of the mining industry. Opportunities to raise collective self-esteem and self-efficacy and to reconcile divisions within the community caused by the miners' strike were missed. The new town was simply handed over for occupation and the old town demolished. Speller also recognised that the early removal of the community architects from the project and the adoption of a less transparent process (in order to implement extensive cost reductions) caused major anxiety during the move that was detrimental to individual appropriation of the houses (Speller 2000, p. 223).

A number of original residents left soon after the move. Arkwright is now poorly represented in local governance and lacks a cohesive voice; there is a declining interest in community issues; and restrictions are imposed on the use of buildings that can serve the community. In July 2012, a reduction in local council subsidies will put the future of the Arkwright Community Centre in doubt. The demise of the Arkwright Centre will sever a strand between the community of the past and the future.

In contrast, the following case study of the Liverpool Eldonians illustrates how an existing community did succeed in revitalising themselves and their environment through self-endeavour and commercial social enterprise.

THE ELDONIAN COMMUNITY, LIVERPOOL ENGLAND

In 1978, the Eldon Street community was being forced to move to make way for new development. In response, a group of ordinary people came together to save their community. Through strong leadership and governance they initiated a programme to deliver affordable rented homes and improve the physical and economic prospects of the area. Over 30 years later, 400 rented houses have been provided, 250 permanent jobs generated, £30 million of assets created, and £155 million of inward investment attracted. A wide range of community facilities have been provided, all owned and managed by the community. Derelict

and polluted land has been restored to form an attractive and secure living environment. The community now provides support and advice to other communities wishing to improve their housing conditions and to have a greater say in their future.

The Building and Social Housing Foundation awarded the Eldonians a United Nations World Habitat award in 2004. The UN citation described an entrepreneurial community taking responsibility for the redevelopment and management of their own environment with personal development of local people as a fundamental economic objective. How was this achieved?

A community vision
The existing community was known for its Irish immigrants and this collective identity and distinctiveness reinforced community cohesion and attachment to their place. In 1981, the site of the redundant Tate and Lyle sugar refinery provided an opportunity for the community to realise their collective vision to build a new life together. The site was reclaimed and the new community developed through a charitable trust established by the community for the community. It comprises of 600 residents each with a £1 share. Phase 1 of the development was initially financed by a total of £12.1million housing grant and a £1.5million loan from the Co-operative bank to the 600 trustees (McBane 2008). There were 3 key aims of the group, i.e. 'to keep the community together', 'to provide good affordable homes' and 'to have a say in how and where they were to live'.

Entrepreneurial community
The community appropriated their homes through this 10% stake and developed skills in housing management and maintenance resulting in Phase 2 being realised through 50/50 shared public/private equity (Santangeli, L 2013, interview, 10 April). This entrepreneurial spirit manifested itself in the establishment of the Eldonian Group Ltd (EGL), a consultancy to facilitate self-regeneration and job creation, bringing new skills and security for local people. The EGL governance structure constitutes community directors and local business leaders and has delivered a new hall, sports centre, children's nursery and three elderly persons sheltered housing schemes. These facilities are commercial ventures that employ local people. They are self-financing and profits are re-cycled back into the community to assist the funding of new education and training initiatives. The group's success and momentum has meant that it has had to look further afield to realise its own potential and bring new skills and income back into the community. ELG is currently developing collaborative ventures in training and employment and have planned a business enterprise unit. Les Bellmon of the Eldonian Group points out that "the EGL have to feed themselves on commercial contracts" and that they "continue to develop collaborative working models creating unique social and private business partnerships" (Bellmon, L 2012, interview 8 May).

A sustainable and capable community
Amartya Sen (2000) believes development projects should be measured against the increased concrete capabilities of people. He advocates positive freedom or liberty that allows an individual, "to be or to do something" and "as an ends and means to development" (Sen 2000, p. 5). Sen argues that it is meaningless to provide an opportunity for choice if an individual does not have the functional capability to benefit from individual choice. This is a bottom up approach, a root and branch alternative to macro, trickle down development economics that puts personal freedoms to live the life of choice at the centre. It is a social development concept that can be applied to community building and is very different to the paternalistic approach adopted at Arkwright that comes from the top as an altruistic trait rooted in the industrial age.

The Eldonian model sets out to replicate Sen's proposition and has the potential to become a sustainable social enterprise by increasing individual capability and providing the platform for the key aspects of place attachment and identity referred to by Speller. The Eldonian model is established as an 'upstream' activity with a long term strategy to put local people at the centre. Peter Roberts (2007) suggests that community building overarches generations and needs time to evolve and take root. He explains:

"The Eldonian Village has taken some twenty years to mature, and this is four times as long as the average lifespan of a community or neighbourhood project. What this suggests is that far more attention than is currently the case needs to be devoted to providing continuity, and to ensure that "effective progression and succession arrangements are put in place at the start of the process of community building" (Roberts 2007, p. 132).

Economic recycling
The retention of wealth through economic recycling or 'local multiplier effect' as described by JM Keynes (1936) is an important aspect of the Eldonian success (Bellmon, L 2012, interview, 8 May). It is the cumulative effect of purchasing goods and services from local businesses as an 'upstream' investment until money leaves the locality further 'downstream' through the purchase of an import. The New Economics Foundation (NEF) has also studied the effects of 'upstream' investment in local business (NEF 2012). NEF worked closely with the EGL in seeking a means to measure the gains of the local multiplier effect. In some instances every £1.00 invested resulted in a gain of £1.75 for the local economy (Bellmon, L 2012, interview, 8 May). The economics of self-reliance being founded on a viable business strategy is embedded within the governance of the community and provides autonomy and mitigates risk associated with operational expenditure and the need for subsidies as experienced by the Arkwright Centre. More recently, EGL have established a JV with electricity suppliers Eon and Peel Holdings to establish a local energy centre (Santangeli, L 2013, interview, 10 April). This collaborative arrangement will provide a de-centralised CHP supply for the local community and local commercial districts as the first phase of the 30 year £5.5billion Liverpool Waters development plan proposed by Peel.

Community Land Trusts
The Eldonian Charitable Trust is the foundation of the community and similar to social housing co-operatives, Co-housing groups and Community Land Trusts (CLTs) established in the UK in recent times (CLT Network 2011). CLTs are elected non-profit based organisations run by volunteers for long term community benefit as a voluntary associative organisation. A CLT is a legal entity usually limited by guarantee, and may or may not have charitable status. CLT's are legally defined in the UK Housing and Regeneration Act 2008, Section 79. They can be established to meet local needs in housing, employment, energy, and food production. The strength of a CLT is that it separates the value of the buildings from the land that is held in trust to provide a community asset for future generations. There is a commercial and legal process required to establish a CLT and many CLTs have partnered with like-minded organisations such as Registered State Landlords (RSLs).

CLTs establish ancestral platforms, providing long-term security and equity for communal beneficiaries. They root people to a place for wider associative action such as human development and well-being or ecological and environmental action with which locals can identify and contribute. Entrepreneurial CLTs such as the Eldonians have the potential to provide the sense of purpose previously embodied in traditional, industrial or rural communities. They initiate a sense of security, autonomy, appropriation, stimulation, place congruence, identity, self-esteem, self-efficacy and continuity. These are the important aspects that constitute the link between place attachment and collective identity that Speller describes.

The future of the Eldonians
The Eldonian village was built at a time of political turmoil and uncertainty where the fear of crime and the forced breakup of the community by external political powers were ever present. The community's desire to be autonomous and secure also brought about a defensive and inward looking perspective. The village is effectively a gated community bounded by main roads on the periphery of Liverpool City centre within, what was an industrial area of relatively low residential density. Like Arkwright, its layout and configuration is influenced by the community's perception of the suburb and its low density semi-detached housing with private gardens as being more desirable than the dense urban models of terrace and tenement they left behind.
There are future risks and challenges for the Eldonians socio-economic model of community building that are exacerbated by the inflexibility of the suburban model. If a community cannot expand or adapt to retain its young people or envelop adjacent groups into the values of its social and economic model then it may be vulnerable and unsustainable beyond the working life of the founding generations. The fundamental question is, can an aging community limited in its population and by the physical constraints of a defined site continue to re-energise its self socially and economically? This risk is clearly recognised by Lawrence Santangeli and Les Bellmon of the EGL who have sought to forge new 'social and private business partnerships' beyond the Eldonian village.
To date the success of the Eldonian model can be attributed to strong leadership and ethical governance that values the social capital of its people and their increased capability as the means and ends to development. In 2014 there was an unexpected change at board level and the future direction of the EGL remains uncertain under this new regime. As Peter Roberts suggested, continuity, effective progression and succession arrangements are vital to community building and to the values of the original Eldonian model.

CONCLUSION

The Arkwright community had been undermined before its relocation by the decline of the mining industry. Unlike the Eldonians there was no opportunity beyond the design consultation stage for the collective identity to self-regenerate through housing appropriation and social enterprise. The Arkwright approach was a top down or 'downstream' activity that reached its course once residents had moved in. The Arkwright and Eldonian studies show a marked difference in the means of delivery and governance. Arkwright was comprised of small separately owned plots that propagated a move towards individualism following the relocation. The Eldonian community provides social housing at affordable rents and is founded on land that is held in trust for the benefit of the whole community.

The three pillars of sustainability are recognised as Social, Economic and Environmental. Capable communities such as the Eldonians are sustainable as they address the social and economic aspects. The Eldonians' story shows us that community capability is evolutionary and acquired through active participation and struggle. The Eldonian scheme is more than the sole provision of social housing in that it links economic development to human development, 'as an ends and means to development'. In contrast, the Arkwright case describes a thorough consultation process that engaged the whole community. However it was a passive process reliant on multiple choices, carefully managed with finite and limited experience for participants. Community architecture failed to revitalise Arkwright's collective identity tenuously held together by memories of the coal mining past with its inherent culture that functioned well whilst anchored in the old town. The relocation exposed the vulnerability of the community and the importance of human capabilities to be the bedrock for building sustainable communities.

The Eldonian model can provide the vehicle for improving human capability by establishing long-term legacies through personal development and collective land ownership. Land that has a specific purpose for human development is the oasis for encouraging sustainable development. However, if such models are to thrive and sustain themselves beyond the founding generation, the model must be sufficiently flexible to foster adaptive reuse, changing demographics, expansion and social mobility.

 It is through such initiatives based around affordable socially focused housing that entrepreneurial communities such as the Eldonians will begin to emerge. They can provide the social structures and values familiar to traditional communities. They nurture personal and collective identity, facilitating human capabilities and allowing substantive opportunities for distinctiveness; self-esteem; self-efficacy and the continuity of the self to flourish. These attributes together with a sense of security; a sense of autonomy; the ability to engage in appropriation; an optimal level of stimulation; and place congruence facilitate the emotional bond to a place.

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GREEN INFRASTRUCTURE AND ECOSYSTEM SERVICES IN INFORMAL URBAN SETTLEMENTS

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Abstract

Urban areas are usually home to important bio-physical assets, which based on their functions, values and potentials to provide basic structures that supports society's functioning, are construed as green infrastructure. Informal settlements as a notable mode of habitation by the poor in cities of developing countries are usually connected to these bio-physical assets. This paper identifies ecosystem services and disservices emanating from informal settlement residents' interactions with these bio-physical assets.
Keywords: informal settlements, green infrastructure, ecosystem services, ecosystem disservices.

INTRODUCTION

The challenges for the provision of appropriate, affordable and adequate shelter in cities of developing countries are linked to broader environmental sustainability issues. It has been argued over the past two decades that environmental sustainability in informal settlements and the low-income housing contexts ensuing from informal settlement interventions has not been much of a concern to actors in states of the global south and some non-governmental actors as well (Dalgliesh et al. 1997, Irurah and Boshoff 2003, Groebel 2007, French and Lalande 2013). There was an explicit assumption among some urbanists that the consideration of bio-physical conditions is something of a luxury in informal settlements, and therefore not important (Quilan and McCarthy 1995). Within discourses on urbanism, Taylor (2011, p. 54) points out that 'issues of informal dwellings and sustainability have diverged so drastically' in the past few decades. Focus on the role of housing development within the agenda of sustainable development and climate change has therefore largely targeted formal, middle- and upper-income residential neigbourhoods (Sullivan and Ward 2012).

This kind of incognizance is problematic, as low-income, informal settlements constitute a notable (and at times growing) proportion of population and space of cities in developing countries. For example, UN-HABITAT's estimate, from around a decade ago, shows that about one billion people, representing over 40% of the urban population, were living in areas categorized as informal settlements in cities of developing countries (UN-HABITAT 2003). These areas are usually peopled by the socially, economically and environmentally disadvantaged, who in addition to being 'victims' of urban inequalities, are more vulnerable to the potential impacts of global climate change (Agbor 2013). Informal settlements also intersect in important ways with the bio-physical environment.

Green Infrastructure us generally defined as "interconnected network of green space" (Benedict and Mcmahon 2002, p. 12) or as those "natural, semi-natural and artificial networks of multi-functional ecological systems within, around and between urban areas, at all spatial scales" (Tzoulas et al. 2007, p. 169). Based on these understandings, green infrastructure approach to urban sustainability is of strong relevance in informal settlements. However, as Grove (2009) argues, the significance of interactions among dynamics of human responses to variation in ecosystem services from green infrastructure in cities is poorly understood, especially in the informal. The paucity of knowledge on bio-physical assets and processes in the context of informal urban housing/settlements therefore precludes appropriate contribution of the necessary understanding to intervention approaches and coherent urban development (Quilan and McCarthy 1995). Studies in Dhaka and Johannesburg informal settlements by Jabeen et al (2010) and Adegun (2013) respectively show that opportunities for sustainability and resilience exist in and around urban informal settlements, through green infrastructure, which deserves exploration.

This paper explores green infrastructure in the context of low-income informal urban settlements. It describes how informal settlements are connected with green infrastructure in cities of developing countries. Ecosystem services, operationalized as services and disservices, emanating from the relationship between bio-physical systems and spaces, as green infrastructure, and informal urban areas were listed and categorised. Tensions in these realms were also identified.

Informal urban settlements and green infrastructure

Informality is a significant phenomenon and a mode of urbanization in cities of developing countries. It is generally defined and understood through its opposite – formality (what is not formal), as well as linkages and continuities between the two (Huchzermeyer 2011, p. 70). Urban informality is usually manifest in socio-economic spheres such as trade, housing and services. For example, in housing and as already mentioned, UN-HABITAT's estimate show that about one billion people presently live in areas categorized as 'slums' (essentially informal settlements) – an increase from the 712 million population estimated in 1993 (UN-

HABITAT 2003, p. 13). This figure might have excluded townships and other low-income areas which emerged through informal settlement intervention but are still largely characterized and shaped by various forms of informal developments.

Informality in the urban socio-economic and spatial sector is undoubtedly linked with the environment. Helen Briassoulis' essay on the relationship between environmental sustainability and socio-spatial informality acknowledges that informal activities, though running simultaneously and parallel to formal ones, result in both environmentally benign and detrimental impacts (Briassoulis 1999). To her then, and still largely true now, "most sustainable development policies are directed towards the formal sector", neglecting the pervasiveness and influence informality have on socio-economic and spatial developments in both developed and developing countries (Briassoulis 1999, p. 213). Introducing informality into the environmental sustainability (and green infrastructure) discourse is therefore relevant since "urban informality is the only means to habitation and livelihood for a large percentage of urban population" in Africa and developing countries (Huchzermeyer 2011, p. 69).

Regarding informality in housing, Alsayyad (1993) observes that informal settlements often take advantage of publicly or privately owned but vacant land. Such lands are usually unsuitable for residential development, and are located near streams, on river banks (see Figure 1), wetlands, hillsides and mountains (see Figure 2), servitudes, interstitial spaces and so on (Armitage 2011, Huchzermeyer 2011). For instance, due to the presence of informal settlements, "population density appears to increase by roughly 10% within 1 km of waterways" in low-income Asian countries (Vollmer and Gret-Regamey 2013, p. 1544). These locations usually hold critical natural assets that are of ecological significance and bio-physical wealth. Apart from being located on lands that may hold critical bio-physical assets, informal settlements in cities of developing countries are usually peopled by residents who undertake various forms of agricultural cultivation (Rogerson 1993, Redwood 2009). The agricultural activities taking place within or around these settlements also convey ecological and bio-physical essence. They constitute another form of informal settlements' connection to green infrastructure.

Figure 1: Kibera informal settlement is located on a low-lying part of the Nairobi river bank (Source: Author's Photograph, September 2012).

Figure 2: Langrung informal settlement, in Stellenbosch, South Africa is connected to a mountain ecosystem (Source: Author's Photograph, October 2013).

Upgrading intervention in informal settlements also shows linkages with green. A central message emanating from the linkage between ecological assets and informal settlement intervention is the possibility of meeting some of the infrastructural needs in informal settlements through bio-physical systems and spaces, as socio-ecologic infrastructure. This approach is possible at dwelling scale or as acupunctural interventions that can stimulate settlement-wide improvements from strategic points of socio-ecological insertions. Projects like Kounkeuy Design Initiative's (KDI) productive public space in Kibera, Nairobi's informal settlement (KDI 2013), Cape Town's MtshiniWam settlement re-blocking for *in situ* upgrading (Henning et al. 2012, p. 5), Christian Werthmann's tactical interventions in Latin America slums (Werthmann 2011) are examples. Others such as Cato Manor township green upgrade ahead of the United Nations COP-17 summit in Durban (GBCSA 2012, p. 19), Urban Agriculture intervention in Ouled Ahmed, Casablanca's informal settlement (Rau et al. 2011, p. 69) are also noteworthy among the growing examples.

Mention must be made that this socio-ecologic infrastructural approach for informal settlement intervention offers prospects for climate change adaptation and mitigation in cities (Gill et al. 2007). They provide multi-functional, at times, soft engineering alternatives to expensive grey infrastructure in low-income urban areas in the light of resource decline accompanying climate change (Kithiia and Lyth 2011). This socio-ecologic approach also aids improvements in quality of life and socioeconomic opportunities in vulnerable low-income urban communities through 'community ecosystem-based adaptation' (Roberts et al. 2012, p. 167).

Ecosystem derivates from green infrastructure in informal urban areas

Connection between informal settlements and green infrastructure in cities results in noteworthy corollaries. When such is positive and beneficial to human-being, it is referred to as 'ecosystem services', which can be defined as direct and indirect benefits, actively or passively utilised contributions towards human well-being and sustenance of ecosystems themselves (Bolund and Hunhammar 1999, Fischer et al. 2009). Millennium Ecosystem Assessment (2005) popularised the concept of ecosystem services through its four-point categorization of services into supporting, provisioning, regulating and cultural services. These services include a host of quality of life benefits with the possibility of deriving the corresponding values therein.

Green Infrastructure also involves 'functions of ecosystems that are perceived as negative for human beings', regarded as 'ecosystem disservices' (Lyytimaki and Sipila 2009, p. 311). These are nuisances associated with normal functioning of undisturbed ecosystems or the negative results from ecosystem degradation through direct or indirect human activities. That is, disservices can emanate from natural or man-made occurrences. Ecosystem disservices cannot be taken literally as the antonym of ecosystem services. They are both anthropogenic constructs (*ibid*), and a differentiation between perceived and actual disservices is therefore necessary (Dunn 2010). Both services and disservices are considered in the following sections.

3.1 Ecosystem services in informal urban areas

Table 1 summarises ecosystem services particular to informal urban settlements, as largely identifiable from literature. The services are classified based on three of the four categories by the Millennium Ecosystem Assessment (2005). The omitted category – supporting services, are process-based and underpins all other

services. It is intertwined with the other categories of services and therefore impossible to separate it in the context of informal urban settlements.

Provisioning services

This category of service relates to goods and products (materials and energy outputs) derived from bio-physical assets and ecosystem. For example, agricultural cultivation in informal settlements provides food for household consumption and sale (income generation). Figure 3 and 4 shows agricultural cultivation in informal settlements. These provide food and plant products used for culinary and medicinal purposes. Averberke (2007) found that over half of households in five Pretoria informal settlements participated in farming. As a female dominated livelihood, farming took place in home gardens, open spaces and group gardens within the settlements. Group farming in open spaces supplied households about 25% of annual staple food requirements, while home gardeners harvested an average of 1.7 kilogramme of fresh food produce monthly (ibid). They generated income through the gardens, although it only accounted for 0.4% of monthly household income. In Davoren's (2009) study of Ganyesa settlement, North-West Province of South Africa, he found meaningful correlation between socio-economic status of homeowners and plant diversity in their home gardens. In the same vein, Singh et al. (2013) identified vegetable and fruit production by slum dwellers in Delhi's wetlands. Coelho and Raman (2013) point to fish harvesting by Pallikaranai slum dwellers located along the Adyar river in Chennai, India.

Water provision is another example of provisioning service in informal settlements. Since there is usually inadequate pipe-borne water supply, informal settlement dwellers depend on surface freshwater sources such as streams and wetlands or groundwater sources from shallow wells (Vollmer and Gret-Regamey 2013, Phukan 2014). These sources supply water of unhealthy and questionable quality, which informal settlement residents at times drink and use for household purposes such as cooking, bathing, laundry. These sources also provide water to irrigate home gardens and group farming activities within informal settlements.

Another common product from ecosystems is timber from tress or forests around informal settlements. This provides fuel for cooking and heating. It is used in building dwellings and for household furniture.

Figure 3: A home garden in Slovo Park Settlement, Johannesburg.
(Source: Photograph by Marie Huchzermeyer, June 2013).

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Figure 4. Home gardening in a dwelling's courtyard in Kibera informal settlement, Nairobi. (Source: Author's Photograph, September 2012).

Regulatory services

Green infrastructure in informal settlements includes processes that regulate the natural environment within and beyond informal areas in cities. Water (greywater, wastewater or stormwater) management through bio-physical systems and spaces is an example of regulatory service in informal settlements. Button et al's (2010) project in Monwabisi Park settlement, Cape Town is telling in this regard. This project included a Sustainable Urban Drainage System (SUDS) that consist of artificial swales, soakaways, infiltration trenches and wetlands. Vegetation covering the swales redirects the flow of water away from unwanted areas. Soakaways, incorporating a layer of bio-filters (plants), absorb excess nutrients and minerals while redirecting excess water to the wetland. A notable attempt to manage greywater through vegetation was observed in Makause Settlement, Ekurhuleni municipality of South Africa (see Figure 5). In this case, greywater flows into a soakpit/soakway covered by a layer of plants. These examples show that bio-physical systems offer services whereby water is treated, the timing and flow of runoff are regulated, and flooding is prevented or mitigated.

Air temperature and quality control are also examples of regulatory service. This is obvious in Bangalore (India) where almost all dwellings in informal settlements have potted plants (Gopal 2011, Gopal and Nagendra 2014). Small plants are grown in a variety of containers, due to space constraints, in addition to trees in the neighbourhood. These foster decrease in ambient air temperature by 3 to 5°C in summer in the Bangalore urban area, and also aid air quality control through the removal of pollutants such as SO_2 and suspended particulate matter (Sudhira and Negrada 2013). Micro-climatic regulation offered by the trees allows domestic, livelihood and recreational activities in spaces under trees with ample canopy (Gopal 2011, Negrada 2013). Cavan et al's (2014) investigation of residential urban morphological types in Addis Ababa shows that informal settlements can enjoy better regulation services, compared to formal, middle and high-income areas. They observed that "informal settlements and traditional housing areas have higher proportions and better composition of green structures than other residential areas, and are thus associated with the lowest modelled land surface temperatures" (ibid. p. 54).

Socio-cultural services

Non-material benefits - culturally, psychologically, socially valued services from bio-physical systems and spaces are also obtainable in informal settlements. Public or private open spaces with or without vegetation/greenery in informal settlements provide aesthetically pleasing environment, and space(s) for recreational activities, social interaction, spiritual and inspirational enrichment, ethical and cultural expression and so on. Mizamoyethu (now known as Mandela Park) settlement residents in the Western Cape enjoyed such services from their connection to green infrastructure. Some of the residents remarked – "Mizamoyethu has a nice view…", "the beaches are nice, the mountains are beautiful and the trees…", "the mountain area, the environmental [green] side of it must stay", "when they do their ritual, the mountain becomes the ideal spot" (Ballantyne and Oelofse 1999, p. 209). Also in South Africa's Western Cape Province, the Macassar informal settlement community has an historical connection and cultural ties with the Macassar dune. Recreational practices such as horse riding and fishing take place by the dune (Graham and Ernstson 2012). Deliberate efforts in landscaping provide aesthetic value to residents as shown in Figure 6.

Green spaces in informal settlements also offer opportunity for educational and cognitive development. Keying into a participatory upgrading plan, the 'Rosario HABITAT' programme included green open space development in La Lagunita settlement – an educationally productive space for children's cognitive development through a demonstration garden and an educational path (Dubbeling et al. 2009). Regarding spiritual benefits, wetlands, lakes and some other water-bodies connected to informal settlements at times form the object of worship and location for religious/cultural ceremonies by slum residents (Negrada et al. 2013).

Figure 5: Greywater Management through vegetated soakpitin Makause Settlement, Ekurhuleni (Author's Photograph, June 2013).

Figure 6: Manicured vegetation (privet hedge) for aesthetics in a Stellenbosch (South Africa) Informal settlement. (Source: Author's Photograph, October 2013).

Available literature shows that informal settlements residents have little direct use or dependence on local ecosystem services. The three studies accessed, which emanate from South Africa, Uganda and India shows that poorer, and usually, informal urban communities, when they use ecosystem services, put higher demand on provisioning services (Cilliers et al. 2012, Waters 2013, Gopal and Nagendra 2014). The studies indicate less demand on cultural services and less contribution to regulating services in informal settlements. The higher demand for provisioning services can be linked to the fact that "the poor depend directly on natural resource environment for their livelihood" (NadKarni 2000, p. 1184). They are unlike the rich and middle-class, who are accommodated in formal areas that are well-serviced by amenities and infrastructure that cater for their basic needs. There is even an emergent realisation that ecosystem services are the wealth of the poor, the so-called 'GDP of the poor' - whether they are domiciled in urban informal settlements or far-flung rural villages (TEEB 2010).

Higher demand on provisioning services, less demand on cultural services and less contribution to regulating services would in reality differ with settlements and urban contexts, since informal settlements are not homogenous. The level of cultural and regulatory services enjoyed in an informal settlement would depend on a variety of tangible and intangible factors within and beyond it.

Table 1. Ecosystem services in informal urban areas

Classification	Service Type	Example/Description	Key References/Sources
Provisioning	Food production	Food and vegetable production in wetlands, open spaces, home gardens and other private open spaces.	(GCBSA, 2011; Hennings et al, 2012; Honning, 2009; Singh et al, 2013; Averberke, 2007).
		Fish production and harvesting	(Coelho and Raman, 2013)
	Water Supply	Groundwater for drinking and other household use through wells; Surface freshwater from streams/rivers; Water for Irrigation.	(Vollmer and Gret-Regamey, 2013; Phukan, 2014)
	Other products	Harvesting timber from plants/trees for household energy (for cooking, heating etc) and dwelling construction; Supply of therapeutic and medicinal/herbal products; Other plant products e.g brooms, incense sticks.	(Negrada et al, 2013; Gopal, 2011; Ballantyne and Oelofse, 1999)
Regulatory	Water Management	Stormwater/Runoff control management and flood mitigation; Water treatment.	(Adegun, 2013; Button et al, 2010)
	Moderating Micro-climate	Tree-shading (decreasing ambient air temperature by 3-5°C in summer in Bangalore urban area/slums)	(Sudhira and Negrada, 2013; Cavan et al, 2014)
	Air Quality Regulation	Cleaning the air through removal of pollutants such as SO_2 and suspended particulate matter.	(Sudhira and Negrada, 2013)
Socio-cultural	Aesthetic	Pleasant views of bio-physical assets e.g. nearby beaches, bays and mountains.	(Ballantyne and Oelofse, 1999)
	Recreation	Mountain climbing, Tree climbing, Horse riding, fishing, green open spaces used for other games/sports	(Ballantyne and Oelofse, 1999; Graham and Ernstston, 2012)
	Spiritual Enrichment/Cultural fulfilment	Thickly vegetated mountainous or lowland areas for traditional rites and rituals; ecological spaces for hibernation during long fast; Wetlands, lakes and other water-bodies as object of worship and location for religious/cultural ceremonies.	(Ballantyne and Oelofse, 1999; Gopal, 2011; Negrada et al, 2013)
	Educational	Green Spaces for demonstrative teaching and Cognitive development, especially for children.	(Dubbeling et al, 2009)

Ecosystem disservices in informal urban areas

It is important to consider ecosystem disservices to fully understand the impact of ecosystems on human well-being. This is especially important in the context of informal settlements where human attitudes, needs and general socio-cultural content can be subjective and diverse as pointed out in Rolfes (2010) and Muyeba and Seekings (2011). Table 2 gives a list of disservices in informal settlements, identifiable from literature, and categorisation as real/actual or perception-based.

Ecosystem disservices related to perceptions in informal settlements include phobia for dense riverine vegetation, because it is thought to conceal criminals and criminal activities, fear of being attacked by animals such as snake, scorpions (Donaldson-Selby et al. 2007). Some informal settlement residents also exhibit fear of being hurt by tree's branch-fall during windstorm. In South African settlements, senses of scare from chameleons (due to its attribute of color change) are also reported (Marie Huchzermeyer, 2013, personal communication October). Another disservice peculiar to South Africa relates to people's perception of spatially delineating green spaces. During South Africa's apartheid era, 'racial' groups, through legislations and forced removals, were spatially segregated by buffers strips/zones from green belts of cultivated and park land in the cities. In the post-apartheid era, interventions in informal settlements that include bordering green belts/corridor are seen negatively by some residents as a perpetuation of pre-1994 urban boundaries (Donaldson-Selby et al. 2007).

Actual ecosystem disservices in informal settlements mostly manifest through health threats and problems. While studying Dakar's settlements, Grubner et al. (2011) and (2012) showed that disservices can result from green infrastructure. In their study area, a river was within 1 kilometre walking distance for more than 75% of the households while the area within 100 metres distance from the dwellings of about 60% of the residents contained over 10% of vegetation. Their study found a negative association between mental health determining factors and the natural environment. Also mental well-being was positively associated with flood non-affectedness.

Informal settlements connected to wetlands and swamps often experience invasion of mosquitos and other insects because these water-logged areas are their breeding places (Rashid et al. 2007, Campion 2012). Furthermore, in what may be linked to their connection with thickly vegetated green spaces, Butchart et al. (2000) found high incidence of snake and spider bite in informal settlements in Johannesburg. Snake infestation and attempted snack attack on residents from dense nearby vegetation and water-logged area has been reported for a Mumbai (Singh 1986) and some Nepal informal settlements (Shrestha 2010). Another possibility of disservices comes from crops' contamination by pathogenic organisms through irrigation with water from poorly serviced households, neighbourhoods or polluted water channels and streams (Dubbeling et al. 2009, Gallaher et al. 2013).

Table 2. *Ecosystem disservices in informal urban areas*

Classification	Disservice Type	Example/Description	Key References
Real	Habitat Competition with animals	Hazard/Attack from snakes, insects inhabiting vegetated spaces.	(Butchart et al 2000, Singh 1986, Shrestha 2010, Coelho and Raman 2013)
		Negative resultants of water inundation	(Coelho and Raman 2013, Grubner et al. 2011 and 2012)
	Animals connection to humans	Health problems resulting from disease vectors. For example, mosquitoes breeding in wetlands, animals with a reservoir of pathogens dangerous to human being	(Rashid et al. 2007, Reis et al. 2008, Maciel et al. 2008, Campion 2012).
		Bacteria growth in humid and vegetated environment	(Reis et al. 2008)
Perceived	Fear	Phobia for dense vegetation- concealing criminals and criminal activities	(Donaldson-Selby et al. 2007)
		Phobia for wild animals (e.g. snakes), fear of tree-branch's fall during windstorm	(Ballantyne and Oelofse 1999)
		Sense of scare from chameleons' colour change	(personal communication; Marie Huchzemeyer October 2013)
	Perception	Perception of green belts as a perpetuation of pre-1994 South African apartheid urban boundaries	(Donaldson-Selby et al 2007)

Tension within the field ecosystem services and disservices

Ecosystem services and disservices from green infrastructure, as two separate strands combine into a tension. There is also further tension between actual and perceived disservices, as well as between what may be categorised as actual and perceived services. Heterogeneity in perceptions also constitutes tensions. This section shows some examples of these tensions.

Survey by Donaldson-Selby et al (2007) on greening for low-income housing in eThekwini Municipality, KwaZulu-Natal is relevant with respect to tension between services and disservices. The residents support greening such as football/sports field, trees and grass within the settlement, but oppose dense vegetation along the river. They perceive dense riverine vegetation as a threat to safety. On the other hand, the city planners advocate dense riverine vegetation as part of the strategy for biodiversity preservation, stream stabilisation and improvement in the river's water quality. Another example is the fact that informal settlement residents take to agricultural cultivation for household consumption and settlement-based livelihood (Davoren 2009, Averberke 2007), but some built-environment professionals see it as a "non-urban landuse", "of lesser beauty" and of low (if any) real estate returns (Viljeon and Bohn 2009, p. 60). Differences between needs and perceptions of the poor and rich also constitute a tension. For example, trees and plants in wealthy residential areas of the city of Bangalore are seen as an extension of people's lifestyles, but greenery in slums is very much regarded as fundamental to the poors' livelihoods (Gopal 2011).

These scenarios complement existing conceptualization of tension in the field of urban informality and urban ecology, adding up as an additional dimension. Huchzermeyer (2011, p. 74) raises awareness on the field of tension within which informal settlements exist, between the opposing poles. She identifies the state's desire for ultimate disappearance and repression of visible forms of informality on the one hand, and the poor's desire for and often need for urban existence which is met through informality on the other. Sitas et al. (2014) point to conflicting views and seemingly irreconcilable aims between the 'greenies' (those who place environmental and green infrastructural issues as a priority) and 'pro-developers' (those who relegate environmental and green infrastructural considerations) camps among urban stakeholders.

These tensions place a particular burden on decision-making around interventions in informal settlements that are connected with bio-physical systems and spaces serving as green infrastructure. Decision-making should not be based only on one side of the tensions but on a balanced understanding of contextual dynamics. Fragility and vulnerability to external and internal socio-ecological disturbances in informal urban areas elevate concerns on these tensions in the context of informality (Little and Laura 2010), thus making the tensions need attention.

CONCLUSION

This paper makes a case for adequate attention to the environment in informal settlements since they are usually connected to bio-physical systems and spaces, serving a green infrastructure in cities of developing countries. It shows that informal settlements' connection to these systems and spaces yields ecosystem services and disservices. In order to maximally benefit from ecosystem services and minimise ecosystem disservices in informal settlements, adequate consideration based on examples identified in this paper and beyond is necessary. Managing to provide sufficient ecosystem services and fewer dis-services will no doubt require multidisciplinary, collaborative, policy-relevant and context-sensitive research. Knowledge from such research would be useful towards intervention in informal settlements across the heterogeneous urban contexts in developing countries. Addressing the tension inherent within the conception on ecosystem services and disservices is important. It would require detailed and informed analyses, and as well as trade-offs.

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UNDERSTANDING URBAN FORM AND SPACE PRODUCTION IN INFORMAL SETTLEMENTS: THE TOI MARKET IN NAIROBI, KENYA

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Abstract

Several authors argue that a better understanding of urban informality is required to create inclusive urban policies and projects. Whereas studies about slums are copious and date back to the sixties, informal urbanism is receiving a new emphasis and has become an unavoidable subject in urban and development debates. This three-part paper develops an analytical framework of urban informality with a focus on the production of space in informal settlements. First, a literature review on the domains of informal urbanism and planning provides a preliminary theoretical framework. Second, a case study is analyzed and compared with findings from the literature review. The case-study explores processes of space production in one of Nairobi's informal markets, through direct observation, structured and semi-structured interviews and mapping. Third, an analytical tool is created to highlight the main approaches, limits and gaps in the existing literature.

Considering the production of space in terms of processes and outcomes, the literature review identifies three theoretical approaches: the functional approach, which focuses on space organisation and form and the concept of order; the anthropological approach, which investigates everyday practices; and the process-oriented approach, which considers informal settlement formation and evolution processes. The case study illustrates how the poor give significant attention to the production of space and site organisation; which directly affect, and are affected by, economic, socio-political and cultural circumstances, providing opportunities for significantly improving living conditions. Although the case study findings cannot necessarily be generalized, the complex and specific experiences that emerge from it suggest that most common definitions cannot efficiently and fully describe informal realities. A bottom-up approach and willingness to learn are fundamental to identifying practical lessons from the slum dwellers' perceptions and use of space; these must simultaneously challenge and complement top-down planning approaches.

Keywords: informal urbanism, informal settlements, space production, Nairobi.

INTRODUCTION

Slums and other forms of informal settlements in the global south have been growing continuously since the 1960s (UN-Habitat 2012). Yet, urban studies still lack adequate tools for fully understanding informality and enhancing sustainable urban development. This knowledge gap today represents one of the main causes of poor urban policies (Elsheshtawy 2011, Samper 2010) that over the past decades have failed to reduce the proliferation of informal settlements, while often encouraging their forced eviction and demolition (Dovey and King 2011). Unsurprisingly, being 'secure from eviction' is an important indicator of Millennium Development Goals (UN 2000).

According to the Lefebvrian concept of social space, "every society produces its space […] (and) the city had its spatial practice; […] Hence, the new need for a study of this space that understands it the way it is, into its genesis and form […]. Programmatically every society having its own space offers it to an analysis" (Lefebvre 1991, p. 40). According to this perspective, understanding urban informality in order to improve the slum dwellers' living conditions requires a systematic investigation of how the poor perceive and experience space, and make decisions in the process of space organisation.

Research about informal urbanism dates back to the 1960s; yet, it has recently gained new emphasis (Elsheshtawy 2011) and remains a critical topic in urban and development studies. The dichotomy of formal versus informal, however, still prevails, despite it being widely accepted that a binary distinction oversimplifies the complex reality of contemporary cities and economies (Doherty and Silva 2011, Simone 2008).

This paper proposes an innovative theoretical framework of urban informality with a focus on the production of space in informal settlements. It is divided in three sections. First, a literature review considers qualitative research in the domain of urban studies and proposes an analytical background. Second, a case study exploring processes of space production in one of Nairobi's informal markets is analyzed and compared against this conceptual background. Finally, an analytical table is created to resume and compare different theoretical approaches and the limitations and gaps in the existing literature. However, before considering the results, let's explore in detail the methods used in the study.

METHODS

The paper is based on a literature review and a case study that simultaneously challenges and enriches conceptual interpretations of the main bodies of knowledge. An analytical table becomes both a tool and our main research outcome. The literature review explored a large number of studies on contemporary informal urbanism and planning. This includes journals and books produced between 1990 and 2014; however, seminal work dating back to earlier studies of informality provided key conceptual insights. Publications were found through keyword searches in scientific databases (Google Scholar, Science Direct and publishers such as Taylor & Francis). Keywords included: informal planning; informal urbanism; slums; and space production in informal settlements. The definition of spatial organisation, drawn from geography and urban studies, considers the process of perception and production of space (Lefebvre 2000), and the configuration that result in a more or less established form. Literature was later organised according to three main approaches: the functional, anthropological and process-oriented approaches.

The case study was conducted during five visits in 2004, 2006, 2007, 2008, and 2011.   It aimed at understanding the market history and formation, its physical structure, the members' participation in projects involving site organisation, and the role of 'informal design'. The approach was qualitative: information was collected through twenty structured and semi-structured interviews with vendors, five conversations with market leaders, six site visits, and several mapping techniques. Informal conversations played a critical role in facilitating the dialogue. Semi-structured interviews with community leaders provided information about the market formation and the challenges and projects undertaken over decades. Pre-established forms were used to interview marketers and map their stalls, through photos and notes describing economic, social and physical conditions. In total, 31 activities were mapped, located in different areas of the market. This allowed for gaining insights about different vendors, activities, and roles inside the market. Interviews targeted an equal number of men and women, representatives of different groups, new and established activities. Semi-structured interviews investigated existing projects, the traders' perception of design activities and the community's expectations for the Toi market. Results were also drawn from more than twenty drawings of the market and its stalls. A comparison of the market's maps before and after the reconstruction occurred in 2008 helped in understanding its evolution. The old market (from 1989) was fully documented through graphics and photos.

FIRST RESULT: ANALYTICAL FRAMEWORK

Informal settlements are typically studied in informal urbanism and planning from two perspectives: a significant number of studies emphasize their potential to provide affordable housing solutions for millions of poor people (Turner 1972, de Soto, 1989), while others highlight the extreme conditions of constraints and deprivations (UN 2003). Whether informality is considered an alternative to neoliberal economic systems or its natural result, overall, the formal/informal dichotomy has dominated since the anthropologist K. Hart (Hart 1973) introduced it five decades ago. Recently, several authors (Dovey and King 2011, Doherty and Silva 2011, Mehrotra 2010, Donovan 2008) have recommended moving beyond this binary opposition that oversimplifies urban phenomena. Yet, informality is still defined and considered as the negative counterpart of formality. In fact, the UN-Habitat definition of slums (UN-Habitat 2003) measures a household's degree of poverty partially by a list of household deprivations.

In establishing a theoretical background to informal urbanism, Elshestawy (2011) identifies three perspectives by which urban informality is explored in cutting edge research: underlying order in informality, socio-economic factors, and strategies of survival. Duminy (2011) also distinguishes three

themes in planning literature: informal planning (as modes not officially regulated and including quasi-legal ways of land transfer and negotiations); informality as income-generation, typically services and practices significantly unregulated and uncontrolled by formal institutions (responding to socio-spatial marginalization and survival conditions); and informality in relationships, city governance processes and urban social formation. This article focuses on spatial production, clustering research contributions into three major theoretical approaches: a) the functional approach, studying space organisation and form, planning processes and legal frameworks; b) the anthropological approach, investigating everyday practices; and c) the process-oriented approach, considering informal settlements formation and evolution processes (Figure 1). Let's consider now each of these approaches in detail.

Figure 1: *Theoretical approaches identified in informal urbanism.*

The functional approach

This approach includes studies about spatial arrangements, form, and the concept of order.   It claims that, although informal settlements may look chaotic and unstructured, their physical structure responds to specific rules and logics; hence, it is necessary to identify tools for effectively reading and recognising informal fabrics and structures. Turner (1972), for instance, first promoted the importance of understanding informal housing standards as a prerequisite for implementing affordable housing programs (Turner 1972). Similarly, the interest in informal housing performance led Rybczynski to map patterns of use of public spaces based on rooted cultural practices in Indian unplanned settlements (Rybczynski et al. 1984).

More recently, common analyses have focused on physical patterns and order, aiming at understanding informality in relation to territorial spaces and distribution. In describing 'subaltern urbanism' as a mode of space production defined by the territorial logic of deregulation, Roy (2005) identifies urban informality as one of four categories of subaltern spaces: peripheries, zones of exception, gray spaces, and urban informality. They are produced as state of exception to the formal order, where the ownership, use, and purpose of land cannot follow an established set of regulations.

Dovey (2011) regrets that there is very little research on the morphologies of urban informality and identifies eight territorial typo-morphologies within which informal settlements and slums develop in South-East Asia: districts, waterfronts, escarpments, easements, sidewalks, adherences, backstages and enclosures (Dovey and King 2011). Arefi (2011) draws from Marshall's (2009) distinction between 'systematic' (visible), and 'characteristic' (implicit) order; and from Mandelbrot's (1983) concept of 'scaling', which refers to the different levels of informality that may exist in a given context. Exploring Istanbul's informal settlements, he describes five distinctive types of order: social organisation, conflict resolution, local politics, and planning and land use. These studies have somehow informed the public mind-set, yet, they have largely failed to acknowledge the presence of order in informal settlements (Arefi 2011).

The literature about processes of enumeration and mapping is also critical for understanding informal settlements (Karanja 2010, Pamoja Trust 2008, Weru 2004). It offers significant insight about slums' socio-economic and physical structures. Enumeration activities can reveal existing or missing infrastructure and services, settlement boundaries, houses and typologies of business structures in informal settlements. In Kenya, for example, these physical features are described in terms of how people live and use them (Karanja 2010, p. 233). The enumeration process, aimed at creating awareness among slum dwellers about the socio-spatial characteristics of their communities, has enormous practical implications, such as allowing for local planning and upgrading implementation, but also suggesting reliable methods to gain and build specific, contextual knowledge about informal urbanism.

The anthropological approach

This approach investigates everyday practices of land occupation and the concept of marginalization. It emphasizes the character of transition and impermanence of informal settlements, but also the various opportunities provided by them. Informal urbanism is considered here as "everyday practices of ordinary citizens, forcing a reconfigured relationship between those in power and the inhabitants of the city" (Elshshstawy 2011).

Adopting this approach in her analysis of Brazilian favelas, Perlman (2010) describes, for instance, the atmosphere of diversity tolerance in informal settlements, presented as a way of life. Perlman criticises the theory of marginalization that depicts favelas as places of loneliness, disorganisation, criminality and anti-social behaviour. Rather, she describes their symbolic and physical attributes, providing extensive data about inhabitants and their trajectories from informality towards better living conditions. This is expressed in a number of ways through the concept of transition, depicting informal settlements as impermanent realms in which people can benefit from a dense social infrastructure (Simone 2008).

The characteristics of temporality in relation to the configuration and use of urban space also emerge in the narratives of rural-urban migration occurring in developing countries. Here, the poor are in constant search for ways to better integrate into cities, using informal settlements as 'arrival cities' (Saunders 2010). This transitional character of informality favours the flow and exchange of goods, cultures and ideas, particularly in informal marketplaces (Mortenbock et al. 2008). Defenders of this approach typically reject the notion that slums are poverty traps that limit household development (Marx 2012); although, recent economic studies reveal that risk of economic and social traps exists for slum dwellers (Duflo 2011, Sachs 2005).

Informal settlements and marketplaces represent the places where meanings transform in the modern urban life, as the concept of black urbanism explains. Black urbanism accounts for the "more invisible modalities of socialities that circumvent normative mechanisms of social exchange'' (Simone 2008, p. 88). Informality is not placed in the background, rather brought into the very center of spaces that concretize the contemporary urban life. Simone stresses the particular condition of double affiliation with the formal and the informal, exclusion and inclusion, precariousness and opportunity. The physical space becomes the arena for such invisible practices and as such, conditions the day-to day negotiation of 'doubleness'. Thus, according to Simone (2008), conventional discourses of urban development fail, while architects should "extend their skills to do something more provisional rather than wanting to solve the problem once and for all" (Simone 2008, p. 91).

Referring to cities in Latin America, Africa and Asia, Mehrotra (2010) elaborates on ways to represent informality, thus developing the concept of 'Kinetic city': the informal city characterized by an "ever transforming streetscape made of processions, festivals, street vendors and dwellers". It is also a three dimensional entity perceived through patterns of space occupation rather than through architecture. Contrasting it to the static city (the formal, two-dimensional entity made of permanent materials), Mehrotra proposes a new binary distinction.

The process-oriented approach

The process-oriented approach considers the informal settlements' historical formation and evolution, including aspects related to planning processes and legal developments. Relationships between informal development and global pressures such as colonialism, post-colonialism, liberalisation and international economic policy are often brought into light. This approach also focuses on the relationship between informal urban processes and work and production. While underscoring that informal urbanisation "has become the most pervasive element in the production of cities in developing countries" (Anyamba 2011), it

focuses on the origins of informal urbanisation. De Soto, for example, provides an analysis of the political-historical evolution of informal housing in Peru. He identifies ten successive historical stages showing how the formal structure has developed the basis for the growth of informal housing. Similarly, Anyamba refers to Nairobi's informal processes as moments in which Africans built villages on the periphery of the town in three waves that embodied a search for modernisation and a departure from local indigenous practices (Anyamba 2011).

Kellet (2010) attempts, through the analysis of Latin American cities, to redefine the terms 'formality' and 'informality'. He highlights bottom-up processes of city transformation, processes of collective appropriation of spaces and formation of informal settlements, stressing that new and more dynamic methods of analysis and intervention need to be developed in order to deal with the conditions of informality in contemporary cities. Similarly, Abbott and Douglas (2010) in a longitudinal study of informal settlements in Cape Town over a five-year period, show how informal settlements in the city grow faster than new housing can be provided, thus calling attention to the need for a radical shift in current housing policies. The possibility to determine distinct trends in the growth pattern of informal settlements can enable such settlements to be integrated into the city development planning process. Finally, Samper, a defender of this approach, complains that the discipline of urban design lacks a comprehensive understanding of the phenomenon of informality and therefore, effective intervention tools (Samper 2011).

SECOND RESULT: THE CASE STUDY OF TOI MARKET IN NAIROBI, KENYA

Location and context
With a total of three million inhabitants, Nairobi is home to about two hundred informal settlements and slums and one and a half million slum dwellers (Pamoja Trust 2008). Furthermore, its population is expected to reach 8 million by 2025 (UN 2001), and the informal sector is believed to represent about 70% of urban economy. The poor's needs are, if anything, satisfied by informal practices, commerce and marketplaces. Kenyan slum dwellers have thus organised in a national federation (Muungano Wa Wanavijiji), whose members come from various communities. The federation works in several communities to mobilise and create awareness, leverage social networks to favour socio-economic assistance, advocate for political and human rights, negotiate with local authorities, and improve local conditions through upgrading and sanitation projects. Nevertheless, slum dwellers in Nairobi still live in conditions of mass poverty, contagious diseases, conflicts, and many social, economic and environmental hazards (Mutisya 2011).

There are about six important informal markets in Nairobi. Toi market is one, located four kilometers south-west the Central Business District, at the northern border of Kibera (Figure 2) - one of the largest African slums (Umande Trust 2010). Kibera covers 250 hectares and has a population estimated at 700,000, of which about 49% lives below the poverty line (Umande Trust 2007).

Figure 2: Toi market location in Kibera.

As an urban entrance for agriculture products and a food supply center for Kibera and surroundings, Toi market offers employment and livelihoods to over 2,400 traders, largely affecting the living conditions of thousands of households. It provides a huge variety of wholesale and retail goods and services. Fruit and vegetables, cereals, meat and fish, spices, textiles, second hand and new clothes, charcoal and firewood, household and handcrafts can all be found at the market. Services vary from food kiosks and water vending, to tailoring and ironing, laundry, vehicle repair, chemists and herbal clinics, hairdressers, furniture and pool tables. Some vendors specialise in bone recycling, rabbit and chicken rearing, and maize growing. Some services extend beyond the market's area such as catering for weddings and funerals, tree planting, and transportation. Briefly, Toi market provides almost everything, though groceries and second hand clothes predominate.

Toi market was completely destroyed in 2008 during the political conflict that followed the presidential election, but was quickly rebuilt. The market has been affected by this major physical transformation, and we will thus refer to the 'old' and 'new' market, to distinguish between the conditions before and after the disaster. The market will be now described through the lenses of the three approaches found in the analytical framework.

The functional approach
Our study provided insights about the physical layout of the market in terms of accesses and paths, landmarks, public spaces and community services, and a typology of the stalls. Toi market extends over about 3.5 hectares of government land. According to the Ministry of Land's records, improvements of the area have been planned several times, but have never actually been translated into specific projects on ground.

The area is not directly accessible from the main road system. The main access is at the South-East, off Kibera Drive. Another five access points open to small pedestrian alleys on the East, North, West, and South sides. The layout presents four legible spatial categories: 1) accesses and paths system; 2) public spaces; 3) community services; and 4) stalls. The stall represents the module defining the entire configuration. In the old market, stalls were irregular and generated a heterogeneous layout. The new market is based on a rectangular, standardised module (Figures 3, 4).

Figure 3: *Distribution of sections and paths' system in the new market.*

Figure 4: *The new market layout.*

Stalls are made up of temporary, wooden structures, polythene or cardboard partition walls, metal sheet roofs and are not paved. Structures often burn or collapse under strong winds. There are three sizes of stalls: 2x2 meters (Figure 5), 3x2 meters (Figure 6), and 10x12 meters, the large ones usually being used for community services. Their combination allows for additional configurations. In the new market, roads have been well planned to accommodate people and handcarts. The major roads are 5 meters wide (Figure 7), while inner roads have a width of 2 meters (Figure 6, 8). All dimensions were established in order to accommodate all traders. The use of modules varies depending on the kind of activity and the economic potential of the traders. In some cases, merchants occupy more than one stall; in other cases, they have created roof extensions (Figures 5, 6, 7) or occupied public passageways with goods, sittings and tables (Figure7).

Figure 5: *Small module. Roof extension.*

Figure 6: *Large module: section through a secondary passage.*
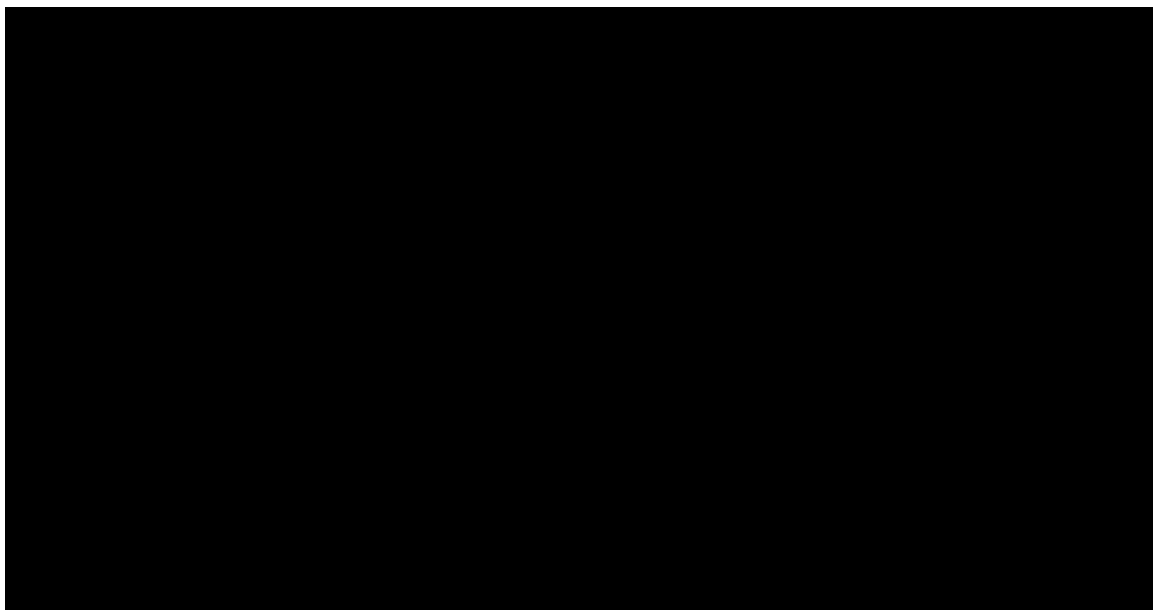
Figure 7: *Section through the main passageway; use of public space.*

Figure 8: *Stall's distribution along minor passageways.*

The anthropological approach

The Toi market community lives in extremely difficult socio-economic and environmental conditions. Since the beginning, in 1989, both structure owners and tenants have been faced with insecurity of land tenure, lack of trading licenses, low income, lack of access to credit and banking, besides constant threats of eviction and demolition. Moreover, the market area presents poor infrastructure, insufficient water and sanitation provision and temporary, fragile structures. The situation has worsened over the years with the increase in population, though the community has steadily tried to improve its conditions. Despite this precariousness, Toi market has always been a magnet for a new and tremendously diverse population looking for opportunities for integration in Nairobi.

In this context of high constraints and uncertainty, there is almost always only room for short term planning. Nevertheless, the community has undertaken different levels of planning and design over the years. Appropriation and distribution of space are critical issues requiring long decision making processes, political negotiation with local authorities, and inner conflicts resolution - mainly related to land issues. Yet in such a climate of day-to-day subsistence, some merchants have become efficient planners. Since the reconstruction of the market in 2008, merchants have learned to accommodate businesses to include all groups, design stalls, toilets and other structures, and to locate services, wholesale and garbage. Solutions have had to respond to a very complex set of long-term and immediate needs.

In subsistence marketplaces, people have physical needs, but also aspirations related to their visions of the future and expectations to overcome poverty (Viswanathan 2009). Despite its precarious conditions, Toi market has existed for over thirty years. Traders now count on it for their children's future and have developed a sense of belonging to this site. All interviewees, in fact, identified themselves as Toi market traders rather than by tribe. Some vendors are willing to invest in improving their stalls and some plan to extend their business adding more modules, but these objectives are often affected by misfortunes and hindered by insecurity of tenure. The vendors considered activities of planning and design positive in different ways. They considered the reconstruction as a positive opportunity to improve accessibility to all the sections of the market. The new market, they say, is working better than the old one: spaces are well defined and recognisable, security and accessibility have improved. Nevertheless, according to some traders, there is less flexibility in the use of space and increased control on businesses by leading groups.

All traders agree that the process of formalisation and an appropriate design for a modern market would increase investments and economic stability. A good design of the stalls with higher quality materials, partition walls and locked doors would reduce the need for a security system (now provided by the Masai people) and increase investments in stocks, improving businesses and economic growth. Over the years, the merchants have imagined solutions for the use of the land, such as the densification of the area by building houses over the stalls and developing new income generating activities, such as renting rooms for tourism

to increase the flow of people and business. There is thus a clear need for multi-functional structures capable of concentrating opportunities in strategic places.

The process-oriented approach

Toi market began in the 1980s in a bush area, with a small group of women selling green vegetables along Kibera Drive. It developed naturally along paths connecting different residential areas; these paths became characteristic of the market structure (Figure 9). Evictions started soon afterwards, to allow for the construction of two formal markets nearby: the Makina market and the Hawkers market. Initially conceived to accommodate the Toi market traders, the two markets ended up being occupied by external entrepreneurs. The original market traders, who were forced to leave, returned to the area, despite constant risk of eviction. In 1996, several informal settlements and markets in Nairobi were demolished. A formal protest against such forced measures turned into a political issue for the provincial administration. The traders lost the case in court because the land was officially owned by the government and the allocation could not be revoked. The number of traders in the area increased, and by 1999, the market was full. The same year, the department of Public Health took traders to court due to lack of adequate sanitation in the market. The Public Health officials gave the Toi market committee one month to build permanent toilets and pour cement on the floor of the food kiosks, but the deadline passed without effective results due to lack of funds. Three representatives of the Toi market committee were taken to court, and then released with a fine. They subsequently began mobilising the community to start a sanitation project. In 2005, a private developer forced the eviction of eleven traders, so the officials of the Toi market came together to support their members and the case was continuously deferred in courts.

Before 2008, the market was organised in sections, but stalls had irregular shapes and sizes. It appeared as a chaotic and dense labyrinth of cardboard, polyethylene, and iron sheet structures (Figure 10). Roof extensions created narrow, dark and poorly ventilated passages, difficult to recognise by pedestrians. Feeble landmarks existed in empty spaces, including the main road, a dump, wholesale area, garages, the church, and the formal buildings surrounding the market. The path system in the old market was comprised of four major passages (3 meters wide) and a series of very narrow paths (50 centimeters wide). Stalls were not easily recognisable by shoppers or accessible for the delivery of goods. Walking in the market was difficult due to overcrowding, lack of roads, pavement and drainage, and sewer flows from nearby formal estates. Environmental conditions worsened during the rainy seasons.

In 2008, the Toi market was destroyed by a fire. Its reconstruction was an opportunity to change its internal structure and spatial configuration. A planning team was established in the community for this purpose, focusing on stalls' accessibility and visibility.

Figure 9: *Old Toi market's path system.*

Figure 10: *Old Toi market.*

The old path system had become overcrowded and inefficient; therefore, despite the huge losses, the community saw the destruction as an opportunity to build a 'modern' market.

The new market looks like a conventional, formal one (Figures 12, 13). It is still organised in sections, but these are accommodated in rows of stalls (Figure 11). The local association Jami Bora provided technical assistance to design the layout and the construction materials that were bought thanks to American funds. Decisions were made through a committee established for the reconstruction, in tandem with Jami Bora and the market committee.

Sections and stalls are now identified with letters and numbers. Activities are registered on the map produced by Jami Bora. Every activity is accessible, customers can recognise traders and goods, and collecting for saving schemes is much easier. On the other hand, the market committee has greater power and control over all activities. The market has maintained six points of access. The northern and eastern points have become linear extensions, adding new activities along the way. The new market has kept the most important inner passageways, while strengthening the north-south and the east-west axes as major ways (approximately 5 and 3 meters wide) of distribution. The northern area, where the Toi market office and the church are located, is used as public space. Indeed, some spaces have changed function: the church in the southern area has been transformed into a mosque, and Muslims maintain rigid control over the structure and the surrounding garden; the old, one-storey, Toi market office was rebuilt, by some members of the Toi market committee with their savings, into a two storey structure that has become a new landmark in the market. Food kiosks once located only along the external roads are now also inside the market. However, merchants still lack land tenure security and basic infrastructure. Public lighting is now provided by the Nairobi City Council (NCC) through five new poles located along the major roads, but most stalls remain without power, while others steal it. Garbage is disposed of in the wholesale area but collection from the NCC is rare, thus a dangerous dump has formed that attracts children and the very poor who scavenge for food.

Figure 11: *The new Toi market layout; identification of the community services.*

***Figure 12; 13**: Comparison between the old and the new Toi market.*

ANALYTICAL FRAMEWORK: FINAL TABLE

The three identified approaches are summarized in Table 1. For each approach, different perspectives from the literature are emphasized. The table allows for identifying some of the emerging concepts and gaps concerning the recent literature on informal urbanism, sparking further reflection and research on the production and organisation of space in informal settlements.

Approach	Subcategories	Author	Concepts - Gaps
Functional approach	Informal housing standards	J.Turner (1968)	Investigation about informal housing standards and relationship with formal housing policies. Housing is considered as a process.
	Informal housing performance	W. Rybzinsky et al. (1984)	Physical characteristics of public spaces and plots. Understanding of the cultural aspects of the use of the space. Search for new design methods for user responsive housing for the poor.
	Epistemology and methodologies of urban studies.	A.Roy (2005)	Informality as a mode of production of space defined by the territorial logic of deregulation. Informal spaces produced as states of exception to the order of formal urbanization.
		A.Roy (2011)	Emergent analytical strategies for subaltern urbanism. Four categories of subaltern spaces: peripheries, urban informality; zones of exception and gray spaces.
	Concept of order	M.Arefi (2008)	Identification of five distinct types of order in Pinar (Istanbul) informal settlements: planning; land use; social organization; conflict resolution and local politics.
	Morphologies of Informal settlements	K.Dovey and R.King (2011)	Eight territorial typologies of informal settlements in South-East Asia: Districts, Waterfronts, Escarpment, Easements, Sidewalks, Adherences, Backstages and Enclosures. Lack of studies about informal settlements morphologies.
	Socio-spatial characteristics	I.Karanja (2010)	Methods of enumeration and mapping to understand the socio-spatial structures of slums. This bottom-up process has enormous practical implications and suggests reliable methods to gain and build real knowledge about informal urbanism.
Anthropological approach	Informal urbanism	Y. Elshestawy, (2011)	Informal urbanism is considered the subject of urban studies focusing on 'everyday practices of ordinary citizens, forcing a reconfigured relationship between those in power and the inhabitants of the city.
	Urban space representation	R. Mehrotra (2010)	Kinetic city: the informal city in constant motion. Three dimensional construct perceived through patterns of occupation of spaces rather than through architecture. Static city, the formal one. Lack of ways to represent informality.
	Urban space and ethnography	J.Perlman (2010)	Favelas provide a free space, tolerant of diversity, oppositional behaviours. They represent a way of life, a state of mind. Demystification of the stereotypes about favelas. Critique of the theory of marginalization.
	Black Urbanism	A.M. Simone (2008)	Black urbanism: condition of double affiliation to the formal and the informal. Invisible modalities of socialities that circumvent normative mechanisms of social exchange. Conventional urban development fails. Architects are called to do something more provisional.

Process-oriented approach	Formation processes of Peruvian informal settlements	H. de Soto (1989)	Historical evolution of Informal housing in Peru. Identification of ten successive historical stages showing how the formal structure has gradually yielded the ground necessary for the growth of informal housing.
	Processes of informal city making in Colombia	J. Samper (2010)	Lack of knowledge about informal cities formation processes. Urban design lacks a comprehensive understanding of the phenomenon of informality and effective intervention tools.
	Historical origins of informal settlements in Kenya	T. Anyamba (2011)	Informal urbanization is made by not homogeneous processes. Informality is not illegal. Origins and historical-political causes of informal settlements formation in Kenya
	Historical formation of informal settlements in Latin America	P. Kellet (2010)	Processes of collective appropriation of spaces and formation of informal settlements. New and more dynamic methods of analysis and intervention need to be developed in order to deal with the conditions of informality existing in Latin American cities.
	Patterns of growth	Abbott and Douglas (2010)	Longitudinal study in Cape Town. Informal settlements will grow faster than new housing can be provided. Discernible trends in the growth pattern of informal settlements enable the settlements' integration in the planning process.

Table 1: *Analytical framework about informal urbanism according to the three approaches*.

DISCUSSION AND CONCLUSIONS

The Toi market case-study provides important insights about the production and organisation of space in informal settlements. It allows for validating the three categories of analysis: the functional, anthropological and process-oriented approaches.

Generally, the case-study shows that the poor pay significant attention to spatial organisation. It is a long and complex process affected by socio-economic constraints, lack of resources, political and cultural issues. On the other hand, organisation of space largely affects social relationships and conflict resolution, occupation, business and income, environmental and health conditions, ambitions of growth and vision of the future. The case-study also confirms that issues of functionality, human and power relations, and development processes influence the way stakeholders perceive informality and its relationship with urban space creation.

The functional approach recognises informality as a contextually-based urban form, emerging through different morphologies. According to Dovey (2011), Toi market may be considered a district: 'large mixed use districts incorporating major retail and industrial functions'. However, his classification concerns large settlements and does not mention marketplaces. Morphologies are critical to read the relationship between informal settlements and cities; yet they are in their early stages and further research in this area is needed. Seemingly, logics and patterns of informal settlements also exist, as the case-study widely describes, but they remain, for the most part, unidentified. Finally, the functional approach seems to neglect significant aspects of decision making concerning space organisation. Generally, there is a lack of bottom-up approaches capable of linking informal decision-making mechanisms to the informal planning and design of space. Recent approaches to the economy of poverty and development (Duflo 2011, Yunus 2006) advocate an empirically based analysis of poverty that explains how the poor cope and adapt to challenges and how they envision the future and make decisions. They can be considered a source of knowledge, as well as experts in overcoming challenges and crises. A top-down approach to planning and design for slums must be combined with a bottom-up understanding of locally adopted solutions for spatial organisation.

The case study confirms that anthropological approaches serve to highlight gaps in the debate about informality and in the ways of representing it. Though informality is seen as provisional and a temporary state of peoples and cities in their path towards development, it can become a permanent status. The Toi market vendors have been striving for thirty years to survive in subsistence conditions. Informality cannot, in any case, be idealized as a poetic alternative to the formal city. Slum dwellers, in our case marketers, aim at being recognised and integrated, and at having modern and efficient facilities. However, Simone's concept of '*doubleness*' is critical to reading the dynamics of space production in informal settlements. As in Toi market, slum dwellers mainly invest in short-term solutions (for instance, temporary structures), but they have hopes and aspirations for future permanent ones, which often reflect a 'modern' view of infrastructure, services, legalisation and secure tenure. This contradicts the vision of impermanence and temporality that often pervades the narratives about slums. Space organisation is intertwined with the concept of inclusion at political, economic, and social levels. It allows community members to create connections with the formal realm in multiple sectors. Confirming Simone's notion of condition of 'doubleness' lived by black residents, the case-study tell us that space organisation plays an important role in such condition. And the relationship with modernity is a critical factor to be explored in the production of new urban spaces such as informal settlements.

The process-oriented approach provides an insightful reading of the historical causes of informal settlements formation, with emphasis on the influence of legal and economic frameworks. The role of official planning in the informal city 'making' and 'solving' is questioned, as well as the relationships between informality and globalisation. This approach explains that informal urbanism is formed through temporal waves of adaptation to processes of modernisation, and that responses and relationships with governments vary enormously. Toi market formed nearby Kibera, a slum that emerged in the first wave of 'informalisation', and mostly serves its own population. Its spatial evolution reflects the significant political and socio-economic events that occurred over the years. As in other informal settlements, the market physical features are extremely vulnerable to political events and changes: elections, conflicts, political occurrences, and transformation in the leadership. The analysis of its historical evolution shows patterns and logics of physical development and growth. More importantly, it shows that planning logics and principles can survive in moments of crisis and be applied to better environmental and economic conditions, as in the case of the market reconstruction.

Generally, determining trends in informal settlements growth is a prerequisite for enabling settlements to be better integrated in the development planning process. According to this perspective, the discipline of urban design lacks an adequate comprehension of the urban informality phenomenon and its evolution processes. New and more dynamic methods of analysis and intervention are required in order to deal with the conditions of informality.

Finally, the existing literature on space production conceptualises informal urbanism in a way that rarely challenges the informal/formal dichotomy, through contextually based analyses. This dichotomy can and should be eliminated/ overturned / invalidated. Rather, what should be explored more deeply are the complex combinations of 'informal' and 'formal' as a new reality and the most pervasive way of producing urban spaces and cities in the coming future.   Space organisation and 'informal design' must be seen as a process, the same way Turner considered Housing as 'a verb' rather than a product. And the outcome, the more or less established form, the design, must be seen as the *temporary result* of this process, through which we can gather important insight about the poor's immediate needs, long term objectives and aspirations.

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RESEARCH ON CONSTRUCTION OF INDEMNIFICATORY COMMUNITIES IN NANJING AND OPTIMIZING STRATEGIES BASED ON MIXED HOUSING MODE

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Abstract

Against the background of city renewal and implementation of government-subsidized housing systems, a large number of indemnificatory communities are emerging across China. However, these constructions of indemnificatory communities were carried out basically under the premise of differential effects of urban land and housing filtering implemented, which undoubtedly increased residential differentiation among various levels. Low-income people are relatively concentrated, have gradually been marginalized and become a hidden danger of social and urban development. Firstly, through analyzing the spatial distribution of indemnificatory communities in Nanjing from 2002-2012, this article summarizes the main characteristics of current indemnificatory communities constructions. Secondly, the relationship between indemnificatory communities and urban residential differentiation is discussed. Thirdly, it researches major problems caused by indemnificatory housing, such as long distance from employment, inconvenient traffic and poor public facilities, and urban residential spatial differentiation. Finally, based on the mixed housing theory, from the perspective of urban planning, it proposes three strategies on constructions of indemnificatory communities, including dispersion strategy, mixing strategy and construction strategy, so as to provide references for the future of indemnificatory communities construction and accelerate harmonious social development.

Keywords: Nanjing indemnificatory communities, residential differentiation, mixed housing mode, optimizing strategies.

INTRODUCTION

During the period of planned economy from 1949 to 1979, China implemented the 'Welfare-oriented Housing System' in urban areas. Housing under such a system was characterized by its low rent charge and relatively poor but standardized living conditions. After 1979, China gradually changed from the planned economy to the market economy. Since the 1990s, the urban housing market reform has begun to encourage residents to obtain houses in commodity housing market. Housing under such a system was diversified in housing conditions and housing prices as well. As a corresponding concept of commodity housing, indemnificatory housing is designed by the government for the low and medium-low income households as a method of social security with specific construction standards, selling prices or renting standards, including affordable housing and low-rent housing. According to the planning of the Ministry of Housing and Urban-Rural Development (MOHURD), China plans to construct 36 million indemnificatory houses during the 12th Five Year Plan (2011 to 2015) to improve the coverage of urban indemnificatory housing of China to above 20%, basically solving the housing difficulties of low-income.

Nanjing, as the capital of Jiangsu Province, plays a critical role in the process of social and economic development in China. Meanwhile, Nanjing is also one of the cities whose housing prices raised fast, which lead low and medium-low income households into serious housing problems. Nanjing started the construction of indemnificatory housing from 2002. Until 2012, there have been 66 indemnificatory housing projects under construction or completed. The scale of indemnificatory housing was small. In 2010, Nanjing started to construct large-scale indemnificatory communities, with a total planning area of 5.6 km2, construction area of 9500,000 m2, and about 82,000 indemnificatory housing units will be built.

What are the characteristics of indemnificatory communities in Nanjing? Will it exacerbate residential differentiation? How to solve the problems encountered during the construction of indemnificatory communities? To explore these issues, this paper, firstly, through analyzing the spatial

characteristics of indemnificatory housing distribution in Nanjing from 2002-2012, summarizes the characteristics of current indemnificatory communities constructions. Secondly, it discusses the relationship between indemnificatory communities and residential differentiation. Thirdly, major problems are found in the construction of indemnificatory communities. Finally, based on the mixed housing theory, from the perspective of urban planning, it proposes certain strategies on the construction of indemnificatory communities.

CHARACTERISTICS OF INDEMNIFICATORY COMMUNITIES IN NANJING

Up to 2012, there have been 66 indemnificatory housing projects and 292,726 indemnificatory housing units in Nanjing. The spatial distribution of each project is shown in Figure 1. The characteristics of indemnificatory housing are as follows:
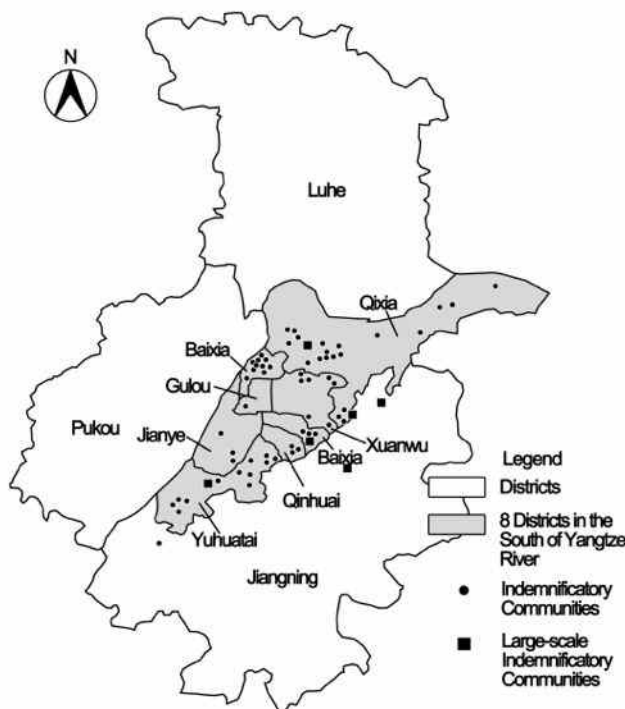
Figure 1: Spatial distribution of indemnificatory housing projects.

Imbalanced distribution

Overall, the distribution of indemnificatory communities in 8 Districts in the South of Yangtze River (all districts except Jiangning District, Pukou District and Luhe District in Nanjing) is imbalanced . The central tendency is evident in Qixia District and Yuhuatai District (Table 1). Yuhua District and Qixia District are the main sources of construction land of indemnificatory housing. The amount of indemnificatory housing projects in these two districts accounts for more than 2/3 of the total in Nanjing. While indemnificatory housing projects are less in three main districts in the main city (Gulou District, Xuanwu District and Baixia District),the construction area of which accounts for around 14% of the total in Nanjing. There is only one indemnificatory community (Jiangdong Village) in Gulou District, which has a construction area of 140,000 m^2.

Table 1: Spatial distribution of indemnificatory communities in Nanjing

No.	Administrative Districts	Number of Projects	Land area (Ha)	Construction Area (thousand m²)
1	**Qixia District**	21	641.93	9462
2	**Yuhuatai District**	12	562.90	7824
3	**Jiangning District**	3	218.12	3223
4	**Baixia District**	4	106.60	1910
5	**Xuanwu District**	7	130.78	1720
6	**Jianye District**	3	49.51	1710
7	**Xiaguan District**	12	94.40	1460
8	**Qinhuai District**	3	63.18	1190
9	**Gulou District**	1	7.37	140

Remote location

The location of indemnificatory communities are relatively remote, almost all of them are in the suburbs. Most of them are about 15-20km distant from the city center. Hengsheng Home (the nearest one) is 10km distant from Xinjiekou (city center), while Jing'an Project (the farthest one) is 45km distant from Xinjiekou. All of them are far from cheap public transport facilities, which means the commuting time is more than one hour by public transport. Meanwhile, indemnificatory communities are in the urban fringe areas and have poor locations in general, such as on the hillside, marsh land or by the railway, lacking transport facilities, commercial facilities, and educational facilities, which make living extremely inconvenient. In addition, high transportation costs not only increase the cost of living of low-income groups, but also reduces their employment opportunities.

Groups cluster and large scale

The distribution of indemnificatory communities also shows a characteristic of groups cluster, forming several indemnificatory community groups such as Chunjiang New Tonw, Xianhe Gate, Yaohua Gate. Each indemnificatory community group has three to four or more indemnificatory housing projects. Meanwhile, Nanjing started to construct large-scale indemnificatory communities in Qixia District,Yuhuatai District and Jiangning District since 2010. The construction area of each community is more than 1400,000 m², and the construction area of the largest one (Daishan City) is up to 3400,000 m², seems to be a small town. The centralized distribution of low income groups in space may lead to the phenomenon of residential differentiation, which is a hidden danger caused by the construction of large-scale indemnificatory communities.

THE RELATIONSHIP WITH URBAN RESIDENTIAL DIFFERENTIATION

The complementary relationship between indemnificatory housing construction and large-scale demolition in the main urban area

The large-scale construction of indemnificatory housing is carried out at the same time with large-scale demolition in the main city; the distribution, methods and demolition purposes also show significant spatial differences. Among them, the streets of the city have been the main demolition area of Nanjing. The total demolition area of the main streets in Gulou District, Xiaguan District and Xuanwu District every year is more than 17,000 m²; the public land after the demolition is mainly used for municipal road widening and environmental comprehensive renovation project in the ecological district, in order to respond to requirements of the central area for improving supporting facilities and improving the living environment. In stark contrast with the central urban area, the periphery areas of the city, especially the municipal public land in the suburbs is mainly used for construction of indemnificatory housing.

Since the vast majority of housing demolition points in Nanjing are concentrated in the main urban areas, especially in the central urban areas and indemnificatory housing is scattered in the main city's periphery, the distribution of large-scale demolition points and indemnificatory housing basically forms a complementary trend in space. As for the reasons, first, the city's relocated residents are mostly low-income

wage earners with limited financial capacity; furthermore, indemnificatory housing to place the relocated residents is largely located in the outskirts of the city; while sale price of real estate in the main city of Nanjing is far higher than the relocation compensation standards, and the area of new commercial housing tends to be larger than the demolished housing area per household once owned; due to limitations of the affordability, there's little possibility to move back for the relocated residents, who often have to move to indemnificatory housing to live on the periphery of the main urban areas.

Further marginalization of the residential space of low-income populations

Traditionally, the low-income residents in the main city of Nanjing are mainly concentrated in the south of the city, the south of the central city and Xiaguan Pier in the north of the city. For the spatial scale of the entire city, the spatial distribution rule of the low-income people as a class is that it's focused on the city's outskirts, overall showing certain marginal trends. With the acceleration of the urbanization process in China, the majority of cities, including Nanjing, there remains a huge amount of land demolition through old town transformation, infrastructure construction, environmental remediation and other forms. These lands after demolition undoubtedly provide valuable space resources for the city's functional replacement and upgrade. For the main city of Nanjing, on the one hand, original residents living in the central area move out gradually and high-income groups move in; on the other hand, the rise of the main urban housing price pushes indemnificatory housing outside the city. Driven by the large-scale demolition and high-intensity space function replacement, the differentiation pattern of residential space in the main city of Nanjing is clear. These two areas also have become the main features of different residential space of the main city of Nanjing in recent years and it's integrated with the original pattern of urban residential space, forming new residential spatial differentiation feature and patterns (Figure 2).
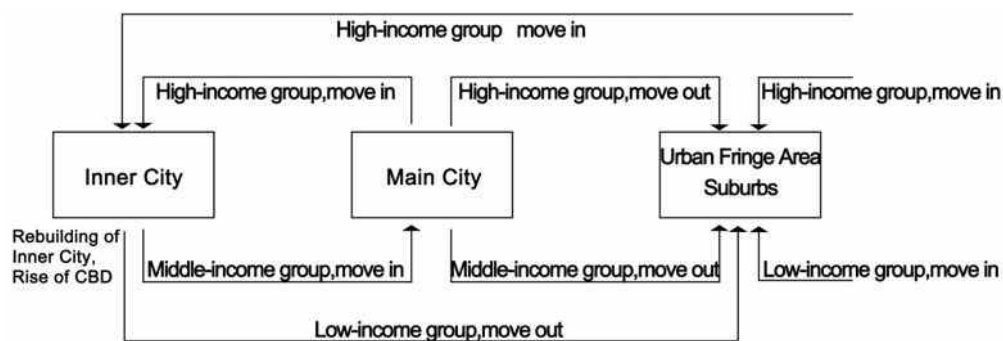
Figure 2: Analysis of population migration of high, middle and low income groups.

Thus, the gathering trend to the urban fringe of low-income residents, formerly in the central city, on behalf of indemnificatory housing, is further growing under the multiple roles of the market economy and government decision-making. As mentioned earlier, the north city, the west of Qixia District and the old south city are the most densely populated areas of indemnificatory housing, and low-income groups in Nanjing, caused by the demolition also tend to be distributed mainly in the south city, north city and east of the Qixia District, so residential space of the low-income people is further marginalized.

MAJOR PROBLEMS CAUSED BY INDEMNIFICATORY HOUSING CONSTRUCTION

Long distance from employment

Indemnificatory housing's protected population is mostly the low-income group, which is characterized by general low educational levels, lack of job training and less employment opportunities that can be selected. Their employment needs are labor-intensive industries; the employment type is single, mostly in

manufacturing and service industries. Nanjing's indemnificatory housing sites are mostly in the suburbs, which is geographically isolated and around which there's no available employment industries, especially related to industries where they can be employed after simple training. Job opportunities are scarce in the surroundings and residents seldom work in the nearest or close places. Under the status that indemnificatory housing extends to the urban periphery, separation of employment and residential space forces low-income people away from the urban labor market, which not only reduces their jobs, but also may increase the risk of unemployment, due to an inability to meet the needs of the units (such as the timely arrival, evening class, etc.), thus further reducing the possibility of upward mobility in low-income populations.

Inadequate public facilities

Imperfection of public facilities is reflected in two aspects: first, the lack of surrounding facilities in settlements; from a point of view of macro location, indemnificatory housing in Nanjing is more located outside the main city, forming an annular arrangement around the main city. The project is relatively isolated and has no support in residential area or surrounding facilities have not yet fully developed; coupled with the short development and construction of settlements, it does not effectively drive economic development, which results in the overall status of imperfect matching of the indemnificatory housing area in Nanjing. Secondly, the supporting region is imperfect and poorly managed, because the surrounding areas are mostly undeveloped or large settlements of indemnificatory housing with limited consumer groups and the spending power, resulting in vacant commercial facilities. And because of the size and limited spending power of settlements, it cannot reach the minimum threshold for setting up appropriate facilities by the respective post offices, banks and other institutions, or the set facility size is too small and too simple, so that it cannot meet the needs of residents. The problem concentrated outbreaks in large-scale settlements in indemnificatory housing in the suburbs, resulting in the connection of residents with urban areas is becoming increasingly weak, so that various related issues ensue.

Urban residential spatial differentiation triggered by groups cluster

The method of focusing on the construction of indemnificatory housing will exacerbate the phenomenon of the spatial aggregation of low-income groups and strengthen the division of different social classes in space. Near the ring roads of Nanjing, a large group of gathered indemnificatory housing has become one of the regions the major low-income groups live in; as the poor is concentrated in the suburbs, it's more likely to cause lag in the information they obtain and sharply less social communicating opportunities. Low-income settlements continue to concentrate in the suburbs and the upscale residential constantly focus on downtown, so development of residential space is even more unbalanced. City indemnificatory housing developing towards the direction of centralization and marginalization will lead to centralized and marginalized spatial differentiation behavior, which may lead to social differentiation of centralized marginalization. The long-term spatial isolation of indemnificatory housing's residents will result in social isolation and may also cause psychological isolation.

OPTIMIZATION STRATEGY OF INDEMNIFICATORY HOUSING CONSTRUCTION FROM AN URBAN PLANNING POINT OF VIEW

The above analysis shows that the construction of indemnificatory communities is an important incentive of increasingly serious phenomenon of residential differentiation in Nanjing. The problems triggered by indemnificatory communities also have a certain relationship with residential differentiation. Based on sociological research, the mixed housing mode is considered to be an effective way to address the isolating problem of different social classes and to promote exchanges between different segments of the population. Many scholars also advocate using the mixed housing mode to ease residential differentiation. How to effectively combine the mixed housing mode with the indemnificatory housing construction strategy?

In this paper, to achieve the mixed housing mode in communities, the author puts forward that it should be divided into three steps. First, disperse the middle and low-income groups by dispersing indemnificatory communities to avoid heavily concentration in one area. Second, achieve mixing of different types of housing through planning and relevant policies to promote mixed living in space. Third, by means of the

construction of settlements, promote the mixing of different segments of the population to achieve residential integration (Figure 3).
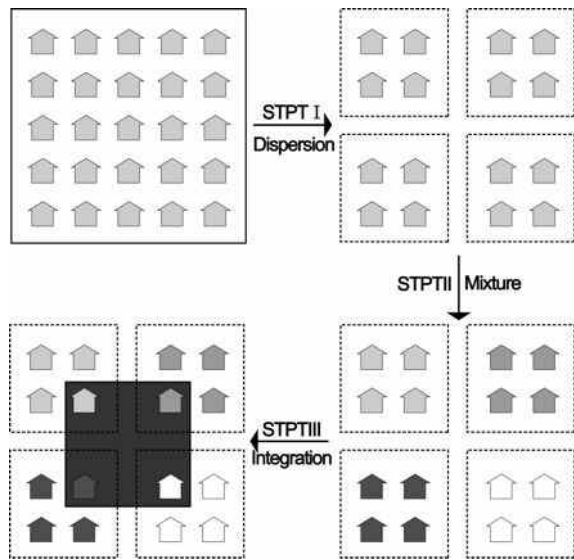
Figure 3: *Mixing steps of indemnificatory housing.*

Dispersion strategy

From a macro perspective, indemnificatory communities should be more evenly distributed in various areas of the city to some extent, to avoid excessive concentration of large-scale indemnificatory housing in an area of the city. By dispersing indemnificatory housing, avoid over-concentration of the poor. In the current social context, the trend of suburbanization siting of indemnificatory communities is difficult to reverse, but the indemnificatory communities in the suburbs should give full consideration to scattered arrangement and should not be concentrated in one area. In this way, the poor can be distributed and the nearest contradiction of people needing housing support, which will enable them to maintain access to existing social networks and will alleviate the contradiction of separate residence and working place of some of the residents.

Mixing strategy

To implement the policy of mixed living, the most important thing is to mix together different sectors of the population to live within a fixed range. However, there are also a series of problems about mixed housing mode; therefore, it needs to find an appropriate mixed way to avoid conflicts arising from frequent contact of different income groups (Figure 4). Therefore, the concept of large mixed residential and small communities should be applied to the indemnificatory communities, that is, the internal settlements are homogenous, but the mixed living is realized within the services radius of public service facilities.
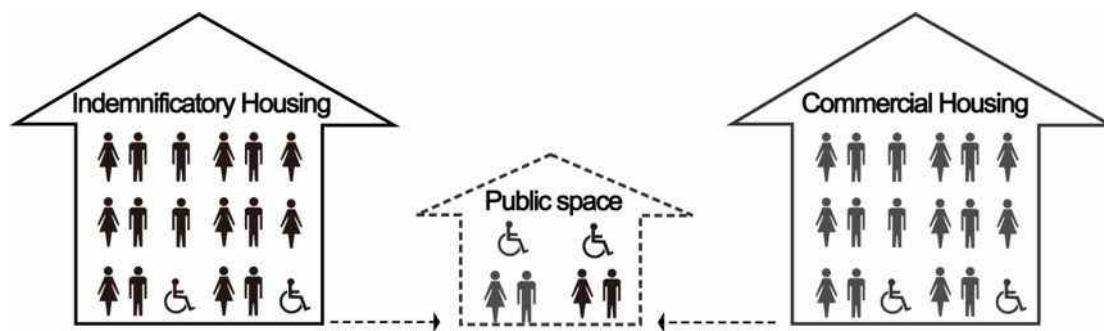
Figure 4: *"large mixed residential and small communities" mode.*

Building strategy

Strategy of external construction
First, we must strengthen the construction of supporting public transport facilities. For the indemnificatory communities, improved public transport facilities are an important safeguard for residents to move. For the suburban indemnificatory communities, it should give full consideration to supporting public transport facilities; especially, siting of public transport facilities represented by the subway station with a large capacity and fast speed should give priority to combining with the site of indemnificatory communities.

In addition, strengthen the construction of other urban functional areas around indemnificatory communities to avoid isolated settlements development. The construction of other urban functional areas should meet the basic needs of the residents living in the area and provide some employment opportunities for them; meanwhile, residents of settlements will become an important driving force of the development of these functional areas. With mutual action, both sides together promote the role of indemnificatory communities in the overall development of the area and form a virtuous cycle.

Strategy of internal construction
First, try to appropriately apply open communities into indemnificatory communities, making it more convenient for low-income groups to contact society outside, promote self-competence and obtain more information through contact and exchange, and making it easier for external information to reach inside communities

Second, pay attention to reasonable scale of residential district. Both oversize scale and undersize scale of communities are bad for development of indemnificatory communities. If indemnificatory communities with oversize scale do not have good development, it will result in unthinkable social isolation; while in the communities with undersize scale, it is hard to establish public facilities. Hence, rational scale of communities plays a critical role in construction of indemnificatory communities. It is suggested to carry on construction based on scale of housing cluster in communities classification in accordance with Code for Urban Residential District Planning & Design, namely, residential population remains about 7,000-15,000 persons.

Next, pay attention to the diversified functions of communities. Apart from living function, indemnificatory communities also provides service functions such as basic business, leisure and recreation. As far as middle and low income residents are concerned, it not only can provide with a certain amount of employment opportunities, but also can promote vitality of the community and strengthen convenience for the lives of residence.

CONCLUSION

The conclusions of this paper are as follows□

1. Three main characteristics of current indemnificatory communities constructions are formed in Nanjing: imbalanced distribution, remote location, groups cluster and large scale.

2. The construction of indemnificatory communities is an important incentive of increasingly serious phenomenon of residential differentiation in Nanjing. There is a complementary relationship existing between indemnificatory housing construction and the large-scale demolition in the main urban area, and indemnificatory housing constructions lead to further marginalization of the residential space of low-income populations.

3. Several major problems are triggered by indemnificatory communities, such as long distance from employment, inconvenient traffic and poor public facilities, urban residential spatial differentiation.

4. Three strategies are put forward to achieve the mixed housing mode in communities: dispersion strategy, mixing strategy and construction strategy.

At the present stage, China has realized the importance of construction of indemnificatory housing and strengthened construction work through a series of policies. However, a series of problems resulting from the phenomenon of residential differentiation are common in existing indemnificatory housing communities. If we keep turning a blind eye to such phenomena, it will surely aggravate existing social problems of indemnificatory housing communities in the current status. Hence, the paper proposes the concept of combining mixed housing models with construction of indemnificatory housing communities, hoping to relieve the phenomenon of residential differentiation resulting from construction of indemnificatory housing communities so as to better promote development of indemnificatory housing communities.

ACKNOWLEDGEMENTS

THE INHERITANCE AND APPLICATION OF ECOLOGICAL THEORY OF TRADITIONAL HOUSES: TAKING HUIZHOU HOUSES AS AN EXAMPLE

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Abstract

Chinese traditional houses are engineered with the integration of nature, the society and human beings, and are also built on the basis of the ecological theory of the harmony of man and nature. This paper takes Huizhou traditional houses as an example, and lists the ecological ideas inside it from four aspects; villages planning, house courtyard and space layout, house structure and materials, house decoration. Then it summarizes that Huizhou houses have several ecological characteristics, inspiring today's residential construction to some extent.

Today, however, due to the change of social and ecological conditions, the traditional houses' ecological way of conforming to nature is no longer able to be fully applicative. So the formulaic way of imitating must be abandoned. Instead, we should face the inheritance of ecological theory in traditional houses using a systematic thought. Only by combining with the reality of society and life can the world of human and nature be in sustained harmony.

Keywords: Huizhou traditional houses, ecology, inheritance.

INTRODUCTION

Chinese traditional houses came from the agricultural society when technology and productivity level was backward. And they were the systemic engineering with the integration of nature, the society and human beings, and were also built on the basis of the ecological theory of harmony of man and nature. The concept of 'harmony' was the fundamental law of traditional housing construction.

Huizhou is located in the subtropical humid monsoon climate zone. There are mountains and rivers lying in it, and its natural environment was relatively independent. On the basis of the unique natural and social conditions, Huizhou ancestors created a special series of ecological adaption methods, where the concept of harmony can be best explained.

THE ECOLOGICAL CHARACTERISTICS OF TRADITIONAL HUIZHOU HOUSES

Consciousness of auspicious site

The theory of geomancy in Chinese traditional culture pursues the perfectly harmonious relationship between heaven, earth and people, which represented the original ecology view. The choosing of a site for the Huizhou villages was mostly based on natural landscape patterns. And most of the time, the flat areas surrounded by mountains and rivers were best choices. This conformed to the idea of 'point' in traditional geomancy .This kind of enclosed landscape pattern provided a natural barrier to meet people's mental needs of being protected and wealth gathering, so that life could be peaceful and prosperous. Thus the site was auspicious.

Except for the geomancy and auspiciousness idea, Huizhou village site choosing also contained a simple ecological thought. The enclosed landscape pattern is conducive to the formation of a cozy local climate. What's more, the Huizhou villages were always built at the foot of the mountain, overlooking the land and backed by the forest. This is because Huizhou ancestors lived on agriculture production, and built on the slope, therefore, the flood could be effectively avoided. At the same time, the forest behind the villages could provide sufficient materials for house construction. Plants were good for conserving soil and moisture and microclimate regulation, economic forest could also bring about economic benefits and fuel.

Soil conservation philosophy

Huizhou lies in a mountainous area and its built land is limited. As a result, the village site choosing, houses layout and construction were based on the principle of soil conservation. The cultivated land was not allowed to be occupied, and the built land was in full and reasonable use. Besides land conservation,

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building houses on mountain slope could help gain plenty of sunshine. Therefore, Huizhou villages were always built close to the mountain and the house layout was intensive.

Villages planning and water
Traditional villages all took water as the lifeline. For one thing, agriculture needed irrigation, and in the dry season, water must be timely supplied. For another, village daily life could not survive without water. Huizhou ancestors had a long history of using water. This is not only reflected in the site choosing by river as the premise, but also after settlement, in order to build the ideal living environment, there was water systems transformation for living convenience. The artificial and natural water system was combined. Village entrances were arranged with the main water, and streets were along the streams or man-made ditches. These commonly formed a structure of 'living water through the village'. The water has the use of irrigation, drinking, sewage and fire protection. Especially, it could be used as a natural air conditioning system, so that the houses' micro climate could be improved.

Villages planning and woods
The traditional Huizhou area was rich in forest resources. To keep the climate cozy and stable, there was always a kind of forest called Feng Shui Woodland in the settlement area, which combined with the water at the village entrance or the creek around hills. To protect the forests according to the local rules and regulations became an inherited custom. In addition, in the village environment, there is a good tradition for planting trees. Often the edge of the field, the pond or the courtyard was used for fruit trees planting.

Good vegetation could conserve water, soil and regulate microclimate, and benefited the villagers by providing energy and materials all the year round.

HOUSE COURTYARD AND SPACE LAYOUT

Intensive combination and space vertical expansion
To fit the Huizhou custom of several generations living together, the house courtyard unit could combine intensively in both parallel and serial direction; the houses expanded vertically, so most had two or three floors. The intensive combination of courtyard units and space vertical expansion helped save land use and building materials. Also it met the need of avoiding the hot and humid climate. The tall buildings formed narrow street spaces and small patios, which provided plenty of shadows to keep cool and comfortable in summer.

Regular shape and introverted pattern
Because of land shortages, the layout of Huizhou houses was compact, mostly rectangular. While considering security and privacy, there were often tall walls surrounding the courtyard, called Ma Tau walls. High walls enclosed extremely introverted courtyard, creating a private, quiet, safe living environment, and was conducive to shading and ventilation, so that a relatively comfortable and stable environment could be formed.

Small patios and open house spaces
Huizhou houses' spatial distribution followed the basic shape of a quadrangle. But affected by the special climate and terrain conditions, the court's depth was smaller, seemed like a narrow strip, usually called a patio. The small patio was an important feature in Huizhou traditional houses. It adapted well to the hot, rainy and humid weather in summer, and assumed the lighting, ventilation, drainage, the family activities and communication with the outside world. In addition, the patios were paved with block stones, also there were drainage pools in them. What's more, the wall side was decorated by bonsai or plants. As a result, the cooling effect was obvious.

Further, in order to effectively organize ventilation to improve the indoor humidity environment, Huizhou traditional house had the layout of combining the tall open hall and small patio. The climate characteristic of no extreme cold in winter made the open house space an ideal choice. This pattern reduced the ventilation resistance, so that the heat and moisture could easily dissipate.

HOUSE STRUCTURE AND MATERIALS

Structural system

The Huizhou area was rich in wood and the traffic was occlusive, so wood became the preferred material. The hollow masonry wall of Huizhou houses was just envelope, and the construction loads were fully borne by wooden columns. The wood structure was combined with two different types. The column and tie construction predominated, and the post and lintel construction was used in several large-span rooms. As a kind of flexible structure, wood could exist for a long time and adapt to a variety of adverse forces of nature, such as earthquakes and wind; wood structure houses could also adapt to complex terrain, and the deep eaves helped produce shadows, keeping the rain off and ventilate.

The wall

The external wall of Huizhou houses is a hollow masonry wall, typically 30cm thick and with white pulp on the outer surface; besides, other walls in the houses are relatively thin, most are partitions made of wood. The hollow masonry wall is conducive to heat insulation, and the white pulp can reflect the strong sunlight in summer. The Ma Tau walls, one of the Huizhou traditional characteristics, were mainly used for fire and theft prevention. The tall wall in a certain extent affected the houses' lighting and ventilation, so most houses had small windows at second floor height.

The roof

Similar to the structure principle of hollow masonry wall, Huizhou houses used the method of hollow layer in the roof construction, namely, added a layer of brick or sheathing under the roof tiles to form a 6~8cm air insulation, so that the thermal insulation effect would be obvious; in some auxiliary space such as the kitchen, often no brick or sheathing layer was set to reduce the structural level, which reached the purpose of saving natural resources.

The ground

To adapt to the climate conditions and different daily requirements, Huizhou houses took different ground laying methods in the outdoor space, the hall and the bedroom. The outdoor ground was most vulnerable to weather damage and the person flow was large, so the ground was made of hard-wearing stones such as slab or gravel; the stones formed many cracks filled with natural soil, which could help cool down in summer. The ground of the hall was slightly affected by the weather, and as the main part of the house, the hall was a semi-public space used for guest reception and other activities, so the ground was made of ground tile or concrete; one practice was firstly to put a layer of lime and then a layer of fine sand, finally ground tiles, so that the wear and moisture resistance would be good. The bedroom is a private space, it bore little damage from outside weather and the wear was not serious, so the raised wooden floor was 30~40cm higher than the hall ground, and vents were set at the foot of the wall towards the hall for moisture resistance and ventilation.

House decoration

The most representative interior decoration in Huizhou houses are the Huizhou carvings, such as brick, stone and wood carving. The carvings have exquisite technique and rich implication, many are about landscape, plants and animals, which reflect people' aesthetic taste on nature. Some decoration was also combined with the residential component, for example, the vents and column bases were carved with delicate patterns.

SIGNIFICANCE FOR TODAY'S CONSTRUCTION

The Huizhou traditional houses not only have rich materials and heritage of the ancestors, but are also valuable remains of ecological wisdom, which originate from nature, go into nature. The experience of conforming to and managing the natural environment has certain enlightenment significance to current residential construction. The following are four ecological characteristics of Huizhou traditional houses.

The integral way of thinking

First of all, it is reflected in the traditional residential construction concepts of advocating the world and harmony of man and nature, namely, focusing on the integrity and coordination of the natural environment and artificial environment, making the landscape become visible; the second is the systematic planning and

design, such as the system design of drainage and sun shading. In today's residential construction, this integral way of thinking helps to form a good cycle of residential ecological environment and also helps to form healthy and comfortable living conditions.

The ubiquitous conservation awareness
The Huizhou traditional houses' location adapts to the terrain, built near the gentle slope, farmland and forest, saving land resources and making full use of natural conditions; the residential layout is compact, with narrow streets and alleys, quadrant courtyard, careful in reckoning of a square building, and built mostly with raw material locally, with the timber structure. In a manner of speaking, conservation awareness went throughout the entire village, and not only leads to the appearance of simple and elegant structures, but also creates the unique Huizhou houses space and form. In today's residential construction, this kind of conservation of energy and resources is not out-of-date, instead, it conforms to the trend of sustainable development.

The management of natural resources
Huizhou traditional houses respected nature and complied with nature, for another, the mode and experience of manage natural resources is very worthy of our reference. This is reflected in the use and modification of natural factors, and the insulation of bad factors to achieve self-protection. The former was such as planting trees, water management, ventilation and patio lighting, and the latter was insulation of heat and moisture.

The aesthetic interest of simple and elegant
The color and elements of Huizhou houses are quietly elegant, and the decoration is simple and delicate. This was due to the 'moderation' concept and traditional social reason, and was in accord with Huizhou houses' ecological characteristics, advocating and living harmoniously with nature.

CONCLUSION

Inheritance and use of traditional residential ecological thought
As a kind of historical relic, the traditional houses were gradually created and improved on the basis of functional needs and the technological conditions widely used at that time. Nowadays, great changes have happened to nature, society and people's life, and many traditional ecological experiences cannot fully apply. When inheriting these ecological thoughts, firstly we should attach importance to the inheritance of philosophy, and combine it with the act of ecological and social development, rather than copying the traditional experience; secondly, to consider the overall instead of referencing single experience; thirdly, we should pay more attention to the management of nature in a scientific way, to replace the traditional way of conforming.

POSSIBILITIES OF DIALOGUE: THE CASE OF THE TRANS-LOCAL URBAN ARTISTIC RESEARCH PROJECT NINE URBAN BIOTOPES.

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Abstract

This paper addresses the question of trans-local dialogue in the case of the EU-funded socially engaged urban art project Nine Urban Biotopes – Negotiating the future of urban living (9UB), running throughout 2014 in cities in South Africa and the European Union.

9UB is an urban research, cultural exchange and artist-in-residency project among partners on all levels of urban engagement (grass-roots, cooperative, private sector, university, cultural institution, NGO and government) addressing issues of urban social sustainability. It aims to build working relationships that allow mutual learning across cultural, geographical and institutional divides. Local solutions are being interrogated and communicated globally by means of artistic interventions and purposely designed time-, site- and media-specific dialogue structures. The particular issues addressed in each of 9UB's sites of operation are without doubt of major concern and widely shared interest (public space, safety, mobility, identity, economic survival, among others). Yet the possibility of dialogue in the first place needs careful interrogation. In this paper we ask; What conversations are afforded by 9UB's artistic interventions and what are the implications of these interventions more broadly when considered within the context of transnational cultural policy? Finding answers to these questions is crucial for all endeavours concerned with 'learning from'. How are the 'otherwheres' of the project addressed and made productive without holding them in a position of otherness? How can we produce and share knowledge among equal partners if these partners do not speak the same language – literally and symbolically – in regard to issues, aims, tools and frameworks?

Keywords: Dialogue, dialogical art, relational object, people as infrastructure, expedience of culture.

INTRODUCTION

This paper addresses the possibilities of trans-local dialogue. It takes as its case study the artistic urban research and cultural exchange project *Nine Urban Biotopes – Negotiating the future of urban living (9UB)*. 9UB is a socially engaged art and knowledge exchange project running throughout 2014 in cities in South Africa and the European Union (Berlin, Cape Town, Durban, Johannesburg, London, Paris, Turin). Centre-stage to the project are nine three-month-long art-residencies that aim to produce site-specific urban research and development encounters between visiting artists and local communities and host settings (referred to as "urban biotopes"). To facilitate and sustain these local encounters, 9UB brings together partner organisations from seven cities in five countries working in different fields, with distinct institutional standings and at a variety of levels of urban engagement. These include grass-roots organisations, cooperatives, private sector partners, universities, cultural institutions, NGO's and local and national government bodies. The project is funded both by the partners and by the European Union.[1]

According to the project's self-description, 9UB aims to establish a "trans-local dialogue" on "social urban sustainability" (Horn, 2013). The issues on the agenda of this dialogue range from migration, public health

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[1] *Nine Urban Biotopes is match funded to 50% by the European Union under the Culture Programme 2007-2013, Scheme 1.3.5. Cultural Co-operation with Third World countries. It receives additional funding from Goethe-Institut e.V., Munich, Sub-Sahara Johannesburg Branch; University of Fine Art HfbK Hamburg; and Gesellschaft für Internationale Zusammenarbeit GIZ, Pretoria, within their* Inclusive Violence and Crime Prevention for Safe Public Spaces Programme *(VCP).*

(HIV/AIDS), mobility, safety and economic survival to questions of identity, public space, the improvement of living conditions and the specific needs of different gender and age groups. By introducing socially engaged art interventions into existing communities and social contexts, 9UB's objective is to direct attention towards distinct local practices in building sustainable cities while, at the same time, translating them and disseminating them beyond the local. Hence, 9UB is a two-layered project: it aims at intervening in the negotiation of urban futures at 'street level' while also building working relationships that allow learning from each other across cultural, geographical and institutional divides.

In order to accomplish this intended research and learning, 9UB proposes an "arena of exchange" through the architecture of five interlinked methods. These are: (a) nine artist-in-residency programmes placing African artists within European, and European artists within South African social urban contexts. The artists engage with particular local issues (issues that either effect life in the biotopes or that are specifically addressed by local actors); (b) nine residency-specific "integrated reporters" (or groups of reporters) working alongside the artists and providing visual documentation of each art-intervention in order to communicate local experiences trans-locally (these reporters are mostly art and communication students that are either locally recruited or brought on site by the visiting artist); (c) the partition of the project into three trialogues, that is, into three operational blocks of three parallel art residencies that allow direct and live trans-local exchange during the implementation of local art projects; (d) a comprehensive web-based communication platform featuring the visual documentation of the integrated reporters as well as backstage conversations among partners in a time-related format (available at www.urban-biotopes.net); and (e) an exhibition and outreach strategy that builds on decentralised yet parallel-run showcases in each biotope. In addition to these interlinked methods, 9UB has built into its structure a series of 'backstage' mechanisms that foster conversations among participants. These backstage methods are crucial to the project's delivery. They include an integrated and collaborative academic- led project evaluation, (carried out by the authors of this paper) allowing for reflexive feedback loops, and a Berlin and Johannesburg coordination team that manages the project 'behind-the-scenes'.

9UB'S DIALOGICAL AESTHETICS

The language of cultural project proposals is always necessarily ambitious and thus has to be read critically in conjunction with what is actually being achieved. At the time of writing, 9UB is closing on its first trialogue of three socially engaged art projects. These address migrant identities in Berlin, township upgrading in Soweto, Johannesburg, and intercultural learning in Cape Town. In this paper we will draw on the Soweto and Cape Town experiences of this first phase of delivery in order to focus on the dialogue afforded by its interventions, and interrogate the implications of these interventions more broadly when considered within the context of transnational cultural policy. We are interested in what is offered and exchanged through the aesthetic and communicative possibilities of the art residencies within 9UB's network structure and architecture for dialogue.

The cultural theorist Grant Kester, in his interrogation of community and participative art, argues that by freeing ourselves from our conventional perceptions, frameworks and obligations, dialogical art – which has the communicative act as its benchmark – allows us to find new and unexpected possibilities for knowing, being and acting (Kester 2004). The liberation that participative art affords is intrinsic to Kester's notion of the 'aesthetic'. Kester provides a theoretical basis for framing artistic practice both as social research and as urban activism. 9UB aims to make the possibilities of dialogical aesthetics productive. By building on art residencies that are inscribed into particular urban settings, the project fosters conversations which grow out of the encounter between artist-outsiders and resident-locals, interventions and contexts, art practice and the issues that bring all these aspects together. Kester suggests the artwork in dialogical art precisely to be such conversations. He draws on the Russian literary theorist Mikhail Bakhtin, calling these conversations a "locus of differing meanings, interpretations, and points of view" (Kester 2004, p. 10).[2] Dialogical art thus challenges the modernist notions both of the artist as individual genius or visionary and of the art piece as a fixed result that stands at the end of an art making process. On the one side, the dialogical artist does not aim at articulating a vision formed prior to the encounter with the participants of the process. Instead he or

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[2] Bakhtin himself was elaborating on the 'dialogism' inherent to the literary genre of the novel during the 1920s and 1930s (Hirschkop 1999, p. 54 ff.).

she poses questions or derives insights through the interaction with others and with otherness. The art piece thus emerges as a collaborative work. On the other side, this very posing of questions and deriving of insights through interaction *is* the actual work of art that is being produced; conflict and conflict resolution are essential to its processual nature as much as listening is its foremost virtue (ibid. p. 118).

FEELING STUPID, LEARNING FROM

Antje Schiffer's practice exemplifies the working of dialogical art. Central to Antje's art learning and trading, exchanging artistic services and products (video, texts, drawings or conversations) for experiences, stories, knowledge and hospitality. In a previous manifestation of her barter-trade-art she successfully applied for the non-existing position of 'company artist' in a German rubber tyre manufacturer, offering to carry out all services the staff thought appropriate for a company artist to do. For 9UB, Antje envisioned becoming an apprentice of Cape Town. For the piece *What Cape Town Taught Me* she teamed up with spoken word artist Ziphozakhe (Zipho) Hlobo. Yet instead of reproducing the well-worn hierarchy between international artist and local assistant (Zipho was contracted as integrated reporter communicating the project into 9UB's trans-local network) they explored what the city could teach them collaboratively. So while Zipho took Antje into her world (Hlobo 2014), opening doors and translating contexts (as well as, surely, keeping other gates shut), Antje confessed that confronted with South Africa's parallel worlds at first she "felt stupid" (Schiffer 2014). From there, they drifted together through Cape Town, meeting radio hosts and journalists, anti-apartheid activists and feminists, sportsmen, gardeners, builders and poets. They met the rich and the poor, black and white, and while these dichotomies clearly cut through Cape Town's society, for Antje and Zipho all partners in these conversations were united, above all, in one shared quality: they all were inhabitants of the same city who could teach them about life in Cape Town. At the heart of their intervention, thus, was the practice of what the sociologist Les Back describes as the art of listening, the modest and cautious recording of "life passed in living" (Back, 2007): "Good listening, side by side" in Antje's words (Schiffer 2014) which Zipho recalls as an act of generosity (Hlobo 2014):

> **Zipho:** Antje thinks she can learn something from anyone. She knew she was out of context and even though she can teach Cape Town things she did not come with that approach. Because, what does she know about Cape Town? She has to go to different people and ask them. Being the leader of a certain project and then allowing people to come into your space and teach you – instead of dictating them what is going to happen – is the most that I admire of her. A lot of projects I have known, international projects, don't actually do that. They don't listen. [...] because I think it should be equal. You should learn from someone as much as they learn from you.

Antje's practice illustrates the dialogical artist's "ability to catalyze understanding, to mediate exchange, and to sustain an on-going process of empathic identification and critical analysis" (Kester 2004, p. 118). It also shows the political potentials that lie within dialogical aesthetics when employing art "as a mediating discourse between subject and object, between the somatic and the rational, and between the individual and the social" (Kester 1998, p. 8). Art, here, has the capacity to deconstruct preconceived notions and identities, allowing us to see ourselves and the world in different light: an 'illumination' that belongs to the essence of the aesthetic experience (Kester 2004).[3]

Set within 9UB's overarching research interest on urban social sustainability, Antje and Zipho's dialogue and conversation with the people they met included coming to know about both the tangible and intangible aspects of life in the city. They learned how to cook, build a good shack and farm the dry soil of Khayelitsha. They also learned about dealing with inequality and violence, about sustaining hope under conditions of oppression and about sharing (Schiffer 2014a, 2014b). Their dialogical learning was at all times social, cultural and contextual; most importantly, however, it was built on personal relationships characterised by trust and respect. Antje would receive in form of conversations and give back by dignifying the people and

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3 We are aware of the critiques of Kester's concept of dialogical aesthetics in relation to the social, aesthetic and political dimensions of socially engaged art practice (Lippard 1973; Lacy 1995). In particular, Claire Bishop (2006) is raising concerns about the political imperative and ethical claims of 'justice' that overshadow both art's principle of autonomy and the aesthetical judgment of art. Bishop argues that in order to escape the predictability of the social imperative, art should contest the social by making visible the ideological operations of place and social organisation.

places she met through creating elaborate hand drawings (which were then combined in the final video). Practicing the art of listening not only with the ears during the intervention but also with pen and paper in her drawings and video, Schiffer's *What Cape Town Taught Me* now allows speaks back to her conversation partners and out to the trans-local audience of 9UB.

RITUALS OF TRANSITION

It is important to note that many of these dialogical encounters do not produce anything that looks like what can be conventionally understood as art. Collaborations may result in a meal, a market stall, a garden, or any other kind of build or social structure. This is the case with Marjetica Potrč's art – which she herself refers to as "Design for the Living World".[4] Potrč's interventions aim at human development through participatory design, particularly addressing problems experienced by marginalised or informal settlements (Lepik and Potrč 2012). In the past she has worked with inhabitants of Caracas building dry toilets and with the Stedelijk Museum initiating an intercultural garden in Amsterdam.

In the context of 9UB, Marjetica Potrč and the students from her class at HfbK Hamburg – in collaboration with the architectural development agency more-than-shelters – initiated three interrelated, participatory projects in the adjoining localities of Noordgesig and Orlando East in Soweto, Johannesburg. Together with residents and local institutions they recovered an abandoned public site as community park (which was collectively named Ubuntu Park), put in operation an educational food garden at a local primary school and held a street festival that brought together inhabitants from the two socially and physically divided neighbourhoods. Prior to their intervention, the space outside Donkey Church in Orlando East was used for dumping, posing severe risks in health and hygiene to the immediate neighbours. With the help of more than 50 people the site was cleaned up and transformed into a recreational and safe space that is, at the time of writing, being looked after by a newly constituted neighbourhood committee. The 'simple' cleaning of the space has recovered diagonal crossings and long buried trees for everyone to enjoy. In addition a new stage and benches invite passers- by to gather and stay.

Even more importantly, this collective action of cleaning and the on-going practice of foreseeing and negotiating the park's future in regular meetings (held on-site, on the benches) foster the positive experience of local development by and for the people. Likewise, the food gardening project in Noordgesig develops its potential not just in the actual food being produced, but also in the opportunity it provides for teachers, school children and parents to experience working with the land in order to change it. Finally, in what was coined 'Soweto's First Street Festival' the essence of Marjetica Potrč and her team's art becomes most apparent. All three interventions have at their core the desire to bring people together in collective action. So, while the three projects do improve the socio-physical conditions of the sites of intervention and, in addition, resonate both with official policies and with third sector driven developmental strategies like those envisioned by 9UB's Soweto host organisation Plan Act[5], their strongest achievement, we argue, lies in the enabling an experience of social engagement shared in time and space. This collective and hands-on, social as much as physical, actual changing of the conditions of people's lives and lifeworlds has been described by Marjetica as the "ritual of transition" that her art is all about (Potrč 2014).

PARLIAMENTS OF THINGS

Underpinning all these projects is a shared belief that community space only works if the people who will use it take initiative, feel responsible and maintain it (Potrč 2014). Hence, all three interventions were developed through dialogue and have on-going dialogue at their very heart. They are spatial yet even more so social interventions, bringing people, issues and sites together. Here, Bruno Latour's understanding of the exhibition as assembly of things that gather people and issues is of particular help in order to expand on Kester's notion of socially-engaged art works as "conversation pieces" (Latour 2005, p. 13, 21ff.; Kester 2004).

[4] *Design for the Living World* is also the name of the 'applied art' class Marjetica Potrč is teaching at HfbK Hamburg.
[5] PlanAct is a well-established South African NGO fostering urban improvement through participatory community engagement, operating in Soweto since 2009. Their vision for Orlando East comprises a tourist route as well as to improve neighbourhood relations between coloured and black (Makwela 2014).

This is, however, transferring Latour's insights regarding the presentation of constellations of artworks in the gallery to the process of participatory interventions in the urban sphere. Latour expounds that conversations emerge around matters that stir responses; matters that are at the same time intangible issues *and* material things (Latour 2005, p. 9). Such 'things' are the park, garden and parade, the benches, vegetables and music of 9UB's Soweto project. Marjetica Potrč conceptualises them as "relational objects" (Lepik and Potrč 2012; Potrč 2014). They are the reason that brings people together, the drivers of dialogue yet not dialogue itself, and thus not the focal point of her art as we have argued above. However, these objects do play an essential role by constituting what we can call, in light of Latour's argument, a parliament of things. An essential part of the Soweto project are the ongoing meetings that Marjetica and her team held with neighbours and local decision makers during the residency. These meetings set the foundations for future action and mapped out networks of influence. A maintenance and safety team, an art and culture coordination group and a general steering committee have been formed and continue to meet on site month after the formal end of the project (Skosana 2014, pers. email, 31 May). There is a local commitment to continue these once the artists are gone It is important to note here is that these meetings do not exclude the possibility also to produce disagreements. The thing, Latour assures, is "the issue that brings people together *because* it divides them" (Latour 2005, p. 13, original emphasis). Continuity beyond such disruptions, he elaborates further, lies in "a hidden coherence in what we are attached to" (ibid., p.5). When activating this shared attachment with what matters (issue and material), socially engaged art, dialogical and relational, provides the opportunity for critical reflection and political action.

This shared attachment becomes apparent in the evaluation interviews with members of the Ubuntu Park neighbourhood committee in which participants described their feelings and memories attached to the site, their collective action and the encounter with the artists. The discussion addressed the mutual learning that took place, the role of the visiting artists and the challenge of sustaining the park once the artists leave. Digging into the history of Orlando East in the research process revealed a shift in perception of public space that was 'freed' through the artistic intervention. In the following we reproduce part of the conversation (von Wissel et. al. 2014):

> **Sophia**: I am very excited that we have come this far. […] I am 41 years old now and ever since growing up they keep telling us that there is going to be a park around here, but when I saw Masachava [the Zulu name given to Majetica meaning "mother of the nation, mother of the people] and the whole crew I was so excited that finally it is going to happen: that our kids will grow up in a nice environment. It is quite exciting, we are moving forward as Sowetans. […]
>
> **Christian**: Why did you not organise yourselves and recover this site as a park before?
>
> **Sophia**: Motivation. Because people are focusing on other things…
>
> **Bongani**: Because of the lack of knowledge and the lack of community communication. And because of the ignorance of the people… if one or two of us would stand up and say: help us as a community, the other people would say I must go to church, I must go and do what ever. So with the use of this site now, we have learned a lot. […] And the neighbours, too. They can see now… I think our neighbours should come and give us that courage. You know, we have some sections [the different committees that have been formed] and there we talk and discuss about everything. If we would not, we would depend on somebody else. But it is us who should stand up and have that power.
>
> **Sophia:** The park is adding something to our families. That is why I am coming her everyday. When I come from work I have to come her and I feel so free and I regret having to go home. It's going to be educational. […] We want to tell our stories in a positive way. You see, we have a very painful history but I want us to tell it in a positive way. In a way that would make my child understand that, yes, it happened, but now we are building our nation. [During apartheid] people were allowed only to care about their families, but this park is going to bring us together. This is how I see it: I am free now. We want to hold workshops, music… This is an amazing space for us, […] right here, under the sun. I don't even think about my painful past. This place has opened up a lot. […] The artists have opened our eyes.
>
> **Christian**: …and it has surely also opened the eyes of the artists. What do you think did the artists learn from you?
>
> **Bongani**: Ubuntu! Ubuntu means caring and tolerating one another in a sense that you tolerate each other's differences yet you are able to build something as a unit. […] Ubuntu is also the spirit of forgiving, a new concept of democracy. [A way to move forward from the demoralisations caused by apartheid and by the war among different ethnicities during the transition period].

Caroline: So why did this culture of Ubuntu not help you organise yourselves before?

Gloria: Others say this is not going to succeed. But what do they know? Because they never helped before. So the artists came… It is almost like we needed someone else, someone with the strength to carry us, to push us forward, someone to hold our hands. And then we saw that we can do it together, so we did it and we will continue.

Themba: The professor and her crew came with the seed and the seed must gain and we need to grow this seed through the Ubuntu concept. [...] This park has created a mind shift.

Pulele: This was a park before but the neighbours destroyed it. This must have been in the early 90s. There were fights with Inkatha [IFP]. The ANC would meet here. It was a serious thing. There were tensions in those times. Even at school. We were afraid. They were killing people.

Sophia: Yes, I remember now, people burned the playground and the police would come and fire rubber bullets. It was chaotic.

Caroline: So the whole concept of public space, parks being used as spaces where communities could enjoy themselves, where kids could play, that was destroyed?

Gloria: Yes. There were many open spaces then, but they were taken away from the community and people decided to make them dumping places. Because there was no way of using them.

PEOPLE AS INFRASTRUCTURE

Within the working of the parliament of things, gathering people around issues that is Ubuntu Park, two more ingredients of Marjetica and her crew's intervention come to the fore that need further attention: firstly, the importance of communication and of access to communication that reaches beyond the conversations with immediate participants and neighbours and, secondly, the working of communication through social connections that have to be made, developed and sustained. These two aspects are crucial for understanding both the possibilities of dialogue 'on the ground' within 9UB's biotopes (or any other given urban situation) and 'and across the air' of its trans-local network (or any network). Gloria and Sophia point to the fact that the artists came from outside opened the residents' eyes; and Bongani mentions a lack of knowledge and communication as two of the reasons why the group did not work together before. These insights, drawn from the becoming of Ubuntu Park, highlight the fact that communication in itself is a serious hurdle that has to be overcome as part of any social endeavour. It is the art intervention that allowed the formulation of local desires which were then placed on new, or previously unknown tracks. In this way, too, the residents and artists alike learnt about the social skills of communicative interaction. It is worth noting that the artists had privileged access to local decision makers, coming came from outside, working within social relationships that had been brokered in advance. Thus they were able to explore and experiment with given hierarchies in ways that most locals are not. PlanAct introduced them to contacts at the top of local governance chains, allowing them to meet the councillors of the relevant two wards at the outset of the project. In addition, they were helped in understanding the cultural politics of knowing how, and when, to "follow the protocol" (Makwela 2014) and how, and when, to "jump the line" (ward inspector Johanna in a meeting with Marjetica Potrč on March 19th, 2014). Although much of the workings of Soweto's political structures might well remain hidden to the artists, residents and the authors of this text, the exceptional position, access routes and practice of the artists' team when communicating with local governance institutions were crucial ingredients in the successful delivery of the project. At the same time, it is precisely through the artists' experimental and playful engagement with the site's "social architecture" (Potrč 2014) that neighbours could participate, and thus learn from the experience of change.

The second aspect to consider is the social connections that have to be made in order to generate and develop communication. In a neighbourhood where "everybody has a phone number yet not enough money to make a call" (ibid.), it becomes apparent that technology and communication infrastructure alone do not guarantee successful interaction and dialogue. It is worth noting that this is an issue that the overall network of 9UB also has to deal with as feeding regular updates into the network is one thing, yet finding the time and generating interest to follow the residencies otherwhere another. Here 9UB's integrated evaluation and pared coordination structure enacted their messenger function between one site and the other. This, together with the development of the projects additional conference calls between hosts and artists it became apparent that the project architecture too could learn from its own operation.

Back on the ground of Orlando East's new Ubuntu Park and Noordgesig's Primary school vegetable garden learning has followed a similar process of realisation: On the bottom line, dialogue does not need much

more infrastructure then the people who are committed to make it come alive by gathering around a relational object of shared attachment. Here, Abdou Maliq Simone's notion of 'people as infrastructure' is helpful in order to make sense of the "flexible, mobile, and provisional intersections [… that] become a platform providing for and reproducing life in the city" (Simone 2004, pp. 407-8). The concept of 'people as infrastructure' offers a way of seeing how people sustain their lives – and dialogue as well as learning we argue – by tying connections that expand their radius of action (ibid.). Simone's notion rests on understanding people themselves as the infrastructure they put to work in order to access business opportunities, local knowledge or relevant skills that allow them to continuously develop their own urban futures. As a conceptual tool it scales down planning and urban development to the level of each "ordinary practitioner of the city" (de Certeau 1988, p. 93) and places the focus on the city as practice and on the "tactical ways of operating" of urban everyday (ibid., p. xix, 37). Just like dialogue and dialogical art, the city is in a constant state of becoming, a process and social being rather than an accomplished piece of work (cf. Harvey 1996). And thus like the future of the city as process lies in the *social* sustainability of its connections – all sustainabilities must be negotiated and agreed upon in a social, participatory process (cf. Hilgers 2013) – the creation of shared civil space (be it in the context of an art project or not) must be sustained through dialogue. This renders sustainability as an ultimately local practice.

BEYOND 'AFFIRMATIVE CULTURE'

As discussed above, these urban interventions may not be easily recognised as art and indeed they expand the notion of art into activism and research. 9UB's aim is to discover, initiate and strengthen local sustainable behaviour and to generate and sustain trans-local dialogue on these matters. The Cape Town and Soweto projects show how dialogical aesthetics and relational objects are put to work in order to make connections and build relationships of trust that allow shared learning rather than merely bringing voices together that continue talking on their own. Drawing all biotopes together, 9UB is creating a valuable pool of comparative case studies in which the politics, possibilities and potentials of dialogue can jointly be investigated. However, one cannot make sense of the kind of trans-local cultural interventions exemplified by 9UB without critically considering the wider relations of governmentality that surround the project as well as the complex institutional landscape in which it sits. The core funding for 9UB comes from the European Commission Culture Programme (ECCP: Strand 1.3.5). As a policy instrument, this programme seeks to bring European Heritage to the fore through policies and financial aid, supporting and promoting common cultural values. The ECCP was established to enhance the cultural area shared by Europeans, based on a common cultural heritage, through the development of cooperation activities among cultural operators from member states and third countries, and with a view to encourage the emergence of European citizenship (EACEA 2013). It is worth noting that the European Union is the biggest source of development aid in the world, proving more than half of the global budget for development (Kühner 2011). The ECCP is one of a large number of European policy instruments which seek to employ a multidimensional concept of culture as a means of development, including economic growth, and of intercultural co-operation as a means of conflict prevention, individual and community identity building, citizenship and governance, encouraging political participation. Within the ECCP, every year one or more Third Countries are selected for co-operation. South Africa was selected as the third country partners of this programme for 2012.

Attention to the cultural politics of interventions such as 9UB, on a translocal global scale, demands a critical orientation to discourses that provide logic for such projects. A number of critics are concerned with the global use of culture, in this case of art practice, as an instrument of governmentality. Georg Yúdice (2003) argues that culture has become a valuable resource that is being invested in, contested and used in an array of socio-political and economic interests by all kinds of commercial, state, non-governmental and activist actors. For Yúdice, culture operates as an expedient resource, an aide to neoliberalism, which has the potential to obfuscate political differences, identity politics, class difference and the inequalities generated by the global market. The negative effects of free-market capitalism such as environmental destruction, privatisation of public resources and social inequality are seemingly addressed through cultural means. Culture becomes an instrument through which populations are managed and democracy is rehearsed. Significantly, the critical potential of art is emptied out of its potential, as it becomes yet another commodity (Mouffe 2007).

Much of socially engaged and participatory art practices have their routes in the political left, in the critical pedagogy of Paulo Freire (2006) and in the practice and aesthetics of Situationism. As Kelly (1984) argues,

community arts were born in the late 1960s from three strands: the search for experimental art forms, epitomized by UK's Art Laboratories movement; the move from the gallery into the streets in order to find what was perceived as the 'original' public; and the emergence of a new type of political activism that incorporated artistic creativity within their campaigns. Although community artists worked using different approaches and media they all shared the view that their art was not a particular type of art but a specific attitude to art (Braden 1978). Artists worked to achieve 'cultural democracy', that is, to celebrate all types of culture, eliminating the distinction between 'high' and 'low' culture, with the firm belief that achieving cultural democracy was a *sine qua non* condition for political democracy. Today, the conditions of art's production have dramatically changed. Art practice described as participatory, community or socially engaged is increasingly employed by a variety of agents in the context of urban renewal and change. Critics of this tendency argue that these kinds of projects merely adorn commercial interests and fill in the gaps left by a shrinking welfare state (Leger 2013; De Bruyne and Gielen 2011) as critical artistic gestures are quickly recuperated and neutralised (Mouffe 2013; Boltanski and Chiapello 2005), whilst formerly radical traditions risk being emptied out of their critical political potential.

Therefore, when considering 9UB and the dialogue it brings about, it is important to think carefully about the deployment of the concept of 'sustainability' and its pairing with socially engaged art interventions delivered on a trans-local basis. 9UB partners are aware of the global cultural politics surrounding their interventions. As has been exemplified above, the project's trans-local yet, at the same time, locally grounded approach offers a fresh perspective on some of the grand narratives of sustainability, also a once radical discourse which has been thoroughly appropriated by neoliberalism (Evans and Reid 2014). Today discourses of urban sustainability opportunistically and systematically deploy the notion of 'ecological reason' but, in a discursive twist, nevertheless advocate the continuation of the very global economic order that has produced the unsustainable conditions of contemporary urban form. Here, similarities become apparent with another current urban policy discourse, that of resilience. This discourse shares its concern with securing (here: cultural) diversity and expression and, likewise, finds itself being subjected to discursive distortions (ibid).

CONCLUSION

To conclude, transnational cultural commissions can easily fall into reinforcing a cultural dynamic of 'the rest' learning from 'the west' in a re-enactment of well-worn routes of cultural imperialism. With its multi-level local and trans-local assembly of things and issues, its dialogical aesthetics, rituals of transition, relational objects and people as infrastructure, 9UB enables shared learning experiences and builds relationships of trust that allow accessing both the European and African urban contexts from the productive perspective of 'otherwheres' that are not held in positions of otherness. At the same time, 9UB brings people together in order to raise awareness of their different social and political positions, perspectives and fields and forms of action. It therefore allows asking the questions of what is being learned and who is learning from whom? On site, 9UB's modes of artistic production, its social architectures, ways of operating and conditions of exchange can potentially overcome "the persistent alignment of a 'theory'/'development' dualism with the 'West'/'third world' division in urban studies" (Robinson 2002, p. 531). Seen from this perspective, 9UB contributes to trans-local learning not only among project partners but also within the study of cultural policies and urban futures more generally.

In regard to what can be learned by whom, it is also relevant to look at the partner structure on all levels of the overall project (residents and neighbours, artists, integrated reporters, hosts and coordinators, funders and government, non-governmental and academic institutions). 9UB's ethos of reciprocal learning aims to strengthen the positions of all these partners within their concrete fields of action (as well as to broaden the awareness of contemporary urban concerns among the general public). Yet in addition to different regional contexts that play out on the issues being discussed, imbalances also exist between partners in terms of their constitutions, positions, aims and ways of working. Project partners invest different interests in 9UB that are negotiated within the overall project's changing structure and on-going development (see Horn 2014). Within the overall picture of 9UB's dialogue network, such imbalances among partners and interests represent both challenges and opportunities. They can lead to antagonisms and potentially different outputs, and yet they provide the ground for fruitful dialogue through which know-how can be shared between 'otherwheres' and 'otherways'. Making these imbalances visible, and making them part of the

enquiry of 9UB, provides the very framework in which the possibilities and politics of (trans-local, cultural, urban) dialogue can be discussed.

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CHANGES AND UPDATES IN THE TEACHING OF ARCHITECTURE. LEARNING FROM INFORMAL CITIES

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Abstract

The studies developed by the United Nations within the scope of the perspectives on the world's population growth for the next 30 years estimate a strong imbalance between the growth and distribution of urban and rural populations, increasingly accentuating the distances between the world's richest and poorest regions. The growth projections for the next 30 years predict that, by 2030, about 60% of the world's population will be living in urban centres, this growth being fundamentally absorbed by the globe's poorest urban regions. Thus, the critical analysis of this issue in contemporary reflections about the city's problem areas has become necessary in the study of large urban centres, with special relevance in underdeveloped and densely populated contexts. From the reality of the numbers and the evidence of the pictures and technical reports, the paradigms of informal cities, recognize a potential case of reflection and intervention, where the acceleration of the unsustainable concentration and growth of the population and of the precarious housing conditions show the need for concrete and effective solutions on the part of the great thinker of the city: the architect. Crossing information between Architecture schools and their location, it is remarkable to see that most of them are concentrated in the northern hemisphere. We raise the following questions: Is this teaching, predominantly in academic moulds, ready to intervene in the southern hemisphere? Is the education provided in the southern hemisphere schools aware of and faced with these familiar problems? This is where it enters the conflict of an'architecture of necessity' with the traditional boundaries of architecture as an autonomous subject, too academic and detached from reality.

The non-adaptation of the curriculum plan to the emerging needs today prevents architects, unlike all other professions, from exercising and being aware of his social duty.

Keywords: human settlements, urban growth, urgency, architectural practice, teaching.

INTRODUCTION

This article aims to demystify the stigma associated with the traditional boundaries of the discipline of architecture, more specifically of social architecture, applied to the problems of informality, where the area of intervention is as vast as imagined, complex and culturally diverse.

Assuming that approximately 70% of architecture is carried outside the West but 70% of architects study and are trained in the West (Sinclair 2012), we understand that what is taught should be directed to what is needed.

Changing what is regularly meant by architectural practice, an activity of studio and of construction project traditionally separated from research, from the practice contrary to a theory, from a project for the people and not with the people (Turner 1972), here is established the need for a new thinking practice in the service of society.

Reality in numbers. Demography, urbanisation and poverty

The studies developed by the United Nations within the scope of the perspectives on the world's population growth for the next 30 years estimate a strong imbalance between the growth and distribution of urban and rural population, increasingly accentuating the distances between the world's richest and poorest regions (UN-HABITAT 2003).

In fact, if at the beginning of the twentieth century, about 10% of the world's population was living in cities. In 2000 this value reached 47%, that is, about 2.86 billion inhabitants, in other words about 47%. The growth

projections for the next 30 years predict that, by 2030, about 60% of the world's population will be living in urban centres, this growth being fundamentally absorbed by the globe's poorest urban regions.
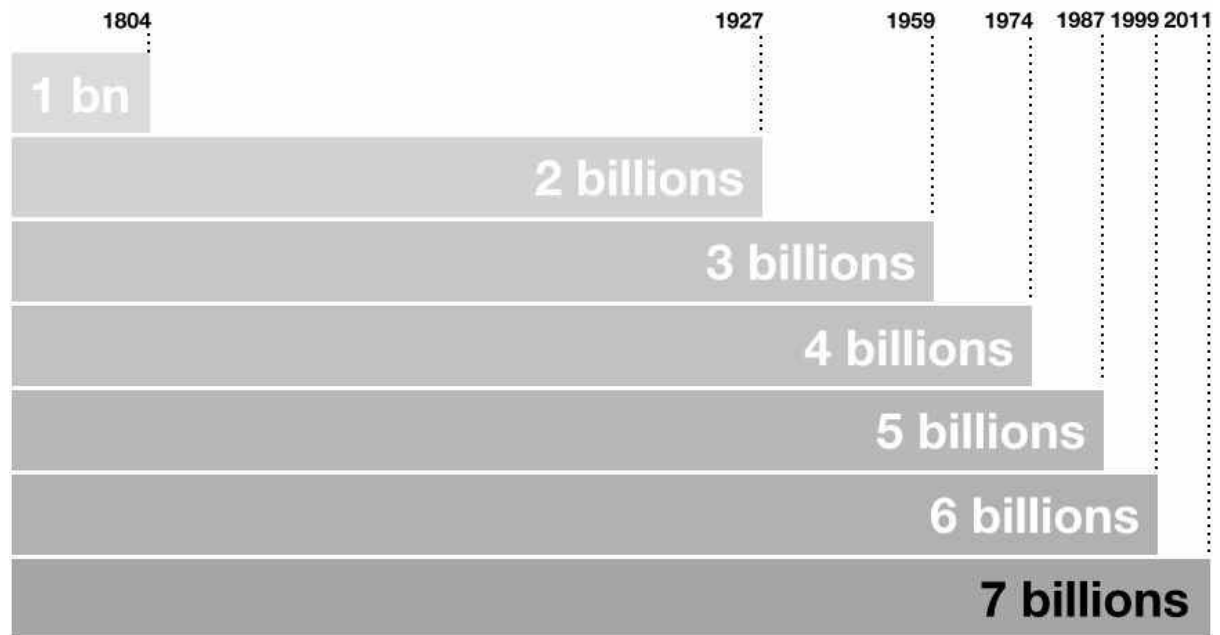
Figure 1: *World population growth, UNFPA/UN.*

On the contrary, the rural population will have a slower growth rate of 0.2% per year between 2000 and 2030. Thus, for the more developed regions, the variation of urban population from 2000 to 2030 will be about 0.9 billion to 1 billion and of 0.29 billion to 0.21 billion in what concerns rural population. In contrast, in less developed regions the growth of urban population between 2000 and 2030 will be around 1.96 billion to 3.98 billion and 2.9 billion to 3.08 billion for the rural population.

A closer look and according to the 2010 annual report of the Foundation CEAR-Habitat, the world population has tripled in the last 60 years and, in the case of the paradigmatic African continent, until 1950, had an increase of only 6% and it is expected to grow about 33% till 2030, only surpassed by Asia with a growth of 54%. Ironically, European growth, precisely the most significant one between 1750 and 1950, is expected to decrease in terms of the world population by 2%, giving origin to a clear discrepancy in terms of the inhabitants of the northern and southern hemisphere countries.

The trend will be towards an increasing urban concentration over rural. If this raises several issues related to urban planning, the issues regarding the political/governmental effectiveness in framework and control of these areas are extremely relevant. Thus, the critical analysis of this issue in contemporary reflections about the city's problem areas has become necessary in the study of large urban centres, with special relevance in underdeveloped and densely populated contexts.
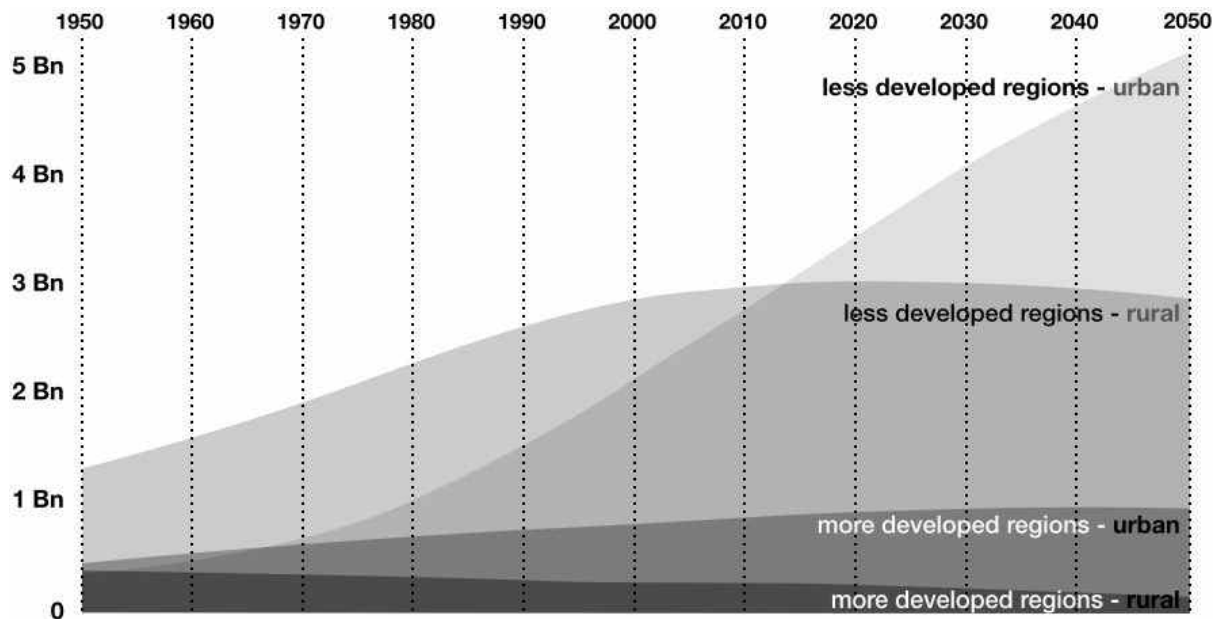
Figure 2*: Urban and rural populations by development group between 1950 and 2050.*

Looking at the reality of the numbers and the evidence of the pictures and technical reports, the paradigms of informal cities, called slums, preconize a potential case of reflection and intervention, where the acceleration of the unsustainable concentration and growth of the population and of the precarious housing conditions show the need for concrete and effective solutions on the part of the great thinker of the city: the architect.

The urgency of thinking informality
Population growth, when not combined with economic growth, generates poverty (Sachs 2005). In turn, poverty associated with urban population growth causes an increase of informal constructions. Today we know that one of the most corrosive aspects that the imposition of the neo-liberal capitalist model brought to the creation of a more fair society was precisely the promotion of speculation as the only way to develop the urban space. "'Overurbanization', in other words, is driven by the reproduction of poverty, not by the supply of jobs. This is one of unexpected tracks down which a neoliberal world order is shutting the future" (Davis 2006, p. 16).

According to the 2007 UN-Habitat report, it is estimated that 7 in every 10 homes which are built in the world are self-built at margin of the market's formal sector, for every 10 temporary houses, around the world, there are approximately 18% of non-permanent habitations with highly fragile structures, 4 of them are located in places of extreme vulnerability, more than 100 million people live in lodgings harmful to health, in urban environments, in slums.
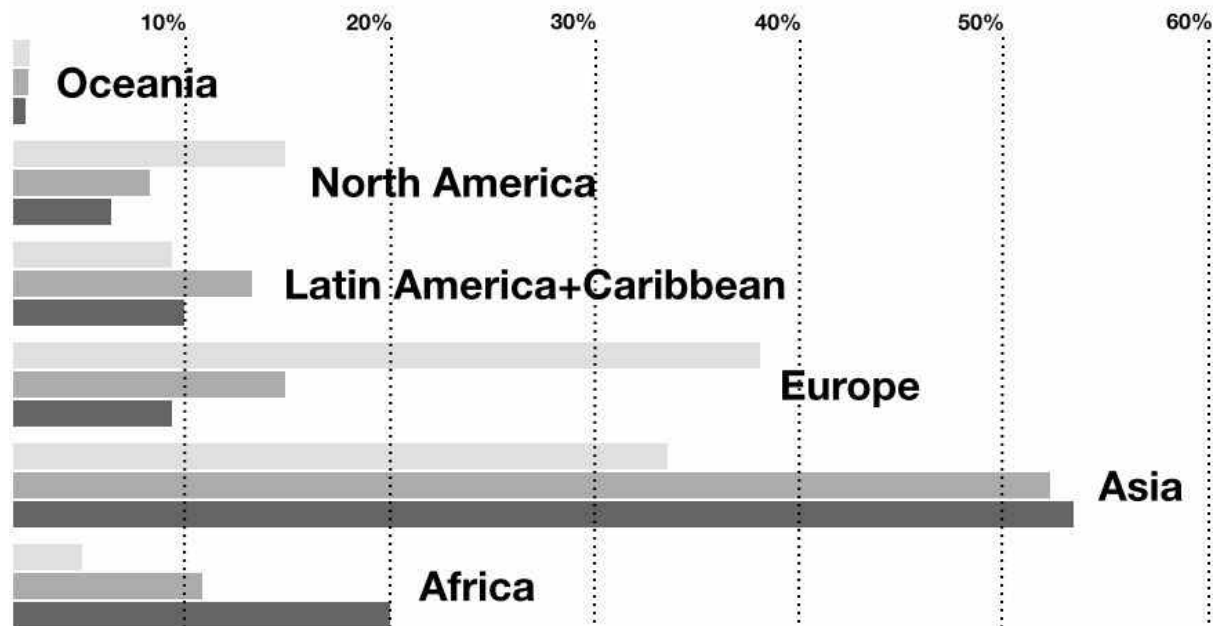
Figure 3: *Distribution of world urban population by major area, 1950, 2011, 2015.*

"And governments know least about their peri-urban borders, those strange limbos where ruralised cities transition into urbanised countrysides" (Davis 2006, p. 45).

Urban growth is directly related to vulnerability. It is not a coincidence that this informal growth is concentrated in countries with a lower level of development.

According to the UN-Habitat 'Slum 2003' report, the precariousness level of these informal areas, known as informal human settlements, is measured considering 5 parameters: drinking water, basic sanitation, sufficient living area, permanent housing and security.

All these issues make us think about the problems of housing and livability. We established that housing is an urban problem, while habitability is a general problem of society (Forjaz 2011). If we analyse in general the issue of informality in rural and urban areas, we can easily understand that while in urban areas, families depend on administrative mechanisms and on the technical capacity of local policies to find a place for their home and to build it, in contrast, in rural areas those problems are more easily overcome. But in both cases, the deficiencies in infrastructure and essential services are the same: the lack of drinking water and sources of energy and also the lack of sanitation and drainage systems, solid waste collection and accessibility of public services, commerce and socialisation spaces. Forjaz also advocates that, growth of a middle class – with new needs and demands, is less qualified for manual and technical tasks and with no ability to community mobilisation – which brings a new dimension to the problem and aggravates the growing problem between what their needs are and the ability to find solutions. The issue of informality appears to be even greater when the asymmetric access to basic livability reflects an unbalanced society. This thought brings the need to (re)consider integrated and sustainable development, where economic growth is only one of the variables in the equation and not the equation itself.

Necessarily the territory is turning to be helpless, no longer being the place where the action unfolds to become a place of dispute, as a result of anti-economic, anti-social and environmentally destructive expansion.

The informal neighbourhoods are shown as an important case of reflection. The acceleration of concentration and population growth in unqualified terms of sustainability and urban habitability imprint

the need for concrete and effective solutions on the processes of human development on a territorial and global scale (Smith 2007).

The investigation of this extended problem of growth and urban densification suggests the reflection through a particular context: habitability as a basis for solving the problem of adequate housing (Salas 1992).

These new residential areas harbour extreme poverty, with a formal diversity and very complex social aspect, where their understanding is impossible to cover in one analysis and discourse. However, we are aware of the need of a theory for a thinking practice. We therefore suggest a critical approach which promotes practical solutions able to foster new emerging urbanities, where it is considered necessary to systematise the needs of regional organisations, local administrations and international cooperation agencies for an optimised management of architectural projects and urban development in partnership with universities and advanced research centres.

The Institute of Cooperation and Basic Livability (ICHAB) of the ETSAM, led by Julián Salas, reveals an interesting intervention methodology based on the challenge of basic livability for all, as a solution to the problem of informality. This methodology is based on 4 steps and simultaneously calls for local political involvement, for the use of local resources, to empower people and communities participation. This institute is one of the examples pointed out as an important seed of updates on the curriculums of architecture schools. An update of practices.

Informality by its scale and impact, requires rethinking starting at the housing scale and ending at the city scale. From architecture to urban planning.

To intervene on these urban crusts presupposes several challenges, from which we highlight the following: high costs, difficulties in providing them with basic infrastructures, difficulty in planning and (re)planning and the inevitable consequence of this entire spontaneous process of urbanisation and the constraint of urban development due to the massive soil occupation inadequate for housing purposes, preventing the same space to be used for other purposes and activities. Failure to follow these processes of territorial occupation by local technicians is perverse. On the one hand, the presence of formal elements connected to local power legitimises the process and formalises spontaneous urbanisation, raising problems associated with social equity; on the other hand, the reality of land occupation is growing exponentially and its non-follow up raises serious governance issues which are reflected on the territory unbalanced development. There is also the problem of politicised planning too dependent on politics, which requires further political training and experience in order for planning lines and matrices to become operational. We have recovered the need to incorporate new contributions within the planning theory through collaborative planning, as already formulated in the 90's decade (Healey 1992), which is exactly based on the theory of communicative action.

It is, of course, within this broad challenge of urban, housing, social and economic qualification that technicians are called to suggest a sustainable and relational methodology that combines the way of life, the cost reduction and the socio-political-economic dynamism, changing the roles traditionally assigned to planners and turning them into process facilitators.

Mapping practices. The discussion around human settlements
Making a brief bibliographic review of the twentieth century history around the discussion of human settlements, we found several key references on this field. From the several history moments, we highlight some of them, as they resume and make possible the creation of a reasoned discourse on the need of (re)thinking human settlements from the architect and architecture point of view as a place and territory where life develops, reaffirming the importance of their attentive involvement, together with other local experts and actors essential for a sustainable human development process and in the long term.

We distinguish the creation of the United Nations which gave rise to the League of Nations after World War II, aiming to maintain international peace and to promote international cooperation in order to solve economic, social and humanitarian problems. In 1948, the Universal Declaration of Human Rights officially declares, in Article 25, the Right to Housing: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and

necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."
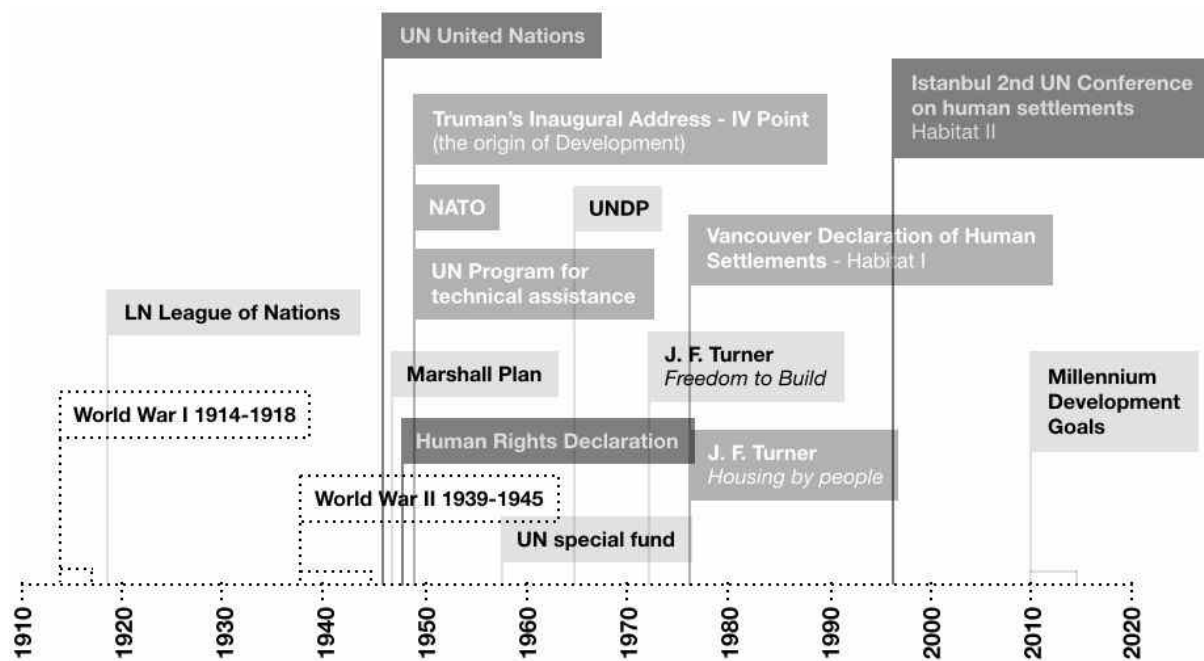
Figure 4: *International background XXth century*

In 1949 starts the era of development through Point IV of the Inaugural Address of President Harry Truman before the National Congress, promoting the implementation of a bold program to place the benefits and scientific and technological advances in cooperation with other nations, so that the benefits of scientific advances and industrial progress are made available to the improvement and growth of underdeveloped areas.

"We must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas" (Stokke 2009, p. 49).

Contrarily to what was expected, external support has contributed to a bigger dependence of developing regions, which are still based on an external financing system that continued generating poverty and dependence, forgetting that a sustainable development must start from local to global, from the micro to the macro scale. Human settlements continued developing with almost complete absence of control politics and previous active planning. In 1965, it is created the UNDP (United Nations Development Programme) aiming to promote the development and to eradicate poverty in the world, investigating on sustainable human development and the living conditions of the populations.

Between Vancouver and Istanbul, the Habitat I and Habitat II meetings have established the Declaration on Human Settlements. On the first conference of the United Nations on Human Settlements (Vancouver 1976), the declaration is divided into three parts: 1. Opportunities and solutions; 2. General principles; 3. Guidelines for action. The Vancouver action plan includes 64 recommendations for National Action adopted in Habitat. Relatively to the theme of improving informal settlements we find Recommendation 6, which refers to the allocation of resources; Recommendation 15, which refers to the improvement of human settlements; and Recommendation 33, which refers to the support of self-help.

In 1972 J. F. Turner writes the book Freedom to Build along with the text "Re-education of a professional" and in 1976 he edits Housing by People: Towards Autonomy in Building Environments, launching important clues for the need to demystify the architect's training. At the second conference, Habitat II (Istanbul 1996), it was set the universal general aim of "(…) adequate housing for all and sustainable human settlements in the world in the process of urbanisation".

In 2000, the United Nations launched the Millennium Development Goals for 2015 from the UNDP, outlining targets and goals on a global scale.

From the eight goals launched we highlight point 7. Where we are called to intervene, with the aim of improving the lives of thousands of people living in informal settlements, with the support of environmental policies and programs, allowing secure ownership of their lands and homes, providing the achievement of cleaner and healthier conditions.

More recently, the declaration of 2010 from UN-HABITAT about "the state of African Cities" reinforced the idea that "Urban master planning for the rapidly expanding cities mostly failed, because these plans did not capture the speed of growth in peri-urban areas while they were also not backed up with infrastructural investments commensurate to this growth" (UN-HABITAT 2010, p. 7).

Even today the definition of human settlement, as a universal concept, is not easy to define due to the great diversity and complexity of the several inhabited places. It goes from the current territory cities to the smallest dispersed lodging. A human settlement presupposes, within itself, a complex physical structure, from housing, equipment and networks of public areas to the great system of territorial connection of large exterior connection infrastructures.
But it is undeniable that the notion of city and urban space is changing and these informal spaces cannot be categorised as part of the city. Rem Koolhaas, on his three texts about the city, ironically states: "Housing is not a problem. Or have been fully resolved and were left completely at random: the first is legal, the second is "illegal", in the first case or towers are usually buildings (with the maximum depth of 15 meters) and the second (in perfect complementarily) a crust of makeshift tents. A solution that consumes the pavement and is a patchwork".

The paradox between the architect's traditional training and the need to intervene
The rapid growth of informal cities reminds us that more than 97% of the world is building without architects, showing that most architect formation is directed to 3% of construction (Aquelino 2011).

It seems very important to raise awareness of the delineation of an operative awareness about this territory. The scale of the informal city, the substandard housing that extends indefinitely beyond the city limits planned, materialising a wide spot of informality.

Paradoxically, the need for intervention of the architect in these countries have witnessed a widespread form of teaching architecture centred on the design methodology based on the building and place in urban areas, a reality too limited, where concepts such as basic habitability for example, assumptions as set acquired and not as targets.
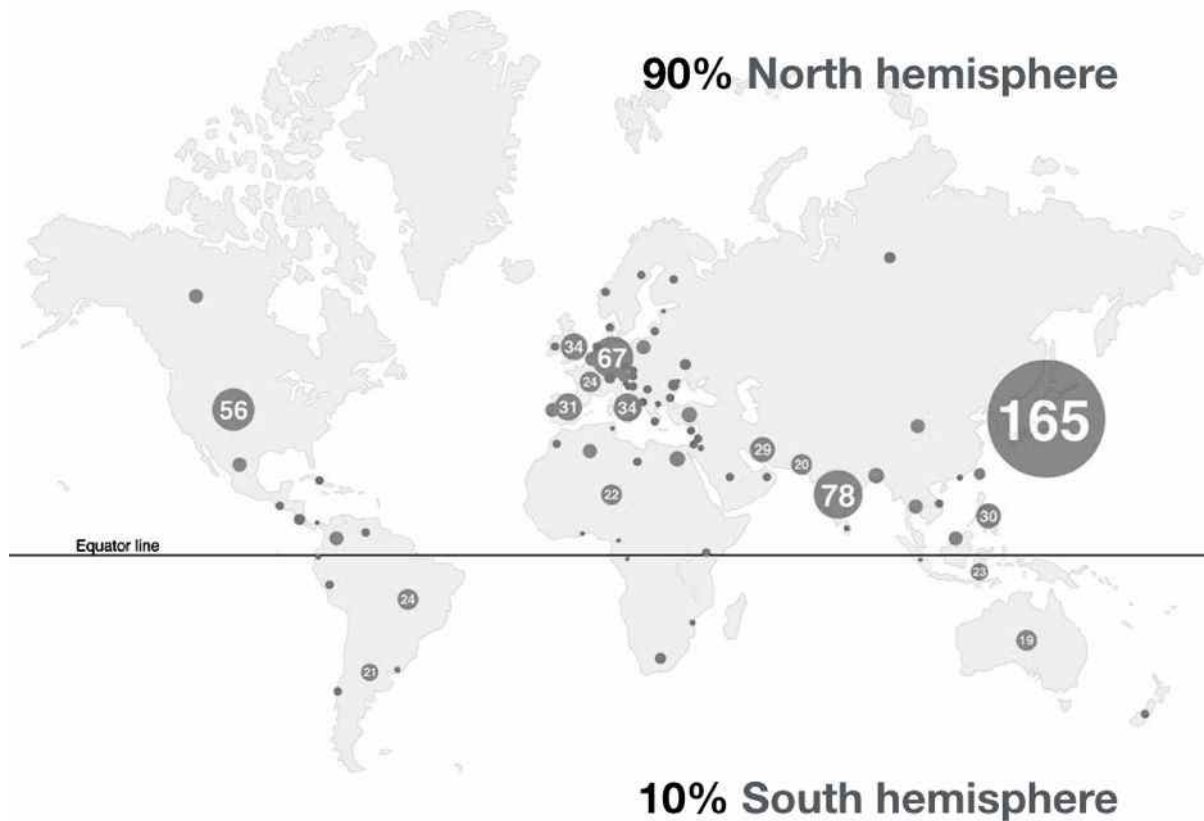
Figure 5: *Mapping the schools of architecture. North versus South hemispheres.*

Crossing information between schools of architecture and its location, it is striking that most architecture schools are concentrated in the northern hemisphere of planet earth. We wonder about the readiness of teaching predominantly in academic moulds to intervene in the southern hemisphere.

Is the education provided in schools in the southern hemisphere sensitised and facing these issues which are so familiar to it? Will this general crisis, both economic and of values, be an opportunity for the architect to modernise himself and to occupy a place of mediation for development?

This is where the conflict of this architecture of necessity, with the traditional boundaries of architecture is a separate subject too academic and detached from reality.

John Habraken, in his most recent book Palladio's Children (2005), mentions that the architect descended from Palladio keeps his values, identity and education rooted in the Renaissance legacy of 'masterpiece', which prevents and is contrary to the needs of today and to the attitude expected from today's architect.

The failure to adapt the curriculum to the emerging needs, prevents, the architect, unlike all other professions, from exercising and being aware of these issues.
"While it may be debatable whether or not are considered 'architectures' the achievements of cooperation for the development in Basic Livability which are built, and what it is done to try to solve housing poverty, there is no doubt that architects are needed for this job" (Pelli 2001).

Perhaps this absence operative generalised by architectural schools is also related to the social role of the architect and an important mediator in the development process have been repeatedly relegated to an inferior position to the role of media architecture.

Today, it is urgent that this role will reverse and be formed to intervene in not only elite areas, but also in the scale of the southern hemisphere, building, creating and collaborating on sustainable growth and dignifying thousands of families.

Point to the question of authorship as a major obstacle in the acceptance of this discussion in schools of architecture, rooted in a notion too traditional and classical of the architect.

The teaching of architecture is, in most cases, facing a broad discussion about authorial identity in this sense, the school exerts a lot of pressure for a methodology and design copyright individualisation that enhances the architecture student.

In most cases, the approach of the architectural Project as an academic subject is referred only to the conceptual operations defined as necessary for the identity and singularity of each project as a response which gives priority to the artistic and poetic authorial subjectivity instead of the operational ability, favouring the product and not the process. Closing the student to himself and his work, he is trained to design for the people and not with the people.

From Boullé and Ledoux, Aldo Rossi and Peter Eisenman, threw themselves constitutive principles of architecture recognition as a theoretical, thus affirming the disciplinary autonomy of architecture.

Quoting Bernard Rudofsky "(...) architectural History, as written and taught in the Western World, has never been concerned with more than a few select cultures. In terms of space, it comprises but a small part of the globe (…) chroniclers present us with a full-dress pageant of 'formal' architecture" (Rudofsky 1965, pp. 8-11).

Rudofsky struggles by extending the study of architecture outside the sphere of 'official' and commercial architecture. If the presence of authorship is intrinsic to the development of a civilisation, it is also true that "(...) there is much to learn from architecture before it has become an art expert (...) as a result of a rare common sense in solving practical problems".

In this scenario we recover Turner (p. 132). The architecture that commonly bothers to work for people has a duty to work with people.

In fact behind the crust of informality exists a network of closeness, support and familiarity. This network is most of the times strategically constructed close to infra-structures and job sources. Invisible elements that feed and organise those spaces. This is something that we need to learn from informality: understand how to intervene and how to construct respecting these pre-existing networks.

Intervene and be a facilitator of development, it is most important that the process model is more important than the author's will and common satisfaction in real places linked to territoriality and emerging needs.

CONCLUSION

Broadening the understanding of the geopolitical issue and of the social, political, economic and ecological problems, one has analysed the problem of informal habitation as a global problem and as an opportunity for learning and updating of professional and academic practices. On the majority of global territory, there is still a prevalence of spontaneous urbanism occupying unsuitable land for urbanisation and vulnerable soils. The lack of proper instalment, the absence of necessary planning and discipline, without a previously established network of public spaces, being only limited to precariously build the so-called housing solutions with scarce resources and techniques.

The problems associated with informality (re)remind us that housing is an issue essential for the architect's activity and that the quality of architecture must not depend on a certain material contingency, on a certain economic and infra-structural scarcity, but rather to claim a critical positioning, involved in its social, economic and cultural contexts, exercising modalities of political action which critically operate through the practice of design and construction.

We argue that the sharing of organisational enthusiasm, the informality in the strategies of adopted construction and organisation and the commitment with community participation in the construction procedures asserts a set of collaborative, collective and altered modes of space production, which allow to dissipate more hegemonic notions of architectural work/project and give origin to altered modes of the

traditional notions of architecture and space, that is worth exploring. In other words, starting from the major theme which is the problem and urgency of reflecting on informal settlements, this paper suggests an integrated theoretical study between local institutions and political and academic mechanisms (from students to professors), promoting an approach of the problems and solutions starting from the study of specific cases. The methodology is, therefore, an integrated approach of several scales, from the habitability to the housing unit, a general and abstract approach with local interaction – a thinking practice in the service of society. We understand that not all architects will be orientated towards this path, but their knowledge seems inevitable for us. That detachment is critical but difficult to unlearn.

Turner states that: "We architects were deaf and even blind to the now obvious differences between our own language and that of our clients" (Turner 1972, p. 134).

Thus we conclude that the broad debate on urban contexts with macro informal settlement requires a multidisciplinary reflection which gathers professors and students in order to implement a new line of thought and practical research, directly involving the production of knowledge from universities in the service of society.

The exchange of experiences, knowledge and practices from north to south is a key-note for a richer and more appropriate teaching to the local needs of each intervention. We challenge schools of architecture around the world to learn from informality, promoting a new debate on the practice of the architect and his role in society not as an author, but rather as a mediator for development; not as a simple technician unaware of local reality and exporting typological and abstract principles, but rather as a professional able to have an open vision and an integrated strategy with no preconceptions.

So we assume a starting point for discussion of this contemporary informality growth of urban growth and densification in schools of architecture, through a critical approach capable of promoting practical solutions that integrate these new emerging urbanities.

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EVALUATING THE FUNCTIONAL PERFORMANCE OF SMALL-SCALE PUBLIC DEMOUNTABLE BUILDINGS

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Abstract

This paper investigates the design, operation and use of contemporary demountable buildings, and explores how functional performance can be assessed in small-scale example for public use together with their relations to other design elements. The research focuses on three case studies that do not require a high-technology building environment or complex construction skills. Demountable buildings are defined as those that are transported in a number of parts for assembly on site. Contemporary demountable buildings respond to ecological issues, social impacts, technological innovation and economic demands. They can be used to measure a society's development in environmental sustainability, innovation and economic growth through various forms. Small-scale demountable buildings fulfil many temporary habitation needs in diverse roles, such as non-emergency transitional housing, ephemeral exhibition buildings and seasonal entertainment facilities.

The purpose of examining functional performance is to assess if, and how, the requirements of the design have been achieved. This enables project operators to address functional performance from a public perspective by reflecting on the scope and ambition of their projects. The research was conducted by combining both quantitative and qualitative research methods, including field research, case studies, interviews, questionnaires and group discussions. Fragmented narratives were transformed into structured evidence, identifying models of best performance in demountable buildings and developing a new method – the Evaluation Conceptual Model – for the effective evaluation and evidencing of the value of demountable buildings in the 21st century. Recommendations for adapting a suitable model to evaluate other design elements in demountable buildings and other types of moveable buildings in further research are suggested and the findings have been used to lay the foundations for a practical evaluation tool for the future.

Keywords: demountable, evaluation, function, public, small-scale.

RESEARCH BACKGROUND

The term demountable building encompasses a wide range of constructions that have a shared attribute: the ability to be deployed and transported from site to site for re-use or recycling. Many other terms, such as moveable, mobile, portable, foldable, deployable, transformable, relocatable, adaptable, kinetic and adaptive, are often used to describe similar designs. Although these terms share a similar meaning, they can be interpreted differently depending on the specific circumstances.

Robert Kronenburg defines demountable buildings as: "Those that are transported in a number of parts for assembly on site. They are much more flexible in size and layout and can usually be transported in a relatively compact space. They have some of the limitations that site operations bring to a conventional building and, depending on the size, complexity, and ingenuity of the system, are not as instantly available" (Kronenburg 2002, p. 10).

The use of demountable buildings began in ancient times, evidence for which can be seen around the world. Prefabricated housing and portable buildings have, in the past, often been considered low quality and cheap construction choices. From the end of the 20th century up to the present day, a renaissance in demountable buildings has been seen, particularly for exhibitions and public event use, combining new technology with building design. Evidence can be seen from many world famous architects, designers and artists, for example, Shigeru Ban's Nomadic Museum and paper structure pavilions. Iraq-born British architect Zaha Hadid has designed three demountable and mobile buildings to date: The Burnham Pavilion, temporarily erected in Chicago's Millennium Park as part of the Burnham Plan celebrations in 2009; The Egypt Pavilion, an elegant and temporary structure exhibited during the Expo 2010 in Shanghai, China, where the architectural part is related to a single, enveloping fabric ribbon that continues from the façade

into the building and exhibition; and the Chanel Mobile Pavilion, which travelled from Hong Kong to Tokyo and New York, before setting in Paris.

Shigeru Ban and Zaha Hadid are professionally trained architects but, as well as architects, designers and artists have also designed extraordinary demountable buildings and structures, with British designer and artist Thomas Heatherwick, recently designing the Olympic Cauldron for the London 2012 Olympic Games. Similar examples can also be found from small innovative research groups, such as the ICD (Institute for Computational Design)/ ITKE (Institute of Building Structures and Structural Design) Research Pavilion, built between 24 June and 23 July 2010. This was a temporary pavilion constructed from plywood strips which was manufactured in the University of Stuttgart. More projects can be seen in the Serpentine Gallery commission – a programme of temporary structures by celebrated architects, designers and artists.

The dynamic form of contemporary demountable buildings introduces many questions, including what role demountable buildings have today. The key features of contemporary demountable buildings and structures include: diverse forms of building, reflecting the developments in new technology, materials and construction skills; the blurring of the boundaries between architecture, functional structures, objects such as furniture, sculptures and installations, because many of them share similar meanings and forms; and more cross-disciplinary collaborations between architects, engineers, designers, artists, computer programmers and scientists, working together towards a shared aim with related interests. The concept of demountable buildings has developed gradually, incorporating evolving new configurations that take into account ecological considerations, contemporary social context, technology capacity and economic demands.

Ecological considerations

Contemporary conversations about sustainability and ecological considerations with respect to architecturally related areas are based on the idea of sustainable development, outlined by the Brundtland Commission in 1987: that the needs of the present society should be met without compromising the ability of future generations to fulfil their own needs.

In response to ecological considerations, all demountable buildings contain reusable and recyclable components. They are generally derived from permanent building construction techniques and can take many diverse forms. Demountable buildings of this type use familiar, bolt-together components in order to produce a building that can also be disassembled for relocation (Kronenburg 2002, p. 78). More directly, many demountable buildings can be constructed with recyclable materials such as paper tubes and cardboard, and renewable materials such as wood, timber, bamboo and even large snow blocks. In particular, small-scale projects require relatively fewer construction materials and energy costs, thus having less impact on the environment. It can be argued that the design and use of small-scale public demountable buildings can greatly encourage the eco-efficiency of the architectural industry by reducing the energy intensity of goods and services, enhancing the recyclability of materials and maximising sustainable use of renewable resources.

Social context

In response to societal impact, demountable buildings are often used for temporary emergency needs. They can represent a better choice for engaging the public and traditional demountable structures, such as tents, remain useful for responding to disaster mitigation projects. For example, UNESCO (United Nations Educational, Scientific and Cultural Organization) supported a theatrical project with Haitian street theatre company Zhovie to give displaced people in Port-au-Prince a moment of joy and solace and help to relieve their fears after the earthquake of 12 January 2010. Zhovie gave their first performance on 11 April 2011 in a camp at the Haitian capital to an audience of several thousand (United Nationas Educational 2010).

As well as being used in emergency situations, demountable buildings and structures also respond to new social issues such as urbanisation. UN-Habitat (The United Nations Human Settlements Programme) reports that the world is moving into the urban age (UN-Habitat 2012), and United Nations Executive Director, Joan Clos, states that a new type of city is advocated that is a "good", people-centred city, capable of integrating the tangible and more intangible aspects of prosperity and, in the process, shedding the inefficient, unsustainable forms and functionalities of the city of the previous century (UN-Habitat 2012). By doing so, businesses, academics, civil society, non-governmental and grassroots organisations, trade unions and professional associations, and political parties need to respond to the situation and bring their contributions

to cities. One of the solutions proposed by UN-Habitat is to encourage social diversity and mixed land-use. Land planning can bring about clusters of land uses in appropriate locations, with the flexibility needed to adapt to the changing requirements of the population. Urban planning must facilitate the deployment of common spaces that allow encounters, interaction and dialogue between different social and ethnic groups. The report gives the example of the Olympic Park for the 2012 Olympics Games in Stratford, London, which was constructed on brownfield sites that had previously become rundown. Following the conclusions of the Olympic Games, the site is to be used to accommodate low-cost housing as well as leisure activities. This emphasises the fact that demountable structures and buildings can inhabit land in a sustainable manner by occupying sites for a relatively short time.

Therefore, it can be argued that contemporary demountable buildings continue to respond to disaster mitigations by offering emergency shelter solutions quickly. At the same time, demountable buildings and structures have great potential to encourage mixed land-use, because their construction requires no, or light foundations, and they can be erected in many different locations.

Technology capacity

Nick Dunn states that with the development of CAD (Computer-Aided Design) and many other software packages, concluding Rhino 3D, DesignBuilder and Autodesk Robot Structural Analysis, the variety of design processes available to architects may influence the fabrication of architecture and its components (Dunn 2012). Such technology has recently been successfully utilised for demountable buildings and structures, for example, Zaha Hadid's Mobile Art Pavilion for Chanel which took advantage of digital imaging and construction processes to create a design with fluid geometries and dynamic spaces (Dunn 2012). Another temporary installation design by Hadid – the Burnham Pavilion, Chicago – also represents the use of digital fabrication technology in a demountable structure. The pavilion comprises bent aluminium structural sections, each shaped and welded to create its unique curvilinear form. Outer and inner fabric skins wrap tightly around the metal frame to create a fluid shape, and these skins also serve as the screen for video installations. The project aimed to maximise the recycling and reuse of materials after its role in Millennium Park and, it can be installed for future use at another site.

The Fabricate Conference, hosted by UCL (University College London) Bartlett School of Architecture, London in April 2011, presented Gramazio & Kohler's installation *Stratification*s, which was a cutting-edge, assembling method first revealed in the UK. The installation presents a research project of using CNC robotic arms to construct a brick installation. A similar research project – Flying Machine Enabled Construction at ETH (The Swiss Federal Institute of Technology Zürich) Campus in Zürich – pushes the construction of demountable buildings to a new era. The focus of this project is the assembly and construction of structures using flying vehicles, the system is built on the Flying Machine Arena platform, with specific components developed to manage and perform construction. The first use of the Flying Machine Enabled Construction paradigm is the installation titled *Flight Assembled Architecture* at the FRAC Centre Orleans. This installation was developed jointly with architects Gramazio & Kohler, the 6m-high installation addresses radical new ways of thinking and materialising architecture as a physical process of dynamic formation.

Using flying machines and robots for construction enables building alternative possibilities to be achieved. The ability of being quickly assembled and deployed is becoming an important requirement, not only for traditional demountable buildings, but also for new conventional buildings. It can be argued that the use of demountable structures and buildings encourages designers to rethink design and construction processes to require an easy dismantling process. According to Matthias Kohler, an effective way to work on the contemporary reality of architectural design and construction is neither low-tech nor high-tech, but involves working with generic technologies, such as industrial robots or computers, as they can easily be customised for a variety of processes and are inexpensive (Sheil & Glynn 2011).

The various choices of construction methods provide dynamic aesthetic forms for demountable structures and buildings. In this digital age, the technological capacity of a project is strongly linked with the collaboration between multidisciplinary teams, including designers, structural engineers and contractor teams. Although the advantages and disadvantages of digital fabrications are yet to be explored further, evolutionary design methods have a strong potential to allow designers to work on more sophisticated digital fabrication projects in comparison to traditional architecture and industrially built architecture.

Economic demands

The design and use of contemporary public demountable buildings are largely related to the creative industry. For example, the Spanish Pavilion of Shanghai Expo 2012 was clad with wicker panels, which were made in a rural village in China. The local authority claims that the project brought $11,700,000 of benefits to the village, because their skills in making wicker panels were recognised through events of the Expo.

According to the NESTA (National Endowment for Science, Technology and the Arts) Policy and Research Unit, the economic contribution of the creative industries is widely recognised, and plays an important role in the UK. In fact, the UK has the largest creative sector in the European Union, arguable the largest in the world relative to GDP (Gross Domestic Product). The most recent statistics for the creative industries, published in December 2011, show that they contributed 2.9% of the UK's Gross Value Added in 2009, and that 1.5 million people are employed in the creative industries or in creative roles in other industries, making up 5.1% of the UK's employment. In addition to this, the IDBR (Inter-Departmental Business Register) showed an estimated 106, 700 businesses in the creative industries in 2011 (Department for Culture Media and Sport 2011).

In summary, contemporary demountable buildings currently need to respond to ecological issues, social impacts, technology innovation and economic demands. Social issues, particularly in urban areas, relate to sustainable land use, reusable building components and temporary employment. Technology innovation relates specifically to the design method, construction process and the use of selected materials. The economic demands have particularly strong impacts on the creative industry and small groups of entrepreneurs and therefore, it can be argued that contemporary demountable buildings can be used to measure a society's development in environmental sustainability, technology innovation and economic growth through various forms.

KEY FACTORS IN THE DESIGN AND OPERATION OF PUBLIC DEMOUNTABLE BUILDINGS

Stephen Brown states, in his book Communication in the Design Process (2001) that the four subdivisions of architecture briefing are function, finance, timescale and aesthetics (Brown 2001). This basic frame has been adapted here to small-scale public demountable buildings in order to analyse their design and operation.

Function

Friedman writes: "The style of a building consists in its users. An unused building is nothing else than a ruin" (Friedman 2000, p. 105). He states in his essay 'Function Follows Form'; "function, for architects, is a mechanistic concept; how should a building be used? The function of each architectural space is determined, first of all by the equipment specific for that space: furniture and fixture" (Friedman 2000, p. 105).

Steen Eiler Rasmussen writes: "The building should be experienced in function" (Rasmussen 1962, p. 158). The author concludes that, in this paper, functional performance means the satisfaction levels of operating the events, planning the project, monitoring the construction and dismantling process, communicating with the local authorities, visiting the buildings and participating in the activities. The functional performance of small-scale public demountable buildings can be evaluated based on suitability, reliability and flexibility. Suitability measures the degree to which a demountable building serves the users' (clients and visitors) needs, reliability measures the continued quality of a building throughout its lifespan, and flexibility focuses on the design and measures whether it serves multi-functional purposes and can be adapted to other projects. Only by assessing the functional performance will clients discover the operational efficiency, designers discover the planning efficiency, developers discover the construction efficiency, planning consultants discover the acceptability by the users and appropriateness at the building site, and the users discover the functional efficiency.

Finance

Generally, the scale of a demountable building is a key aspect in controlling its finance. For example, a smaller scale building will require less material and should therefore, cost less. Further ways to help reduce costs include re-using the building elements, and a key characteristic of a demountable building is that most of its components can be dismantled and re-constructed in whole or in part. If they have been well

maintained the elements that make up the components can be re-used many times rather than being abandoned or recycled.

An efficient method of cost reduction is the use of local materials to reduce material transportation costs. Shigeru Ban's Nomadic Museum, which was constructed from steel shipping containers and paper tubes travelled from New York to Santa Monica and then to Tokyo, but each building site, the majority of the containers used were from the local area. Only small numbers of containers were retained for the transportation of other construction materials such as paper tubes. The containers used for transportation were then reused as construction elements (Ban & Gould 2009). A further possible method of cost reduction is to apply multiple functions to limited space, for example, circulation space can also be used as exhibition areas or reception.

Whole-life costing is a useful tool for estimating the best cost option for the life of a building and, according to William Fawcett, is used as an essential foundation for sustainable design. It means that when comparing alternative strategies for constructing a project, the cheapest appearing alternative may not be the most economical in the long term. Whole-life costing can often show that a durable and efficient building, despite higher construction costs, is better value and more sustainable in the long-term than a more cheaply built design with high running costs (Fawcett 2012).

Reducing building costs alone does not necessarily make a building economically sustainable. If a demountable building has been built for commercial purposes, it may offer faster payback and commercial benefits for the project owners by comparison with static buildings. If there is insufficient payback or commercial benefits, the building can be considered to be unsuccessful. It is argued here that 'finance management' not only refers to reduction (materials costs, transporting and construction time), but also to growth. Growth includes improving the quality of the buildings' functions and usability, and improving quality of life, for example by engaging with the local community. Growth can also mean creating increased opportunities for commercial benefits for future projects.

Timescale
Timescale is the duration of the project, and in this paper, it includes: design, construction, use (by events operators and visitors), deployment and transportation. Some demountable buildings will be completely reconstructed following redeployment, and others will be partly re-used and some will be entirely recycled. Through the study of existing projects, this paper analyses the entire life cycle of a demountable building within the three scenarios:

(i)   All building elements will be re-used - following use, and according to specific needs, some demountable buildings are immediately redeployed and some will be transported for temporary storage before being used or exhibited again. The difference is that the buildings which require storage incur additional transportation time and costs compared to those which are directly transported to the next building site.

(ii)   A quantity of building elements will be re-used - in some circumstances, it is not necessary to re-use the entire building, for example, where clients expect new designs, or if it is more cost-effective for stakeholders to recycle some building parts. It is also possible that some building elements cannot be re-used due to damage or because they are made from low-quality materials which will not withstand a further use. In these cases, some elements are abandoned by the project directors at the end of the deployment.

(iii)   All building elements will be recycled - sometimes, it is most efficient to recycle the entire building, particularly when the first design is not considered successful or where the project owner does not need to keep the design. Budgetary reasons or transportation limitations can also affect this decision.

A timescale and clear objectives are normally established and agreed during the architectural briefing process. Herein the project overview needs to be broken down into manageable tasks. This helps to classify the tasks required and identify the relationships between each work package before establishing what will be required to complete each task. Risk and uncertainty may also be revealed during this process. Gantt Chart, Microsoft Excel and Network Analysis Software such as Mind Genius can be used to aid architects and project managers to schedule realistic tasks in order to achieve the design objectives.

Aesthetics

Aesthetics is defined by Michael Kelly as "critical reflection on art, culture and nature" (Kelly 1998, p. ix). In architecture, aesthetics generally means appearance and sense, referring to matters of visual quality of the building. Kevin Lynch considers the term "aesthetics" too vague, and describes as the "unanalysed residuum," or what is left after the objective analysis of built form (Lynch, Banerjee, & Southworth 1990, p. 259). The aesthetics of demountable buildings can be understood as: visual appearance, acceptability by the users and appropriateness at the building sites.

The visual appearance of objects is communicated by the way in which they reflect and transmit light. According to Harold T. Nefs, this transmission of light is determined by the shape, material, colour and illumination of the object at different levels (Schifferstein & Hekkert 2008). The author summarises that the visual appearance of demountable buildings is determined by the combination of scale, construction system, material, colour and illumination at different percentages.

The assessment of 'building friendliness' is decided by its acceptability to the users, which means how well the design of the building is accepted by people psychologically. Generally, architects have tools (simulation software, monitoring equipment) to measure the physical performance of buildings. However, there are no 'tools' to measure 'building friendliness'. This 'friendliness' can instead be measured through psychological experiments.

Most demountable buildings are temporarily constructed within a permanent site. Generally, they are built in open spaces with easy access, such as parks, squares, car parks, harbours and, sometimes, inside a large building. Apart from open spaces, there are also small, relatively restricted, informal spaces in urban areas which can be used to construct small-scale demountable buildings. In Tokyo, for example, architect Yoshiharu Tsukamoto found that there are small buildings, between streets, along widened roads, and in the spaces between tracks and streets. Most of these buildings are built at a low cost, are not spectacular in design, and have not required cutting-edge technology. Tsukamoto called these buildings "pet architecture", and much of it is built as small retail, hairdressing and property agencies. Some 'pet architecture' is entirely demountable and its temporary existence became a tool for Tsukamoto to use to explore how towns and cities have been developed through time.

Apart from open space and informal space, another key fact regarding the sites of demountable buildings is that heavy foundations are often not required due to the light weight nature of many demountable buildings. Furthermore, demountable buildings can be surrounded by the natural environment, built environment or both. The existing environment provides standards for designing new buildings and sites in the vicinity. Contextual issues concern material choices, as well as the size and proportion of buildings. A well-chosen open space can strengthen a demountable building's identity and provide additional value, by being a pleasant environment conducive to more active activities. The arrangement and positioning of a demountable building not only depends on the availability of the construction space, but also on the position of the surrounding existing buildings. The key relationship between a demountable building and its static background is that the users are aware of the temporality of the demountable building and the motionless of its background. As such, the users create the criteria of how well the demountable building is perceived, and this indicates the importance of users' opinions to this research.

A conceptual model for evaluation

At the time of writing, there are few documented or practical evaluation/analysis methods specifically designed for demountable buildings. During this research process designers of demountable buildings, started a tendency to evaluate projects through empirical experience gained from other demountable or static building projects. In the past, a variety of standards, principles, software and multi-dimensional methods, originally designed for other purposes, have been used, in part, for demountable buildings, such as, ISO (International Organization for Standardization) Standards, including ISO 14000, written initially for environmental protection systems. Guiding principles for shelters after disasters, such as Habitat (*United Nations Centre for Human Settlements Guidelines for the Evaluation of Post Disaster Programmes*), have been taken as a framework for evaluating rehabilitation interventions in human settlements. Assessment systems such as LEED (Leadership in Energy and Environmental Design), BREEAM (Building Research Establishment Environmental Assessment Method) and CASBEE (Comprehensive Assessment System for Built Environment Efficiency) have been used for providing practical and measurable green building frameworks. Software such as ASPIRE (A Sustainability Poverty and Infrastructure Routine for Evaluation), IES (Integrated

Environmental Solutions) and DesignBuilder have also been implemented as evaluation tools. In addition, more specific methods and guidelines, such as CASBEE for Temporary Construction Criteria, *Temporary Structures in Historic Places (Guidance for Local Planning Authorities, Site Owners and Event Organisers)* by English Heritage and *Temporary Building Design Guide* by Aberdeen City Council, have been modified for use in demountable building designs. These evaluation methods belong to various different technical fields and scientific disciplines, such as economics, different branches of engineering, structural technology, architecture and town planning.

Having identified the key factors of demountable buildings and studied the existing evaluation methods, the results of the review suggest that a conceptual toolkit can be proposed to develop a conceptual model for the effective evaluation and evidencing the value of demountable buildings. In order to achieve this, two main criteria must be met:

- This method will be developed for building users and visitors, and practitioners engaged in the commissioning, design, planning, production and management of the demountable building.
- This method will focus specifically on assessing and measuring the functional value of the completed demountable building, and will provide a unique tool for everyone involved in the production and use of buildings to gain a deeper understanding of their design.

Through a review of the relevant literature, the Design Quality Indicator (DQI) method, which "seeks to complement methods for measuring performance in construction by providing feedback and capturing perceptions of design quality embodied in buildings" (Gann, Salter & Whyte 2003, p. 318), was identified. The key features of the DQI include:

- It is a pioneering process for evaluating the design quality of buildings. The DQI is based on a research project aiming to provide a toolkit for improving the design of buildings. It seeks to complement methods for measuring performance in construction by providing feedback and capturing percentages of design quality embodied in buildings. Development of the DQI has been led by the CIC (Construction Industry Council), with sponsorship from the DTI (Department of Trade and Industry), CABE (Commission for Architecture and Built Environment), Constructing Excellence and Strategic Forum for Construction, and with support from the OGC (Office of Government Commerce). The DQI can be developed into an easy-to-use online tool, with access for everyone involved in the procurement and use of buildings.
- David M. Gann, Ammon J. Salter and Jennifer K. Whyte argue that the benefit of the DQI is its role as a "tool for thinking", rather than being an absolute measure. As such, it has the potential to capture lessons from current building designs for strategic future use, as well as initiate, represent and inform discussion involving designers, clients, producers and end-users and their perceptions of the tangible and intangible aspects of the possibilities within live design projects (Gann, Salter & Whyte 2003, p. 318). The benefits of the DQI make it suitable for developing a conceptual evaluation model for demountable buildings because, as outlined in Chapter 2, the evaluation methods can be varied and optional, and the key is to select methods that reflect the architects' design intentions.

The key features of the DQI satisfy the required criteria for developing a conceptual model, therefore suggesting that the DQI is suitable for being adapted for the design of a new tool that can be used for the post-occupancy evaluation of small-scale, public, demountable buildings.

In order to clarify the scope of the evaluation model, the term conceptual model has the following meanings:

- It is not intended for a direct application in the building assessment industry or market. Although this paper concludes that there are possibilities for developing the conceptual model further into a direct practical toolkit.
- It intends to convey a common conceptualisation through which it is possible to develop an understandable evaluation model. The model is adaptable for its broadest users, including architects, designers, clients, building users and all other stakeholders.

- As a conceptual model, it does not cover a wide range of evaluation factors. Instead, it concentrates on solving the specific problem of how to evaluate the functional performance of small-scale, public, demountable buildings.

Twenty-seven indicators are identified through the previous research: thermal comfort quality, acoustic quality, spatial comfort quality, design for disabled users, circulation space, furniture arrangement, storage consideration, usability, maintainability (material), maintainability (structure), construction preparation, physical plant, administrative service cost, cost of allocation, dismantling cost, cost for transportation and storage, usage time, deployment time, transportation time, scale, structure, material, colour, illumination (daylight), illumination (artificial lighting), acceptability to the users and appropriateness at the building site. They were selected following these instructions:

- Evaluation indicators are reasonable and appropriate, which means that they present the key features of demountable buildings, and they are concerned with the building's functional performance but no other performance, including energy costs and temperature measurement. They are also related to post-occupancy evaluation.
- The evaluation questions regarding the indicators are measurable and answerable. They should be able to identify clear and observable dimensions of functional performance that are relevant to the evaluation goal and represent domains in which the evaluation can realistically be expected to make accomplishments. The evaluator can select a single answer from five options: strongly disagree; disagree; neither agree nor disagree; agree and strongly agree.

The FFTA tool

The FFTA (function-finance-timescale-aesthetics) tool assists a demountable building's management team in defining and checking the evolution of functional performance quality at the post-occupancy evaluation stage. There are two main parts to the FFTA tool: the FFTA questionnaire and the FFTA visualisation. The FFTA questionnaire is a coherent, straightforward, non-technical set of statements that collect the opinions from all stakeholders by looking at the function, finance, timescale and aesthetics of small-scale, public demountable buildings. *Function* concerns a demountable building being used effectively for what it is intended. This is split into use, access, space and usability. *Finance* focuses on reviewing the final costs of the building and the consideration of dismantling costs, waste management, transportation and storage, where applicable. *Timescale* relates to examining the use-time of a building, and the time for building deployment and transportation after dismantling. *Aesthetics* is assessed from the visual appearance of the building, as well as acceptability to users and appropriateness at the building sites.

The FFTA questionnaire includes two sheets: the evaluation indicator list, and the details of the questionnaire. The purpose of the indicator list is to clarify the exact meaning of each indicator and provide a common understanding for the evaluator before they fill in the questionnaire. The questionnaire is presented on a single sheet, with clear instructions that allows the evaluators to treat uncertainty explicitly, thus, when the evaluator is asked about their opinion on the colour of the building, they are able to select a response from five alternatives in hierarchy order from low to high: strongly disagree, disagree, neither agree nor disagree, agree and strongly agree

The weighting system of FFTA can be applied and indicates the evaluator's opinion: strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. The results can be distorted depending on how the respondents judge the success of various aspects of the building.

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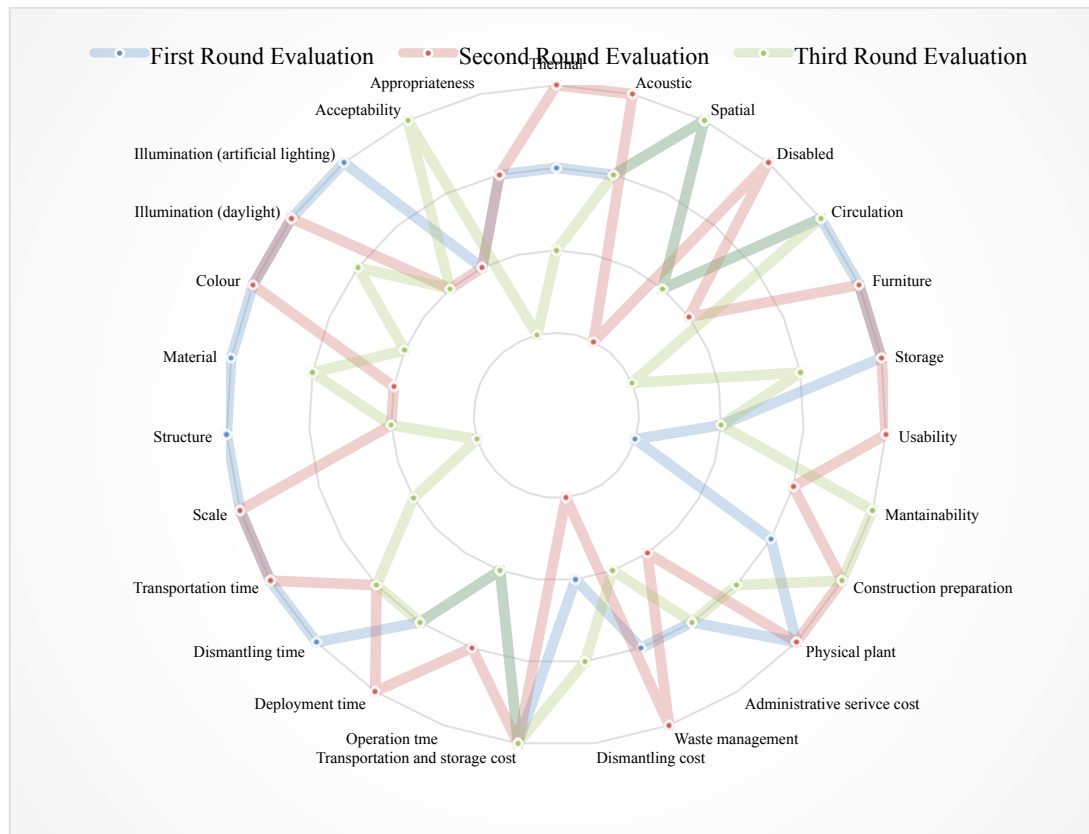
Figure 1: *The FFTA weighting diagram – a possibility.*

FFTA can be graphically presented in various ways and can highlight comparisons between groups of respondents, comparing the views of the building's eventual users with those of the delivery team. For example, each stakeholder can rank the indicators separately, and the results can be generated together for further comparison. It can also be used to compare a number of stages of the evaluation and present how these are being achieved by the modifications in design. For example, after a demountable building is evaluated and dismantled for further use, design changes are sometimes made because of common factors such as the clients' needs, site requirements or a part of the building components needs to be replaced. When the building is used for the second or third time, the evaluation results can be different. At this stage, the results can be presented for comparison and reviewing over time.

The FFTA conceptual tool has been developed for the post-occupancy evaluation of small-scale, public use, demountable buildings. It can be used by architects, designers, project owners, other stakeholders or external evaluators who are interested in examining the functional performance of the projects.

It can be used flexibly according to the evaluator's requirements. For example, based on the same criteria, the architect can first rank each indicator, and later use the results of questionnaires and interviews with users to rank the indicators for a second time from the users' perspective. Therefore, two results can be presented together for comparison and, by doing this, the differences can be easily identified for further investigation.

Having proposed an evaluation conceptual model, the next step is to identify a series of case studies and test the usability and practicability of this model through projects that have been successfully constructed and used to serve their functions.

CASE STUDIES

Figure 2-4: *Chengdu Hualin Elementary School; Exxopolis (2012); Kreod in the evening.*

Three case studies were selected for consideration in this research: Chengdu Hualin Elementary School in Chengdu, China, designed by Shigeru Ban Architects from Japan, 2008; Exxopolis, designed and exhibited in 2012 by Architects of Air, a company based in Nottingham, UK, with twenty years of experience in designing and constructing inflatable structures; and Kreod, a multi-functional structure delivered by designer Chunqing Li, exhibited from 18 September 2012 – April 2013 between the O2 Arena and Emirates Air-Line in the Greenwich Peninsula, London, with plants for further display in the UK after dismantling. The table below provides a summary of each case study.

Table 1: *Case study comparison*

	Hualin School	**Exxopolis**	**Kreod**
Research methods	Interviews, questionnaires for users, volunteers and designer	Interviews, questionnaires for both the users and designer	Interviews, questionnaire for the main designer
Designers	Shigeru Ban Architects (Yasunori Harano)	Architects of Air (Alan Parkinson)	Pavilion Architecture (Chunqing Li), Ramboll (Harri Lewis, Jogn Harding, Stephen Melville), Evolute (Florin Isvoranu, Michael Elgensatz, Alexander Schiftner)
Client	Chengdu Hualin Elementary School	Various (Lakeside Arts Centre, June 2012)	Various
Owner	Chengdu Bureau of Education	Architects of Air	Li Investment
Date of implementation	August 2008	Various (started from 2012)	Various (started from September 2012)
Software used	Auto CAD	Rhino 3D	Auto CAD, Evolute
Architectural model	A 1:100 model was made before the construction	No model, but cardboard was used to test the design concept	A 1:100 model was made two years before the construction, and the actual structure was modified to ensure construction safety
Main function	Specific function – school building (non-commercial)	Multi-functional (commercial)	Multi-functional (commercial)
Location	Chengdu City, Sichuan Province, China	Various (the location that has been included in this research was in Nottingham, UK)	Various (currently limited to the UK, and the exhibition that has been included in this research is located in London, UK)
Scale and capacity	9.7×6×4.68m each	50×20×10m (estimated),	3×2m², up to 66 visitors

	classroom, up to 280 students and 6–8 teachers	up to 70–80 visitors at the same time	at the same time.
Type of architecture	Building	Inflatable structure	Flat-pack structure
Material	Paper tubes, plywood	PVC plastic	Wood, steel
Construction team	Volunteer students	Temporary labourers	Volunteer students
Contributions	• Provides a pleasant studying environment for 250 pupils and their teachers • Increases the awareness of using sustainable construction materials in China • Supports architectural education by providing wide voluntary opportunities • Entirely demountable; the paper tubes and plywood can be recycled, the PVC windows and doors can be reused • The project creates very little construction waste	• Provides a bright and friendly environment for visitors • Provides a friendly environment for disabled visitors • Engages the local community and encourages communication and skills learning • Encourages people's understanding of culture nationally and internationally • Valuable in the research relating to pneumatic structures	• A success in applying a parametric design method to demountable structures • Shows sophistication in using cutting edge modelling software • Encourages architectural education • A good example of setting up a small business in the architecture industry in the UK
Limitations	• Lack of funding management • Building lifespan unclear • Lack of communication between the designer and the school	• Lack of sophistication in using computer software • Lack of creativity in design	• Lack of consideration in selecting construction materials • Not convincing in claiming the project is sustainable
Recommendations	To encourage more solid communication	To encourage more design types	To consider good reasons for choosing materials

This research has benefited from the selected case studies in various respects:

- The three case studies provide a series of evidence to prove that small-scale, public use, demountable buildings can identify a specific need which it sets out to meet satisfactorily and efficiently. They are lightweight, flexible in function, require a small construction team and building site, and can be deployed and dismantled in a short time.
- The case studies show that demountable buildings can provide the same functional performance as transitional buildings. They can be made from much more sustainable construction material, such as paper, cardboard, wood, recyclable plastics and metals. A major benefit of using a demountable building is that it can be constructed and deployed rapidly without leaving heavy foundations.
- Both Exxopolis and Kreod prove that small-scale public demountable buildings can offer the satisfaction of producing something that is all one's own, and each project can be unique. Importantly, they can be used for the designers and project owners to promote their business in the creative industry.
- Case studies are used to examine the evaluation indicators, which are concluded from analysis and synthesis of an in-depth review of the design, use and operation of contemporary demountable buildings.
- They can be used to test the conceptual model designed by the author, to demonstrate how a small-scale public demountable building project can be evaluated holistically. In order to

achieve a relatively objective evaluation result, evaluation questionnaire sheets were sent to each designer to rank the evaluation indicators. These evaluation indicators were ranked objectively for each case study, based on the data collected through site visits, questionnaires and interviews. The final stage concentrates on comparing the evaluation results between the designers and the author and the gaps are identified with further questions and recommendations.

The following diagrams provide the results of the post-occupancy evaluation of each case study.
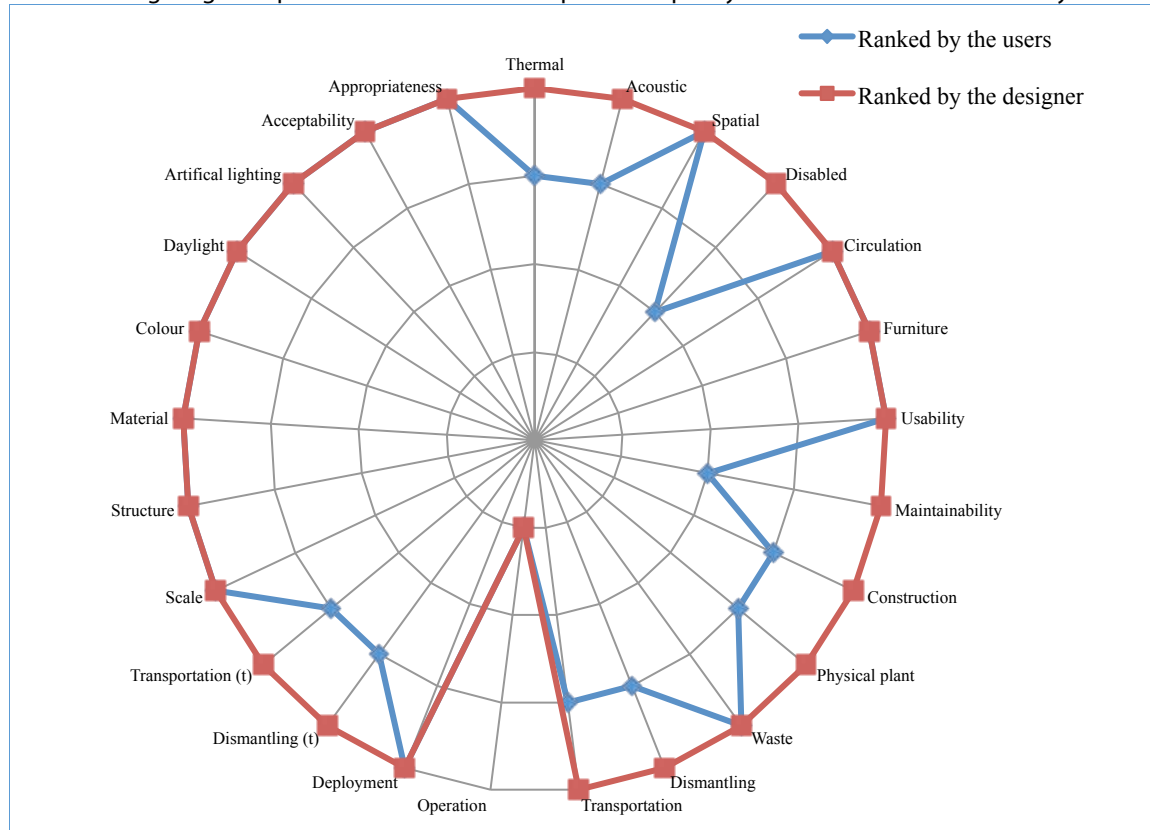
Figure 5: *Post-occupancy evaluation of Chengdu Hualin elementary school.*

At present, no decision has yet been made regarding the final destination of the paper school. There is clear evidence that the school intends to use the paper building for as long as it remains. The school leader should consult Shigeru Ban Architects for information on how to maintain the building in the future and how to dismantle the building if applicable.

The information gathered from this case study suggests that encouraging more communication between the designers and the school leaders is important during the post-occupancy evaluation (POE). The purpose of POE is to engage the building users and the designer to provide more appropriate designs in future projects and make changes where necessary.

Shigeru Ban Architects evaluates their disaster relief projects through questionnaires and revisits, including the Container Temporary Housing in Japan and the Transitional Cathedral project for Christchurch, New Zealand. The main reason for the company not evaluating the Hualin project until the end of 2012 could be due to difficulties in communication. Reiji Watabe states that he and Harano are the only two staff in Ban's office who were involved in the Hualin project, and it is unlikely that any volunteer from Japan would visit the school in the near future. They only evaluated the project with regards to the materials used, time spent and other descriptive information, and not from a self-critiquing perspective to analyse the project management.

An interview was arranged on 4 December 2012 with Watabe regarding the completion of the evaluation questionnaire for the Hualin School. The only performance indicator for which Watabe selected disagree was the use-time of the building. Apart from this, he selected strongly agree for all other indicators. Based on the outcomes of the user questionnaires and field research, the author ranked the indicators from the users' perspective and compared the results with the designer's opinions.

The author will continue to liaise with all key stakeholders in the Hualin School and further observe the school's final decision on the building. Information and feedback will be passed directly to the architect, Harano, for further discussion and critique.
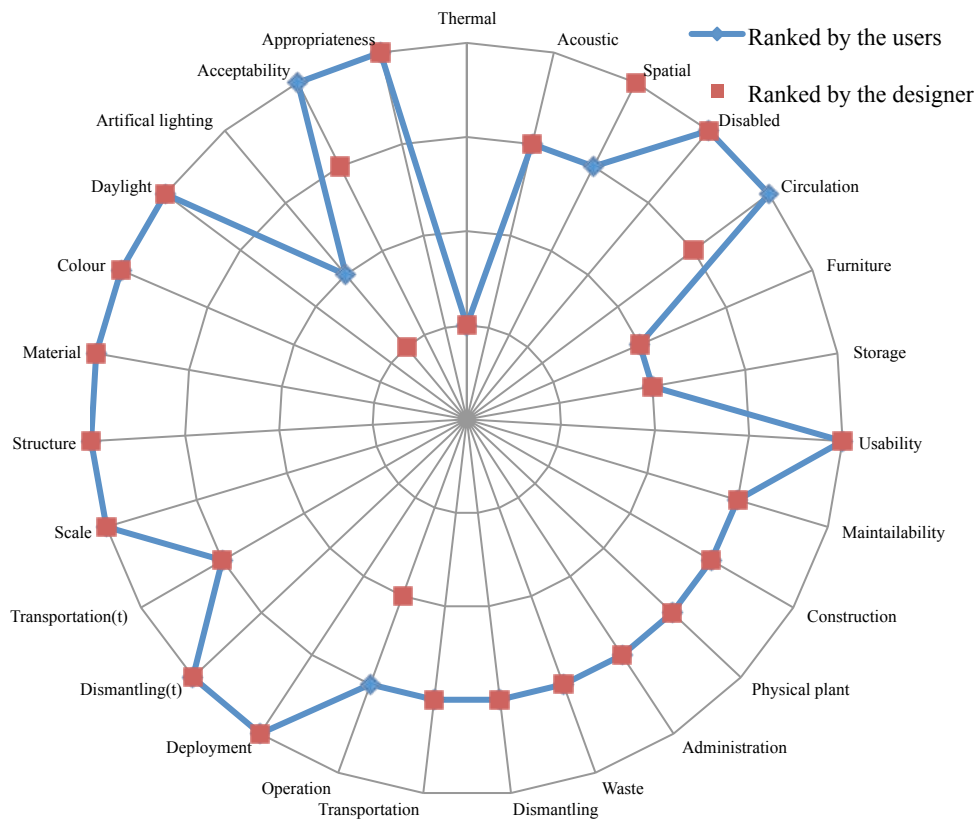
Figure 6: *Post-occupancy evaluation of Exxopolis.*

From observations on site, it was noted that a baseball was put on top of each metal peg to protect the PVC plastic from any potential scratch damage. One of the members of staff, whose main task was during the construction process, said that she once injured her knee on a metal peg that she could not see clearly in the dark when checking the structure after it was deflated. Fluorescent tape could be used to cover the baseball so that they could be seen clearly in the dark. Furthermore, when the structure was deflated, the pegs would stay in the same location so that, with the help of the illuminated tape, the general shape of the structure could still be seen in the dark when people walked or drove past. This could encourage the curiosity of potential visitors and promote the design even when it is closed in the evenings.

The author noted that during some exhibitions, signs are put outside the structure to remind visitors that the luminarium is not a bouncy castle and that children are not allowed to jump on the structure. This limits the enjoyment of the design as young visitors may find it a more exciting experience if they could interact with it through jumping and running. Parkinson explains that his objectives for the design are to create a relaxing atmosphere for all visitors, instead of aiming it only at a particular group of people. Although the designs of Architects of Air have been developed significantly over the last 20 years, especially in the techniques of manufacturing much larger inflatable structures, the purpose of the designs have not been developed towards alternative creative approaches.

Parkinson completed the designer questionnaire on 27 November 2012. He selected disagree on two performance indicators, namely thermal comfort quality is appropriate for its use and artificial lighting levels in the structure are satisfactory. Apart from these, he agreed or strongly agreed with the majority of the indicators. Based on the outcomes of the user questionnaires and field research, the author ranked the indicators from the users' perspective and compared the results with the designer's opinions. The results are similar; however, the visitors showed more positive opinions towards the artificial lighting and considerations of circulation space.
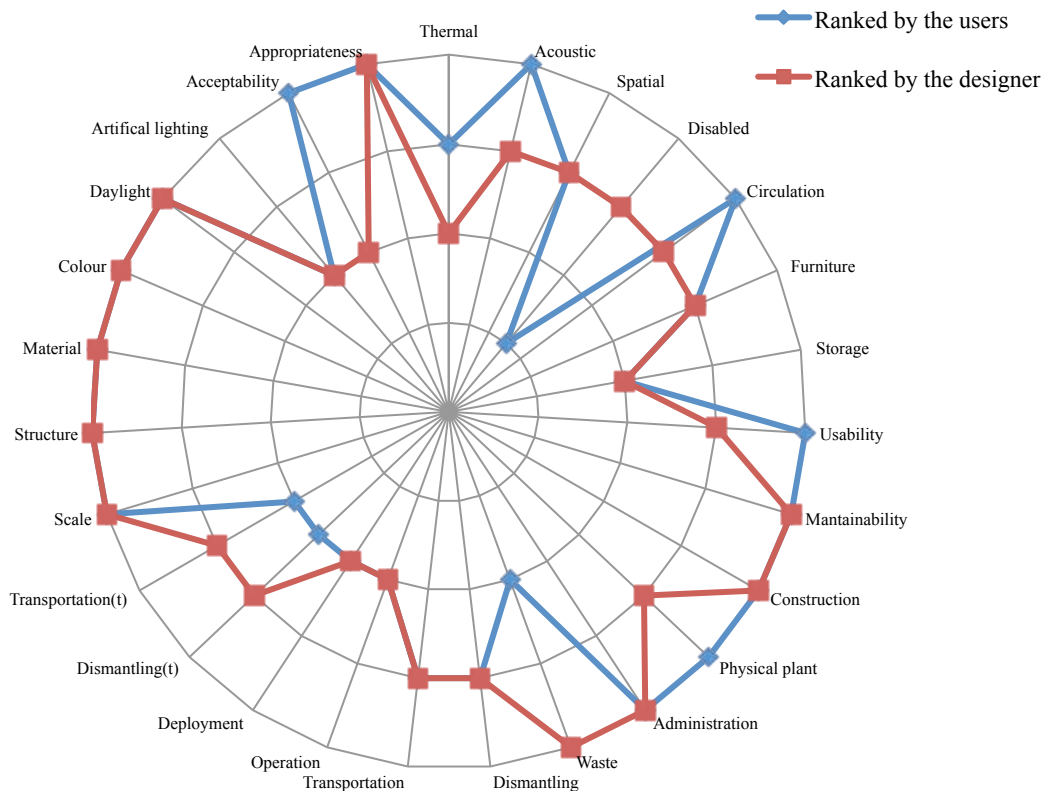
Figure 7: *Post-occupancy evaluation of Kreod.*

The Kreod project raises an important question over whether natural materials are a good option for parametrically designed buildings and functional structures. The designer needs to consider good reasons for selecting construction materials and to do this, the designer needs inventive spatial and constructional concepts. During the manufacturing process, a large number of wooden components could not be used and were burnt as an energy resource for hot water. Li was not aware of the problems of timber prefabrication until he visited the studio in May 2012, and prior to that, he had received images from the Liverpool Scenic Workshop through email that suggested the prefabrication was going well. It was not until then that Li realised the project was going to be delayed for at least two months. It could be argued that, when Li was concentrating on seeking partnerships and sponsors, he ignored the importance of monitoring the project process and because the project was delayed until September, it missed the opportunity of attracting visitors who came to the site for the London 2012 Olympics Games. The designers of small-scale demountable buildings, who are often also the project managers, need to pay particular attention to the project monitoring because it is critical to ensure that a demountable building/structure project can meet its deadline. During a conversation with the author on 6 December 2012, Li revealed that his initial intention of constructing the pavilion was to create a working methodology in architecture to prove the importance of practice in education. Moreover, he intends to succeed in his first step of entrepreneurship in the UK through this pavilion, and further monitoring of Kreod is proposed in the future.

Li completed the designer questionnaire on 17 December 2012. He selected agree and strongly agree for the majority of the performance indicators. Regarding thermal comfort, storage, use-time, time for

deployment and artificial lighting, he selected neither agree nor disagree. The main reason for this was that the structure is going to be in use until August 2013, and the artificial lighting was not installed. Kreod was used as the press and visitor centre for Ecobuild exhibitions in London from 5 – 7 March 2013. A large scale project - Kreod Trading Pavilion Rio 2016 is being planned and the designer hosted the press launch in London on 12 September 2013.

CONSLUSION

The Evaluation Conceptual Model – FFTA (function-finance-timescale-aesthetics) – is currently the only existing comprehensive method that is dedicated to evaluating the functional performance of demountable buildings. The model is based upon a comprehensive range of literature and carefully selected case studies, which were framed as an "explore-proposition-test" research approach. The model was tested on live projects and this paper demonstrates that it is practical and adaptable for wider disciplines, including exploring new architectural design methods, identifying cultural changes in urban studies, and increasing the economic benefits for different sectors, such as local city councils and small enterprises. Although limited in some aspects, including the need to further explore the usability of this model to develop a more sophisticated evaluation tool, the research results have established a valuable foundation for future investigations, which benefits academia, architecture and design practice.

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CIB Comissions as those contribute to defined Priority Themes and have their focus in certain Areas

Legend: **G** = green (Activities and Outcome always of special importance); **g** = gray (Activities and Outcome may be of special importance).

CIB Task Groups and Working Commissions		SC	IDDS	RU	GEN	BCT	BPh	DB	BE	MOE	LPP
TG59	People in Construction									G	
TG72	Public Private Partnership									g	G
TG74	New Production and Business Models in Construction		G							G	
TG78	Informality and Emergence in Construction									G	
TG79	Building Regulations and Control in the Face of Climate Change	G		g		g					G
TG80	Legal and Regulatory Aspects of BIM		G								G
TG81	Global Construction Data									G	
TG82	Marketing in Construction									G	
TG83	e-Business in Construction										
TG86	Building Healthy Cities	g		G							
TG87	Urban Resilience: Benchmarking and Metrics	g		G					G		
TG88	Smart Cities	g		G							
TG89	Construction Mediation Practice										G
TG90	Information Integration in Construction		G		G					G	
W014	Fire Safety					g		G			
W023	Wall Structures					G					
W040	Heat and Moisture Transfer in Buildings						G				
W055	Construction Industry Economics									G	
W056	Sandwich Panels					G		g			
W062	Water Supply and Drainage	g				g	G				
W065	Organisation and Management of Construction									G	
W069	Residential Studies							G	G	G	g
W070	Facilities Management and Maintenance					G		G	G	G	
W078	Information Technology for Construction		G							G	
W080	Prediction of Service Life of Building Materials and Components	g				G		G			
W083	Roofing Materials and Systems	g				G		G			
W084	Building Comfortable Environments for All					G		g		G	
W086	Building Pathology					G		g		G	
W089	Education in the Built Environment				G						
W092	Procurement Systems									G	G
W096	Architectural Management							G			
W098	Intelligent and Responsive Buildings	g						G			
W099	Safety and Health in Construction							G		G	
W101	Spatial Planning and Infrastructure Development	g		G					G		
W102	Information and Knowledge Management in Building	g			G						
W104	Open Building Implementation							G	g	G	
W107	Construction in Developing Countries	g						G			
W110	Informal Settlements and Affordable Housing	g		G				G	g		
W111	Usability of Workplaces					g		G		g	
W112	Culture in Construction									G	g
W113	Law and Dispute Resolution										G
W114	Earthquake Engineering and Buildings	g		G				g			
W115	Construction Materials Stewardship	G		G		G					
W116	Smart and Sustainable Built Environments	G		G		G					
W117	Performance Measurement in Construction									G	g
W118	Clients and Users in Construction									G	
W119	Customised Industrial Construction									G	
W120	Disasters and the Built Environment	G		G				G	G		

CIB Priority Themes header spans: SC, IDDS, RU.
Areas of Scientific Interest header spans: GEN; BT (BCT, BPh); BBE (DB, BE); BP (MOE, LPP).

Extend of Involvement of Task Groups and Working Commissions

(gray)	Same of the Activities and Outcome of this Task Group or Working Commission may be of special importance to the respective Theme or Area
(green)	Activities and Outcome of this Task Group or Working Commission in principle always are of special importance to the respective Theme or Area

Abbreviations of defined Themes and Areas

Priority Themes

SC	Sustainable Construction
IDDS	Integrated Design and Delivery Solutions
RU	Resilient Urbanisation

Areas of Scientific Interest

GEN	GENERAL ISSUES: Innovation, Information, Education
BT	BUILDING TECHNIQUE
BCT	Building and Construction Technologies
BPh	Building Physics
BBE	BUILDINGS AND THE BUILT ENVIRONMENT
DB	Design of Buildings
BE	Built Environment
BP	BUILDING PROCESS
MOE	Management, Organisation and Economics
LPP	Legal and Procurement Practices

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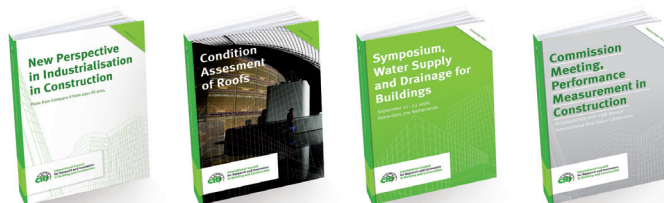
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