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SOUTH AFRICAN HOUSING: CONSTRAINTS ON SUSTAINABLE BUILDING TRANSFORMATION

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ABSTRACT

The paper investigates the state of the South African residential sector and how the principles of Open Building are relevant and applicable to this field. This is done firstly through unpacking the concept of Open Building and related concepts; the catalytic potential of Open Building for design and technology, space and society, the public realm, as well as its relevance and potential for management, economics and industry are considered. Definitions of sustainable building transformation are articulated; it is an approach that is firmly rooted in theories of architecture which highlight the design of systems and the interface between systems. The approach draws heavily on Habraken's concept of 'supports', Kendall and Van Der Werf's Open Building 'levels', as well as ideas related to the way in which materials, building components and buildings themselves are re used or salvaged based on life cycle analysis. The paper distinguishes between superficial (cosmetic) change and functional/technical/spatial change, where the latter is believed to add value to the users' experience and quality of life. Both are perceived to have positive social impact. Residential case studies are revisited to strengthen the argument for the need to accommodate the changing circumstances and preferences of users as well as enhance 'change capacity' in buildings. The issues that emerge from the case studies have assisted in the development of assessment tools, which enable measurement of 'change capacity' in new buildings and building refurbishments. This in turn allowed for the development of 'design tools' for the architect. To demonstrate the latter, a teaching experiment is presented, deeply rooted in the South African context – with its unique characteristics, idiosyncrasies and difficult histories. There are some obstacles to the adoption of an Open Building approach. Practice and education systems are rooted in convention, negative

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perceptions about change, and a lack of experimentation are seen to be some of the reasons why 'change capacity' is not fully considered in the built environment in general, and in the residential sector in particular. There is also an assumption that changing practice would increase costs. However, this is untested and it is argued that long-term capacity of the building stock would have immense, long-term, economic benefits. There is also a lack of collaboration across disciplines and countries, and a lack of uniform definitions, with the result that different groups pull in different directions.

Key words: Open Building, South Africa, building transformation, teaching, practice, experimentation

Introduction

This paper summarizes and reflects on many years of research into Open Building and its relevance in the South African residential sector. The decision to use the term Open Building in defining a particular way of thinking, teaching and practice in the built environment came as a result of linking up with an international network of researchers and practitioners who adopt this approach. The term "open" also appeals because of the positive connotations of architecture becoming open to participation and experimentation and to serving wider populations, and thereby growing more relevant as a field.

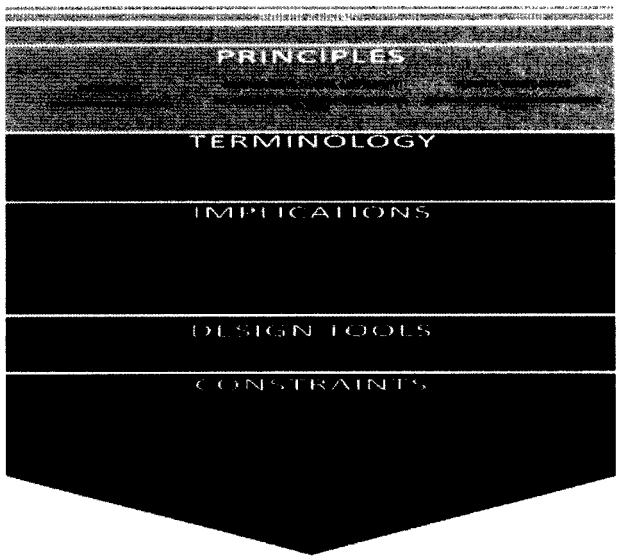


Figure 1 : The structure of the paper and themes addressed

The Current Situation in South Africa and Research Imperatives

The paper is conceptualized within a larger research project. Its broader goal is to formulate a position for architects and architecture that makes it more relevant and viable as a profession.

Housing for the poor in South Africa is a contentious issue. A highly successful housing program by quantitative terms (i.e. in terms of number of house units delivered per year) is unsustainable. Moreover, when a newly appointed Minister of Human Settlements proposed that the government could not continue to provide RDP houses (referring to the Reconstruction and Development Program of South Africa) for those who were not immediately and directly affected by Apartheid, the backlash was understandably strong: "Public housing, far from being some kind of unique and temporary South African exception to the general status quo, is a standard part of even basic social democratic programs. The pretense that apartheid's consequences came to an end in 1994 is the sort of denialism that is out of touch with reality – and in a way that works to naturalize inequalities inherited from a long history of brutal oppression that turned race into class – that it is almost obscene to even engage it as if it was a serious proposition." (Pithouse, 2014).

South Africa is a country wherein political unrest, protest, anger and segregation could be described as characteristic features of everyday lived experience, resulting in the topicality of issues such as the upgrading of informal settlements or 'slums', abolishing the Apartheid legacy of workers' hostels, and delivering affordable housing in well-located and serviced neighborhoods. The Western Cape Government has acknowledged the fact that practice has to change in a major way if the situation is to be remedied:

> "The core problem that needs to be addressed is that, if nothing changes, existing subsidies and interventions will deliver 14 360 RDP type project-linked housing units per annum, mainly on the urban peripheries of the Western Cape's towns and cities. The assumption is that an amount of R1 billion will be available per year, and that each unit will cost R70 000 (maximum permissible amount) to build. This might just address the backlog in 15 years, but it will do nothing to address new needs created by in-migration, natural growth, and an increase in the number of households as family units shrink in size." (Western Cape Government, n.d.)

Current housing delivery processes entrench poverty and disadvantage through the peripheral location of government-subsidized housing, and are moreover unsustainable environmentally and financially.

Smart Urbanism begins to address some of these issues in meaningful ways: "From our understanding and thinking around complex systems found in cities, nature, business, information technology and choice architecture we can extract the lessons that have been learnt to derive simple rules that can be applied to a better urbanism." One of the

"rules" proposed through Smart Urbanism, and which is a principle which strongly supports the premise of this paper, is that "LEADERSHIP MUST BE ENABLING:"

> "...open systems are therefore organic rather than mechanistic, and require a completely different mind-set to run them. The role of traditional civic leadership grows less effective in bottom-up systems – less concerned with establishing a direction for the city, and more involved with enabling and encouraging the clusters that generate the best ideas. In these conditions, strategy and feedback are more important than detailed planning." (Neighborhood Co:efficient - a guide to making massive small change, 2011)

Principles of Open Building

Open buildings are not tightly integrated with programatic uses. Rather, Open buildings may transform functionally over time, while still being able to offer architectural infrastructure of sustained architectural quality, as well as spatial and technical capacity. In this sense, there are links between Open Building and the notion of sustainability, as both promote a long-lasting and resource-conserving built environment – one which has the capacity to adapt and change to meet new social-technical conditions.

Participation
(collective versus individual needs;)
Flexibity, Variety, Choice
(functional, spatial, aesthetic, size, type, tenure options)
Incrementality, Change Capacity, Adaptability
(sub-divisions; expansions; affordability; accessibility; inclusive design)

Figure 2 : The idea of participation and its implications

Open Building promotes the idea of "LIMITING CHOICE" for "INFINITE POSSIBILITIES." This is the understanding of "the need for narrowing down choices as a precondition to emergent behaviour." (Neighborhood Co:efficient - a guide to making massive small change, 2011). This idea is key to understanding Open Building and built environment 'levels', especially in a country such as South Africa where the overarching critical rhetoric is usually to "offer more choice" and to "let communities decide for themselves." Thus, Open Building can offer a more balanced point of view, where choice will need to be limited at some level in order to offer diversity, choice and variety at another level. This approach appears to be in accord with the nature of the built environment, which comes into existence and transforms as a social-physical ecosystem, which is never finished but rather transforms part by part. This, as Hollis (2010) describes, is a known phenomenon of the built environment:

"...buildings have secret lives; all too often, the existence of their stories have been either overlooked or willfully ignored... one is struck by the multiplicity of different functions that a building can contain over time, and how these functions are completely independent of form."

Concepts and Terminology

The Open Building approach is neither new, nor unique. Many approaches to architecture are premized strongly on the idea that the built environment is in constant flux, though not all of these researchers or practitioners specifically use the term "Open Building."

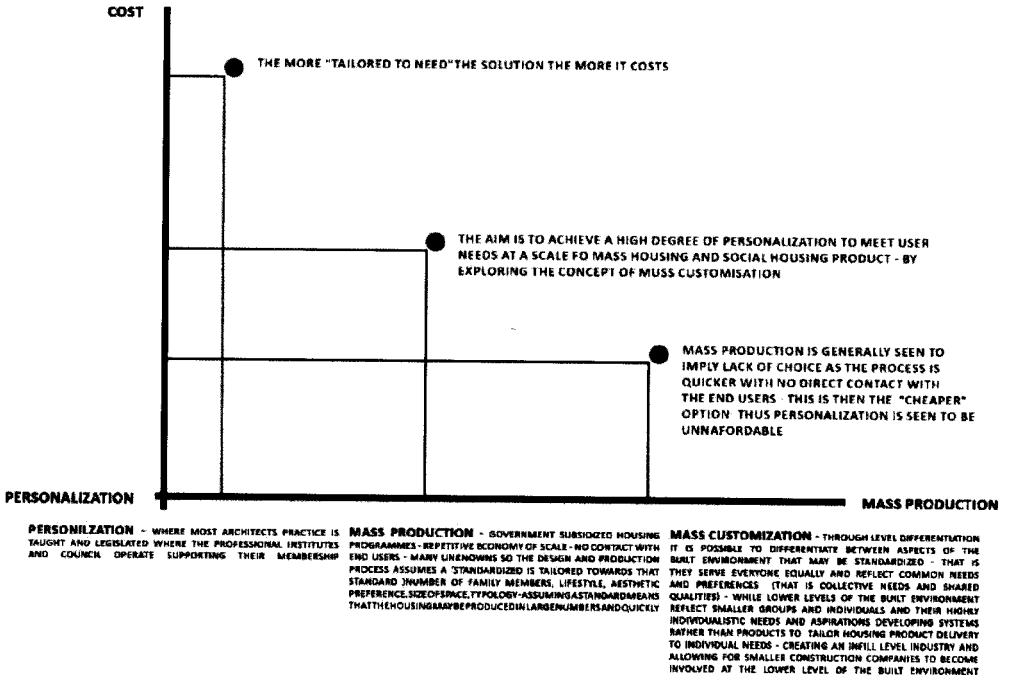


Figure 3 : Mass Customization unpacked (diagram in process)

Moreover, in the opinion of the authors, very few approaches coherently offer the broadness of interpretation, the range of applications, or the tools that Open Building offers. Ideas such as time-based architecture, 4-Dimensional design, disentanglement, system separation, design for deconstruction, disassembly and dismantling, and mass customization are all concepts entailed and articulated by Open Building. An independence of built environment components, for example, can also described by the term 'disentanglement'; and so too the detailing of the interface between built

environment 'levels' and building components in such a manner that allows for variation on one level/component without disrupting another level/component. The term 'disassembly' implies that the three aspects of materials (the manufacture a building's components, the components themselves, and the building as an entity) would need to be reconsidered. The term 'mass customization', although implying a standardized product deliver en masse in highly industrialized systems, is a concept whose relevance, importance and application must be considered in countries where there are massive government housing programs but which fail to meet the individual needs of the end users. In this regard the Neighborhood Co:efficient argues that "scalability" is

> "...a desirable property of a system, a network, or a process, which indicates its ability to either handle growing complexity in a graceful manner or to be enlarged or reduced..." (Neighborhood Co:efficient - a guide to making massive small change, 2011)

The application of Open Building would have clear implications on practice in the built environment. These implications are elaborated in the following sections of the paper: in terms of design and technology, space and society, the public realm and catalysts, and finally management and economics.

Implications of Open Building Approaches: Design and Technology

Adaptability of buildings and their components may be categorized in terms of ease or difficulty, as well as the frequency of intervention, whereby 'easy' refers to the enabling of short term adaptability, 'moderate' to medium term adaptability, and 'intensive' to long term adaptability. Easy to adapt elements in a building allow users a level of intervention that offers a sense of personalization and ownership and has high social value. Moderate adaptation in the medium term of a development allows benefits through interventions on the actual functioning of space and comfort, while intensive and longer term interventions allow a development as a whole to be sustainable over time by responding to market demand, new technologies and changes in lifestyle preferences (Osman et al., 2011).

At the urban design scale, and in selecting zones for injecting market housing, social housing, and mixed use and mixed income developments, it is the 'edges' or the visible zones that need to be targeted. This 'activation of edges' not only adds value to all locations irrespective of the income groups that would reside there (and is thus equitable), but it would also revitalize routes (economic opportunity and passive surveillance) and improve the image of an area or neighborhood, thereby contributing to enhancing morale and the general uplift of communities as well as confidence in government (Osman and Sebake, 2010).

Design and technology are not abstract concepts, but exist in a social and cultural setting and have tangible effects. According to Habraken (1985):

> "Production is shaped by social structure and society organizes itself around production... For a technical system to become vernacular it must allow some form of control to all parties... In a way such a physical system, shared by a society, is like a language. It has its limitations of grammar, but one can tell any tale in it. The true language of form, if this too fashionable metaphor must be used, is technology, not architecture."

South Africa offers great opportunities for links to be made between existing, small-scale industries, which sometimes fall outside of the formal sector, and for combining indigenous knowledge and modular building systems as a means of providing low-income housing - a relatively unexplored option. Shack building industries (albeit, informal industries) offer a rudimentary form of modularization used in South African townships and informal settlements. This raizes a number of provocations; could shacks...

> "... inform new innovative solutions, albeit with more quality and robustness? Perhaps these solutions may be used in single family houses and multi-family medium and higher density options as infill/fit-out at the secondary levels of development? Perhaps this will allow for "zozo" (shack) yards in the townships to become legitimate, more developed businesses and allow them to enter the affordable housing market with a more advance product?" (Osman and Sebake, 2010).

Using Habraken's SAR method, 'upgrading the shack building industry' may well be a more viable and systemic option to current approaches of 'upgrading shacks'. In one example offered in the Grunsfeld Variations, an educational experiment run by Habraken, the participating students stated:

> "The use of a modular system made it easy to understand the relation between the urban and building scales. Decision-making at the two scales could be simultaneous rather than sequential, allowing a better integrated design. The modular system also facilitated coordination between the members of the team. Those working on the facades knew how their rules would affect the urban design, and vice versa." (Habraken and et al, 1981, p. 125).

The students further explained that much preparation went into "writing the rules," so that very little time was required to design the details.

There appears to be some consensus that there is not enough experimentation in the built environment in South Africa generally (Osman and van der Schaar, 2015). However, there are also concerns about greater experimentation in low cost housing than elsewhere, which exacerbates the notion of the 'other' and highlights difference, leading to further segregation rather than integration. Alternatively, the use of uniform, high quality 'support' structures within the urban environment would serve everyone,

regardless of race or socio-economic status, and would allow for different users (including different age groups and different mental or physical capabilities) to live in close proximity to each other (Osman and Sebake, 2010). This would require a major shift in how the built environment is designed so that the spatial and societal benefits may become evident.

Implications of Open Building Approaches: Space and Society

Physical de-segregation does not guarantee social de-segregation. However, achieving physical de-segregation may begin to offer the opportunities for a more holistic de-segregation, and addressing the very visible, physical urban disconnections may begin to reduce some of the psychological problems that are associated with it. Open Building applied at the building level, as well as at neighborhood and city levels, may have an impact in terms of enabling the poor to access the city in legitimate ways.

The differentiation between 'levels' of the environment allows for the accommodation of informal processes, the involvement of small scale builders and small local industries in the fit-out/infill levels and full on-going participation by residents and users. It may also be possible, with innovative design, to successfully include the poor within the city on land conventionally thought of as too expensive for lower income housing.

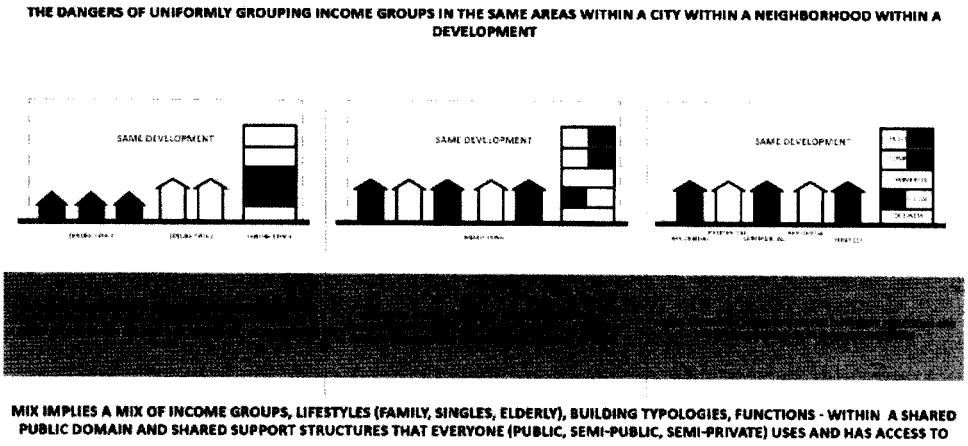


Figure 4 : Unpacking the idea of "MIX" and "ACCESS" in residential developments

There are negative consequences of uniformly grouping low-income people in the same housing developments. Income mix, race mix and tenure mix need to be implemented if government housing programs are to achieve their long term developmental aims. Concepts such as the rubric of 'access' in the built environment have many

interpretations, involving many levels and scales. It could for example imply access in terms of affordability, access to land perceived to be too expensive for low income groups, access to neighborhoods previously reserved for one racial or income group, or access in terms of conditions of disabled, the elderly, children and disease. Moreover, access could also imply to what extent people have access to information on planning and participation in decision-making and in the built environment; but participation is a complex topic:

> "BOTTOM-UP NEEDS TOP-DOWN ... you can have top-down without bottom-up: but bottom-up needs top-down, albeit with a different mindset. Collaborative systems recognize that traditional top-down, command-and-control does not work... managing complexity must be open and hierarchical if it is to be effective." (Neighborhood Co:efficient - a guide to making massive small change, 2011)

A key significance of Open Building, thus, is that it offers clarity in the tools and mechanisms to be able achieve a desired 'mix' and 'access'.

Implications of Open Building Approaches: The Public Realm and Catalysts

In an Open Building schema, the public realm could be taken as the formal framework (the 'support' or 'base'): a permanent, long-term 'structure' that allows for informal activity and interventions to occur within its parameters; it is designed to allow for the unexpected. Focusing on the public realm as part of the support level of the built environment and on the shared components of the built environment, the collective as opposed to the individual, is key to achieving the aims of integration. The public and the shared thus become catalysts for creating opportunities and variegated responses:

> "SMALL CHANGE = BIG DIFFERENCE ... the concept of sensitive dependence on initial conditions ... a small change at one place in a complex system can have large effects elsewhere. Distributed networks have shown us that a small number of rules or laws can generate incredibly complex systems. Small changes or 'nudges' can lead to big differences." (Neighborhood Co:efficient - a guide to making massive small change, 2011).

Hamdi (2004) explained how 'small' interventions grow and guide development and how the role of the professional becomes one of creating conditions for emergence and, in this respect, a search for catalysts. Subsequently, these catalysts generate a process of "negotiated reactions" (Dewar and Uytenbogaardt, 1991), whereby continuous transformation is achieved within a stable environment.

While projects need to have a larger vision, they still must start small; through identifying where existing energy is found and 'latching' on to this spatially, physically and functionally. Urban routes and nodes, for example, may help to structure this development process, section by section, by allowing for natural processes to occur and

thus creating connectors and energy flows between them. This is possible because projects have influence beyond the confines of their sites, as expressed diagrammatically below.

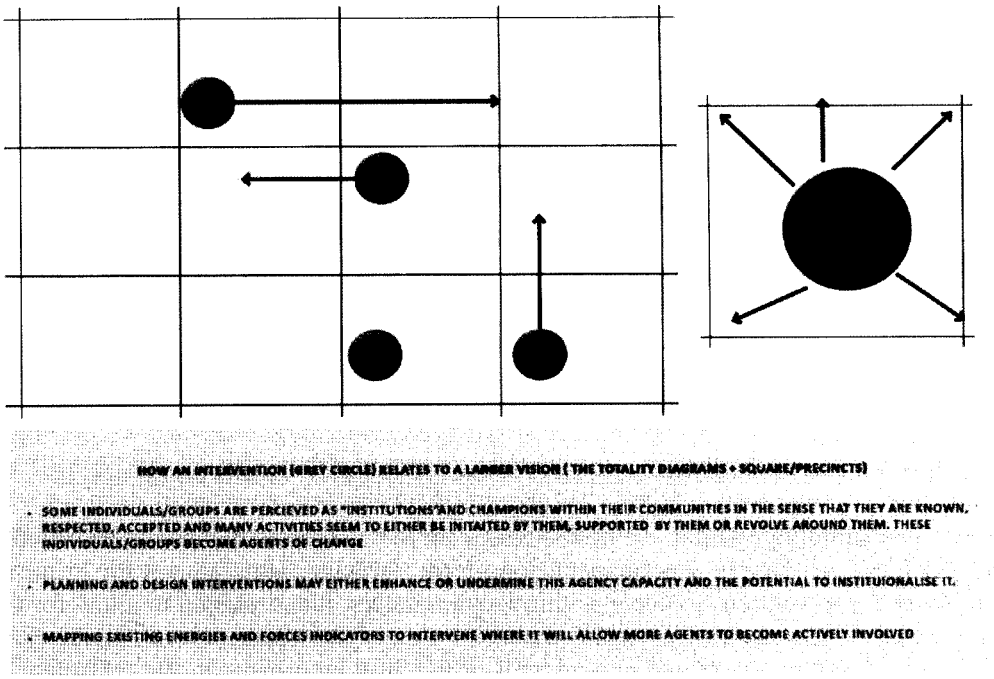


Figure 5 : Catalysts: people and projects

Implications of Open Building Approaches: Management, Economics and Policy

Open Building principles envision a system where government, the private sector and local 'communities' are involved and included in the development and management of a new type of housing stock. Current funding, conventional approaches to building and settlement development are inefficient and ineffective. While the private sector is stepping in to fill "gaps" in the market for affordable housing, various forms of government support (including but not restricted to funding) will be important for many years to come. Funding (subsidies, grants, loans, etc.) needs to be employed more strategically:

- to put in place assets that will be useful for many years into the future, such as 'base buildings' and 'supports' based on Open Building principles;
- to develop institutions that will be sustainable and able to function independently in the future;

- and to encourage individual or group ownership and long-term commitment and responsibility for the residential building stock.

Like any significant change to an ineffective status quo, achieving these goals in a comprehensive, rather than sporadic, manner would ultimately and inevitably require systemic change where industrial systems begin to be aligned to support a new way of practice, that policy be adjusted to accommodate alternative finance and subsidy mechanisms, and that new regulations allow for 'level' differentiation as well as different procurement processes in the built environment.

Sustainable building transformation

Defining sustainable building transformation

Two definitions of sustainable building transformation relevant for the purposes of this study – as they are based on the principle of adaptability and capacity – are as follows:

> "LONG LIFE/LOOSE FIT: ... applies to the adaptability of a place and is understood as the ability of a system to adapt itself efficiently and fast to changed circumstances. An adaptive system is therefore an open system that is able to fit its behaviour according to changes in its environment or in parts of the system itself. 'Long life, loose-fit' displaces 'form follows function' as a construct and universal space becomes more important as a measure." (Neighborhood Co:efficient - a guide to making massive small change, 2011)

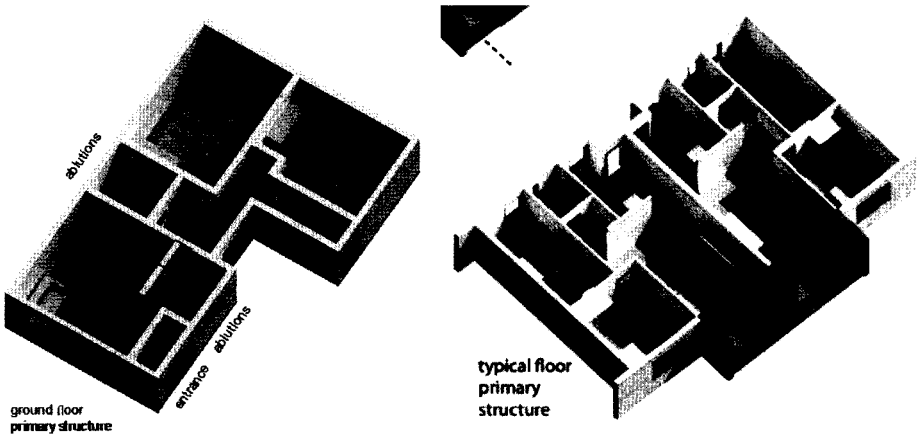
And,

> "Capacity: The capacity of a space is its ability to contain a number of functions depending on the norms we maintain for their design..." (Habraken and ximage, n.d.)

Assessing the need for 'change capacity' through case studies

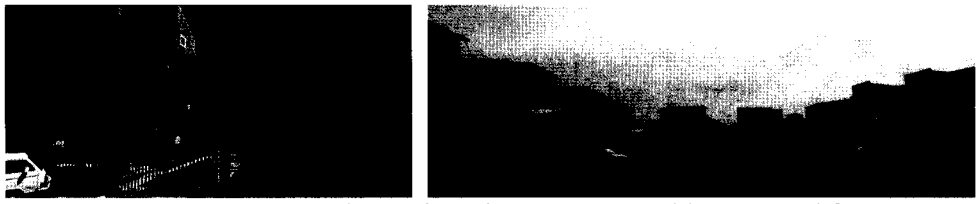
Case studies were used to assess the need for change capacity. Some residential projects were assessed in the South African housing sector with regards to their capacity to cater for different categories of users, their achievement of long-term relevance by allowing buildings to adapt and transform to a higher-order 'level' of the built environment with minimum waste and disruption, and their achievement with regard to creating a balance between the shared domain of the project with areas of individual control.
The information in the remainder of this section – which considers change capacity at the level of the residential unit as well as at the level of the overall residential developments – is compiled from a previous report conducted on the case studies by Osman and Davey (2011).

In the 'K206' project in Alexandra, Johannesburg, the positioning of staircases and ablutions significantly impacts on the capacity for change. This means that no meaningful change can be achieved without major structural changes or without compromizing the functionality of the units. The same constraint is evident in the 'Elangeni Gardens' project in Marshall Town, Johannesburg, since the load-bearing structural system employed means that breaking through walls is not possible. The positioning of ablutions, vertical circulation and the nature of the structural systems used could have been better optimized to allow for multiple spatial patterns within the internal spaces.



Figures 6 and 7 : 'K206' and 'Elangeni' primary structures

While consideration of the preferences and needs of the inhabitants are important in allowing for adaptation and change of their individual units, there is also a longer-term consideration when looking at a development as a whole, namely the ways in which units are grouped together to create the overall residential complex. Taking this into consideration at the design stage can enable the developer or social housing institution to make changes to the number of bedrooms, size of the units as well as the internal functioning of the units. This ensures that the developer or social housing institution is in a better position to later adapt their building stock to changes in affordability, market demand and lifestyles. Retrofitting in order to include environmentally sustainable features, such as solar water heaters or additional space for waste separation and collection, could also be considered at a larger scale.



Figures 8 and 9 : 'Elangeni' and 'K206' general layouts and form

Measuring 'change capacity'

In an assessment of the adaptability of a building, the materials used to manufacture a building's components, the components themselves and the interface between them, as well as the building as a complete entity, must all be considered. (Osman et al., 2011) If 'change capacity' is to be measured, priorities should naturally be identified first, and building attributes categorized and weighted. This is represented diagrammatically below, as are several examples toward developing an 'Adaptability Assessment Tool' (AAT).

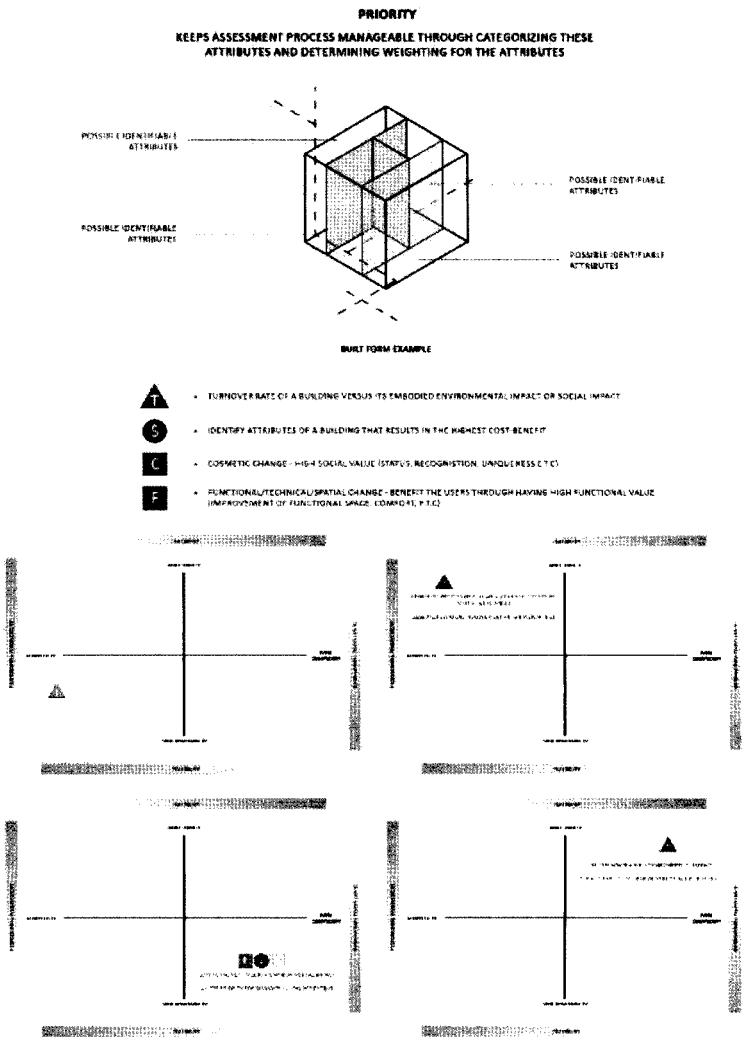


Figure 10 : Concepts of priority, categories and weighting in order to measuring 'change capacity'

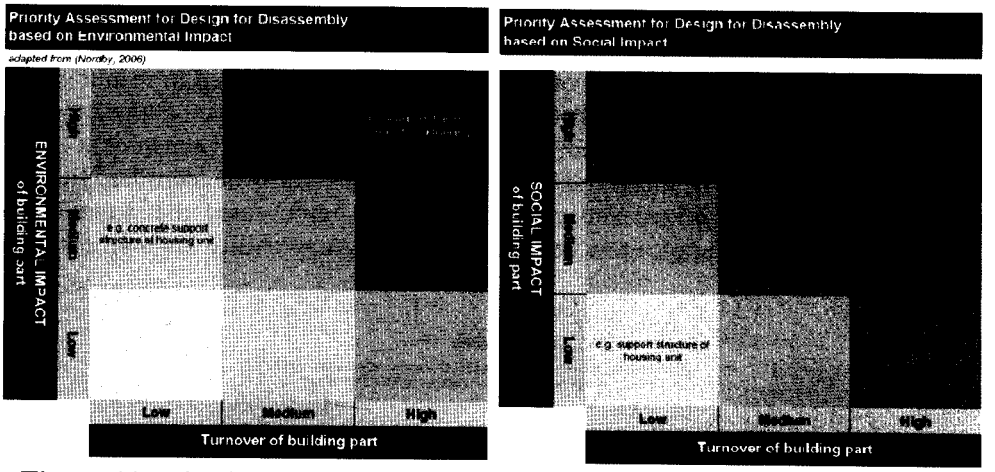


Figure 11 : The determinants of environmental and social impact (Osman et al., 2011)

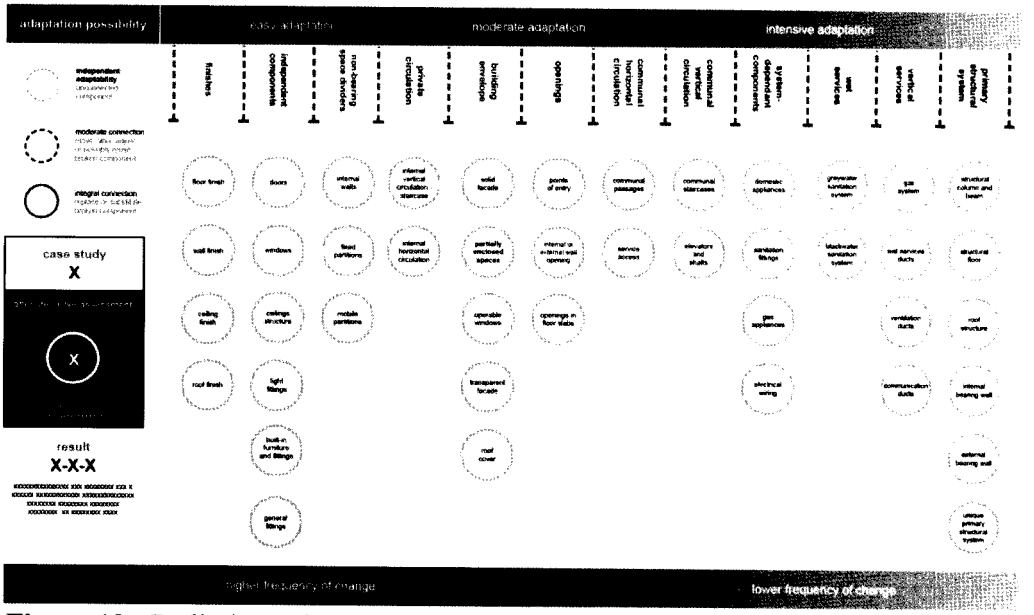


Figure 12 : Preliminary format of an 'Adaptability Assessment Tool' (AAT) (Osman et al., 2011)

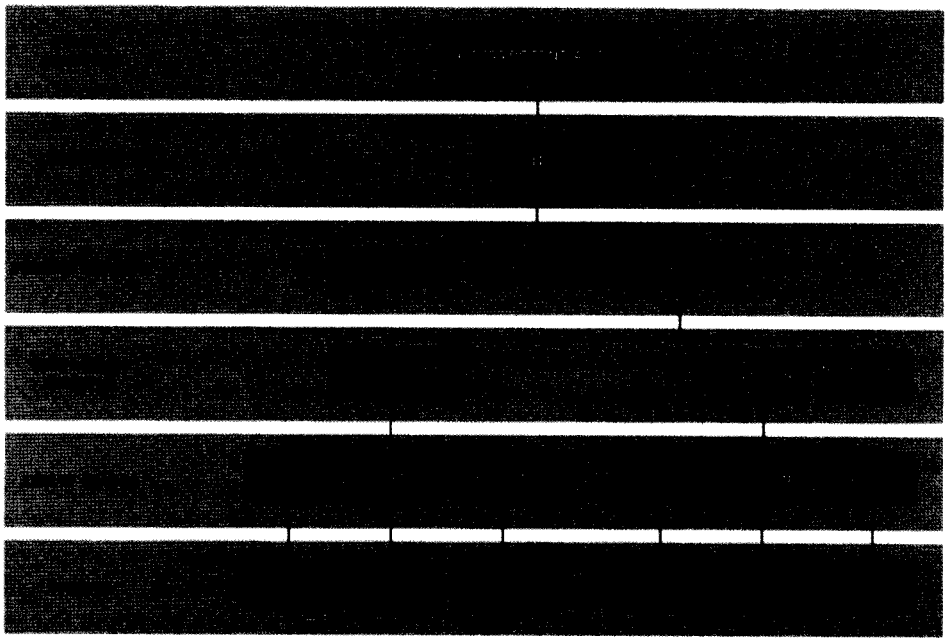


Figure 13 : A section of the revised 'Adaptability Assessment Tool' (AAT) (Osman et al., 2011)

Brand (1995) identifies site, skin, structure, services, and spatial layout as elements that make up a building's components. This has similarly been used in this study to categorise building attributes in the first draft of the AAT, which was then restructured and the degree of entanglement or interdependency between components was assessed.

Design tools for sustainable building transformation

Habraken defines tools as "...any methodical convention in use by the design profession for the making of a design" (Habraken and ximage, n.d.). Habraken's website, 'Thematic Design', proceeds to list systems, patterns, type and levels, etc., as tools that may be used in the design process.

An important consideration in the development and communication of design tools, is the fact that architects make up less than 0.05% of South African society, while a large proportion of stakeholders within the built environment have no high school education, and an overwhelmingly larger percentage have no tertiary education. As a result, the tools, language and graphic communication skills used or developed by spatial practitioners need to speak to a much wider audience, not only to fellow designers. Tissue models/plans and supports/infill at neighborhood, urban block and building levels are highly useful tools that may be shared and effectively communicated across the built environment disciplines, as well as with the various stakeholders within the

built environment. Habraken's 'Grunsfeld Variations' employed the SAR method, and some of the responses include the following:

- "...the method appeared to be a useful design tool. It made it possible for a group of designers to take a large piece of a city and coordinate a complex design, in a relatively short period of time." (Habraken and et al, 1981, p. 120)
- "...the method was very successful at addressing two principle issues: the ability to work at a number of design levels at once; and the ability to achieve variety within a common structure." (Habraken and et al, 1981, p. 108)

The idea of developing 'supports', with strict system and level separation rather than more conventional, "entangled" buildings is an important feature of the Open Building approach; 'supports' are defined as being "simple and solid" by van der Werf, who motivates for a "solid base building, a support with basic services, and appropriate outdoor spaces for traffic and social life." (Van der Werf, n.d.)

Constraints to Sustainable Building Transformation

Campbell states that "...in the world of urban planning and design, there are not many new ideas about how to solve the problems of our times." (Campbell, n.d.) In this context, Smart Urbanism has been presented as "new thinking to manage complexity", providing "practical alternatives" through "open and collaborative approaches". This study has drawn much from the concepts of Smart Urbanism, as they resonate with the idea of sustainable building transformation.

One of the greatest constraints toward changing the status quo of practice in the built environment, and specifically in the context of residential developments, is the lack of acknowledgement of public space as integral to a development. Zuidema articulates the problem thus:

> "Urban fabric can only be designed when designers and politicians are aware of the importance of consistency in the layout of public space, in other words, the space between the buildings. Often this awareness is lacking ..." (Zuidema, n.d.)

Zuidema also asks pertinent questions regarding the constraints to a change in practice:

> "Why are there not more base buildings? Why did the development come to an almost complete standstill in the 1990s? What is the outlook for the future? Why is there so much resistance to this application, when the methods work well and the building costs are not higher than normal? Why is 'base-building fit-out' still not commonplace in public housing? How will individuals deal with this, even if they are not in a position to pay for the entire house themselves, just the fit-out?" (Zuidema, n.d.)

In addition to the general lack of new ideas, the lack of appreciation for the importance of public space and a general apathy towards the adoption of new approaches cited above, it is also a known fact that the construction industry is rooted in convention, and new approaches and systems are not adopted easily. There is a fear of risk, as well as a persistent assumption that changes in practice would increase costs. The latter concern may be attributed to the perception that alternative systems – and specifically Open Building systems – do not have enough backing in terms of financial models and solid economic arguments.

Educational systems remain largely unchanged, and the teaching of Open Building and the introduction of useful tools for practice are not considered important in the design studio – indeed, the methodical approach is many times frowned upon and perceived as a hindrance to design innovation and creativity.

Further, there is also a lack of collaboration across disciplines and countries, worsened by the lack of uniform definitions and terminologies which would allow for potential synergy to emerge. Finally, policy and building legislation favours an approach to building that is based on function rather than on increased capacity and adaptability, and also favours conventional forms of tenure (ownership and rental). This is in conflict with an approach that aims to move away from buildings that are not strictly tied down to function.

Experimenting with Teaching Methods in the Architectural Studio

In the educational approach adopted by UJ_UNIT2 2015, a Masters studio at the Architecture Department, University of Johannesburg, students are taught to pay particular attention to the 'levels' of the built environment, as well as to detecting the methods of negotiation that happen in the built environment – acknowledging how that negotiation is facilitated (or hindered) by the spatial and structural qualities of the area. In this way, students are asked to reflect on the lower levels of the environment, those under the direct control of groups or individuals, and the concepts of levels and agency in general. A deep understanding of concepts and applications of Open Building is encouraged through the use of tools such as 'Tissue Models' and 'Supports'.

The line between urban design and architecture is also blurred in this approach. All projects are conceived as

> "...a series of distinct neighborhoods of manageable size, both stable and identifiable... large enough to be life-sustaining, and small enough to have their own identity. The overall pattern of the neighborhood is then made up of a series of clusters of communities of varying densities." (Habraken and et al, 1981, p. 72)

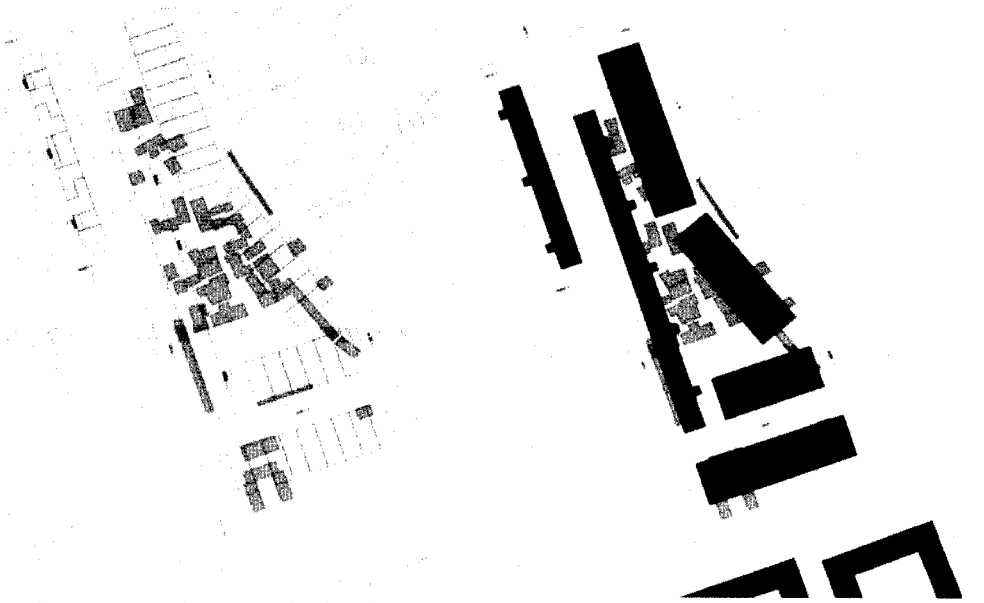


Figure 14 : Tissue analysis of Denver informal settlement in Johannesburg, with adjacent workers' hostels precinct – a studio project for UJ_UNIT2 (Acknowledgement: UJ_UNIT2 students, class of 2015)

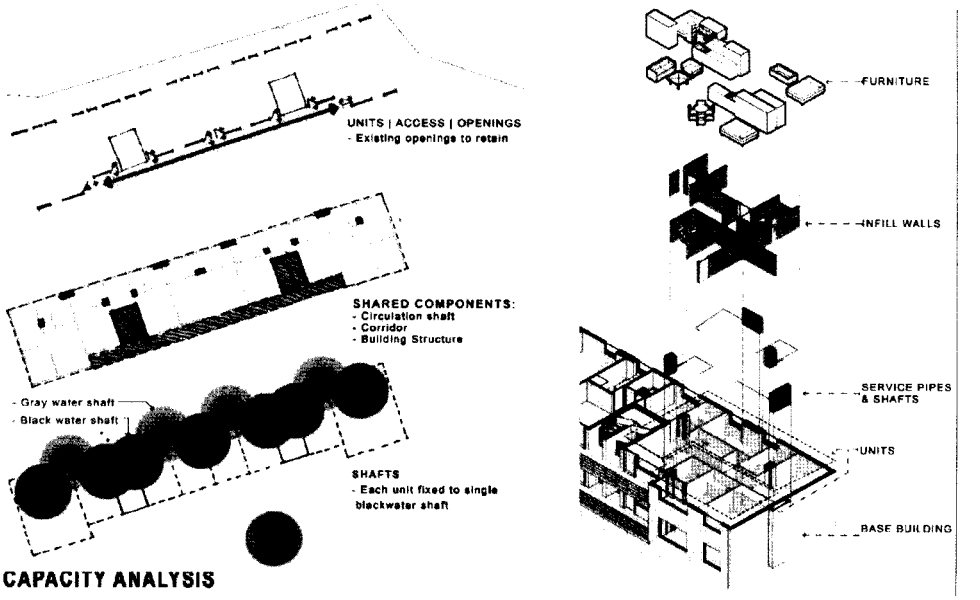


Figure 15 : Supports and infill – a studio project for UJ_UNIT2 2015 (Acknowledgement: Simon Ngubeni)

The UJ_UNIT2 studio draws heavily on the work of Kendall, specifically two documents on teaching with tissues and supports (Kendall, 1984 and 1982).

The students followed a carefully structured process to enable a balance between top-down and bottom up approaches, and between physical and socio-cultural conditions – acknowledging that participation has more nuanced and complex interpretations and that built form, carefully considered, can facilitate and support socio-cultural processes.

Research on Sustainable Building Transformation

This paper presented some aspects of a larger research project, which essentially asks the two-fold question:

> Would 'time' as a key factor in design and technical decision-making allow for more success in housing products, specifically with regards to concepts of accessibility, affordability, participation, choice, variety and change in the South African housing sector?

And,

> How can this be (re)presented to different stakeholders to make it more accessible and implementable?

A key deliverable of this approach will be a unique model for conceptualizing, financing and delivering housing at a neighborhood, block and unit scale. The project will fill gaps in knowledge with regards to allowing for the differently-skilled (as opposed to unskilled) to participate in the construction process, as well as including different types of technology and materials, to ensure that innovation serves a larger vision of social-spatial transformation and city restructuring and does not become self-serving. The project also has the potential to allow for better economic models, ensuring more efficient use of limited funds and subsidies, and thereby also accommodating experimentation in hybrid systems of finance and construction processes.

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