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Open building as an approach for more effective core-housing implementation? An exploration.

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Summary

Recently, the field of urban development has witnessed a renewed attention for the core-housing concept. The rationale is to re-establish incremental housing as a proactive strategy for satisfying housing demand in rapidly urbanising cities and as an alternative to slum upgrading. As the concept has swung back into the attention of practitioners, it is crucial to integrate "what was learnt last time around". To avoid a strong sense of 'déjà-vu' about the way the concept was understood in the 1970s, it would help to engage in a quest for more effective implementation and to link the concept to contemporary debates on urban development. An interesting way to refine the thinking may come from the field of architecture, where open building approaches are gaining importance and leading to designs with the potential to change over time. Currently, the field is still divided in two largely disconnected disciplines, architecture and urban development (comprising housing related studies). Evaluations and conclusions are consequently also fragmented. In this thesis I explore the potential of a cross-pollination of disciplines: could an open building approach lead to more effective core-housing implementation for low-income households living in rapidly urbanising contexts?

To answer this question, in this thesis three key elements of 'effective core-housing' - sustainable, adequate and legitimate – are identified and then simplified into a workable tool which allows for assessing the trade-offs made in the implementation process. Thereby the assessment of effectiveness intentionally takes a longer term perspective. Particularly promising as a starting point for this exploration are several common denominators in the paradigms of the "people's housing process" and of "open building approaches" - respectively in Turner (1979) and Habraken (1998). These common denominators centre around a discourse of 'users', 'building control', 'autonomy' and seeing 'the act of building' in the light of the temporal dimension.

The analysis starts with a discussion on the application of (modern) open building systems to the residential sector, though the outcome is rather disenchanting. Perceived pragmatic advantages along with ideological motivations suit the context of origin – Europe, North America and Japan - best, while not answering to the specific opportunities and limitations of rapidly urbanising contexts and the stringent affordability criteria of low-income households.

Since no core house is implemented in a vacuum, the case study method is used to get an understanding of the consolidation process over time and "on the ground". The core-housing implemented in Khayelitsha, Cape Town, in 1983 - a settlement occupied in 1985 - offers a unique opportunity to analyse consolidation over more than 25 years as well as understanding a project from its embedding in a tight land- and housing system. For the fieldwork, 25 plots are intentionally selected, primarily on the basis of the level of physical consolidation of the plot. Several visits to the plot, including semi-structured interviews and open conversations, as well as photography, are used to identify trends in the consolidation process over time. Triangulation with 1996 aerial photography and expert validation is used to verify findings and interpretations, as well as a focus group discussion with key informants and close cooperation with a local CBO.

Five trends are identified through the case study analysis, followed by a discussion of considerations for future core-housing implementation. Possibly the most sobering finding is that, from a time perspective, the plot potential – not so much the superstructure - has been the most flexible element of the 'core-housing concept'; and it's size allowed for a variety of forms of densification. If indeed the plot is the prime enabler, the inevitable implication is that core-housing concept requires considerable rethinking. Practitioners must engage in thoughtful consideration of the concepts' sustainability aspect in relation to plot sizes, balancing negative consequences of low-density (commonly referred to as "inefficient land-use") – and their direct impact on low-income households - with the need to prepare room for future densification. During the analysis of extension "trails" (e.g. the timing and material use of subsequent extensions), another interesting trend was found. There has been a steady shift away from the use of impermanent material towards the use of conventional material - mainly brick or block, based on a strong intrinsic motivation of low-income households to "achieve" these "higher level" extensions. In the light of progressive realisation of adequate housing, inherent to the core-housing concept, there is a need for a sensitive pro-active approach by municipalities that moves away from perceiving impermanent extensions as "slummification" but instead guides towards a more safe and resilient "product". A key challenge to the initial core house is the attempt to *least constrain* conventional material extensions through reducing the costs and time involved in achieving such safer and more resilient extensions. This pragmatic approach is grounded firstly in the realisation that the temporal dimension had rendered many of the intentionally enabling aspects of the initially provided superstructure unrecognisable and possibly irrelevant, whilst the main constraint of extending amongst households themselves was found in their very stringent affordability criteria.

The open building approach is brought back into the scene, not as a building concept, but through the principle of *zeggenschap* - or *distributed* decision-making in building control. It is argued that *Zeggenschap* may serve as a fruitful principle (or "way of seeing" the built environment) to articulate thinking on core-housing towards more effective implementation, whereby different stakeholders play different roles at different levels of the building through time.

This exploratory and qualitative research provides several indicators and considerations that may give direction for further studies and implementations towards more effective core-housing to its targeted beneficiaries. The conceptual framework of the thesis offers a useful tool to help assess the inevitable trade-offs between sustainability, legitimacy and adequacy made during the implementation process. If anything, this research leads to the conclusion that a longer-term study on the effectiveness of core-housing must jointly focus on the plot and the household(s) that lives or lived on it. A serious challenge for future implementations is to give targeted beneficiaries a level playing field in decision-making as early as possible in the housing process so that they take ownership of the core-housing concept.

Keywords: core-housing, low-cost housing implementation, open building approach, pre-fabrication / building systems, incremental housing.

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This work is dedicated to my Father.

Tikvah Breimer,

Rotterdam, November 2011

Propositions

1. Whatever you do, always remember to apply common sense. It is perhaps the most neglected tool. *(Davidson & Payne 1999, preface to Urban Projects Manual)*.

2. With a world population in excess of 6,000,000,000 people, it is possible that there are a billion dwellings. Of these, only a miniscule proportion was designed by architects; 1% may well be an overestimate. The real challenge is to understand what goes on in the other 99% of the global housing market.' *(Olivier 2003, p. 15).*

3. 'Everything in the world of architecture continues to revolve around the moment of completion: the presentation of the consummate icon. By doing this we are failing to acknowledge a building's developmental history and its eventual use, on which time has a crucial influence. What happens when we approach architecture from the temporal dimension and the idealised icon is no longer the only objective?' *(Nederlands Architecture Institute (Nai), Architecture of Consequence Series - Programme Flyer Mar/Apr 2011, Rotterdam (The Netherlands).*

4. 'I am eager to encourage all kinds of novel and unusual comparative research {between cities} to compensate for years of neglect and to challenge entrenched assumptions of incommensurability, {on the condition that} such an experimental comparativism is {grounded} in careful and rigorous procedures. (…) A more interconnected field of research could draw both inspiration and method from the cities that form its objects of study. Their interconnectedness might inform our eagerness to proliferate conversations across scholarships embedded in different urban contexts at the same time as it directs us to new units of comparison. (…) this style of theorizing would be neither a parochial universalism nor a uniform global analytical field but a rich and fragmented array of ongoing conversations across the world of cities'. *(Jennifer Robinson 2011, p. 19).*

5. If it cannot be done the way it ought to be done, it'll just have to be done the way it can. *(Traditional tile in the hallway of my aunt's house in Fryslân, the region where our family's roots lie).*

A Frisian case for pragmatism.
Picture by author. Tile in house of Feik Stamhuis.

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Chapter 1 Introduction

Recently the field of urban development has witnessed a renewed attention for the core-housing concept. The founding of a platform to combine expertise on provided incremental housing is possibly the best proof of this renewed attention. The mission of the *Global University Consortium Exploring Incremental Housing* – based at Massachusetts Institute of Technology (M.I.T.), Boston (U.S) - is: 're-establishing incremental housing (core-housing, self-help housing, etc.) as the proactive strategy for satisfying housing demand in rapidly urbanizing places and the logical alternative to the inefficiencies of slum-upgrading' (Beattie et al. 2010). The vision is to bring together experts from a variety of backgrounds and regional contexts to build a pool of knowledge from combined expertise and grow a network of practitioners[1]. The consortium first presented itself at the latest UN World Urban Forum in Rio de Janeiro (2010) where experts hosted a number of sessions. The presentations spanned the last 40 years of incremental housing ideas, from site & services projects built in the early 1970's to today's housing concepts. As Wakely (2010) puts it: 'core-housing - a déjà vu?'

Core houses typically are structures which are built with the intention of being subsequently extended and improved by residents or their direct agents. There is much variety in the process and product characteristics which emerged in the application of core-housing and therefore these should be stated as variables rather than as defining descriptors of the core-housing approach (Rapoport 1988 in Napier 2002:15). What is striking about the core-housing concept, is that it cannot be simplistically categorised as fitting into one era more than another; rather as a housing concept it has proven to be able to serve the principles of the day (Napier 2002:24).

As the core-housing concept has swung back into the attention of practitioners in housing development strategies worldwide, it is key to integrate "what was learnt last time around" and engage in a quest for more effective implementation. 'Effective' here is understood in the way Gans (1972:7) introduced it as 'that version of the potential environment that is manifestly or latently adopted by its users' - whereby the 'potential' environment refers to the physical environment as planned by the professional. With reference to the core house, the professional is involved in a quest to design an initial house by which its user can progressively achieve a more adequate living environment. The targeted beneficiary is, still, the low-income household. In an era of cities it seems logic to focus on the potential of the core house to meet the housing needs created by rapid urbanisation.

'Effective core-housing *implementation*' surely is more than just about the physical environment of the individual user. 'Housing', argue Oktay et al. (2010) 'is on the cutting edge of sustainability'. Oktay et al. (2010:27) state that 'housing environments have a crucial role to play in the sustainable development of cities,

[1] The organisation has an online database on Incremental Housing (core-housing) which can be accessed via http://web.mit.edu/incrementalhousing/ [August 5, 2010]. Since the organization is still young, the database is still quite limited in numbers of entries – but incremental in its own right.

and, accordingly, since they are an important component of the built environment, there is a need to have socially and environmentally sustainable housing in order to achieve attractive, sustainable and healthy living areas'.

Physically speaking, a core house has two components: the superstructure, and the plot on which it is built. Thus, when thinking about a single plot and its initially provided core, these must be understood from their embedding in a particular urban land- and housing system in order to assess whether this is indeed effective implementation. The time dimension is fundamental to such an assessment, mainly because it is inherent to the core-housing concept whereby the user is part of an incremental housing project.

An interesting way to sharpen the thinking about contemporary implementation of the core-housing concept may come from the field of architecture, where open building approaches are gaining importance internationally as they direct towards design that has the potential to change over time (Osman 2010:237). In other words: the motivation is to include the temporal dimension. Quite common an approach for commercial and office buildings in the form of open building *systems*, open building is currently 'gaining more recognition as being equally valid in residential (...) buildings' (Osman 2010:237). 'It is anticipated', writes Osman (2010: 237), 'that if the Open Building approach gains momentum as a movement, it will ultimately not only transform the built environment, but also the development processes'. Thus, an open building approach is interesting exactly because it appears to direct beyond the built environment as such.

This thesis is an exploration of the potential for a stimulating influence of diverse elements open building approaches for the core-housing concept which may help to get beyond the sense of déjà-vu.

1.1. Definition of the problem

Disconnected disciplines

Both the core-housing concept and open building approaches have incremental development after completion as a key quest. Studies are nevertheless scattered within two largely disconnected disciplines – that of Architecture and that of Urban Development and Housing (adjustment) Studies. Evaluations and conclusions are consequently fragmented as well. The reason is that the main disciplines involved – architecture and housing/urban development studies - have each gone their separate ways in the second half of the 20th century (i.e. see Stohr 2005).

The debate on core-housing has, for the past 40 years, mainly focused on 'the recognition of the problems experienced by governments attempting to continue to meet housing needs through full provision' (Napier 2002:7, Beattie et al. 2010). In addition, development thinkers and agencies have applied core-housing in aid-relief; as can currently be witnessed for instance in debates on aid-relief in Haiti[2]. The debate on building systems, has taken another route

[2] At the World Forum in Brazil, March 2010, the *Global University Consortium Exploring Incremental Housing* for instance held a side-event with the following guiding question: Is

altogether. Architects and private sector focused on flexibility, individualization – sometimes even as an exclusive form of art, convenience, building speed and in recent years also on 'green construction' and affordability (e.g. Staib et al., 2008).

Where Architecture and core-housing meet

Architecture is nevertheless starting to be more and more involved with rapidly urbanising countries, so that an assessment of the potential of open building approaches for the core-housing concept becomes ever more interesting. Called upon to work interdisciplinary and 'take a delight in trying out something new, in experimentation' (after Staib et al. 2008:11), there has been a booming interest of architects in designing for low-income households in rapidly urbanising contexts[3].

It may very well be that it is the pragmatic way of dealing with issues of adequacy in rapidly urbanising contexts that opened new doors for experimentation with open building approaches. In many cities in the Europe, North America and Japan the implementation of less than high standard adequacy is legally impossible because of a plethora of building requirements included in the minimum standards[4], hence experimentation in these contexts has been virtually impossible. Ongoing experimentation that turned to rapidly urbanizing environments instead however is often painfully ignoring the right to basic decency of a house, and its designers would probably "never even consider to let their grandmothers'' live in the house – let alone come to visit her regularly"[5]. Other architects, when experimenting, display social awareness and sensitivity to the limitations and possibilities of a socio-political context. When assessing the long-term effectiveness of a 'housing solution' proposed, its legitimacy is indeed of key importance. Thereby legitimacy refers to the opposite of introducing an alien way of 'doing housing' altogether within the specific urban context in which the targeted beneficiaries are embedded.

The idea for this research was ignited by questions that arose from my personal involvement with the Open Source House (Rotterdam, The Netherlands) project, volunteering as a so-called 'lead-user' from autumn 2009 onwards. I was, amongst others, part of the 'rating team' that would evaluate the designs architect-teams had sent for the proposed 'eco-affordable modular house'. This experience triggered my interest in combining the knowledge and expertise of architecture and urban development studies, as well as my own background in anthropology. Regular personal interactions on the proceedings after the international competition further nurtured my curiosity into what happens after the concept is taken from the design table into implementation on the ground.

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an incremental core-housing approach the way to re-establish communities in Haiti? See: http://www.unhabitat.org [August 15, 2010].

[3] To illustrate, the design competition for the proposed 'eco-affordable modular house' called out by the Open-Source House in 2010, resulted in some 257 designs by collaborative teams worldwide. Designs and original competition case can be accessed through www.os-house.org [August 21, 2010].

[4] Frederik Groos, expert interview via email, August 25, 2011.

[5] Cameron Sinclair, focus group discussion, June 21, 2010, Delft (The Netherlands).

The guiding question of this thesis is therefore both exploratory and qualitative in nature: May an open building approach lead to more effective core-housing implementation for low-income households living in rapidly urbanising contexts?

Testing the potential environment: South Africa as a scenario – Khayelitsha core-housing project as a case study

The explorative research of possible synergies – and pitfalls – of combining the core-housing concept with open building approaches has much to gain from understanding the origins of both ideas. After all 'history doesn't repeat itself – but it does rhyme'[6]. What proved especially difficult however, is finding relevant case studies to analyse and evaluate implementation processes.

There is a void in the body of knowledge of both architecture and housing development studies particularly when it comes to *evaluations* of projects. Within the field of urban development and management many a study is dedicated to the examination of incremental housing processes. However, they have all tended to have only two focuses (Napier 2002:2). Studies either look at housing in informal settlements – which are designed and constructed by residents without the interference of any architect or government (e.g. Van Lindert, 1992; Ramirez et al, 1992; Gough, 1996[7] - or they focus on formal mass built housing – which is professionally designed without the eventuality of extension in mind (e.g. Tipple 2000). It seems to be a fairly rare occurrence for researchers to study housing that was explicitly designed to enable residents to further consolidate it and work towards increasing the liveability of the house.

Cases found within the field of Architecture on the application of open building approaches for low-income households don't go beyond a discussion of prototypes for higher income households in the Europe, North America and Japan (e.g. Anderson & Anderson 2007; Cruz 2008) or in emergency housing (e.g. Architecture for Humanity 2005). Professionals confine themselves to mostly technical evaluation of a pilot (e.g. Karni 2008), predominantly architectural evaluations (e.g. Debicka & Friedman 2009; Kahn 2010) or merely general explorations of the potential of the modular concept or prefab constructions for developing countries (e.g. Jucá-Filho 1998).

It would be rather meaningless nevertheless to discuss effective core-housing in a vacuum. Feasibility studies need to be conducted within a certain locality (Davidson & Payne 2000). The discovered void in the availability of qualitative case studies has led to a reorientation of the methodology chosen. To overcome the foot-looseness of an exploration (e.g. not having a specific urban context to evaluate the effectiveness of a core-housing project), a considerable part of this research takes urban contexts in South Africa as a scenario. The choice is informed by the scale and ambition of the provision of newly constructed houses for low-income households in South-Africa (in this case by the State)[8].

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[6] After Schinkel, in a Dutch newspaper column: 'De geschiedenis herhaalt zich niet, maar zij rijmt wel'. *NRC Handelsblad*, August 3, 2010.

[7] A sum-up by Napier (2002:2).

[8] Since 1994, when a democratic government was installed, 2.3 million housing units have been provided to nearly 11 million people (Tissington 2011:8, 34).

Many of the state-provided housing projects have applied the core-housing concept since the 1970s. The body of knowledge built up on the effectiveness of core-housing over time is of special interest to this research.

The fieldwork of this research takes place in so-called "core Khayelitsha[9]" – referring to the fact that this has been the starting point of a nowadays extensive settlement. It is a relevant and insightful site to study core-housing into time. Not only for the sheer numbers of core houses implemented there, when the concept of core-housing was still developing, but also for the rich and in-depth variety of documentation available about the site – both qualitative and quantitative. It is also here that the most extensive study on core-housing implementation was found in the form of a dissertation by Napier (2002) which could serve as a starting point for operationalisation into (measurable) indicators. Opting for the same neighbourhood as in Napier's study makes it possible to follow the process now 26 years into consolidation as well as allowing for triangulation of data. The choice for Cape Town is also informed by the personal and professional network of the researcher.

1.2. Objectives

The exploration in this thesis intends to:

a) Integrate expertise / evaluations across disciplines;
b) Identify:
   - possible common denominators of the core-housing concept and open building approaches;
   - possible ways in which land- and housing systems in rapidly urbanising contexts impact consolidation processes;
   - key concerns in the consolidation process of a core house over a prolonged period of time;
c) build on practitioners' understanding of analysing and assessing the effectiveness of core-housing implementation and consolidation processes.

1.3. Scope

Acknowledging the inability to be comprehensive[10], this research confines itself to a very specific scope. The unit of analysis is the implementation of the individual

[9] While the nickname may seem to refer as well to the concept of "core-housing", in fact during the fieldwork of this thesis in 2011 it was found that this concept is not familiar locally – even among practitioners, and instead the houses are referred to as 'Apartheid houses' for their acknowledged distinction in the quality of the material (better) and their size (much smaller) when compared to post-1994 RDP houses.

[10] Indeed, housing implementation by now has come to be understood by The United Nations Human Settlements Programme (UN-Habitat) as a multidimensional process involving many aspects such as: 1) Finance (e.g. housing costs, affordability threshold, capital markets), 2) Tenure (e.g. property rights, homeownership), 3) Services (e.g. basic infrastructure provision, tariffs & user fees, delivery capacity), 4) Policy, 5) Durability (standards & quality control, maintenance), 6) Location (land, accessibility, public transport, densities), 7) Size (typology, building code), 8) Institutions. Source: Claudio Acioly Jr., Chief Housing Policy UN-Habitat, Lecture at the Institute for Housing and Urban Development Studies (IHS), Rotterdam (The Netherlands), April 5, 2011.

core on a plot, understood from its embedding in a land- and housing system. While integrating other dimensions as well, the analysis and discussion continually circle around the effectiveness - here interpreted as the sustainability, adequacy and legitimacy - of the 'housing solution' proposed.

The arena is that of rapidly urbanising contexts. In the 1970s the context of implementation was without exception the so-called 'developing countries'. Apart from semantics, whereby the meaning and implications of the term 'developing' are ate best questionable, the focus area of this research follows the attention of contemporary debates on sustainable cities. This attention increasingly goes to the dramatic change that has occurred in just two decades; the new 'bottom billion' live not in poor countries but in middle-income countries[11] (after Sumner 2010). This matters because it raises a lot of questions for policy and resources (ODA in Sumner 2010:4). Since South Africa is taken as a scenario, it is perhaps even more precise to state that the focus is on rapidly urbanising contexts in *transition economies*. Caution is required with regard to generalisations as every context needs to be understood from the inside out to allow for effective implementation. Even so, this research does indeed take up the challenge of extracting considerations which may be applicable across rapidly urbanising contexts, as the experiences of specific city-phenomena converge (see e.g. Robinson 2011).

1.4. Thesis structure

The next Chapter - 2 - encompasses a literature review across disciplines, working towards the conceptual framework of the research. This conceptual framework is outlined and visualised in Chapter – 3 -. Chapter - 4 - gives an introduction to the case study, the core-housing project in Khayelitsha, followed by Chapter - 5 – which operationalises the research into its main question, methods and limitations. Chapter - 6 - provides for a first analysis of the viability of introducing an open building *system* to rapidly urbanising contexts, targeting low-income households. Findings are based on a convergence of data found across disciplines on previous experiences, expert validation and –interviews and several findings of the fieldwork. Chapter - 7 - offers an extensive analysis and discussion of the case study findings, with the aim of identifying trends and considerations which will be meaningful for future implementation. Finally, Chapter – 8 - brings the discussion and analysis together in concluding remarks, whereby special attention is given to suggesting directions for further detailed studies. After the bibliography of this research, the glossary follows which can be used for quick reference of the operational definitions of the main terms presented here.

I have adopted a structure that 'relegates' the bulk of the detailed data of these case studies to relatively long appendices so that the overall picture and the analysis can take centre stage. It is highly recommended to keep the annexure close at hand throughout[12], to get a more lively understanding – particularly of "what happens on the ground".

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[11] From a situation where 93% of the poorest people lived in low-income countries, to a situation where the new 'bottom billion' live below the poverty line in the new middle-income countries (Sumner 2010:4).

[12] Whenever a reference mentions 'A' (e.g. table A1) this signals to the annexure.

Chapter 2 Literature review

Theory is relevant as it guides thinking and practice (Pugh 2001). This chapter accordingly presents a literature review and works towards a conceptual framework that can guide the further exploration and case study analysis presented in this thesis. The first part comprises a consideration of the physical aspects of a core house: its superstructure and its plot. Starting with a discussion on the superstructure, both the rationale of the core-housing concept (paragraph 2.1) and the rationale of the open building approach (paragraph 2.2) are reviewed. A starting point for the exploration at hand is found in common denominators in 'the particular way of seeing' identified in the discourse of Turner (e.g. 1972, 1976) – the "icon" of the people's housing process – and of Habraken (e.g. 1998) - the "icon" of the open building approach.

The attention then shifts to the household, the targeted beneficiary of the core house. After a short note on the discourse of incremental housing, the households' own motivations to consolidate a house are analysed (paragraph 2.3). A visualisation of the main elements that impact the decision to 'move while standing still' aims to further aid understanding of the trade-offs made by the household.

The plot is then analysed from its embeddedness in the socio-spatial urban system (paragraph 2.4). When considering the implementation of a plot for a low-income household, two paradigms may guide the thinking about sustainable development: 'compaction' and 'room for the future'. As the discussion will reveal, they each point in quite opposite directions. The last section of this chapter (paragraph 2.5) gives an overview of the tools and (measurable) indicators by which the consolidation process can be analysed.

2.1 The rationale of the core-housing concept

Core houses - or starter houses - are structures built with the intention of subsequently being extended and improved by residents or their direct agents. Such structures are designed to be minimal in size, level of finish and/or level of service. Rather, in their construction, layout and siting, specific provision is made for the upgrading of one or more of these aspects (Napier 1995:4 in Napier 2002:1). The core-housing approach assumes that the provision of formal services and minimal shelter will place beneficiaries on the path towards the production of adequate housing and settlements through their own investments after occupation of that housing (Napier 2002:2).

There is much variety in the process and product characteristics that emerged in the application of core-housing and therefore these should be stated as variables rather than as defining descriptors of the core-housing approach (Rapoport 1988 in Napier 2002:15). In terms of building control as Turner conveyed it (Harris 2003), core-housing can be placed in the middle of the continuum between, at one extreme of the spectrum, 'the heteronymous dweller in a mass built formal house', and on the other extreme, 'the autonomous occupant of a shack dwelling in a un-regularised informal settlement' (Napier 1993 in Napier 2002:13).

2.1.1. The origin of the core-housing concept

> *It is a pity that government authorities think of people as "millions". If you regard people as "millions" to be shoveled into various boxes like loads of gravel… always needing things done to them, you will miss the biggest opportunity to save money ever presented to you.*
>
> *For (…) give him half a chance and a man will solve his part of the housing problem – without the help of architects, contractors or planners – far better than any government authority ever can.*
>
> *Instead of one architect in an office sitting up all night to find out how many houses of each size will best fit the masses to be housed, each family will build its own house to its own requirements, and will inevitably make it into a lively work of art. Here, in each private person's longing for a house, in his eagerness to make one himself, is the alternative to the disastrous mass housing schemes of so many governments. Fathy*[13] (1976:32 cited in Stohr 2005:42-43).

The concept of core-housing came out of a particular period in history and its more comprehensive implementation took place against a moving backdrop of development thinking (Napier 2002:21). It is the emergence of a set of philosophical debates around 'self-help' in the 1950s and 1960s that brings forth the proposal and growing acceptance of the core-housing approach.

The self-help housing movement grew out of disillusionment (Stohr 2005:42). The very public failure of modernist public-housing initiatives prompted a general loss of confidence in architecture and its ability to improve lives (Stohr 2005:42). Anderson & Anderson (2007:9) conclude that architecture had lost momentum 'particularly in the realm of practical construction'. The idea at the crux of the 'self-help' movement was that homeowners had been successfully building their own homes for generations – and they had been doing it without the aid of government agencies or architects. 'Rather than pour money into government-built housing projects, why not use government funding to support and empower families to upgrade and build their own homes?' (Stohr 2005:42).

Abrams and Koenigsberger – both UN consultants - were the ones to take this concept further 'by moving from a recognition of the advantages and limitations of informal housing processes, to suggesting concrete ways in which these processes could be harnessed by the public and private sectors and, very importantly, by the international donor community' (Napier 2002:10). Essentially they were 'suggesting a direct translation of their observations of unassisted gradual construction into a set of formal alternatives that intervening agencies could employ to exploit the perceived strengths of the informal process and indeed the energies of the "vigorous, capable and organised working-class people" whom Turner had come across in his work' (Napier 2005:10).

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[13] One of the most notable early experiments in self-help-style housing was the work of Hassan Fathy in Egypt in the 1930s. Unfortunately, his experimental project did not live up to the expectations. 'Even in failure however the New Gourna experiment left a lasting legacy, not the least of which is *Architecture for the Poor* (1979), Fathy's detailed and moving account of the project and its shortcomings' (Stohr 2005:43).

Over time a variety of elemental approaches[14] emerged, one of the most interesting being the core-housing scheme. It was Abrams (1964:174-181) who first described the core-housing approach in detail. In this 'important building device in the less developed areas' (Abrams 1964:175), agencies provided a number of identical cores, typically consisting of one room that in some cases included basic services such as water and electricity. Abrams described a series of different kinds of core houses that should be designed to match the local conditions including the particularities of climate and affordability (Napier 2002:10). In the form that Abrams' conveyed it, the core would be mass-produced at scale and then user contributions would take place from that point onwards, as time and money allowed (Napier 2002:10; Stohr 2005).

2.1.2. *Realpolitik* of core-housing implementation in the 1970s

It is Turner's written work (e.g. 1967, 1972, 1976) that can be seen as 'largely responsible for persuading academics, donor agencies, government officials and professionals that the creative activities of people in (informal) housing should be seen as part of the 'solution' rather than as the major urban problem that it was perceived to be by many city officials' (Napier 2002:8; UN-Habitat 2005). Napier (2005:9) analyses Turner's impact as follows:

> Because Turner held that housing should be seen for what it *does* for people (i.e. housing as a 'verb') rather than as merely an object or product (i.e. housing as a 'noun'), the construction, or consolidation, process suddenly became more visible both to policy makers and to formal designers who had until then invariably designed impervious processes and completed structures with little consideration of how households would participate in the process of modifying the houses and plots.

The concept of subsidiarity – the idea that the lowest effective level of decision-making should be in charge – further stimulated the recognition of the efficacy and efficiency of informal settlement processes (Wakely 2010). The lowest level of decision making was then, the household.

Momentum during World Bank demonstration projects

The 1970s saw a number of significant policy shifts. 'As the concept of self-help gained momentum,' writes Stohr (2005:44), 'the poor were seen no longer as a burden but as a resource'. A powerful boost for partial provision[15] approaches came from the World Bank, as it began lending programs for urban development projects. It made an explicit effort to demonstrate that it was both financially and

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[14] A term used (e.g. by Ward 1982 in Napier 2002:10), to sum up the site-and-service schemes (originally called "land-and-utilities schemes") informal settlement upgrading and core-housing approaches.

[15] The many different types of partial housing that have emerged can be grouped into three main categories (after Napier 2002:14). 1) Houses which are habitable from the outset – they include all the main built components such as foundations, walls and roof; 2) Houses which usually require some input by residents before being habitable – they have one or more of the major built component missing; 3) Service cores- they house the wet services (water supply, sanitation, drainage, possibly also energy etc.). Combinations of these types of cores have also been built. Service cores have often been provided on site, attached or detached from the main core house. Another common form was the provision of a single habitable room or a bathroom under a larger roof structure which could then be filled in by residents.

economically feasible to provide services and shelter for the lowest income segments of society (Kessides 1997 in UN-Habitat 2005:21). The approach taken during this period concentrated on demonstration projects of limited size with the idea to later replicate them at a large scale elsewhere (UN-Habitat 2005). The demand for full-cost recovery was the fundamental base for developing other ideas and the requirement for considering replication.

Powerful agencies like the World Bank and IMF have also used elemental approaches as smokescreens for reneging upon historic state commitments to relieve poverty. As Napier (2002:1) painfully analyses: 'an investigation of the roots of the core-housing concept reveal that it was essentially a compromise which allowed governments to pull back from the provision of completed mass housing while at the same time - ironically by providing less - giving an opportunity for residents to add to and thus participate in the production of, their own housing.'

Flaws in implementation choices and discourse in the 1970s

Apart from macro-economic agenda's, there were also several flaws resulting from the way demonstration projects were implemented in the 1970's. In retrospect, critics analysed amongst others the following flaws. The emphasis on quantity above quality – resulted in homes so basic as to be almost bereft of design, lessening their value over time (i.e. see Stohr 2005:45, Napier 2002, 2005). Projects tended to be outside of municipal control and had different standards from elsewhere (i.e. see UN-Habitat 2005). Projects suffered from self-perpetuating and limitless growth of subsidies – particularly in the range of services provided by the project staff – whereby some subsidies were declared on the budget of the projects, and some were hidden (off-budget) (i.e. see UN-Habitat 2005:22). Yet exactly because the demonstration projects had different means than 'normal housing projects', they had little effect or relevance 'outside the fence' poor (i.e. see Buckley & Mayo 1989 in UN-Habitat 2005:22). The implementation moreover suffered from limits to devolved decision making and autonomy by people producing their own housing (see i.e. Burgess 1982). Participation was, in fact, extremely controlled. "Projects tended to include a bundle of services and components chosen by distant decision-makers and imposed upon the recipients, with their involvement sought only in a token participation exercise to gain their cooperation and acquiescence" (UN-Habitat 2005).

Some perceived failures at the time were inherent to the way the core-housing concept was understood in the discourse of the 1970s. Strongly ingrained in the projects of the 1970s was the concept of "sweat equity". Each of the residents would be involved in the project through adding their own physical work in building the dwellings. 'This process was guided by two main assumptions: "a reflection of the Protestant ethic[16], hard work was morally good" and, a reflection of the importance of the dominant discourse of making home as a process[17] (UN-

[16] An ethic which came into the scene primarily through Habitat for Humanity (Stohr 2005).

[17] Through the highly influential work of John Turner (e.g. 1967,1972); although he himself was highly sceptical of sites-and-services (Harris 2003).

Habitat 2005:21-22). In other words: it was intuitively expected that if someone had been part of constructing a dwelling, he or she will be 'vigilant with respect to its maintenance and will also be capable of repairing it' (UN-Habitat 2005:22). Financially the idea was that the opportunity cost of leisure time or other economic activity would replace money to pay contractors – 'just as in pre-industrial societies' (UN-Habitat 2005:22). It is a popular misconception that the potential cost savings from owner-built housing is primarily the self-help labour input, writes Turner (1978:86-87). Thus in reality, it was difficult for residents 'to fit the sweat equity mould' – and many employed local craftsmen to carry out construction tasks[18] precisely because they were in fact not really idle in the time when outside a formal occupation (i.e. see Martin 1983, Jiminez 1982 in UN-Habitat 2005). The misguided thinking that the opportunity cost of participants' time is near zero is stubborn – it still appears in the literature. For instance, when Chiquier (2009:160) writes that "Self-construction by individuals is the predominant form of {construction} finance for lower-income groups in many emerging economies" - one wonders what it is precisely that he understands with 'self-construction'.

Long-term effectiveness – in retrospect

In retrospect it becomes clear that assisted self-help is in essence an inefficient approach. The process of teaching lay-people to build their own dwellings in a way is inefficient, in that they only really master the process when they have almost finished (Tipple 1994 in UN-Habitat 2005:23). Some go on to make a living with their new skills and gaining confidence and understanding of construction and installation of services, for most however, the newly learned skills may be neglected. Indeed, perhaps dealing with authority figures is more useful in the long run. UN-Habitat (2005:23) analyses that this is counterproductive as 'it is more important to have a well-functioning cadre of small-scale contractors than to teach individuals skills that they will only use once'.

With time, even the 'lucky beneficiaries' often found themselves in housing that was unsuited to them (i.e. see UN-Habitat 2005:22). Indeed, many core house / site-and-services owners would rent or sell out their house to a better-off household, taking advantage of demand for secure tenure, and then move into another un-serviced area, leading to a process of gentrification of the housing project. Sadly, few low-income households gained full market price 'as even a relatively small capital sum represented more money than most and ever contemplated possessing, and they were easily wooed into selling themselves short' (UN-Habitat 2005:22-23). Hence it cannot be said of these households that they have exercised *a reasonable market choice* to convert housing capital gains into more flexible forms as an income generating strategy for their livelihoods.

[18] Evaluations have shown how many participants used professional building workers. For instance in a Philippines scheme only 1/5 had relied upon their own labour (Keare 1983 in UN-Habitat 2005:22), in Matero, Lusaka, 92% employed construction labour and in El Salvador about 72% of labour inputs – by value – were hired (Laquian 1983 in UN-Habitat 2005:22).

Downraiding by middle-income households has been a feature of many partial provision approaches through the decades (Pugh 2001; UN-Habitat 2005:23). In such a process, higher income groups end up occupying housing and land intended for lower-income groups resulting in gentrification of the neighbourhood. This process has been identified in cases of disproportionally good level of tenure within the city-wide land system (e.g. Payne 2002) or disproportionally good level of servicing compared to the disposable income groups of the target population, who may not be able to afford the housing in the longer term and decide to return to informal settlements (see e.g. UN-Habitat 2005; Tissington 2011).

Municipalities and utility agencies mostly inherited servicing and maintenance burdens and found that the clients had no intention of repaying the cost of fitting or the ongoing service charges. Municipal capacity was usually too small for proper tax collection and utility charges, so that such benefits were minimized. More importantly, analyses UN-Habitat (2005:23) in retrospect, "these early projects had almost no positive effect on the ability of municipalities to manage urban programmes as their staff had been bypassed in the planning, financing and implementation, which were conducted by a specially recruited team only tangentially attached to the municipal councils".

How the core-housing concept was buried in history
– and the lasting relevance of Turner's thinking

This brings us to the ironic aspect of Turner's reputation (after Harris 2003). In fact, there is a double irony. The first irony, analyses Harris (2003), is that the aspect of his argument that was most original - namely his emphasis on dwelling control - is the one that was least influential. 'This aspect has only rarely been discussed by those who have written about housing policy in the developing world, and it has not been embodied to any significant degree in the recommendations and policies of international agencies" (Harris 2003:263). The second, and related, irony is that "Turner is credited with bringing into being site-and-service projects of which he himself was, from the very beginning, quite sceptical" (Harris 2003:263). Or as Pugh (2001:411) analyses, 'a state-assisted self help method has different political and community characteristics from 'autonomous' self help which was advocated by Turner (Pugh 2001:411). The World Bank's initiative was financially important, 'but in principle nothing new,' argues Harris (2003:263), leading to the conclusion that 'social scientists have given Turner credit for a qualitative shift in policy that did not, in fact, occur'.

This analysis leads to the conclusion that the writings of Turner do continue to be of importance in thinking about the implementation of core-housing. Particularly his faith in the rationality of the poor and his argument that dwelling control by the resident allows families not only to reduce housing costs but also ensures that their dwellings will best fit their needs and circumstances.

As for the concept of core-housing, it seems to have been buried in history, not necessarily because it was completely flawed, but because it was replaced by other concepts, as trends and paradigms in thinking about housing shifted towards a more comprehensive 'whole-housing sector' approach, or even 'housing without

houses'[19]. The individual house is here not merely understood as the physical structure, but for a spectrum of integral aspects of housing, including it's embedding in the city-system. If anything, what was learnt "last time around" is how interwoven core-housing implementation is with the city-wide land- and housing system so that that even the longer-term effectiveness of a single house can not be understood in isolation.

2.2 The rationale of the Open building approach

Recently, architecture is witnessing a revitalisation of several modernist concepts where 'construction with elements or systems is considered to be the very essence of building' (Staib et al. 2008:9). A chunk of contemporary experimentation with low-cost housing as referred to in Chapter -1- seems to be inspired by the revival as well. An important break with modernism of the 20th century is the move towards an instrumental use of pre-fabrication. Staib et al. (2008) illustrate this break by writing that with their publication on Components and Systems they 'would like to pave the way for a sensible approach to the use of prefabricated elements and systems: away from a view of prefabrication as an end in itself, and seeing it more as an instrument capable of enhancing comprehensive design concepts' (Staib et al. 2008:5). The aim is to 'develop a form of building, capable of anticipating and meeting the technical, ecological and social demands that will be made upon it' (Staib et al. 2008:11).

2.2.1. Closed versus open ended design

In contemporary thinking about building systems, there is a move away from deterministic, closed systems. Modular construction is such a 'systemised approach to design' (Lawson et al. 2011:44) which offers a closed system (Staib et al. 2008:43). LEGO®, the Danish construction game, is a good illustration of the way a closed system works: a particular number of elements are pre-determined and can be organised into complete entities by combining them in a number of different ways. It is a closed system because it cannot be combined for instance with DUPLO® – the other children's construction game. In the context of housing, modular construction traditionally refers to pre-fabricated room sized volumetric units – modules - which are normally fully fitted out in manufacture and are installed on site as load bearing 'building blocks' which can be put together in a number of ways so that a handful variations for housing can be put together. When placed on a permanent foundation, these combined components are ready for immediate occupancy (Lawson et al. 2011). The limitations to the size and shape modules are determined a priori as it must be compatible with manufacturing and transportation requirements (Lawson et al. 2011).

Closed systems are now considered as incapable of leading to acceptable solutions for the demands posed to buildings. In closed systems all elements, independent of a particular building, are fabricated by a single manufacturer; 'the individual elements are coordinated and harmonised with one another and cannot simply be exchanged, altered or extended as desired' (Staib et al. 2008:42). The elements of a closed system can only be used within that particular system while

[19] Acioly, C. Jr., Chief Housing Policy UN-Habitat, lecture on 'The Housing Sector Profile' at the Institute for Housing and Development Studies (IHS), Rotterdam, April 5, 2011.

the range of design options is quite limited due to the rigidly determined function of the building parts. Hence the main focus of liberal interpretations of architecture which seeks to 'enhance the ability of a building to adapt to (ever-) changing requirements' (Schwehr 2011:16) is the open building system.

Technically, the elements of an open system can be combined as required, allowing a wide range of very different construction projects to be carried out. The concept offers the possibility of using products from different manufacturers as the open system is based upon the combination of various prefabricated building parts and not – as is the case with closed systems – allotted to a single building. When designing with an open system, the architect determines the function of the building components and selects potential manufacturers. In order to minimise assembly difficulties these elements are standardised, dimensionally coordinated and rules of classification of the elements – according to their building method - have been decided upon so it becomes possible to add, exchange and vary type standardised elements and to use them in building with different functions.

Importantly, closed systems are not off the table but instead – for example the load-bearing structure – can be coordinated with open systems. Indeed the three construction principles characteristic of system building, the frame, the panel and the room module, 'are frequently combined in the building industry and rarely appear in isolation' (Staib et al. 2008:42). Accordingly, the current application of modular construction includes a range of varieties with a mixed use of modules, panels and steel frames to create more adaptable building forms (Lawson R.M., Odgen R.G. et al. 2005 in Lawson et al. 2011). When it comes to the level of flexibility of the three principal building methods, 'the frame is the most flexible, followed by panel systems and then modular building methods, while the level of prefabrication follows the reverse order – modular units are the most highly prefabricated (Cheret, P. et al. 2000 in Staib et al. 2008:42). In order to ensure that different manufacturers employ the same dimensions, in the building industry today standardised modular dimensions are used in the manufacture of construction elements (Staib et al. 2008:42-43).

Uniform definitions and concepts are still lacking for the field of open system building (Osman & Sebake (2010), meaning that for the context of this thesis operational definitions are needed. The flexibility potential of a building is seen as an indication of long-term value retention (after Plagaro Cowee & Schwehr 2008 in Schwehr 2011). Adaptability is a key aspect of flexibility and considers 1) the materials used to manufacture a building's components, 2) the components themselves and 3) the building as an entity (after Osman & Sebake 2010). The fundamental idea under both flexibility and adaptability is open ended design.

2.2.2. Revival of modernist concepts and the surge of open building systems

Several pragmatic advantages explain the use of open building systems in contemporary construction. In a review of modular technologies, Lawson et al. (2011:44) give a useful sum-up of the primary perceived pragmatic advantages:

1. Economics of scale in manufacturing of multiple similar units.
2. Speed of installation relative to site-intensive construction.
3. Improved quality and accuracy in manufacture.

Modernist concepts that relate to these advantages accordingly experience a revitalization.

Yet, it is not merely pragmatism that stimulated the surge in the use of open building systems. Contemporary architects – at least in Europe - often identify with a paradigm that has been labelled 'eco-modernism' (after Danko 2009). In essence however, it can be understood as an ideology. These architects are often motivated by ecological concerns – be it out of their own concerns, or their clients' concerns; a combined interest that has led to experimental eco-design in which the modular concept is explored anew as well (e.g. Brouwer et al. 2009). More precisely sustainability concerns of eco-modernism refer primarily to attempts to mitigate the effects of climate change, the loss of biodiversity and depletion of natural resources. A powerful illustration of the influence of its discourse is given by the spectrum of international and national standards and codes for so-called 'green building'. In its official definition, green building (or: 'sustainable building' or 'high performance building') is 'the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction' (U.S. Environmental Protection Agency 2009).

Importantly, there is also a perceived economical benefit to the interest in mitigation. In the face of 'the mounting ecological and economical challenges facing the construction industry today' – in the wordings of Staib et al. (2008) the modular concept draws attention because 'a thoughtfully integrated system of construction can (…) logically lead toward significant reductions in energy and transportation costs; reduction in materials waste and redundant warehousing; the reusability and recyclability of building components; and massive savings of time, frustration, injury and redundancy on the job site' (Anderson & Anderson 2007:16-17). The term 'green' may be an euphemism. It is perhaps more realistic to understand the practice of 'green building' as a concern that expands and complements traditional building design concerns of economy, utility, durability, and comfort while it attempts to direct towards sustainable development – here understood primarily as mitigation.

Modernism – as an ideology - can still be recognised in contemporary systemic approaches to design. Interest is not primarily in issues of modernist style, but in fundamental concepts and imperatives in modern thought and theory: 'standardization, systemization, rationalization, material honesty, realism and technical innovation in support of social progress' (Anderson & Anderson 2007:9). Modernism is also reflected in 'the desire to bring architecture and industry closer together, and to take advantage of the resultant opportunities' (Staib et al. 2008:10). Architects are called upon to work interdisciplinary and 'take a delight in trying out something new, in experimentation' (Staib et al. 2008:11).

Thus, three motivations must be added to the reason why modernist concepts, and particularly the open building system, have witnessed a revival in recent years. These three motivations are:

1. flexibility and adaptability of an open system building
2. drive to experiment & perceived aesthetics of modernist construction

3. the possibility to combine the implementation of an open building system with climate mitigation

A meaningful assessment of the effectiveness of open building systems for housing in development countries will have to take these ideological motivations into account as well.

It is relevant to track the geographical origins of today's "standard work" on modular construction. The latest publication by Detail; Institut für Internationale Architecktur-Dokumentation on components and systems - namely Staib et al. (2008) - is illustrative herein. The prototypes that embody the latest understanding of the open building systems and modular construction, all come from either Europe (Germany, Switzerland, Austria, Denmark, Finland, The Netherlands, Belgium, France, Great Britain, Italy), North America or Japan. It is in these contexts that structures based on building systems and prefabricated production techniques are gaining in importance.

There are strong suggestions that the open building system will need a totally different approach when implemented in a rapidly urbanising context outside Europe, North America and Japan, where different challenges altogether are faced. Some of these suggestions are given by what was learnt "last time around" when prefabricated housing was promoted as a "housing solution" for low-income households in developing countries. A striking example is given by Abrams (1964). The limited success of prefab projects in Europe in the post-World war II era did not prevent the idea from being exported to the desperate housing ministries of the developing world (Stohr 2005). In Karachi, Pakistan, for instance, small aluminium prefabs were constructed which their owners soon adapted and extended with adobe, discarded wood and other makeshift building components, making them, in Abram's (1964:166) words "the first prefabricated slums". Surely, these were closed systems. Yet, for the implementation of an open building system too, careful consideration will have to be given to the factor of consolidation which is difficult - if not impossible – to control in the context of a soft state. Controlling it moreover will render the housing concept alien to the way people do housing in developing countries[20].

2.2.3. Common denominators of Turner and Habraken

A revealing outcome of the literature review of both urban development studies and architectural writing that when both are traced back to their roots, is that there are several common denominators in the discourse of the "people's housing process" and the discourse of "open building approaches" - respectively in Turner (1979 see also Harris 2003) and Habraken (1998[21] see also Osman & Königk 2009). These common denominators centre around the principles of 'users', 'building control', 'autonomy' and in seeing 'the act of building' in the light of the 'temporal dimension'.

It is relevant to dissect where the common denominators lie to justify certain fundamental understandings that are then taken into further account.

[20] For a theoretical background, see Chapter 2.

[21] I am indebted to Frederik Groos for introducing me to this publication of Habraken (1998) as well as to understanding building systems not merely as construction activity.

Habraken (1998) makes a deliberate and quite explicit choice[22] not to reference to the sources of specific ideas[23] throughout his argumentation. He does however refer twice to Turner[24] as a direct inspiration in his bibliography. The direct influence of Turners' thinking on Habraken is further confirmed when considering that Turner was one of Habraken's teachers at Massachusetts Institute of Technology (MIT) in the United States[25]. What follows is a brief outline of where the particular way of seeing of Turner and Habraken overlap and how they advanced the understanding of housing design and implementation.

Turner's influence is reflected in Habraken's discourse. The common discourse can be recognised in key terms such as 'act of building' - Turner speaks of 'housing as a verb' – and 'users' – while Turner speaks of a way of understanding residents' relationship to their house (Napier 2002). Habraken's ideas are rooted in applied research begun in the 1960s in the Netherlands with the distinction of support and infill levels (Habraken (1998:xvi). Again, Turner (1976) can be recognised in Habraken's application of the term 'autonomy' As Harris (2003) analyses it, it is the element of autonomy - which Turner (1976:11-34) defines as the issue of 'who decides' - that is fundamental to Turner's understanding of 'self-help housing'. It is on the basis of their differing 'structure[s] of authority and control' that Turner (1976:5) preferred owner-built homes, however modest, to public housing, however well built'. Turner made a bold statement for low-income *people*'s autonomy over their own consolidation process.

Habraken (1998) further elaborates on the idea of decision making as he dissects various *levels* of the building and – himself a Dutch architect – introduces the concept of *zeggenschap*[26]. The Dutch word *zeggenschap* is difficult to translate without losing part of its meaning. Osman & Königk (2009:54) possibly come closest, when they use the term 'distributed {i.e. on different levels of the built environment} decision-making in building control'. Key to understanding *zeggenschap* is the introduction of *agents* to the various levels of the building. As Habraken (1998:23) explains:

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[22] Within the discipline of anthropology for instance quite contrary to common practice.

[23] As Habraken (1998:xviii) writes: 'in this work, I do not present writing that builds on other texts, footnote by footnote, to fill in blank spots in the map of our knowledge. Rather, in looking at what is already known – the more common the example, the better- I attempt to demonstrate a particular way of seeing. Naturally, I have strived to identify the origins of specific facts utilized. (…) A select bibliography limited to writings that have directly informed the present work, stimulating and informing my thinking (sometimes by opposition), has accordingly been added'.

[24] The two publications of Turner mentioned as direct sources are: Turner (1977) *Housing by People: Towards Autonomy in Building Environments*, and Turner & Fichter (eds.) (1972) *Freedom to Build: Dweller Control of the Housing Process.* See also Bibliography of this thesis.

[25] Prof. dr. John Habraken, Expert validation, May 19, 2011, Rotterdam (The Netherlands).

[26] Prof. dr. John Habraken, *Tijd en de struktuur van het alledaagse* {time and the structure of the ordinary}, lecture at the Netherlands Architecture Institute (Naï), Rotterdam (The Netherlands), May 19, 2011.

> Although levels [of the built environment] are defined by physical parts, we equate them with the agents in control. (…) Agents operate on different levels by virtue of what they control. Agents can have quite varied social identities: they may be individuals, organisations, or institutions. Yet they are into some extent interchangeable. As long as the role is played, the game remains the same. This suggests that the form possesses a certain autonomy.

In other words: Habraken transfers the idea of autonomy to the building levels.

'Theoretically', the open building approach means that there is 'a level of the environment (referred to as the 'support' or 'base building' in terms of neighbourhoods or city structures) which is permanent, of high quality and robust, which benefits everyone. Within these supports or base buildings another level exists (referred to as the 'infill' or 'fit-out' level) that is less permanent and of varying quality' (Osman & Königk 2009:55).

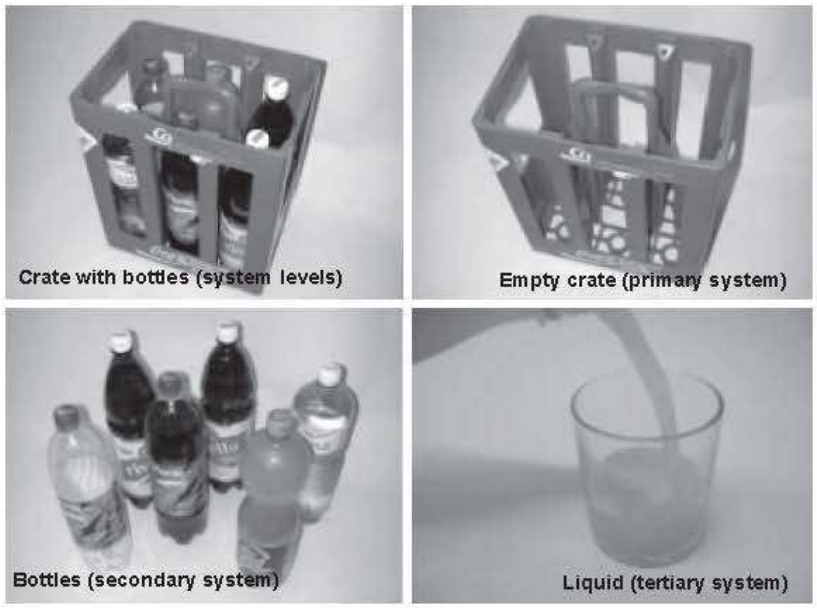

Figure 1 Visualisation of primary, secondary and tertiary systems within the built environment.
Source picture: Geiser (2006 in Osman 2010:244).

A helpful visualisation of the potential autonomy of building levels comes from comes from theoretical papers on the INO hospital concept in Bern[27] (Switserland). Using a crate with bottles to express the various levels of the system (see Figure 1). The visualisation aims to aid the understanding that is relevant to disentangle the sub-systems of a built environment into primary - the crate, secondary - the bottles, and tertiary - the liquid - systems, 'so that change in one part can happen without disrupting the others' (Osman & Königk 2009:54). Like within a crate with bottles, 'open building maintains that housing should be adaptable within a stable and robust structure, a structure that gives an environment its character and identity within which there exists another level that changes over time and that allows for participation' (Osman & Königk 2009:55).

[27] See also: http://www.dgies.min-saude.pt/recursos/seminariocrh/Relatorios/INO_Report.pdf [Accessed October 9, 2011].

What Habraken (1998) adds to the understanding of implementation of housing is that various agents can play *various roles* in various levels of the house design. 'The concept of levels is of prime importance,' writes Habraken (1998:23), 'because it provides a way to discuss environmental organization in concrete ways, presenting a real and observable structure within which transformation occurs predictably'. Continuing to argue that: 'this should not be confused with a simple building structure, it is a way of organising complex relationships in the built environment' (Habraken 1998:7). Thus understood, the open building approach 'is about understanding the environment in terms of levels with different agents acting at each level; and it is about the organisation of this inherent complexity.' (Osman & Königk 2009:54). Building control is explained by Habraken (1998:8) as the ability to transform some part of that built environment and it is herein that Habraken introduces *agents* – including the users of the building.

Habraken also further explicated the role of time. Indeed, the very term 'open building approach' can be traced back to the approach given by Habraken (1998:55), stating that the built environment has always been an 'open' environment in the sense that it has allowed for continued transformation over time within more permanent structures, and adding that 'this has led some to perceive modernism as a regressive movement'. Habraken (1998:xvi) himself explains that 'it is the early experimentation in the Netherlands in the 1960s that 'led to development of tools for a new design approach which would be based on 'inevitable change over time'. In the 'particular way of seeing' (Habraken 1998:xviii) which resulted from this experimentation, the focus is shifted from housing and architecture, to the 'built environment' within which 'ordinary growth processes' that have been 'innate and self-sustaining' for centuries take place (Habraken 1998:3). Turner is echoed once more when Habraken (1998:27) in-between-lines mentions the developing world: '*Barriadas* and *favelas* throughout the developing world daily witness a mass attempt by the disenfranchised to force entry into the game, to become players with control over their own configurations on their appropriate level'. Habraken (1998:27) then comes back to his argument of 'decision-making', stating that: 'Such struggle must not be minimized. The lot of those who are entirely left out of the game is real and hard enough: not to be a player at all is intolerable'.

2.2.4. Application of the principle of *zeggenschap* to low-income housing

As the exploration focuses on rapidly urbanising contexts, it would be particularly relevant to be able to integrate thoughts and writings of experts and practitioners who have an inside-knowledge of these contexts. An influential translation of Habraken's *zeggenschap* to low-income housing was found in the writings of Osman, Senior Lecturer in Architecture at the University of Pretoria (South Africa). Osman's work integrates "time" as a key factor in design and technical decision-making (see e.g. Osman & Sebake 2010). Her thinking is rooted in the discourse of 'Time-Based Architecture (TBA)'or '4 Dimensional Design (4D design)' which refer to 'a design attitude to conceive 'objects' from a long term vision, therefore integrating the fourth dimension, i.e. time, in the initial design phase' (Paduart et al 2006:2 in Osman & Sebake 2010:237). Moreover, Osman is not only focusing on experimentation with middle class housing, but also consciously reflects on low-income housing implementation and the inclusion of

locally available skills and materials (see e.g. Osman & Königk 2009). Considering that incremental housing has an inherent temporal dimension, and has many linkages to the informal economy of material and skills, Osmans' writings are considered of particular relevance for the further analysis in this thesis.

Importantly, the application of *zeggenschap* did not remain confined to experimentation, but is being taken into implementation on a pilot scale as well. An influential example[28] is that of the Chilean architect Alejandro Aravena and the project of his bureau: "Elemental" (see picture A1). The Elemental architects call themselves a DO-TANK[29], referring to the idea of 'learning by doing'. Their social housing project combines the idea of decision-making building control over extensions - infill – at the household level with a collective support system[30] - not only represented in the building but also in the settlement layout. The concept is as much about open-ended design as it is about an attempt to introduce more dense low-income housing projects based on thoughtful settlement layout. The reason the project stands out is that it is still targeting lower-income households[31] as it goes to some scale, to illustrate: the project implemented in Chile in 2004 involved the 'absorption of a shantytown for 100 families' (Contal & Revedin 2009:116). Only time can prove whether the concept is indeed an effective form of core-housing and many are following this development. The following section explores the process of incremental housing from the point of view not of the building, but of the users. What happens to the house after occupation?

2.3 Incremental housing and consolidation of a core house

Incremental construction and expansion of houses is a process in which homes are built or expanded over time by residents themselves – either in informal or in formal settlements. In the context core-housing it refers to the period after occupation, when residents progressively consolidate the initially provided superstructure – the core - into a more full and adequate house.

A note on discourse

Incremental development in informal settlements used to be the field of interest of urban development practitioners and anthropologists (e.g. Fathy 1976; Turner 1965, 1972, 1976; Abrams 1964 – and more recently Seabrook 1996; Payne 2001; Green & Rojas 2008). From within the field of architecture[32], it was mainly the

[28] The Elemental project implemented in Mexico, recently won the world largest monetary prize for design, the INDEX Award 2011, which focuses on designs that target and solve the challenges and problems of human life.

[29] Elemental Chile. See: http://www.elementalchile.cl/ [Accessed: September 25, 2011].

[30] I am indebted to Frederik Groos for introducing me to Elemental Chile and seeing it with a fresh perspective, as experimentation that leads to advanced understandings of housing concepts.

[31] Although possibly not as poor as the households identified in the case study of this thesis, focusing more on the lower bands of middle-income households.

[32] OHIA was founded in 1976 from within the Dutch Stichting Architecten Research (SAR, Foundation of Architects Research). By 2011, the OHI is an association incorporating ten institutes worldwide, while its quarterly magazine has a 'small but solid' group of subscribers of around 400.

Open House International Association (OHIA) which served as a platform for innovative thinking on the built environment and alternatives to mass housing. The journal *Open House International* has not gone to scale however, so that it has not "gone mainstream".

With the break of the 21st century – the "age of the city"[33]- nevertheless it seems that the incremental way in which people in informal settlements go about "doing housing" (after Turner 1972) has also caught the attention of mainstream architects[34] and the public. One example is the so-called 'activist architecture' of the *Urban Think Tank,* which was founded by an Austrian and a Venezuela-born American and conducts research in Caracas, Venezuela[35]. Apart from its humanitarian concerns, the *Urban Think Tank* in its own words 'attempts find a discourse on architecture, urbanism and culture that is suited the contemporary city of the developing world' (Brillembourg et al. 2005:20). 'From a theoretical standpoint,' they write (ibid. 2005:43), 'the 'informal' can serve as a laboratory for the study of adaptation and innovation; from a design point of view, informality is a condition of complex, non-linear systems in which patterns overlap, intersect, and mutate in unexpected ways.'

Due to this broad interest in incremental housing, by now, as Napier (2002:54) writes, there is 'a plethora of descriptions for home modification'. The word 'consolidation' comes from the study of how shack houses, normally located in squatter settlements, are developed into more permanent and extensive homes – for example in the work of Turner (1965, 1968) and Abrams (e.g. 1964). Following Turner - and with him Napier (2002) - this thesis uses the term 'consolidation' to refer to the investment of residents themselves in the improvement of their core houses. The term is useful exactly because it allows for wider application and does not limit itself to one type of adjustment. Instead it draws attention to the various ways in which residents put effort in enhancing the adequacy and liveability of the initially provided core, adjusting it to their own needs and preferences.

One form of consolidation, namely extending (i.e. adding usable space) is particularly inherent to the core-housing concept. The reason being that the initially provided superstructure is so small – a compromise - that it almost certainly implies housing. It is for that reason that a disproportional accuracy of the attention in the analysis of the consolidation process by 'users' goes to extending.

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[33] After VPRO, available: http://eeuwvandestad.nl/ [Accessed October 29, 2011].

[34] In 1991 Tipple (1991:6) writes that 'there is a small but growing body of literature on the phenomenon of transformation'. However, these writings seem to be confined to 'mainly (..) architectural journals' (ibid. 1991:6) of which Tipple himself only mentions the *Open House International* published (then). In his own work Tipple (1991) mostly reviews the stock of dissertations and course work carried out within this centre within the University of Newcastle-upon-Tyne in the United Kingdom.

[35] In the autumn of 2010 Brillembourg and Klumpner were given the stage at the Netherlands Architecture Institute (NAï) to share their views in a public lecture, November 11, 2010, Rotterdam (The Netherlands).

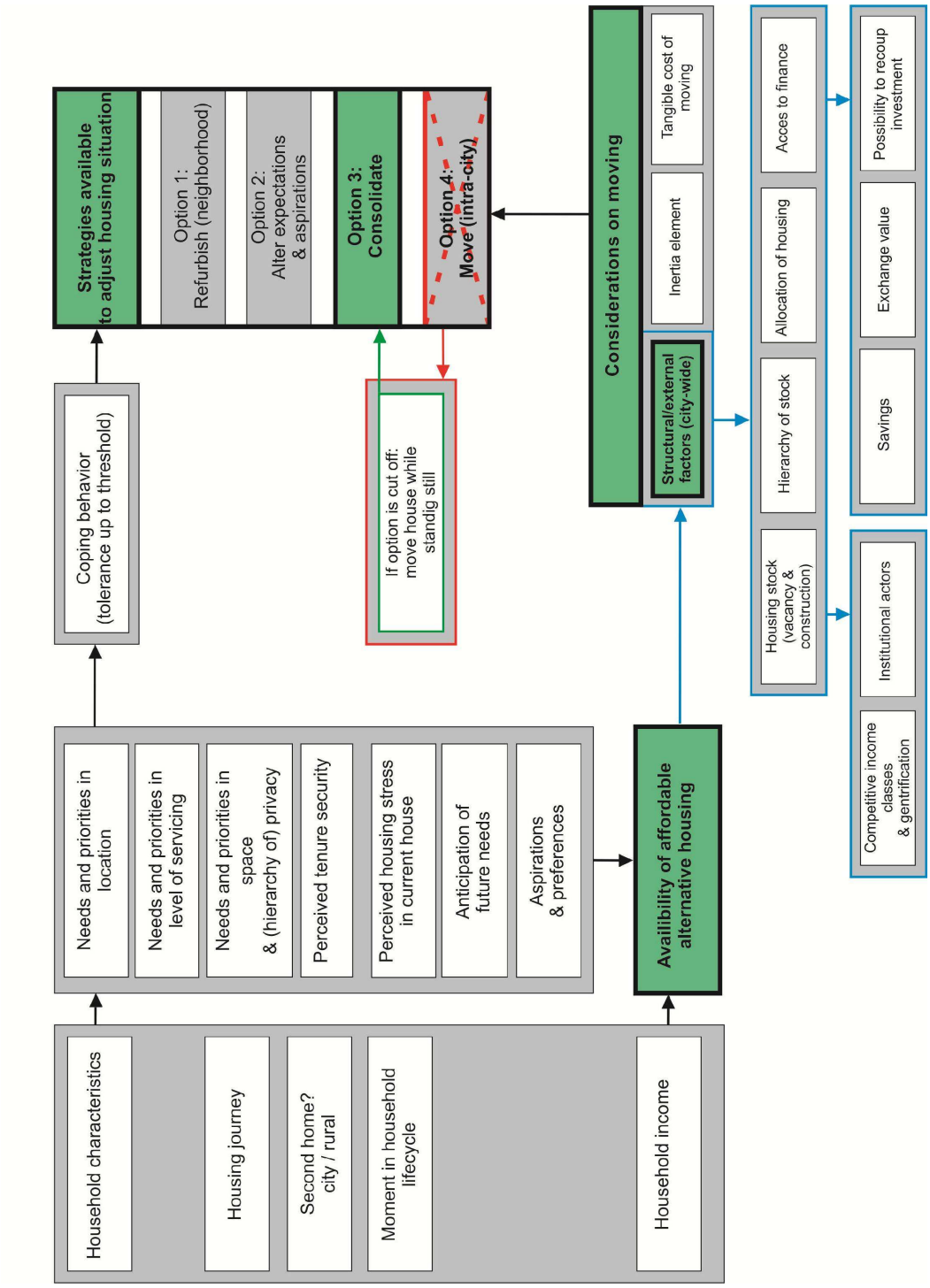
2.3.1. Motivations to consolidate

To enhance understanding of the way relevant factors operate and influence a households' motivation to opt for consolidation, their relationship has been visualised. The model (see Model 1) presented here, reflects the most important hypotheses and interrelationships presented in theory and practitioner writings across disciplines[36]. An elaboration of the model can be found in the annex (Annex 10). Below, the most crucial understandings deriving from the visualisation are briefly highlighted, focusing on those elements that have been found particularly relevant for the case study analysis.

To start with, a 'household' as understood in this thesis, is based on the arrangements made by people – individually or in groups – for providing themselves with food or other essentials for living (UN-Habitat 2011:190). Such a household may be either: 1) a one-person household or 2) a multi-person household. In this broad interpretation, the latter category may constitute of related or unrelated persons - or a mixture of the two – who pool their incomes and may, to a greater or lesser extent, have a common budget. Especially relevant is the understanding that one housing unit is not automatically home to one household; the housing unit may also be occupied by more than one household or by a part of a household (UN-Habitat 2011:190). The latter is especially relevant within the context of this research, whereby the unit of analysis is not only the core house but also – importantly – the plot.

What causes housing stress? Housing stress is a gap between current levels consumption of housing and the demands and preferences of the occupiers. As it is relatively difficult for low-income households to change housing, the gap will grow gradually but with increasing intensity over time (Tipple 2000:23-24). The model shows there is a plethora of factors involved. Perceived housing stress varies from household to household. Michelson (1977) conceptualised the idea of 'coping behaviour' to explain how households will vary in their threshold of housing stress, as 'the point at which some action is taken to relieve rather than continue to tolerate it' (Tipple 2000:24). To be meaningful and useful for analysis and action to relieve housing problems, people's housing needs must always be stated in terms of *priorities* (Turner 1976: 96-97). Turner's fieldwork proves that there is an enormous local and personal variety of housing priorities which affect trade-offs. Indeed, household coping strategies may not be as easy to generalize as is often assumed. Instead, as Napier (2002:342) advocates 'housing adjustment studies need to redefine the basic concepts of theories and hypothesis for each context or locality study'. Turner (1976:96-97) goes even a step further and points out that it is actually only at the individual household level that housing demand can really be understood – and only best by that specific household itself.

[36] Housing Adjustment studies are combined with (former so-called) Third World Mobility studies, Informal Settlement Consolidation studies, while also including other disciplines such as Housing Finance, Urban Development and Management Studies and the field of Architecture.



Model 1 Why consolidate? A model of low-income households' motivations to opt for consolidation.
Visualisation[37] by author and Beudeker.

[37] Model based on the most important hypotheses and interrelationships presented across theory and practitioner writings, including: Turner (1972, 1976), Blauw (1991), Tipple (1991, 2000), Davidson & Payne (2000), Baharoglu & Lindsfield (2000), Bronchart (2000), Napier (2002), Payne (2000), Thorns (2002), Daphins & Faulhaber (2004),UN-Habitat (2005), Hoek-Smit (2009), Tissington (2011). For further explanation see Annex 10 and Glossary.

Many of the assumptions about mobility that have been developed in cities of Western Europe and the U.S.A. are not transferable to cities in developing countries[38] (Napier 2002:52). In well-developed housing markets households who wish to adjust their housing situation throughout their lifecycle have the option of either moving or improving. The choice between moving or improving to relief housing stress - or a combination of both – will depend on the balance of costs and benefits associated with each alternative (Seek 1983 in Tipple 2000:23). More often than not, the situation in developing countries is a different reality altogether: formal housing shortages are extreme, personal choice is much more limited by resource constraints and the types of strategic intervention such as new State housing production are very limited. As Napier (2002:338) concludes, the arguments made in Conventional Studies[39] are 'very constrained in the light of the complexity of decision making in real situations and in the face of the alternatives to moving, which are not considered'. Therefore, argues Napier (2002:52), it is clear that a much wider set of options needs to be considered to extend the models usefully, to explain behaviour in the urban contexts of the developing world.

As the model shows, many external structural factors may close off the option to move for a low-income household altogether. Indeed, the availability of affordable housing options for low-income households – as well as the whole issue of housing demand - can only be understood from the perspective of the city-system as a whole (Payne 2002; Davidson & Payne 2000). From this perspective, option 2 – altering the house - is often the only option of low-income households, and can be likened to 'moving house while standing still' (Gosling et al. 1993 in Tipple 2000:25). This reinforces the idea that the decision to extend is likely to be explained in the same terms as residential mobility'. In other words: in cases of low or absent mobility the housing stress experienced by households is *absorbed within the location* (Gilbert 1999 in Napier 2002:340), meaning that if resident's cannot geographically move, they can at least attempt to upgrade their housing conditions in the very location they are now. An important difference between consolidation and mobility is that a change of location can increase access to the opportunity to fulfil aspirations and preferences. 'Modifiers can only attempt to bring opportunities nearer to themselves' (Napier 2002:342). The benefits derived from relatively costly consolidated can be increased by long residence: 'the use-value of the work done' (Tipple 2000:46).

Even so, finely tuned demand-based models of housing adjustment evolved for (former so-called) First World cities will mean little in contexts of extreme housing shortage (Napier 2002:341). Rather than looking purely at the household unit and their needs and aspirations, one needs to take a wider view of what is available on the supply side (Edwards 1983 in Napier 2002). Moreover, as Edwards (1983 in Napier 2002:341) demonstrates, people respond rationally to the opportunities presented by the housing market. Households may seize an

[38] For a broad brushed questioning of this term see Chapter 1.

[39] The word 'conventional' has been introduced here to signal a distinction between these first world mobility studies and more contemporary urban development studies that show explicit awareness of the regional, national and international context of a city and its internal dynamics (e.g. Van de Berg 1999, Alderson & Beckfield 2004; Sumner 2010).

opportunity for fulfilling a housing demand in an era where there is a sudden availability of such an opportunity – if this is normally suppressed. This means that even before the threshold of a household's coping behaviour has been reached, household members may 'seize the moment', if opportunities appear. Particularly so in situations of sever housing shortage or lack of access to land.

2.4 Socio-spatial embedding in the urban system

The effectiveness of a core house cannot be considered in a vacuum, ignoring its physical characteristics. Physically speaking, a house has two components: 'the constructed physical fabric of the house and the land on which it is built' (Moser 1987 in Oktay et al. 2010:27). Inherent to the core-housing concept, which requires progressive realisation of adequate housing by physically extending the core – is that not just the superstructure but also the plot alike is a key spatial component of the core-housing concept. As Dewar (1991:11) argued in his 'Manifesto for Change' with respect to South African Cities – in particular the Greater Cape Town, 'the emphasis on physical development should not be misinterpreted to imply that a-spatial issues and actions are not of great importance in the urban management process or that issues of physical development can be pursued in isolation from the prevailing political and economic dynamics of the specific context in question; it simply reflects a realization that the way in which physical development is managed significantly affects the lives, and indeed the life chances, of urban dwellers'. There is a mutual and dynamic relationship between the plot and its embedding in the socio-spatial urban system. Indeed, the idea of a 'system' is at the crux of contemporary paradigms on sustainable urban development.

Urbanisation is considered to be a defining phenomenon of the 21st century (see e.g. World Bank 2009a, b). No longer regarded as a problem for development that must be contained, urbanisation is now seen as a contribution to economic development – which must however be *guided* in order to be sustainable (see e.g. Jenks 2000; OECD 2008; Satterthwaite 2009). The word 'guidance' is key here since it refers to a different perception of reality which is dynamic and complex and thus can never be fully understood. Instead of trying to control reality – which is considered impossible – new understandings of governance attempt to influence the direction and the speed of the complex dynamic processes towards a systematic shift or transition (see e.g. Van der Brugge et al. 2005; Rotmans & Loorbach 2006; Loorbach 2010). 'Like all systems, the World Bank (2009b:6) argues, 'a city depends on the smooth functioning of its constituent elements'.

Likewise, in the study of the initially provided core house and its plot, as Davidson & Payne (2009:x) state in their approach to urban planning 'the nature of the housing system must be understood' within a certain locality. With 'housing system' Davidson & Payne (2009:x) refer to 'all the complex interrelationships between peoples, needs, market values, construction industry capacity, legal framework, the existing forms of housing supply etc.' In order to know in which direction to guide the implementation of the plot, its interaction with the urban systems must be analysed. Two key issues are at the heart of the debate on the socio-spatial aspects of the city: efficient land use and coexistence.

2.4.2. Embedding in the house- and land system: coexistence?

Equity continues to be at the forefront of the sustainable development discourse, with a key concern for coexistence of various income groups within the city and focusing particularly on inclusion of the poor. An emphasis on *process* makes it possible to restructure analysis away from the question of how many are excluded (a focus on absolute numbers) to the *reasons* for this situation (Anderson 2001 in Thorns 2002:151). Brand (1998 in Thorns 2002:151) draws attention to the fact that social exclusion 'is not a state but rather entails a process whereby people experience a progressive loss of their identity and involvement with the wider society'. Social exclusion thus understood is 'the process by which certain individuals are denied access to positions and resources to live a fully participative life' (Thorns 2002:152).

Coexistence inherently impacts the sustainability of a city's urbanisation as it relates to competing claims of economic growth and social equity. Extreme wealth and bitter poverty are often found side by side in cities worldwide – with an even more stark contrast in metropolises. A situation of stark contrasts however breeds serious social tension. An unbalanced, market-oriented policy may even sow the seeds of a new and serious urban decline (Berg 1999). As Hall and Pfeiffer (2000 in Berg et al. 2004:8) put it: 'a city that prospers economically but fails to distribute the wealth with some degree of equity runs the clear risk that it disintegrates into civil war between the haves and have-nots, a war in which both sides are losers'. The challenge will not simply be to redistribute money from the rich to the poor, but rather 'reinstating them (the socially excluded) into the mainstream social fabric'. Indeed Sumner (2010:4) calls for a new development narrative, 'a post-Millennium Development Goals narrative' which addresses (among others): 1) a focus on poor people rather than on poor countries (after all it is no longer even these countries where inequality is most urgent[40]), and 2) a greater focus on equity and *shared prosperity*.

Inequality is often spatially entrenched within a city, with an uneven nature of the resource distribution and the separation of wealthier and poorer areas (Thorns 2002:157). Such a situation is the opposite of coexistence. One very significant aspect of spatial separateness, analyses Thorns (2002:157), is that of how the 'boundaries' between areas are formed and maintained. The work of Marcuse (see e.g. 1997[41]) is of value to understand the physical boundaries between neighbourhoods. Marcuse describes 'a city of distinctive subareas, socially separated through the action of inclusion and exclusion by powerful social groups and actors' (Thorns 2002:157). 'Boundaries around areas can be further reinforced through planning regulations, building restrictions and zoning practices' (Huxley 1994, Luymes 1997 in Thorns 2002:158).

The surrounding land- and housing system is crucial in determining processes of voluntary and involuntary exclusion. A powerful illustration is that of gentrification within a certain neighbourhood whereby plots (and houses) are down raided by households with (slightly) higher incomes (see e.g. Payne 2002). This is further exacerbated by processes of exodus of those who start to earn better

[40] See Chapter 1.3.

[41] Also earlier work: Marcuse (1989, 1995).

incomes and aspire for more consumptive lifestyles, leaving behind an even more impoverished area (see e.g. Marcuse 1997). Both 'downraiding' and 'exodus' lead to the suggestion that housing targeting low-income households must be tailored for their priorities and affordability levels – but so must ideally the availability of tailored housing for those whose incomes start to go up and whose lifestyle aspirations and consumption levels change (see e.g. Satterthwaite 2009). The challenge of core-housing implementation would then be to allow for variety and inclusionary access. Fundamental – literally too – to both variety and inclusion is land.

2.4.1. Two spatial paradigms

Efficient use of land in particular is a complex part of the debate on sustainable urban development (Jenks & Burgess 2000). The current debate on sustainable spatial development of the city is centred on two paradigms: the dominant discourse of compaction (i.e. see Jenks & Burgess eds. 2000) – i.e. fighting urban sprawl - and the alternative paradigm which has been recently introduced to the debate on sustainable use of land, and is coined by Angel (2011:2) as the 'making room paradigm'. The alternative paradigm is grounded in the conviction that 'containment' is not appropriate in rapidly urbanising countries where most growth is now taking place (Angel 2011). The conviction is that in such contexts a more realistic strategy is at least minimal *preparation* for sustainable growth and expansion of cities – rather than to constrict and contain them (Angel 2011:57). The implications of applying each of these paradigms to the spatial characteristic of the core house, the plot, guide to quite opposite directions for 'sustainable development'.

2.4.2.1. Prevailing spatial paradigm - A case for compaction

The theory and practice of urban planning is – like many other disciplines – now globalised and thus the dominant paradigm defines the discourse of the debate on sustainable land-use. Therefore, among various platforms and at various levels the prevailing paradigm guiding the planning of cities and metropolitan areas the world over is that of 'efficient land-use', 'compaction' and 'containment'[42] (Angel 2011:4; Jenks & Burgess eds. 2000).

In contrast to the earlier environmentalism of the Garden City and Regional Planning Movements within modernism[43], the principal preoccupation of ideas for compact cities from the late 1980s onwards are largely propelled by the search for global sustainability goals on climatic change and resource use (Burgess 2000). Secondly, there is a recognition of a global rational; derived from the realities of rapid globalization and the "totalisation" of environmental problems, urban architectural, planning and design practice need to be "green and global" (i.e. see Burgess 2000). Advocates mention, among others, the following arguments: a lock-up in the degradation of the living environment due to continuing sprawl due to increased mobility (see e.g. UN-Habitat 2008; Dewar

[42] At the global level (e.g. World Bank 2009 for cities in industrial and developing countries alike), at the regional level (e.g. UN-Habitat 2008 for Southern Africa), and at the very local city level (e.g. Dewar 1991 for Cape Town).

[43] Burgess (2000:10) mentions Howard (1898), Geddes (1968) and Mumford (1938) as examples of these schools of thought.

2000), significant loss of quality of agricultural and natural land (see e.g. Dewar & Uytenbogaardt 1991; Dewar 2000; UN-Habitat 2008; Richardson et al. 2000), as well as resource conservation (particularly fossil-fuelled energy) and waste-mineralization (particularly carbon emissions into the global atmospheric sink) (Burgess 2009).

Unsustainable urban development is more than just a matter of waste of resources; the paradigm therefore evolved to a more holistic approach which includes several crucial economic, social, cultural and political justifications for compact city initiatives and different and often contradictory policies. Burgess (2000:9) gives the following definition of such a more holistic contemporary compact city approaches: '{a compact city approach means} to increase built area and residential population densities; to intensify urban economic, social and cultural activities and to manipulate urban size, form and structure and settlement systems in pursuit of the environmental, social and global sustainability benefits derived from the concentration of urban functions'. The discourse of "sprawl" is of particular interest to the exploration in this thesis, as it considers plot sizes as possibly problematic. A useful conceptual definition of sprawl is given by Galster et al. (2001:685 in Gren 2006:4) as: 'a condition of land use that is represented by low values of one or more of the following dimensions: 'density, continuity, concentration, clustering, centrality, nuclearity, mixed uses, and proximity'. The conceptualisation is useful because it quickly indicates what is considered as more sustainable use of land within the city – namely the opposite.

The model of the compact city – e.g. anti-sprawl, pro densification - is not only stimulated by sustainability concerns, but also by the fact that local governments lack resources and means to cope with increasing public expenditures, including the demand to foster sustainable urban development (Acioly & Davidson 1996). The assumed benefits gained from economy of scale and concentration of population – for instance through mid-rise and high-rise residential buildings - have therefore further promoted the compact city model, stimulating the densification and verticalisation of low-income settlements as well.

2.4.1.2. Alternative spatial paradigm - room for the future

Given the strong promotion by many planners of compact city strategies in the West, and given the evidence that shows that developing country cities are more compact, an obvious result is that protagonists of compact city approach often take city compactness in developing countries as "best practice". An example comes from Drakakis-Smith (1996 in Richardson et al. 2000), who argues that developing country cities have exhibited such a strong absorptive capacity in terms of population, that they demonstrate their dense cities are indeed sustainable both now and in the long run; although sustainable must here mostly be understood as 'coping' (see Richardson et al., 2000:33).

There is nevertheless a growing awareness that spatial containment strategy cannot simply be transplanted from one city to another. In one city containment may be sensible because population growth has slowed and densities are too low to sustain public transport (Angel 2011:3) – yet in another city it may be completely inappropriate or even contra-effective (see e.g. Jenks 2000; Angel 2011). Angel (2011:52) argues that 'a clear distinction must be made between

urbanized and urbanizing countries'. In cities which may grow exponentially, the prime focus should be on *preparedness*, as Taleb (2007:208-211 in Angel 2011:59) argues: 'invest in preparedness, not in prediction… the probabilities of very rare events are not computable… We can have a clear idea of the consequences of an event, even if we do not know how likely it is to occur… All you have to do is mitigate the consequences'.

Angel (2011:5) makes a strong case for the decision on whether to contain cities or make room for their expansion 'must be based on a careful assessment of the empirical evidence, not on ideological positions that may turn out to be unrealistic'. In their publication various considerations are given for how to carefully assess the needs of a specific city and better prepare for what the temporal dimension may throw at the city. In direct translation to this thesis, balancing 'containment' with 'room for the future' does not only apply to the meso-level, but also to the micro-level: the plot. Thereby particular attention goes to the argument that densification can be best achieved by reducing the permitted maximum plot size in low-income settlements at the periphery. It is an argument that 'has to be treated with caution' (Burgess 2000).

2.4.1.3. Land-use and density indicators must be treated with caution

Urban designers routinely use population density as a reference for decisions taken at the level of plot size (Acioly & Davidson 1996). Densities are used to express specific qualities and development potentials of the site; they are key issues for technical and financial assessment of the distribution and consumption of land, infrastructure and public services in residential areas. Before densities can be determined, a balance must first be struck between various types of uses for the site available for the housing development project. These types of uses include residential use, public space (traffic, streets, pedestrian pathways, parking areas etc.) and semi-public spaces (schools, playgrounds, public facilities, recreational spaces) (Davidson & Payne 2000). Once the trade-off between public and private domains has been made it is possible to start calculations on prospected densities. The assumption is that high density assures the maximization of investment, including infrastructure, services and transportation – and allows efficient utilization of land. Assuming that there are benefits derived from a concentration of people and activities efficient utilization of land may guarantee high rates of return and efficient revenue generation (Davidson & Payne 2000).

Such figures on overall plot densities are however likely to hide the widely different population densities on each plot; these individual-plot densities depend on the type and intensity of development on the plot. Moreover, low-residential densities of many low-income settlements are deceptive since plots seldom involve single-nucleus family habitations and densities increase over time. The squatting, self-help and progressive development procedure consists of a slow (15-20 years) process of consolidation and densification that is finely tuned to changes in household income and space requirements (Burgess 2000:18). Most developing countries find themselves in an early demographic transition phase. Overall, the rate of household formation in developing countries is high because of high rates of natural increase and due to rural to urban migration. Families are large – even with falling average family sizes; the number of single-parent households is high – particularly among the poor; the number of young people of

childbearing age is high; and the numbers of the old are low (Burgess 2000). The caution needed in rapidly urbanising context, can be further illustrated by a closer look at the indicators commonly used to measure the efficiency of land-use.

Common residential density indicators

Residential densities are generally expressed as population or number of dwellings per unit of land. The most visible aspects of the latter – dwellings per unit of land - at the plot level are plot coverage and floor area ratio. Plot coverage is the proportion of the total plot area occupied by buildings (Davidson & Payne 1996). This measure indicates the amount of open space that is left on a specific plot or area of land (Forsyth 2003 in Gren 2006). Its value is commonly expressed as a percentage which represents the ground floor of the building divided by the plot size. The "footprint" of a building (Forsyth[44] 2003 in Gren 2006:17) defines the ground floor of a building. It would however be wrong to equate high footprint with efficient land development as the indicator fails to incorporate the efficiency of verticalisation. For this reason, FAR may be a more relevant indicator of density. Floor Area Ratio (FAR) gives an indication of the height of the building in relation to the plot size (Davidson & Payne 1996). Its value is commonly expressed as a decimal fraction which represents the total floor area - on all levels of the building, including thickness of walls - divided by the plot size. Thus, verticalisation too is seen as a powerful form of densification – allowing more people per plot (e.g. Acioly & Davidson 1996).

Limitations of plot coverage and FAR

For various reasons it is however problematic to use plot coverage and FAR as indicators for the intensity of the use of the plot by low-income households. Plot coverage hides the intensity of use of the land apart from the superstructure (e.g. the non-visible). Schoonraad (2000) draws attention to the key difference between the African city and the European city: in the African city there is a lack of correlation between built form and physical appearance, activity and use. A failure to recognise that low-income areas are actually more sustainable and compact than other parts of the city, argues Schoonraad (2000:223), 'derives from the attempt to evaluate them in terms of built form an not in terms of actual *use*'. Building density and house type[45] in African cities have little to do with occupational density and activity because of the informal and temporary character of many of the structures and activities. Indeed, observes Schoonraad (2000:223), in South Africa ´the initial planning of relatively large lots, accommodating mono-functional single-family units, does not reflect the way they are used nor the densities that develop over time´. Schoonraad's observation to a large extent equally applies to the case study of this thesis, as will become clear as the analysis unfolds.

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[44] Gren (2006) here refers to: Forsyth, A. (2003), Measuring Density: Working Definitions for Residential Density and Building Intensity. *Design Brief, Number 8/July.* University of Minnesota, Design Center for American Urban Landscape, Minnesota (U.S.).

[45] The analysis of house types is a systematic way of studying the design of residential buildings by considering a limited number of factors implicated (Lawrence 1994 in Gren 2006:13). This classificatory tool offers the possibility of using type as a means of analysis and to present and compare the key features in a standardized manner (Gren 2006:13). Each type can have multiple varieties.

Activity intensification as more meaningful, but not measurable indicator
Likewise, FAR will fail to express the intensity of use of the land (apart from the superstructure) by a low-income household just as much as it will fail to express the unsustainability of low-density urban development related to underutilized plot sizes such as by middle- and higher income groups (e.g. Schoonraad 2000). The concept of 'activity intensification', as introduced by Williams et al.[46] (1996:84 in Zillmann 2000:203) may be more meaningful as it refers to a broader set of utilization, here defined as: 'increased use of existing buildings or sites; changes of use which lead to an increase in activity; and increases in the numbers of people living in, working in, or travelling through an area'. A drawback of the concept is that it has no measurement to indicate its value, and cannot be used as a quick reference in planning (Zillman 2000). In the end, the experts on optimalisation of the plot-use are the users themselves – the residents. Even though to them, the bottom-line of all housing considerations, is not so much efficiency, but affordability.

2.5. Tools and indicators for analysing a consolidation process

Based on the literature review thus far, what follows is a discussion of tools and indicators that are relevant to the discussion of the consolidation process of core-housing projects. There is no pretention that the operationalisation into (measurable) indicators for the sake of case study analysis is complete. To the contrary, it is more like a work in progress that is inherent to the exploratory nature of this thesis. All are operational terms (i.e. pragmatic simplifications).

2.5.1. Temporal dimension

Trends: The term 'trend' is introduced to indicate a possible direction in which the consolidation process of the core-housings and their plots are developing – in other words: as an expression of the impact of the temporal dimension. The term 'trend' intends to stress the fact that any patterns observed can by no means be generalised into a general tendency. This is important in the case of small samples which have not been randomly selected as they reflect more qualitative considerations. Trends identified may be an interesting entry for further detailed studies.

2.5.2. 'Ways of seeing' the built environment

When it comes to the superstructures on the plot and their relation to the initially provided core several concepts may aid the 'way of seeing' the built environment based on the common denominators found in the discourse of Turner (e.g. 1972, 1976) and of Habraken (e.g. 1998) (see Chapter 2.2). The principles that aid 'seeing' are: "users" (e.g. the dwellers or residents of the superstructures), "building control", "autonomy" (e.g. the issue of ''who decides''), and seeing' the "act of building" in the light of the "temporal dimension", as well as the principle of "zeggenschap".

Zeggenschap: Particularly relevant to the exploration of the potential of open building approaches is the principle of *zeggenschap:* distributed decision making

[46] Zillmann here refers to: Williams, K., Burton, E. & M. Jenks (1996) 'Achieving the compact city through intensification'. In: Jenks, M., Burton, E. & K. Williams (eds.) (1996) *The Compact City? A Sustainable Urban Form?* E&FN Spon, London (U.K.).

in building control. Hereby an attempt is made to "dissect" various levels of the built environment – including the residential building - into primary, secondary and tertiary systems, and to identify the *agents* that have building control over these levels and the roles that they play.

2.5.3. Affordability of extending

Relative measures of income levels: As Napier (2002:129) finds in his case study average incomes are not all that useful when clearly still households are living in situations of poverty. Napier (2002) argues that *relative* measures to other settlements at the time may be more relevant.

Predictability and stability of pooled income: To give an indication of the affordability levels at the household level in this thesis it is opted to work with a rough indicator of the pooled income per main household based on its predictability per month. Such income may come from formal, informal jobs (if any). The predictability and stability of money flows coming in is considered to be of direct relevance to the possibilities of a household to plan for extensions and to proceed in making their plans happen. Thus in the case study analysis, various sources of income encountered in the fieldwork are categorised in either regular or irregular income.

2.5.3. (Measurable) indicators of land-use efficiency and optimalisation

As argued, at the plot level, a useful differentiation is that between land-efficiency - which is determined from the point of view of the planner – and land-use optimisation, which is a better reflection of the use-value of the plot's size for the household itself. It has also been argued however that 'activity intensification' (after Williams et al. 1996 in Zillman 2000) is difficult to measure. Nevertheless, at the plot level, through case studies a spectrum of meaningful indicators can be used to assess the land-use. Napier (2002) has been found to offer the most extensive application of (measurable) indicators for the assessment of the living conditions of residents in core-housing. As part of the objective to build upon existing expertise, those indicators offered in his dissertation that are also relevant for this thesis are taken as a starting point for the fieldwork – and here discussed. Importantly, there is a bias towards physical indicators still. The fieldwork of this thesis will add several indicators that are more qualitative in nature (but therefore also inherently more difficult to measure).

Physical construction on the plot

The types of extensions added to an initial core gives a broad brushed idea of what residents have done with the house and on the plot over time. The level of consolidation is firstly analysed by Napier (2002) and classified in a pragmatic way based on the possibilities and limitations of aerial photography, which is the main source of quantitative data in his dissertation, as well as on the basis of his own expertise as an architect. The method allowed for a classification according to the addition of 'usable space', material use, size of the extension and whether the extension had been built directly onto the house or was separate from the house. Importantly, the level of extension achieved is here put in a hierarchy that fits the case study (Khayelitsha) – yet the principle behind it may be applied anywhere.

Material use: As an architect, Napier (2002) makes a useful categorisation of the quality of the materials used for adding space through extensions to the initially

provided core house. Thereto Napier (2002:89) makes the following classification of extension types: *no extension, informal extension, formal extension* and *mixed extension.* Napier's categories 'formal' and 'informal' here refer to material qualities. Within the discourse of urban development (and anthropology) these labels carry a connotation of separate economic sectors within a city – yet such a connotation would here be misleading. 'Formal extensions' in Napier's analysis do not necessarily imply 'formal sector' provision or contractor-built extensions, neither do 'informal extensions' necessarily rule out hiring local formal constructors.

In the context of this thesis it is opted to refer to 'impermanent' and 'conventional' material, in an attempt to use the same categorisation of material quality as Napier does whilst also avoiding confusing connotations. Admittedly, these labels are not entirely precise either as 'impermanent' extensions may actually last for many years. At the same time, during the 2011 fieldwork, respondents expressed the strong aspiration for 'permanent material' for their extensions, referring to the opposite of their 'shack' extensions which thereby are implied to be considered as 'impermanent'. Therefore, as operational terms within the context of this thesis, the labels seem legitimate, leading to the following categorisation and coding: (I) impermanent, (C) conventional and (M) mixed material use. Apart from the labelling, the categorisation follows Napier (2002), and within the specific context of Khayelitsha this leads to the following indicators for material use (see table 1).

I = Impermanent	Extension using materials such as earth, corrugated iron, plywood etc. Not necessarily sourced from informal contractors.
C = Conventional	Extension using permanent material such as brick or block. Not necessarily sourced from formal contractors.
M = Mixed	A combination of impermanent and conventional material used for the extension.

Table 1 Operational terms and coding of material use.

The particular classification Napier makes in material use for extensions is relevant from the perspective of *how* households "do consolidation". Napier (2002) uses the quality of the material as a basis to analyse: the sourcing of building materials, building skills within the household, costs of the extensions, dates of the extensions, support for construction of extensions, the condition of the extensions and the way in which residents themselves perceive the adequacy of their current house (see Napier 2002:18, 157-192).

Contiguity of extensions: Contiguity in the context of this thesis refers to whether extensions are built next to the initially provided core house, or separately from it (Napier 2002). Indicators are: detached or attached to the initially provided core house. The contiguity of extensions may be related to the location of the bedrooms of the main household to indicate their perceived hierarchy.

Positioning: The positioning of extensions is related to the street side and back of the plot. The positioning may be related to visibility from the street side and a perceived function of the back of the plot.

Level of extension achieved: Combining material use, size in comparison to initially provided core house, contiguity and positioning of extensions, Napier (2002) made a hierarchy of the level of extension achieved on a plot on a certain moment in time, in order to allow for comparison not only between plots but also over time. The level of extension per plot included in the 2011 sample can be indicated with two snapshots into time: 11 years into consolidation and 26 years into consolidation on the plots. To that end, every plot included in the 2011 sample, was first identified on the 1996 maps reflecting the outcomes of the aerial photography of Napier (2002) (see Map A1). Next, the current level of extension was established. For the sake of comparison, the categorisation for 2011 follows the same numbers for the types that Napier (2002:318) used to analyse the 1996 aerial photography[47] - while adding three "higher level" extensions (level 6 - 8) that had not yet been observed in Khayelitsha 15 years ago. The implication of building upon Napier's' categorisation is nevertheless that the use of the space (e.g. rental, commercial etc.) is not indicated by the 'level of extension' as this was impossible to distinguish from aerial photography in Napier's´ method of fieldwork and according categorisation. In other words: it is merely the physical appearance of all the superstructures on the house. Some limitations of aerial photography were solved through the different method used in the 2011 fieldwork, whereby it was very easy to identify a secondary storey from the street side – a level of extension rarely observed in 1996. The resulting categorisation allows for an indication of the success in the level of extension achieved on each plot (see Table 2, see also Annex 6).

Type	Description of consolidation level on the plot	Contiguity, material and size
0	UNIMPROVED CORE HOUSE With no other structure of any kind on the plot.	N/a
1	DETACHED STRUCTURE OF (predominantly) IMPERMANENT MATERIAL Detached from house, built of impermanent material[6]. May be a bedroom (Locally known as 'backyard shack' or sometimes 'bungalow') or another use (e.g. storage, garage, commercial).	Detached, Impermanent Any size
2	SMALL, ATTACHED IMPERMANENT EXTENSION In the form of a lean-to.	Attached, Impermanent Smaller than or equal size to original
3	LARGE, ATTACHED IMPERMANENT EXTENSION In the form of a lean-to.	Attached, Impermanent Larger than original
4	SMALL, ATTACHED CONVENTIONAL EXTENSION	Attached, Conventional Smaller than or equal size to original
5	LARGE, ATTACHED CONVENTIONAL EXTENSION	Attached, Conventional Larger than original
6	REMODELLED HOUSE Where the original starter house has been substantially remodelled so that the original is no longer distinguishable, or demolished.	Remodelled Any size
7	DETACHED STRUCTURE OF (predominantly) CONVENTIONAL MATERIAL Locally known as 'flat'. Must include at least one habitable space.	Detached, Conventional Smaller than original
8	SECOND STOREY OF CONVENTIONAL MATERIAL A second storey on top of original core or one of its conventional extensions. Locally known as an 'upstairs'.	Attached second storey, Conventional Any size

[5] Any types for Inanda Newtown exclusively have been left out as some obviously only apply to a different housing implementation with sites and services only.
[6] Very small shack structures of less than 1.5 m2 were disregarded in 1996. The criteria of a bedroom is for 2011.

Table 2 Operational terms and coding of level of extension.

The year of occupation of the core house is taken as a point of reference. This allows comparison between the extension activities of various households. Obviously, upon occupation by the first household the level of extension was '0': an unimproved core house. The categorisation again takes a pragmatic approach. For 2011 no types were added if non-applicable for this area. As a rule of thumb, where several categories may apply (e.g. an upstairs is also of conventional

[47] Any types for Inanda Newtown exclusively have been left out as some obviously only apply to a different housing implementation with sites and services only.

material and attached to the core), the extension that was most costly - an indication given by residents themselves - was chosen to represent the level of physical development on the plot.

Housing stress in terms of space and privacy

Overall density in settlement: Here not a single indicator but as many indicators as possibly available across secondary sources have been used, stemming from the understanding that land-use efficiency is a highly contested issue and depends on the perceiver (see Chapter 2.4.2).

Number of people on the plot: The unit of analysis here explicitly is not merely the core house but the plot, as it may include persons who do not belong to the main household / live in the core house. Included are only those persons who have a bedroom on the plot and spend at least half of their time per year here.

Household composition: Mainly number of persons, age and gender are considered as well as main households and any additional households on the plot. These may be indicators of perceived housing stress in terms of privacy as well as relating to perceived 'decency' of the house through its dwellers' eyes.

Habitable space: Habitable space usually refers to the floor area in a dwelling *excluding* service/utility spaces (kitchen, toilet, bathroom, storage, hallways) (see e.g. Acioly & Davidson 1996:23). Common within housing type analysis is the use of two types of use: habitable and non-habitable. Habitable space is the floor area in a dwelling excluding service and utility spaces such as the kitchen, toilet, bathroom, storage, hallways (Acioly & Davidson 1996:23).

For the sake of his analysis of core-housing, Napier (2002:166) uses a much broader definition, relating habitable space to any room of the house in which people are likely to sleep, with the criteria of at least having a roof. This understanding thus does not confine itself to however bedrooms, but also includes living rooms, kitchens and spaces used for commercial purposes during the day. Napier's choice for a broader interpretation is closely related to the fact that low-income houses may be crowded and residents thus have to be creative with their use of space for sleeping. Non-habitable space is here defined by Napier (2002:166) as rooms or spaces in which people are less likely to sleep (e.g. bathrooms, toilets, passages, staircases, stores etc.). For the sake of comparison with Napier's' findings the *current* main household is taken as a point of reference. Thus, any secondary households are not included nor are the rooms that they occupy.

Housing stress in terms of space, over time: as a rough indication the number of people per habitable space is taken, resulting in a ratio. This ratio may allow for comparison over time due to the availability of sufficient quantitative data of the situation some 15 years ago which can be generalised due to the methodology applied by Napier (2002).

Positioning and contiguity of bedrooms of the main household: in relation to the core house: this may be an indicator of the perceived hierarchy of the structures by the household itself and issues of privacy.

2.6. Summary

Core houses – or starter houses - typically are structures which are built with the intention that they subsequently be extended and improved by residents or their direct agents. The idea is that residents - through their own investments after occupation of the core and its plot – work towards the production of adequate housing. Moreover, rather than defining descriptors of the core-housing approach, it is better to speak of variables as many varieties in the process and product characteristics have emerged over time.

The core-housing concept emerged out of a set of philosophical debates around self-help in the 1950s and 1960s and was based on a direct translation of observations of unassisted incremental construction in informal housing processes into a set of formal housing alternatives intervening agencies could then implement. It is Turner's work in particular that persuaded academics, donor agencies, government officials and professionals to see the informal 'people's process' as a solution rather than as a major urban problem. The acceptance was further stimulated by the dominant paradigms at the time, taken up by powerful agencies such as the World Bank. In retrospect, demonstration projects had several flaws resulting from the way they were implemented, as well as the discourse through which it was understood and poses some challenges to contemporary interpretations.

Interesting is the conclusion that the concept of core-housing has been buried in history *not* necessarily because it was completely flawed, but because it was followed up by new trends and paradigms. Thinking about low-cost housing shifted towards more comprehensive approaches beyond mere physical focuses – or even 'housing without houses'. This also implies that the idea of building control by residents as advocated by Turner may not have lost its relevance, and may still be an important way to best ensure that their dwellings will fit their housing needs. If anything, what was learnt "last time around" is just how interwoven core-housing implementation is with the city-wide land- and housing system. This leads to the conclusion that even the effectiveness of a single house can not be understood in isolation.

The chapter has proceeded by discussing the open building approach. It is Habraken who, based on experimentation in the 1960s, introduces the open building approach, disentangling the sub-systems of built environments. In contemporary practice the revival of several modernist concepts has led to a surge in the use of open building systems and an instrumental use of pre-fabrication. The aim is to enhance the flexibility of buildings in a quest for comprehensive design concepts which are capable to adapt to (ever) changing requirements. Perceived pragmatic advantages and ideological motivations of contemporary applications of open building systems are interwoven with the European, North American and Japanese contexts from which they originated. The three primary advantages perceived are: 1) economics of scale in manufacturing of multiple similar units; 2) speed of installation relative to site-intensive construction; and 3) improved quality and accuracy in manufacture. Three ideological motivations identified are: 1) flexibility and adaptability of the open building system; 2) the drive to experiment and perceived aesthetics of modernist construction; and 3) the

possibility to combine the implementation of an open building system with climate mitigation.

Several common denominators have been identified in the discourse of the "people's housing process" and of "open building approaches" - respectively in Turner (1979 see also Harris 2003) and Habraken (1998 see also Osman & Königk 2009). The 'particular way of seeing' is guided by the principles of: 'users', 'building control', 'autonomy' and in seeing 'the act of building' in the light of the 'temporal dimension'. Particularly the principle of *zeggenschap* – distributed decision-making in building control – draws the attention. *Zeggenschap* adds to the understanding of implementation of housing by showing that different agents can play various roles in various levels of the house design.

Moving then to the targeted beneficiaries, incremental housing by low-income households themselves is taken up. The most important hypotheses and interrelationships presented in literature on the consolidation process by a low-income household have been discussed in this chapter and visualized (see Model A1). If anything, low-income households are faced with external, structural factors which more often than not cut off their option to move houses. In that light, consolidation can be seen as "moving while standing still" as households attempt to achieve more adequate housing to fit their needs and demands and if possible bring their aspirations closer to themselves. For many, the housing stress is a 'coping' situation in terms of for instance space and privacy, whereby the threshold of tolerance may differ widely in between individual households. Particularly in urban contexts with extreme housing shortage and lack of access to land, finely tuned demand-based models of housing adjustment may mean little, as households may anticipate future needs and 'seize the moment' if opportunities appear. In fact, it is only at the individual household level that housing demand can really be understood – and only best by the specific household itself.

From here, the attention shifts to the embedding of the initially provided core and plot in the socio-spatial urban system. From an equity perspective, the literature review has given several pragmatic arguments why sustainable development requires active attempts to achieve coexistence of middle- and low-income households, not only city-wide but explicitly also at the settlement-level. As for land-use efficiency two paradigms have been presented: the case for compaction – which is currently the prevailing paradigm calling for densification and verticalisation – and the alternative paradigm of room for the future. The paradigms point in two quite opposite directions and therefore inevitably also render the plot a contested space. Several difficulties with the use of indicators to measure efficiency of land use at the micro level as applied in the dominant discourse are discussed. At the plot level, a better reflection of the use-value of the plot's size for the household is found in the term 'land-use optimalisation'. Stemming from the objective to build upon existing expertise (see Chapter 1), the most extensive study of the consolidation process of a core-housing project (Napier 2002) is taken as a starting point for (measurable) indicators that aid the analysis. Whereas these have still a bias towards physical construction, the fieldwork of this thesis has the potential to reveal additional qualitative indicators which together will allow for convergence of data.

Chapter 3 Effective core-housing: conceptual framework

'Effective housing' (after Gans 1972) in this research refers to housing that is legitimate, sustainable and adequate. Thus understood, effectiveness is closely tied with both the user-value of the house and external factors that together determine how the potential intended by the architect/provider is interpreted in reality.

The choice to focus on these three concepts as an interpretation of 'effective' is informed by the literature review that preceded as well as the objectives of the research. Among the main lessons, in retrospect, of earlier core-housing implementation in the 1970s is that there is little future relevance if there is not careful consideration of users' own needs, preferences and (effective) demand (UN-Habitat 2005). Legitimacy is at the heart of that quest. Another lesson is that the embedding in a specific socio-spatial urban system must be central to the considerations made during implementation. In order to move away from a déjà vu herein, it seems logical to link core-housing to contemporary debates on urban development which centre on sustainability, in particular efficient land-use and concerns for coexistence. Moreover, since adequate housing is a universal human right, 'adequacy' cannot be left out of the discussion – particularly since core-housing involves considerable trade-offs inherent to the principle of progressive realisation of more full housing. The question then is: what are the right trade-offs?

This chapter shows how the three concepts, legitimate, sustainable and adequate, have been defined in such a way that they can be used as a tool to discuss trade-offs, stemming from the understanding that the ultimate effective core house does not exist but rather the process of implementation should attempt to direct towards more effective development over time. Instead of expanding towards a discourse that leads away from indicators, the attempt here is to give the much needed simplifications[48] – without rendering the concepts meaningless. The simplification is this: sustainable here is confined to land-related issues; adequacy is confined to the perspective of the professional; and legitimacy is confined to the perception of the user. It is believed that such a simplification is in fact much more useful, as the three concepts now serve as a workable criterion for actual implementation projects, allowing for an assessment of the balance found between the three pillars of effective implementation.

3.1. Working definitions

Each of the working definitions follows the rationale of Weaver & Rotmans (2006), namely a quest for a definition that confines itself to the project context it applies to – in this case core-housing in rapidly urbanising contexts, thus allowing a move away from the 'ideal' towards a pragmatic simplification. How this is done is explained first for the concept 'sustainable'.

[48] See for instance the difference between the working definition of 'adequacy' discussed here, and the hierarchy of housing needs proposed by Oktay et al. (2010) which includes both structural soundness, resilience and cultural user-needs (amongst others) – making it difficult to disentangle problematic issues in the overall picture such an indicator would give.

3.1.1. Sustainable

It is exactly the 'ideal' aspect of sustainability that makes trade-offs in sustainable development inevitable (Weaver & Rotmans 2006:8). Sustainability assessment is rendered meaningless and its purpose in supporting sustainable development is fatally undermined unless there is a clear definition of sustainability principles and values[49]. According to Weaver & Rotmans (2006) is impossible to come up with a definition that is fully accepted by all stakeholders in every context. Therefore, they argue, instead of developing a 'generic' definition, it is better to seek a context-specific *interpretation* of sustainability that is acceptable to a wide range of stakeholders within a particular application domain. The researchers prefer to refer to 'sustainability interpretation' rather than to 'sustainability definition', since they 'acknowledge that any interpretation of sustainability will change between contexts and, also, over time, as new knowledge emerges'. Weaver & Rotmans (2006) consider this to be 'an inevitable aspect of the contingency of the sustainability concept, which arises from its systemic character'.

Weaver & Rotmans (2006) go on to discuss what should be included in the context-specific interpretation of sustainability in order to make it an operational basis for decision-making. They identify generic challenges in making the concept operational. First of all it involves a multidimensional concept (e.g. socio-cultural, ecological and economical). Arising from this, there is the need to establish both the set of sustainability criteria (and related indicators and thresholds) to be able to decide how trade-offs are to be handled among conflicting sustainability values (Weaver & Rotmans 2006:7). Secondly, sustainable development is an integrating concept that cuts across time, space and domain, hence an operational interpretation requires the use of concepts that are time, space and domain-exceeding (Weaver & Rotmans 2006:7).

Trade-offs, argue Weaver & Rotmans (2006:18) must be guided to seek synergies. The first trade-off is that between shorter- and longer-term impacts; the principle of inter-generational equity that is part of most definitions of sustainable development. In practice, according to Weaver & Rotmans (2006: 8) this means that any assessment of sustainability needs to take into account a *time horizon* of at least two generations, i.e. 25-50 years. The second trade-off is that implied by the distribution of impacts over *space and affected parties*. Thirdly, sustainable development operates at different scale levels, which implies trade-offs between multiple scale-levels (from global to local). Practically, this implies that an operational interpretation of sustainable development must involve at least two different scale levels, for instance the macro- and micro-level (Weaver & Rotmans 2006). Increasingly, stakeholder consultation and participation are used to reveal non-market values and provide insight into the acceptability of trade-offs (Weaver & Rotmans 2006:9).

Ideally, for a variety of reasons, all income groups have options and choice to satisfy their housing needs and aspirations within the settlement. *Variety, choice* and *options* were already emphasized in the Global Strategy for Shelter

[49] For an analysis of the way 'sustainable development' has come to be understood in dominant paradigms since it's introduction, as well as an analysis of it's sensitivities, see Annex 11.

(1988) as ‘more important than having pre-determined targets in terms of housing production’. The GSS (paragraph 22) states: ‘The goal of national housing policy should be to widen the *range of housing choices* available to all households so that they can adjust their shelter situation to their own *needs* and *preferences*.’ Offering variety ‘within the settlement’ refers to the coexistence of low- and middle-income households at the neighbourhood level. Mixing the highest income groups together with the lowest in reality is little likely, as their lifestyles and consumer power differ too much. The mixing of lower and middle-income groups in the same neighbourhood is usually more viable and has the potential to result in more socially and economically vibrant settlements are able to develop (see e.g. Dewar 1991, 2000).

Working definition for ‘sustainable’

This research bundles the ecological and equity concerns related to ‘sustainability’ as a development *process* towards an ideal. It is a deliberate choice to have a straightforward focus for the operational definition of sustainability within its relevance for the context of core-housing implementation. Therefore, the plot is taken as a unit of analysis, focusing on its embedding in the land- and housing system. Along the essential components that Weaver & Rotmans (2006) list for operational interpretations of sustainability, the following working definition has been developed:

> ‘Sustainable’ refers to a process of qualitative improvement that responds to the challenges that face the urban land- and housing system and its residents in the long term (25-50 years, e.g. at least two generations) through promoting *optimal* use of land (plot size) and through implementing housing that is *accessible* for low- and middle-income households within the settlement, and *tailored* (typology/adaptability of superstructure, plot potential) to their needs and demand.

The working definition intends to give direction for guiding more sustainable core-housing implementation. The various components are understood from their embedding in the city system, which is here narrowed down to two essential systems at the meso-level: the land system (see e.g. Payne 2002) and the housing system (see e.g. Payne & Majale 2004).

3.1.2. Adequate

In 1988, the Global Strategy for Shelter (GSS) formally adopted by the United Nations General Assembly affirmed the *right* to adequate shelter and governments’ obligation to meet it progressively (UN 1988, paragraph 13). But, exactly what is ‘adequate housing’? ‘Adequate shelter’ refers to much more than merely protection from the elements but has come to be understood as a multifaceted concept. The Habitat Agenda (UNCHS, paragraph 60) defines adequate shelter at some length as follows:

> Adequate shelter means more than a roof over one’s head. It also means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and adequate and accessible location with regard to work and basic facilities; all of which should be available at an affordable cost.

Although adopted widely, the right to housing as understood in contemporary literature, does not imply housing for *free*, nor assumes that immediate full house provision is always possible; rather the right to housing implies the establishment of an *appropriate* environment (see e.g. UN-Habitat 2005). In the reality of housing implementation it is most likely that trade-offs in needs and preferences of residents must be made due to limited funding opportunities. This leads to the necessity of setting priorities in implementation. Such a quest is closely connected to the *in*effective demand of the low-income households and the usually limited funding opportunities from the side of the "implementer" of the housing. In this light, the Habitat definition for adequate housing clearly stipulates the ideal situation – a 'wish-list'.

But then again: what is an appropriate environment for core-housing? Inherent to the provision of a housing concept which is based on the idea of progressive realisation of adequate housing – such as with the core-housing concept - the provider and architect (if any is involved) are faced with the question: what components of the house would a household need at the very beginning? Also: what housing is attained in the end, after consolidation? The concept of incremental housing forces the provider and/or architect to think of a hierarchy of adequacy to analyse what to leave out of the core. Such considerations may be closely tied to regulatory frameworks for housing construction in the form of "minimal standards".

As Weaver & Rotmans (2006) already understood for sustainability, another way to reach consensus and operationalisations – and often an easier way – is through identifying *unsustainable* conditions and could also be applied to the concept of 'adequacy'. The component of 'housing unit quality' within the 'living conditions diamond' (Gulyani & Bassett 2010) seems helpful for a working definition of 'adequate housing' *but* 'while the most iconic image of a 'slum' is', of course, 'a poorly constructed or dilapidated housing unit – using unit quality as a chief indicator (…) is quite problematic since housing standards and materials vary greatly across climates and geographies' (Gulyani & Bassett 2010:2204). Nevertheless, Gulyani & Bassett (2010:2205) assert that two characteristics can still be used to depict and differentiate unit quality: 1) building material/structural status and integrity and 2) occupancy level and overcrowding. The first characteristic of the unit quality in particular, *building materials and structural status and integrity* 'has been heavily relied upon by governments of all stripes to determine whether a building should be considered substandard' (Gulyani & Bassett 2010:2205). With regard to the second characteristic, the difficulty arises because 'there is no hard and fast rule for determining at what point overcrowding at the unit level arises and becomes dangerous to health' (Churchman 1999 in Gulyani & Bassett 2010:2205). Yet, Gulyani & Bassett (2010) argue that this problem is not entirely paralyzing when considered as conditions *relative* to other settlements. Indicators may be: rooms per household and persons per room.

Two additional aspects not mentioned by Gulyani & Bassett, yet fundamental to contemporary analyses of low-income housing, are resilience and level of servicing. Again many trade-offs are involved due to the inherent idea of progressive realisation of adequate housing in the case of implementing a core-housing concept as well as stemming from tight budgets of project leaders.

Resilience is more a discourse than it is a workable concept so that contextual interpretation is needed, certainly when it comes to prioritising (see also Annex 11). Servicing is more concrete and has been identified as a key characteristic of adequate housing over time (see e.g. Tissington 2011), although again, the level of servicing that is most likely to lead in the direction of effective core-housing implementation is highly dependent on the embedding of the project as well as on the targeted beneficiaries.

Working definition for 'adequate'
Based on these considerations the following working definition has been developed for the context of the exploration in this thesis.

> 'Adequate' refers to the perception and considerations of the professional (e.g. architect, provider, building supervisor) on the quality of the house and its minimum performance requirements in terms of 1) structural status and integrity, 2) occupancy level, 3) level of servicing and 4) resilience. Adequacy is moreover understood as an inherently political issue in direct relation to the human right to adequate housing and minimum standard requirements by regulation which the professional must take into consideration.

Adequacy is understood as an inherently political issue. In the working definition these political aspects are nevertheless related to the direct considerations a professional designer makes with an eye to the universal human right to adequate shelter and to quality of life (UN-Habitat 1996) - a right which is possibly also enshrined in a country's constitution[50] - and minimum building standards to which the professional must adhere through national regulations. Political aspects to housing related to its perceived 'decency' are considered under its legitimacy. Everything else deemed political about housing is considered as impossible to generalise as political issues are wired through the specific urban context to which the housing is proposed.

3.1.3. Legitimate

Provision of housing should be such that it fits in with the processes and strategies of how 'housing is done' by people locally. Thus understood, 'legitimacy' refers to the exact opposite of introducing an alien concept[51] of 'doing housing' altogether. Instead, it enables the way households "do consolidation".

Legitimacy may clash with adequacy as considered by the professional and it cannot be assumed that adequate housing is necessarily also legitimate housing. The architects Idham et al. (2010) for instance have used Maslow's hierarchy to various related housing needs of low-income households. Thinking of adequacy hierarchically however assumes a logical sequence of increasing fulfilment, along with Maslow who clearly has a hierarchy in mind by which the following step is

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[50] The obligation of states to take reasonable legislative and other measures, *within its available resources*, to *progressively* achieve the *full realisation* of the right of access to adequate housing is part of the International UN Covenant on Economic, Social and Cultural Rights (see: http://www2.ohchr.org/english/law/cescr.htm [Accessed October 17, 2011].

[51] Geoffrey Payne, Lecture at the Institute for Housing and Development Studies for the course 'Urban Land, Access by the Poor', Rotterdam, May 11, 2010.

not reached unless the lower level need is first fulfilled. Thinking of adequacy as hierarchical is problematic, as it does not incorporate the option of having fulfilled "higher needs" while simultaneously being deprived of "more fundamental" needs, or a unique mixture of these housing aspects within a certain locality and even in between low-income households in the same neighbourhood. Moreover, various priorities that have been found to be inherent to low-income households, such as location relative to (informal) job opportunities (e.g. Turner 1976; Angel 2011), have not been recognized in this hierarchy.

The general public has a certain perspective on what "decent housing" looks like. This is an important aspect of perceived legitimacy and may have great influence on the agenda of the implementer of core-housing. Not only do perceptions of appropriate building standard in one place vary, an additional problem is that 'housing quality is a moving target' (Gilbert 2007:706 in Bulyani & Bassett 2010:2205) since 'as general housing standards rise, areas that fail to reach the new standards will be newly categorized as slums'. "Decent housing" thus too, can be understood relative to adjacent settlements.

When it comes to progressive realisation of adequate housing, the participation of residents themselves is key in finding the right trade-offs in housing priorities of the targeted population. The need for a participatory process is also highlighted in the Habitat Agenda (paragraph 60) where it stresses the importance of *participation of the people concerned* in determining *needs* and *preferences*: 'Adequacy should be determined together with the people concerned, bearing in mind the prospect for gradual development'.

Controversially, housing that complies with standards of performance as seen by providers and architects is usually fairly expensive relative to household incomes or investor resources (Hoek-Smit 2009), so that the low-income households themselves may not in the long run be able to afford 'adequate housing' implementation. In that light, legitimacy of a proposed housing solution is probably best reflected in the households' ability and willingness to pay (effective demand). The ability to pay depends particularly upon the economic conditions of the potential users of a house; usually expressed as a percentage of a household income. Willingness to pay represents perceived utility and benefit of a service. Factors that are likely to affect willingness to pay may include: the households income; the potential of additional income or savings owing to the improved house or service; the level and value of time saved; the perceived convenience, reliability and quality of the improved house or service compared to the old house or service (UN-Habitat 2005:26). Willingness to pay has found to produce a much more accurate estimate in cost-recovery calculations as it is a better representation of effective demand (UN-Habitat 2005, Daphins & Faulhaber 2004).

Working definition for 'legitimate'

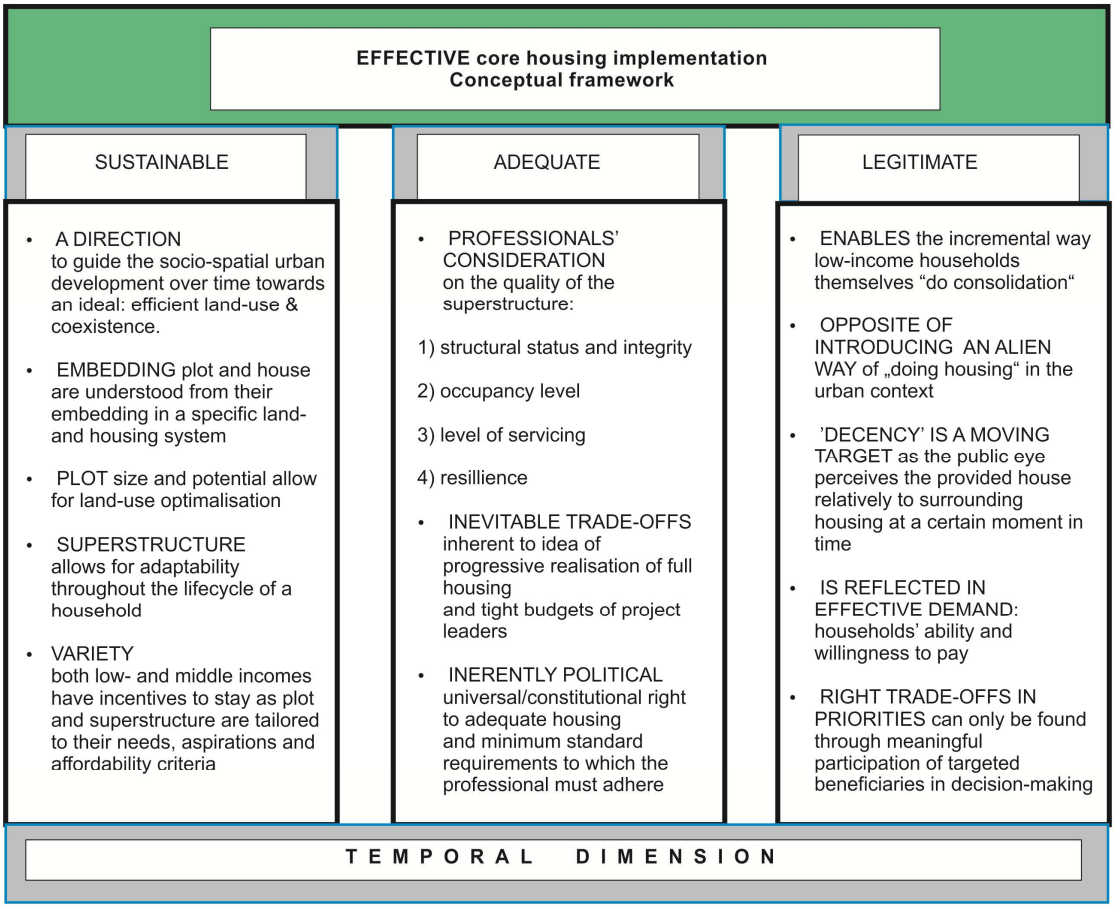
For the context and scope of this research the following working definition is used:

> 'Legitimate' refers to an actual demand for a housing solution by the specific households to whom it is proposed - the "users"; the implementation of a core that enables incremental consolidation strategies of the household.

Meaningful participation is a prerequisite for finding the right trade-offs in the implementation of both legitimate and affordable housing.

3.2. Visualisation and summary

A broad brushed summary of the conceptual framework is here visualised (Model 2), and forms the backbone of the exploration in this thesis.



Model 2 Conceptual Framework for effective core-housing implementation.
Visualisation by author.

This chapter integrated the literature review into a conceptual framework that can be used as a tool to discuss 'effective core-housing'. Three elements form the meaning of 'effective' are used: sustainable, adequate and legitimate. Using Weaver & Rotmans (2006) for each of these terms, a working definition is drafted that allows for a consideration of trade-offs between the elements. The temporal dimension is wired through the conceptual framework, as it is inherently interwoven with the concept of core-housing and subsequent consolidation processes. The resulting conceptual framework serves as a backbone for the exploration and analysis throughout the thesis. The chapter that now follows, functions as a hinge between the theoretical framework and the analysis part of this thesis, as it gives an operationalisation of the conceptual framework and an overview of the methodology chosen.

Chapter 4 Introduction to the Case Study

The case study of this thesis follows 26 years of consolidation of the core houses and plots since their occupation. The chapter is set up in chronological order, starting with the project implementation and using 1996 as snapshot along the route to date. As no housing is implemented into a vacuum, the chapter commences with a brief outline of the projects' embedding in the geo-political context at the time of implementation and occupation. Subsequently, the quantitative outcomes of the fieldwork of Napier in 1996 are reviewed, followed by a description of contemporary Khayelitsha and Eyethu to set the scene for the fieldwork, conducted in 2011. Reference is often made to Annex 3 – which offers a factsheet on the project upon implementation and occupation, and displays detailed tables, figures, calculations and pictures. For a more lively and in-depth insight it is advisable to keep this annex close at hand.

4.1 The implementation and occupation of the core-housing

The establishment of the township of Khayelitsha - Xhosa for 'new home' - was announced in 1983. A 3,200 hectares site was levelled to prepare the way for the project that was intended to exist of 'towns' and within them 'villages' (resulting in neighbourhood names such as T1V2) for the prospected eventual 250,000 to 300,000 people. Of particular relevance to the exploration in this thesis is Town 1 that included about 5,000 plots prepared for core-housing, whereby T1V2 is the neighbourhood where the 2011 fieldwork takes place, contemporary Eyethu. Provincial and central government established the project along with a team of professionals who designed and managed the building of the neighbourhood (Napier 2002:88).

Picture 1 Cape Flats. The oval (long axis about 25km) roughly encompasses the Cape Flats.

Source: land stat in http://en.wikipedia.org/wiki/Cape_Flats [Accessed: August 30, 2011].

Socio political embedding of the project

Housing is always interwoven with politics, but in this particular housing project perhaps even more so. The Flats (see Picture 1) are described by some as 'Apartheid's dumping ground' since from the 1950s race-based legislation either

forced non-white people out of more central urban areas designated for white people and into government-built townships in the Flats, or made living in the central area illegal, forcing many people designated as 'Black' and 'Coloured' into informal settlements elsewhere in the Flats. Khayelitsha was deliberately located beyond the urban edge of Cape Town at the time, at a distance of 35 km from the centre; east of Mitchell's Plan and South of the N2 freeway (Napier 2002). Clearly this is less marketable land for development; the site's geography is typical of the Cape Flats and has problems of wind-blown sand, a high water table, flooding, and lack of vegetation (Napier 2002; Dewar & Uytenbogaardt 1991).

Two years after their construction in 1983/4, the core houses were still standing empty due to the resistance to the initial relocation scheme[52]. Finally, in February 1985 the idea of moving all Africans in Cape Town to Khayelitsha was dropped as well. Eventually, towards the end of 1985, the core houses were occupied by people from backyard shacks in the nearby townships of Guguletu, Langa, Nyanga and some from informal settlements of Crossroads (Napier 2002:115, 120). These people had no say whatsoever in the houses assigned to them. Napier (2002:115) concludes on the basis of his historical analysis and fieldwork that 'many of the factors which appear to have initially limited the potential of the incremental growth process, can be traced back to the development rationale applied and the ideology which informed it [the project]'.

Embedding of the core-housing in the dominant paradigm of the time

Despite its inherent Apartheid characteristics, the core house project in Khayelitsha nevertheless also reflected the dominant paradigm on low-income housing in developing countries at the time (see also Chapter 2.1). Indeed Napier (2002:92) explicitly states that it is important 'to note that the description of the local realities within South Africa should not be divorced from the global trends in development thinking and the emergence of progressive housing approaches'. How then was the core-housing project in Town 1 designed and implemented?

Plot sizes and layout

Plot sizes varied from 144m2 to 160m2 and were laid out back-to-back, although in 2011 plot sizes in Eyethu, T1V2, were found to be larger, namely between 194 and 204 m2[53]. Within separate sections, virtually all plots had the same size. For an illustration of the plot layout, see annex (Map A1).

Core houses and positioning on the plot

A consultancy firm – Van Niekerk Klein and Edwards (VKE), made a design for the initial house: a 26 m2 core including a bedroom, a kitchen with a sink and the wet core which could be upgraded into a bathroom (Rault 1985 in Napier 2002:118). Three large contractors were appointed to undertake sections of the house construction on the basis of the design. Each of the contractors adapted the design slightly resulting in three types: Besterecta contractor was arranged to build 3,300 core houses, Wimpey contractor to build 924 core houses and Murray and Roberts 776 precast panel houses (Rault 1985 in Napier 2002:118). The three

[52] For more historical background see Ellis 1984 and Cook 1992 in Napier 2002.

[53] Faizel Amoo, Expert interview, August 4, 2011.

core house varieties all had two habitable spaces, in a broad interpretation whereby the kitchen is included. Village 1 and 2 were built at slightly different times and had different core house types; T1V2 had only the Besterecta houses, while T1V1 had a mix of the three core types (Napier 2002:175). The 2011 fieldwork takes place in T1V2 – now Eyethu – and thus includes only the Besterecta house (see Picture A2).

From a rational (here: architecture's) perspective the positioning of the core houses on the plot was 'reasonably good', as Napier (2002:220) analyses, 'in that most of the space available could be used for extensions'. Care was given to dealing with the windblown sand and adverse weather by orientating building blocks mainly on the east/west axis (Napier 2002:117). Nevertheless, a large open space – as included in the total site and the plots that needed empty space for future extension – did little to avoid the effect of these hardship environmental characteristics. During the fieldwork of this research (2011) it was found that most houses, at least in Eyethu, were placed halfway both sides of the plot, positioning it usually at the front, close to the street side – although some had been positioned in the centre or back of the plot (see Picture A3 – A5). Some houses were placed on the site one metre from the one side boundary (without going the final step of designing two neighbouring houses as semi-detached), 'which was a relaxation of the conventional 2-3 m side building line which applied in residential areas to allow residents to extend on the other side of the house' (Napier 2002:118).

Tenure

The state at the time initially refused to grant full ownership of the core houses to residents, which, according to Napier (2002:115-116), illustrated the tension within the government to embrace a participatory housing development approach. Eventually the housing was being offered for sale from 1986 onwards as advisors to the state had urged the granting of secure tenure. Most residents themselves however – at least during Apartheid - opted to continue to rent. In 1990 only 14% of the core houses had been sold (Cook 1992:128 in Napier 2002:115). In 1996, during the case study of Napier, 79% is still rental (Napier 2002:116).

Construction costs

The direct costs of the houses were R 9,400 per house with R5,000 being spent on the servicing and the rest of the building (Ellise 1984 in Napier 2002:119). In other words, the implementation cost of a core house was about $11.750[54] in the value of both currencies at the time, with $5,500 spent on the superstructure plus services.

Rent/servicing cost

Rents were heavily subsidised and included the costs of municipal services. Service levels were generally high: from the outset there were water and sewer connections to each house, allowing flush toilets and showers. Electrical connections to houses were not available until 1994 (Napier 2002:117, 120). This combined rent with servicing cost stood at R40 per month in 1996 (Napier 2002), some $10 in the value of both currencies at the time. Obviously, as Napier

[54] Possibly equivalent to $36.500 (total cost – a very rough indication) in today's value according to measuringworth.com.

(2002:119) concludes too, the project was implemented ‘with apparently very little attempt to recover costs from the residents’.

Housing journey and utility costs
For almost all initial occupants the move to Khayelitsha generally meant an improvement in their housing situation. Initially Khayelitsha was dominated by people who lived in backyard shacks (Napier 2002:120); 15% came from informal settlements and 82% from other townships (Napier 2002:128). For almost all households nevertheless, the move to Khayelitsha meant that they were further away from the city of Cape Town and further from most areas of employment (Napier 2002:129). The utility costs of the core-housing thus were high.

Household characteristics of initial occupants
In retrospect, Napier (2002:130) established among his respondents that the mean household size at occupation in Khayelitsha was 4.1 people. Cook (1992 in Napier 2002:114) mentions that in October 1985, the 5,000 core houses were rented out to 13,000 people. It proves quite impossible to establish exact household incomes at the time of occupation – yet clearly households were still living in situations of poverty (Napier 2002). For 1990 Cook (1992 in Napier 2002:129) established that households in Khayelitsha core-housing areas were better off (52% living below a normative poverty line) than the households living in the sites and service areas of Khayelitsha (where 76% of households lived below the poverty line).

Planned support for the consolidation process
Project-related support after the provision of the initial core house was almost completely absent. The project planners had recognised from the beginning that ‘some kind of ongoing support was essential if people were to be enabled to consolidate the core houses’ (Napier 2002:119). Thus, the establishment of a ‘resource centre’ and a ‘technical advisory service’ was proposed from the inception of the project (ABWC 1982 in Napier 2002:119). Despite initial attempts however, little thought had been given to the equipping, staffing and running of the centre and the whole initiative collapsed (Napier 2002:119). In effect then, the occupants of the core-housing in Khayelitsha were not directly supported in their efforts to consolidate their housing, concludes Napier (2002:119). Moreover, lines of communication between residents and the local authority did not appear to have been open, and as Napier (2002:188) sees it, the small proportion of households who applied for permission to build is evidence of this lack of communication.

Thus it came to be that, contrary to classical elemental housing projects in the 1970s (see Chapter 2.1) the early collapse of the support initiative in Khayelitsha meant that ‘residents were left to achieve their consolidation projects in isolation from almost all institutional assistance’ (Napier 2002:220). The professional team involved in the design of the houses, ‘effectively had no say in the political and social dimensions of the project and so the rhetoric of self-help was revealed to have been empty’ (Napier 2002:220).

4.2 A snapshot 11 years into consolidation

What do the plots and superstructures look like eleven years later when Napier (2002) conducts his fieldwork in 1996? Eleven years after implementation of the core houses Khayelitsha is ‘only partially consolidated’ in that built densities ‘are

not yet anywhere near those seen in other parts of the world', concludes Napier (2002:190, 191). The housing stock being produced through extension is mainly accommodating the internal growth of households, very little new stock is being created for secondary households, and very low levels of lodging are being observed. Only a proportion of space of 1.67% was added for commercial purposes (Napier 2002:169). Secondary storeys are extremely rare (Napier 2002:167) still.

Extension types achieved

The snapshot of the consolidation process in 1996 resulted in the following picture of the extension types. In Town 1, roughly 23% of the core houses were still unextended, 42% of the plots had impermanent extensions, 24% had conventional extensions, while 11% had a mixture of the two, and 3 core houses had been completely remodelled (see Figure 4).

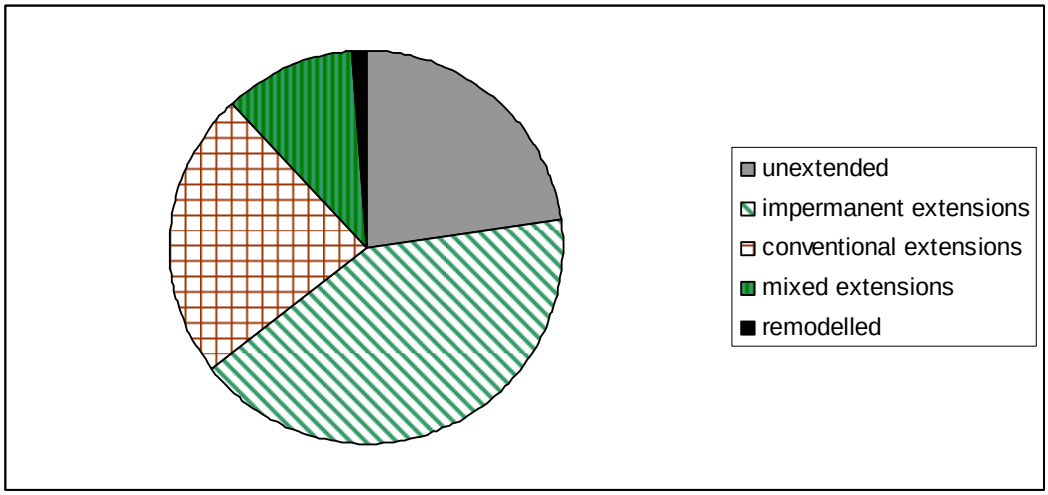


Figure 2 **Pie chart displaying extension types 11 years into consolidation, 42% impermanent.**
Based on Napier (2002:91, 157), re-labelled.

Essential is the observation that 11 years into consolidation, impermanent extensions – including backyard shacks - are by far the most common form of extensions: 51.5% of the plots in T1V1 and 51.4% in T1V2 include impermanent extensions. Obviously, impermanent extensions helped to relief housing stress while they were 'not as costly to construct as when using formal [e.g. conventional] building methods' (Napier 2002:176).

Densities on the plot and site level

For Khayelitsha Napier finds a growth of 34% in household size since occupation, resulting in an average of 5.0 (T1V1) and 5.3 (T1V2) people per plot (Napier 2002:222). At site level, this leads to people densities between 302.5 (T1V1) and 245 people per hectare (T1V2). Napier (2002:222) explains the difference between the two villages by the different layout density and the difference in the average number of people per plot. Obviously the extensions have an impact on plot coverage. In Khayelitsha, coverage was on average between 35% to 40% of the plot size (Napier 2002:167).

Secondary households on the plot
11 Years into consolidation 94% of the plots have one household on the plot (Napier 2002:149). Napier (2002:149) calls the number of plots with more than one household 'surprisingly low' in comparison to older settlements in other parts of the world, where 'it is common for many households to live on one plot'. That in turn has an implication for the consolidation of houses as space is sub-divided as many times as possible (Tipple 2000).

Rental and commercial activity
Napier (2002:177) expected to see housing types related to the building of shacks for rental and commercial purposes. The incidence of it was however still low eleven years into consolidation, as Napier (2002:150) analyses:

> With the growth in households being mainly from increases in numbers of children and direct relatives moving to the core-housing, it was clearly too early for a larger market in lodgings to emerge. House sizes were also still small and being used mainly to accommodate the immediate family.

Napier (2002:150) however also acknowledges the difficulty in studying lodging. Firstly, residents may be unwilling to divulge income received from lodgers, and secondly, the number of lodgers was probably under-counted, 'and a more directed questionnaire would be needed to better assess the levels of lodging and the degree to which income is being supplemented from rentals'. The accuracy of the finding nevertheless seems to be supported by the low incidence of houses with more than one resident household (6%), concludes Napier (2002:150).

Lack of communication between community and local government
When it comes to local government support, it seems that the small proportion of households who applied for permission to build is evidence of the lack of communication between the two; community and government (Napier 2002:188). Only 32% of residents applied for permission to build extensions, whereby 'as might be expected' (Napier 2002:187), 'more people with formal extensions got local authority permission, than people with shack extensions'. The difference is 44% for the former, versus 17% for the latter.

4.3 Embedding in today's South Africa, Khayelitsha and Eyethu

South African cities today are fundamentally characterized by three spatial patterns: sprawl/low-density, fragmentation and separation (Dewar 1991; 2000). An understanding of these three patterns starts with an awareness of the fundamental legacy of separation that South Africa inherited from the past. Above all other forces, analyses Dewar (2000:210), South African towns and cities have been spatially shaped by two 'ideologies' in history: the ideology of modernism, and the ideology of apartheid. The latter has been a major form-giving ideology in South African towns and cities, with at the core of its spatial impact, the separation of racial groups (Dewar 2000). This 'separate development' policy pursued under the Apartheid system from 1948 onwards changed the South African landscape. Sadly, the precepts of modernism and apartheid were significantly compatible with apartheid planners eagerly embracing the concept of separation 'while grotesquely distorting its scale' (Dewar 2000:211). The apartheid segregation intent marked South Africa's first area-wide urban planning

approach and hence its master plans have had a profound impact upon the structure and functioning of urban areas since (UN-Habitat 2008:163).

The low-density development of South Africa's cities thus far also has a profound impact on the lives of low-income households themselves. When it comes to densities, the contemporary South African city – particularly also Cape Town - probably best resembles a doughnut city. New developments on the periphery tend to be denser – although still at low density – than the older more centrally located areas, with smaller lot sizes, but are still not linked to any form of effective public transport, thus isolated parts of the city (Schoonraad 2000; Todes et al. 2000). Among negative impacts listed for Cape Town (and other cities) are:

1. Degradation of the living environment and a mobility lock-up as a consequence of sprawl and dysfunctional public transport (UN-Habitat 2008; Dewar 2000)
2. High economic utilization costs of the house – particularly for low-income households in relationship to economic opportunities (UN-Habitat 2008; Dewar 2000). For the majority who cannot afford to own a car, within a city-system in which public transport is inefficient and often non-existent 'life is cripplingly inconvenient and expensive, (…) so that many households are effectively trapped in remote locations', analyses (Dewar 2000:211).
3. Significant loss of quality agricultural and natural land that also directly affects livelihoods (UN-Habitat 2008; Dewar 2000; Richardson et al. 2000).
4. Low-density combined with mono-functionality of the low-income sites as merely residential areas, hinders the generation of employment (Dewar 1991, 2000; Schoonraad 2000; Todes et al. 2000).
5. A major hindrance for social interaction and inclusiveness (UN-Habitat 2008; Dewar 2000). 'Spatial planning continues to be heavily implicated in urban fragmentation with a city for the rich and foreigners, a city of economically excluded locals and a city of the marginalized ultra-poor (non-citizens, refugees and immigrants)', reports UN-Habitat (2008:161).
6. Socio-economically, the outward sprawling low-income settlements are still mostly separated from the dominant formal economy. Despite political ambitions of newly democratic governments for inclusion of informality (see e.g. McAuslan 2002), the low-income settlements at the periphery still resemble what Marcuse (1997) labelled 'outcast ghetto's'. In an outcast ghetto 'ethnicity is combined with class in a spatially concentrated area with residents who are excluded from the mainstream of the economic life of the surrounding society, which does not profit significantly from its existence' (Marcuse 1997:23).

It is the combination of these characteristics that have made South African cities 'into some of the most inefficient and dysfunctional cities in the world' (Schoonraad[55] 2000:220).

[55] Schoonraad (2000) refers to the work Dewar (1992), Hattingh & Horn (1991), Van der Merwe (1993) and Watson (1994).

4.3.1 Khayelitsha today

As a consequence of government provided housing and informal occupation, the settlement of Khayelitsha as a whole also further developed and sprawled into time. Today, Khayelitsha is quite an enormous area; "a country in itself", as a representative of the Khayelitsha Development Forum[56] puts it. It is the second largest township in South Africa after Soweto in Johannesburg, comprising 12 wards[57] and within that, 22 neighbourhoods of various character (AL+HDC 2009). Bad statistics make it difficult to know the actual population of Khayelitsha with wide ranges in between censes (AL+HDC 2009). The number of total residents is estimated at well over 0.4 million, which makes up for 22% of the entire city of Cape Town (DPLG 2005). Most of the new migrants to the city – some 50% on estimate – choose to settle in this area, with an influx of about 10,000 new arrivals who set up house in Khayelitsha every year (Brown 2009:6), resulting in a continued growth in shack numbers (AL+HDC 2009). Current population density is around 7,748 inhabitants / km² (AL+HDC 2009). Multiple income classes exist in Khayelitsha with richer neighbourhoods next to very poor ones (Brown 2009:7), yet overall 71.8% of the households earn below the national poverty line[58] (AL+HDC 2009). The informal sector currently employs some 22% of the labour force, while unemployment rate is 54.1% - compared with an average of 29.9% for Western Cape (AL+HDC 2009).

Despite the initial temporal claims to the city of the residents during Apartheid, its residents now consider the area to be "a permanent site of African urbanity in Cape Town"[59]. Even so, there is a sense among residents of not being integrated into the wider Cape Town city (Brown 2009). Khayelitsha is 'a heterogeneous place in terms of income, housing type, service level and employment status, but less heterogeneous in terms of race and language' (Brown 2009:5). Approximately 90.5% is officially considered 'Black African', 8.5% is considered 'Coloured' and some 0.5% is considered 'White' (AL+HDC 2009). As such reflects many of the characteristics of an outcast ghetto (after Marcuse 1997).

Establishment of Building Development Management Department

Before 1994, the external contingent conditions early on in the consolidation process in Khayelitsha were 'fraught and unsupportive of people's own efforts to extend' (Napier 2002:220). Political changes after the fall of Apartheid and the dawn of democracy, were reflected in the ambition to provide adequate housing, with all the complexities involved with the actual implementation of "whatever that means" (see e.g. Tissington 2011, see also Model A1).

Possibly the most remarkable development identified in the light of the exploration in this thesis, is the establishment of the Building Development

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[56] Luvuko Ntshuntshe, member of the Environment Forum of the KDF. July 18, 2011.

[57] 'Ward' is commonly used in South Africa to refer to a constituency; one of the small areas that a city has been divided into for the purpose of local elections.

[58] The national poverty line is the Human Subsistence Level (HSL), which is an estimate of the minimum cost of essential food and non-food consumption per capita per month. It gives a poverty line of R 431 per person in 2006 prices (National Treasury 2007), which is about €44 per month at 2011 values.

[59] A KDF representative in: Brown 2009:5.

Management Department which may also hold important changes for the consolidation process of the core houses in Eyethu (T1V2). Although it is an immense task to get into a sphere of influence on the informally built environment, progression has been made herein by the Local Government Department over the past ten years. During the very period of the fieldwork the department opened a new counter to the public, in an attempt to further bridge the gap between residents and local government.

Building supervisors working from the Department have a clear confinement "from higher order", and concentrate only on the 'health and safety of persons in a building'. This focus is part of the 'thoughts, philosophy and intent' behind the National Building Regulations, as guided by the code of practice for professionals (SABS 2009)**.** Here it is stated that 'regulations (….) should not increase the overall cost of building'. Moreover, the aim is 'to reduce the number of regulations to a minimum'. Since regulations now require that a building permit is approved prior to construction, the counter was well staffed and indeed busy with residents who came to approve their building plans for conventional extensions.

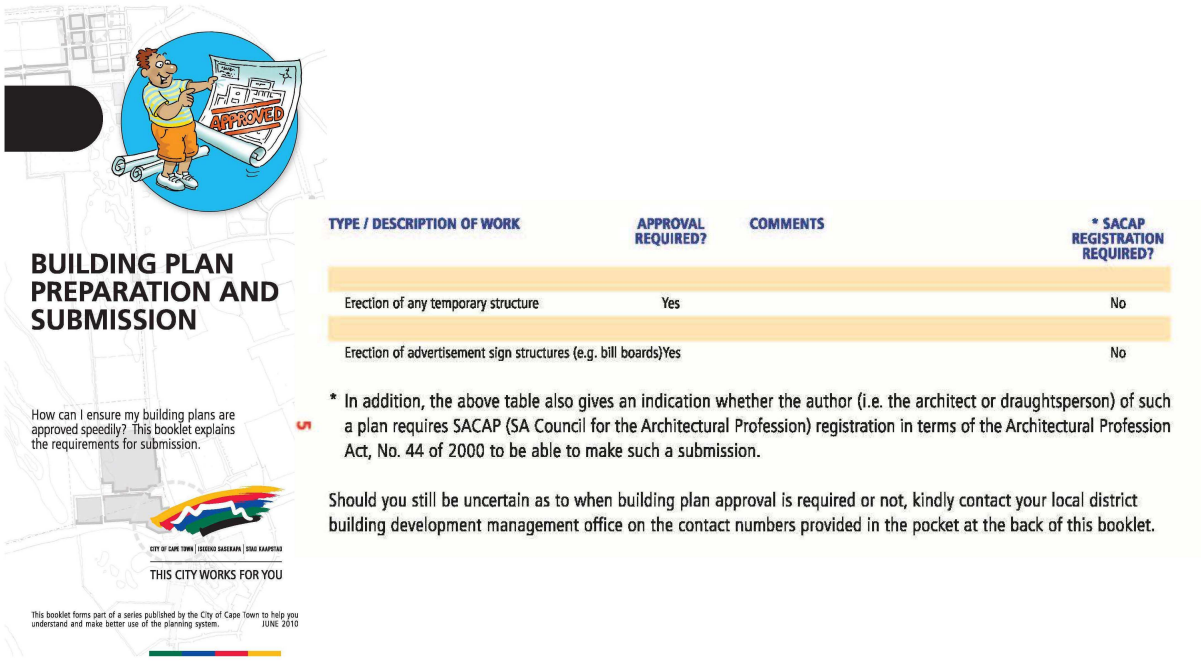

Figure 3 Booklet for the public on Building plans, distributed at the counter of the Building Department in Khayelitsha, explaining a building permit is required for impermanent extensions.
Source: City of Cape Town (2010:1, 5).

The requirement of a building permit equally applies to impermanent extensions, and the translation of the code of conduct hereto has resulted in the following guidelines, as explained by a Senior Building Inspector[60]:

> "Any structure erected will have to be submitted as an official application in order for us to ensure compliance for health and safety reasons. Many people in our City (especially backyard dwellers) have erected structures illegally, posing a fire

[60] Faizel Amoo, Expert interview, August 4, 2011.

> risk and detrimental to the health of such occupants. The only (temporary) structures that we approve is timber structures insulated with a raft foundation with the necessary sanitary facilities. These structures should be positioned 1 meter from adjoining properties to help prevent fire jumping to neighbours and allow for safety routes. All structures that do not conform to the conventional methods as prescribed by the National Building Regulations will have to be endorsed by a Prof. Engineer and necessary material test report will have to be submitted in order to ensure stability etc. This makes the temporary structures a costly exercise, therefore conventional methods are encouraged."

While regulations also require building permits for impermanent extensions and this is well communicated in a booklet at the counters (City of Cape Town 2010:5, 11) (see Figure 3), none of the residents included in the 2011 sample were aware of this regulation – nor was the largest Community Based Organisation (CBO) involved with housing, the Human Settlement Department of the Khayelitsha Development Forum (KDF)[61].

Certainly, a considerable number of conventional extensions is outside of municipal control. This is due to a number of reasons[62] ranging from the fact that a lot of houses in the township have not been transferred to the owner and so there is no legal record of ownership by the occupants whilst when one applies for extensions to the house one needs to show owners consent. Other reasons relate to it being financially onerous for poor household to pay for the services of an architect to draft the plan and then also having to pay the fees for getting the plans approved and the building permit (see also Payne & Majale 2004). Municipal planners in Khayelitsha receive credit for being 'well aware of the dichotomy between closely regulated residential construction in middle and high-income areas, and unregulated construction in low-income areas'[63].

It would seem at the very least unrealistic - for the time being - to enforce the building permissions to impermanent extensions. In practice then, the approach taken by the staff of the Building Department in Khayelitsha to impermanent extensions is mostly reactive: building supervision of impermanent constructions is done only upon complaint by neighbours, where after mediation between them is led by a street representative. For now, it is pragmatically chosen to focus on stricter compliance for newly planned conventional extensions.

The arrival of the department (potentially) is a major change in the political embedding of the core houses and possibly also on the consolidation process going. It is bound to be a slow process of getting a meaningful sphere of influence. Painful clashes between residents of informal settlements and government representatives in the post-1994 period may burden the relationship between government and residents who use impermanent material and/or live informally (see e.g. Symphony Way Pavement Dwellers 2011). The modernist visions of the Department of Housing and 'anti-slum state discourses' (Robins 2008) were especially clear in the advent of the "beautification" (after Davis 2006)

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[61] Mava Kenneth Nowala, Validation of research outcomes at meeting with the Human Settlement Forum of KDF, August 8, 2011. Expert interview via email, August 15, 2011.

[62] Expert validation with Moegsien Hendricks, local NGO, July 28.

[63] Expert validation with Prof. dr. Jeremy Seekings, July 28, 2011.

for the World Cup in 2010. Billboards along the N2 highway towards the Cape Town International Airport visualised ´utopian images of suburban bliss´, ´an idyllic future of modern, middle-income homes, happy families, clean playgrounds, and shining motor vehicles´ and proclaimed the "abolition of slums" (Robins 2008:13). Adjacent to the N2 highway is a massive informal settlement known as Langa, which suffered considerably from the implications of these ´anti-slum´ state discourses, leading to social movement resistance to the schemes that are ´simultaneously about constructing modern houses *and* "responsibilised citizens" (Robins 2008:13). Such experiences are not unique to South Africa, but painfully common in quickly urbanising and modernising contexts where the ideology of 'modernism' has guided urban development policies (see e.g. Davis 2006, UN-Habitat 2008).

4.3.2 Eyethu – T1V2

The fieldwork conducted for the sake of this thesis focuses on one part of the settlement Napier studied in 1996, namely the neighbourhood of Eyethu – sections F-J. An enumeration in 2005 gives an estimated 13,584 people living in Ward 94 (KPRU 2005:41), although the same report also gives 18,636 as a figure, in other words: there is a lack of certainty here. It is particularly surprising that mobility outside of this neighbourhood is very low relative to other wards. The ward recorded the lowest percentage of people who had arrived in the settlement after 2001 (3%) (KPRU 2005:43), implying that most have stayed within Eyethu since occupation. The neighbourhood of Eyethu (T1V2) can be considered as a 'middle of the road' neighbourhood where people are doing a bit better economically than those in the informal settlements' (Brown 2009:7). Due to the core-housing project of the 1980s, ward 94 is probably one of the most formalised wards in terms of housing, at nearly 83% versus about 17% informal structures in the area (KPRU 2005:44). The household size is on average 3.26, which represented the smallest household size of all the wards enumerated in 2005 (KPRU 2005:44).

Tenure and rent in 2011

People in Eyethu (T1V2) have accessed formal housing through a particular historical juncture in the 1980s rather than through the private market or the state (Brown 2009:7, Napier 2002). In terms of home ownership in the area, a lot of people bought their house about 10-15 years ago from the bank or the state and have invested in their homes. Home ownership however, reports Brown (2009:9) is complicated: people don't always know if they own legally or not. Rent collection and eviction are politically very difficult. The confusion over tenure and rents was also identified during the fieldwork in 2011. Ironically – a strong civic movement in Khayelitsha is the source of the confusion. A service and rates boycott remained in place for several years meaning that a considerable number of people chose not to purchase their core-housing from the State when this was offered to them (Napier 2002:221). This origin for the confusion over tenure and ownership in Eyethu is also given by the Khayelitsha Development Forum[64]. For the case study analysis it means that it is difficult to establish a potential relationship between finalising payments and sparking off extensions.

[64] Mava Kenneth Nowala, Validation of research outcomes with the board of the Human Settlement Forum of KDF, August 8, 2011. Expert interview via email, August 15, 2011.

Utility costs

It was observed that many residents were not clear about the difference between rent and servicing costs. Adding to the variation between service cost per households is that payment for servicing of water is negotiable, while electricity is privatized via a company and must be bought upfront as 'airtime' and would for some be truly expensive resulting in situations where people would never heat their house, even in wintertime. During the fieldwork of this thesis it was observed that for many households paying the servicing costs is a real struggle, with some people coping only by being extremely cautious with the use of tapped water, some would even hesitate to flush the toilet. Considering that Khayelitsha is located in a peripheral area as far as 35 km from the city centre, the economic utilization costs to the poor are high – even when it is subsidized housing they are living in. Indeed, for many, movement on foot is the only mode of travel affordable (see also Dewar 2000:212). There is a crucial link between mobility and livelihoods. UN-Habitat (2008:153) argues that increased mobility and accessibility ´create opportunities for income generation and capacity of individuals to tackle their own poverty situations´. In that light, the legacy of the original intentional separation of Khayelitsha continues to haunt it.

4.4 Summary

Established in 1983, Town 1 of Khayelitsha included about 5,000 plots prepared for core-housing. Professionals established the entire project. Described as 'Apartheid dumping ground' the project is planned on the Cape Flats, where quite particular geographical and climatic characteristics make habitation a challenge. Two years after construction the core houses are still standing empty due to resistance to the initial relocation scheme. People from backyard shacks and informal settlements eventually occupy the houses in 1985. In other words: the residents did not form a community and had not participated in any aspect of the project planning. The development rationale applied and the ideology that informed the project will have lasting impact on the consolidation process.

The project – apart from Apartheid characteristics – reflected the dominant trend in development thinking at the time: elementary housing approaches for low-income households. Within separate sections, virtually all plots had the same size, with relatively large plots in size of around 150-200 m2. A consultancy firm designed the initial core. It included a bedroom, a kitchen and a wet core that could be upgraded into a bathroom and a small hallway. In the broadest interpretation there were two habitable rooms in the 26m2 core implemented in T1V2 (Eyethu), where the fieldwork of the 2011 takes place. From a rational perspective the positioning of the core on the plot was reasonably good. Tenure has remained a politically charged topic throughout the years, with a great lot of confusion over ownership. The bottom line is that there is de facto security, as residents do not need to fear eviction by the state. Little attempt was given to recover costs from residents, and both rents and the generally high level of services were heavily subsidised. For almost all initial occupants the move to Khayelitsha generally meant an improvement in their housing situation although, being further from the city centre and most areas of employment, utility costs of the core-housing were high with regards to transport and unemployment plagued the project since the beginning. As for household characteristics of initial

occupants they were clearly living in situations of poverty and had a mean household size of 4.1 people at occupation.

The rhetoric of self-help – engrained in the classical elemental housing projects at the time - revealed to be empty as the professional team involved in the design of the houses effectively has no say in the political and social dimensions of the project. The early collapse of the planned support initiative left residents to achieve their consolidation projects in isolation from almost all institutional assistance. As for local government support, the small proportion of households who applied for permission to build seems evidence of the lack of communication between the community and local government.

Eleven years into consolidation, in Napier's (2002) snapshot taken in 1996, a key observation is that impermanent extensions – including backyard shacks - are by far the most common form of extension. Obviously, these are more within the reach of affordability levels than conventional material extensions and helped to relief the housing stress of the particularly small cores. Built density is not yet anywhere near those seen in informal settlements. The housing stock produced is mainly accommodating the internal growth of the households and their immediate families. Hardly any new stock is being created for secondary households, the incidence of extensions for rental and commercial purposes is still low, and second storeys are extremely rare still 11 years into consolidation.

Chapter 5: Research Methodology

'Effective housing' (after Gans 1972) here refers to an ideal, namely the implementation of 'sustainable', 'legitimate' and 'adequate' core-housing. Thus understood, effectiveness is closely tied with both the user-value of the house and external factors that together determine how the potential intended by the professional is interpreted in reality. This research explores the potential of combining the core-housing concept with open-building approaches – both of which experience a revival (see Chapter 1, Chapter 2.1 and 2.2) - and attempts to indicate whether such an open building approach may lead in the direction of more effective core-housing for low-income households living in rapidly urbanizing contexts.

The chapter at hand presents the methodology of the research. Based on the rationale and nature of this thesis, the chapter starts with an overview of the research question – its aim, guiding question and sub questions. In the following section, the conceptual framework is operationalised. As outlined in the introduction, South Africa will serve as a scenario for the unit of analysis of the exploration, namely core-housing implementation. The third section discusses the method of case study analysis and outlines how it was set up for the sake of the exploration in this thesis, including the fieldwork undertaken in Khayelitsha.

Nature of the research

Since knowledge and experience on the core-housing concept and open building approaches are still split within the field of architecture and urban/housing development studies[65] - this research is an exploratory research using qualitative case study analysis. The nature of this research and the research strategy chosen also reflect the field of expertise of the researcher, namely anthropology.

Case study analysis is a comprehensive form of research. The case study method is used when the researcher deliberately wants to cover contextual conditions – believing that they might be highly pertinent to the phenomenon of study (Yin 2003:13). As such, the case study contrasts with the experiment – which deliberately divorces a phenomenon from its context (typically the context is "controlled" in a laboratory). The case study in essence tries to illuminate *decisions*: why they were taken, how they were implemented and with what result (Schramm 1971 in Yin 2003:12). Yin (2003) stresses that a case study inquiry should rely on multiple sources, where data converge in a triangulating fashion. Moreover he highlights that the inquiry will greatly benefit from prior development of theoretical propositions to guide data collection and analysis. Accordingly the fieldwork conducted for this research is simultaneously guided by the conceptual framework, and an open-minded take, stemming from an ethnographers' approach to the field (see e.g. Hammersley & Atkinson 1995).

This research – in some respects - fits into the 'deviant' or 'hypothesis-generating' case-study method (after Lijphart 1971 in Robinson 2011), whereby the case-study strategy is used to bring the experience of households in Khayelitsha into careful conversation with other settings in order to reflect

[65] See Chapter 1, 2.1 and 2.2.

critically on existing theory and practice, to raise questions about this city-context through attending to related dynamics in other contexts, or to point to limitations or omissions in existing accounts' (Robinson 2011:6).

The research bears resemblance to an initial feasibility study[66] as well. Such a brief and selective study is conducted to determine whether the project is likely to meet its objectives, or whether these objectives will have to be modified (Davidson & Payne 2000). The basic purpose here is, as Davidson & Payne (2000:xii) put it, 'to avoid the wasted effort involved in taking research and design to too detailed a level before a decision is taken to abandon or develop the project'. This is particularly true for the exploration on the viability of applying open building systems to residential buildings targeting low-income households.

5.1. Research question

The rationale and nature of this thesis lead to the following research question.

Aim: to explore the potential of a applying an open building approach to core-housing; and on the basis of that possibly provide for considerations which may lead to more effective implementation in rapidly urbanising contexts.

Main question: May an open building approach lead to more effective core-housing implementation for low-income households living in rapidly urbanising contexts?

Sub questions: The approach chosen leads to the following three sub questions:
sQ1: What are perceived advantages of open building systems and in which context?
sQ2: What can be learnt from 26 years of consolidation of the core-housing project in Khayelitsha with regards to the effectiveness of the core-housing concept?
sQ3: To what extent is the introduction of an open building approach expected to result in more legitimate, sustainable and adequate core-housing?

Target population & target audience
In the stage of the feasibility study, as Davidson & Payne (2009:3-4) argue, it may suffice to have a quite broad initial definition of the household characteristics bearing in mind that 'it is sensible for any project intended to benefit low-income households to pay particular attention to economic characteristics'. Indeed, the nature of this research, which is exploratory, requires such a broad scope of the part of society that is referred to as 'low income households' in order to allow for new insights to be drawn from various urban contexts. As for their economic characteristics, the main concern of this research goes to the stringent financial criteria that apply to the affordability levels of low-income households.

[66] Davidson & Payne (2000) in their handbook provide for a framework which is, albeit simplified, based on the work sequence likely to be undertaken in preparing a new development project for low income groups within a certain locality. The framework distinguishes five stages[66]: feasibility studies (stage 1), detailed studies (stage 2), developing project options (stage 3), detailed proposals (stage 4) and project implementation (stage 5).

Target audience
With this research I intend to think alongside the urban professionals and other academics and practitioners who consider the implementation of core-housing in rapidly urbanising contexts outside Europe, North America and Japan.

Outcome & Output
Currently dispersed expertise is brought together, whereby the case study explicitly has the objective of revealing new aspects that need to be taken into consideration when implementing core-housing. The fieldwork provided for new (measurable) indicators for the consolidation process that may be useful to practitioners. On the basis of the trends identified in the consolidation process several considerations for future implementation are provided.

The output of this research is firstly a thesis for the Institute of Housing and Development Studies (IHS) as part of the master Urban Management and Development. Secondly, upon request of the Community Based Organisation (CBO) with whom I cooperated in the fieldwork, a short summary of relevant findings in the form of a report will be offered to the board of the Human Settlement Department of the Khayelitsha Development Forum (KDF) for further use in the benefit of the residents of Eyethu. Lastly, some of the outcomes will be translated into specific recommendations for the eco-affordable modular project conducted by Open-Source House (where I am active as a volunteer), and as an opportunity for mutual learning on combing architecture and anthropology.

5.2 Operationalising the research

In Chapter – 3 -, three "working definitions" have been developed for each of the building blocks of 'effective core-housing'. Herein, the elements of 'effective' – although in reality entangled – have been somehow "artificially" disentangled in order to shape them as a tool that allow for a meaningful discussion of trade-offs made in the implementation of core-housing. The temporal dimension is seen as fundamental to any assessment of each of the elements of 'effectiveness'. Time moreover is also wired through both the core-housing concept and open building approaches, and also allows for more meaningful evaluation of housing projects (see also Chapter 1). The conceptual framework thus formed on the basis of literature review has been summarised in a visualisation (see Model A2**)**, and forms the backbone of the analysis in this thesis.

Two additional tools for analysing the consolidation process have been given in the literature review (Chapter 2.5): 1) the influence of the temporal dimension is approached through the term 'trend' which indicates a possible direction in which the consolidation process of core houses and their plots are developing, 2) the principle of *zeggenschap* – distributed decision-making in building control – is used as an 'alternative way of seeing' the superstructure (core house), dissecting it into primary, secondary and tertiary levels and introducing various agents to each of the levels. Various (measurable) indicators to assess the consolidation process after occupation have been discussed in the literature review as well, with the explicit intention to build on existing expertise herein. Additional indicators followed as an outcome of the fieldwork.

A schematic overview of the methods used for each sub-question is given in the following table (Table 3, see also Annex 12).

sQ1: What are perceived advantages of open building systems and in which context?	**Main variables** Adequate**,** Legitimate
Source of data **-** Expert interviews with practitioners and literature on experiments and prototypes etc. - Fieldwork - Expert validation with: 1) an architect and practitioner in applying open building systems, 2) an academic practitioner specialised in urban planning in rapidly urbanising contexts	
sQ2: What can be learnt from 26 years of consolidation of the core-housing project in Khayelitsha with regards to the effectiveness of the core-housing concept?	**Main variables** Sustainable, Adequate, Legitimate, Temporal dimension
(Measurable) indicators **-** *Physical construction on the plot* (building on Napier 2002): Level of extension achieved; Contiguity of extensions; Material use; Positioning of extensions - *Housing stress in terms of space and privacy* Number of people on the plot; Habitable space added over time (after Napier 2002); Ratio people per habitable space, over time; Overall density levels of settlement; Positioning and contiguity of bedrooms main household in relation to core house - *Household characteristics* Composition (age, gender); Income levels, based on predictability thereof *-New indicators which may come out of the fieldwork and case study analysis* **Tools** Identification of trends	
Source of data **-** Case study analysis of core-housing implemented in Khayelitsha, including multiple sources such as popular, practitioner and academic publications across disciplines. -Fieldwork in the neighbourhood of Eyethu (former T1V2 Khayelitsha), using semi-structured interviews and several visits to the plots including extensive photography - Triangulation of findings from earlier case study in same area (Napier 2002) by an architect, who conducted this fieldwork 15 years earlier into consolidation, including extensive expert validation with this researcher - Triangulation of findings on level of extension and 'extension trail' of households with maps based on aerial photography of entire site in 1996 (see annex 3)**.** - Constant validation of findings through working with research assistants active in a local CBO, including validation of findings during a reflexive-session with this CBO. - Validation of findings through Focus Group discussion of key respondents	
sQ3: To what extent is the introduction of an open building approach expected to result in more legitimate, sustainable and adequate core-housing?	**Main variables** Sustainable, Adequate, Legitimate, Temporal dimension
Tools A 'particular way of seeing' guided by the principles of: "users" (e.g. the dwellers or residents of the superstructures), "building control", "autonomy" (e.g. the issue of ''who decides''), and seeing' the "act of building" in the light of the "temporal dimension" and the principle of 'zeggenschap'- distributed decision making in building control.	
Source of data **-** Case study analysis including fieldwork - Expert validation with: 1) an architect and practitioner in applying open building systems, 2) an academic practitioner in urban management and development	

Table 3 Summary of operationalisation and methodology per sub question.

This research took place in the period of October 2009 to November 2011, whereby the literature review was spread throughout 2009-2010 (part-time, namely alongside the UMD programme and a job), and the fieldwork took place (full-time) in a 5 week period in July and August.

Case study chosen

The choice of the case study and field work site, is informed by the desire to follow the consolidation process of core-housing over a longer period of time and to allow for triangulation of findings. The selection was done on the basis of that the work should include: Physical and technical analysis of cores and their extensions by an architect, quantitative data analyses and surveys, extensive information on the implementation process of the core-housing project and the occupation thereof by the targeted beneficiaries. Ideally the same site could be chosen for the fieldwork and ideally the researcher would be available for expert validation. On the basis of the criteria listed above, a dissertation by a South African architect was opted for, Napier (2002). His study 'Core-housing, enablement and urban poverty' is comparative of the level of participation in two core-housing projects – respectively in the settlement of Inanda Newtown (Durban) and in Khayelitsha (Cape Town) of which Khayelitsha was chosen as a main focus and locality for the fieldwork of this thesis as well. Napier's study is amongst the most comprehensive in the field of core-housing. Moreover, as an urban professional he continues to publish on housing in South Africa (see e.g. Napier 2005, Landman & Napier 2009, see also Annex 12).

Fieldwork

The actual fieldwork started with a meeting with a powerful local Community Based Organisation (CBO), the Human Settlement Forum of KDF (Khayelitsha Development Forum) on July 15, 2011. Their approval and support was sought for the fieldwork, which was key to gaining access to the households and having their trust, as well as having local government permission by the section wards. As a way of not only coming to get something, but also giving back something to the community inquiries had been made after the possibility to employ a local research assistant. A research assistant was then appointed by the CBO at that same meeting, in the person of Luvuko Ntshuntshe, who has 10 years of experience in community work in Eyethu and is an active member of the KDF. Support in gaining access to households was given by Happy Boy Sonyati, chairperson of Human Settlement Department of the KDF in ward 94 (Eyethu). Moreover it was jointly agreed to provide households with a supermarket voucher of R50 as a compensation for their cooperation, which would allow the households themselves to choose what to buy from that money[67]. It was agreed to report back the findings of the fieldwork in a plenary session at the end of the fieldwork period, which then took place on August 8, 2011. Prior to commencing the semi-structured interviews, the questions were carefully analysed and discussed with the KDF research assistants, and where necessary adjusted to local interpretations (see Annex 12).

The sample of 25 plots that forms the basis of the fieldwork analysis was based on intentional selection. Selection took place primarily on the basis of the level of physical construction achieved and with a conscious attempt to include "successful extenders". One non-extender was included on purpose, to get a feel of the housing stress experienced in the initially provided house. Two exceptions

[67] As an indication: one may buy a kilo potatoes, a kilo carrots and some chicken and stock from it.

to the rule of physical appearance as a criterion are the selection of plots with renters and plots with commercial activity. These were intentionally included as part of the interest in analysing the use of the plot for that purpose and because they were quite a "novelty" compared to the uses observed in 1996 by Napier (2002). The bias of selecting successful extenders no doubt has both direct and indirect implications for the composition of the household(s) on the plot.

Plots included in the 2011 sample were each visited at least twice to establish the current level of the extension achieved on the plot as well as identify their location on the 1996 maps of Napier (see Map A1). The "extension trail" followed over time since occupation was then reconstructed together with the head of the main household. Napier's findings for the very same plot in 1996 were used as a double check for the households' recount, as memories may blur over time, and at times led to interesting new topics arising from residents' clarifications. Importantly, the 1996 level represents the level of physical development on the plot and may not necessarily be related to the current household. Extensive photography further helped to analyse the level of consolidation on the plot.

The multiple visits to the same plot were initially mostly part of strategic attempts to "get hold" of the head of the main household who, typically the eldest members, would be best able to tell about the consolidation process. As the fieldwork proceeded the multiple visits turned out as a way to gain even more trust of the residents as well as the opportunity to clarify and verify what had been said in earlier conversations. For each of the plots included in the 2011 sample a semi-structured interview (of half an hour) was held as well as several more open conversations with the head of the main household. A qualitative understanding of the consolidation process was thus gained.

Expert interviews and -validation.

Multiple experts across disciplines were approached to give input on specific topics within the exploration. Key findings of the literature review as well as the analysis of the findings of the fieldwork have been validated with experts as well. The specific topic of validation is indicated in the text, using a footnote. A detailed list of the experts interviewed can be found in the annexure (Annex 12).

Sessions for validation of fieldwork findings

Validation of the findings and first outcomes of the fieldwork was held during two sessions, one with residents during a focus group discussion, and one with the board of the Human Settlement Department of the local CBO with whom I cooperated, the Khayelitsha Development Forum (see also Annex 12).

Transparency and "reader validation"

It is my explicit intention to allow for validation of the analysis, by giving transparency over the fieldwork outcomes. This is the motivation behind the quite detailed annexure, which intentionally show every single plot included in the sample – albeit with a fictitious address – in every single table as this may possibly also allow for other combinations and further analyses of the findings. In the analysis each of the plots is given an anonymous reference, which does however refer to the section to give some indication of the location within the neighbourhood (e.g. plot#F6 refers to section F, the house number is not however 6 in reality).

5.3 Limitations

Several limitations to this research are inherent to its scope and exploratory nature. The scope is directly related to the primary concern of open building approaches namely the built environment as well as the focus on enabling its prime users. While touching on other dimensions of housing indirectly, this thesis does not delve into issues such as tenure, settlement layout or an understanding from the perspective of a secondary household. Rather, this exploration is a simplified yet comprehensive analysis of the core house and the plot, in particular the socio-spatial and physical implications of both. Accordingly, the indicators given to assess the consolidation process too best resemble a work in progress that builds on existing expertise in case study analyses and is open to new additions and corrections. Considering the strategies chosen to answer the research question as well as the time- and capacity limitations of this thesis, the following main limitations must moreover be taken into account.

The case study is not analysed here so much for drawing conclusions that are of direct relevance to its households and project site, but represents an attempt to extract issues which may be relevant across urban contexts. Clearly for the 2011 fieldwork the area coverage as well as the respondents and plots covered is too small to allow for generalisations, while the intentional selection of households to be included in the 2011 sample would render such generalisation methodologically misguided. Rather, the qualitative fieldwork in 2011 offers a rich insight in the consolidation process of the core-housing into time. To verify the trends identified among the sample of households in 2011, secondary sources and expert validations have been actively sought.

Possibly the largest limitation of the sample of households in 2011 is the strong bias towards successful extenders, while the situation of non-extenders is basically left out. The reason for not including an equal number of non-extenders is that one of the main objectives of the fieldwork was to reconstruct the order and timing of extensions and identify a spectrum of possible constraints experienced *along this extension trail*. Moreover, the analyses of Napier had already extensively discussed the situation of prolonged non-extenders. Doing justice to their situation would require a different approach altogether, possibly needing considerably more capacity in terms of time and staff to track down their housing journey (e.g. to establish whether downraiding had taken place etc.).

It was beyond the time and capacity of this research to include measurements and drawings of the physical layouts of the extensions – and also not within the field of expertise of the researcher to do so. Other, more brushed indicators have therefore been included to indicate the level of housing stress experienced – yet these cannot be used for any residential density calculations. As the sample is not random, such a calculation would be rather meaningless anyhow. It is believed that for an exploration the current indicators give sufficient background. Moreover, to compensate the lack of physical layouts, architecture's drawings and analysis of possibilities and constraints of quite similar core-housing implemented elsewhere in South Africa is actively included.

The pitfall of referring to the targeted beneficiary of core-housing as 'homogenised' entities along the discourse of a uniform core house and

construction process that assumes worldwide applicability (after e.g. Escobar 1995) - is here acknowledged. Care has been given to regularly stress that each household must be recognised for its own unique characteristics. At the same time, this thesis does indeed attempt to extract considerations that may be relevant across rapidly urbanising contexts. In that it follows the call of Robinson (2011) who 'proposes a new phase of comparative urban research that is experimental, but with theoretically rigorous foundations', by explicitly also including 'comparisons that stretch across (…) divides', such as the traditional North-South divide, wealthier and poorer cities, capitalist and socialist, different regional groupings of cities etc., with the objective to meet the 'urgent contemporary need for thinking across different urban experiences'.

5.4 Relevance of this research

Studies on the core-housing concept and open building approaches are still scattered within two largely disconnected disciplines – architecture and urban development (and housing adjustment) studies. Evaluations and conclusions are consequently fragmented as well (see Chapter 1). With this research I aim to provide urban practitioners with an overall picture of lessons learnt. The exploration may result in a stimulating influence between currently scattered elements and direct to a contemporary and more comprehensive interpretation of the core-housing concept. Such an outcome is interesting with a view to the renewed attention for the use of core-housing among urban professionals worldwide, echoed in the founding of *The Global University Consortium Exploring Incremental Housing*, based at Massachusetts Institute of Technology (M.I.T.), Boston (U.S)[68].

The outcomes of this research may also be meaningful to assess the prospected effectiveness of contemporary proposed "housing solutions" by architects[69] or of government initiatives[70] which have the intention to speed up the delivery of low-cost housing as a response to the huge backlogs found in many cities in the developing world. A viable assessment of housing innovations for developing countries often is a common problematic aspect of innovations; either because the innovative concepts have never been implemented in the first place, because they only involved pilot studies or because the observations were typically based on project evaluations done immediately after the completion of the projects or just some years afterwards (Napier 2002:10). The case study analysis in this thesis offers the opportunity to "follow" a project site over a period of time of 26 years since occupation and assess what the effectiveness of the implementation has been when the time dimension is given central stage.

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[68] See Chapter 1. Also: Beattie et al. (2010) and http://web.mit.edu/incrementalhousing [Accessed August 5, 2010].

[69] See Chapter 1.

[70] For instance, the National Housing Corporation (NHC) in Kenya in its Housing Bill 2009 has included the initiation of low cost pre-fabricated materials plant in Nairobi, with the idea to produce housing at a higher speed. Source: lecture by dr. B. Hendriks, lecture at Institute for Housing and Urban Development Studies (IHS), June 7, 2011, Rotterdam (The Netherlands).

Chapter 6 Figuratively taking the open building system out of its context of origin to assess its potential environment

In construction practice, open building approaches have been promoted and perceived as a way out of the incapability of traditional building processes and have resulted in the introduction of open building systems (Osman & Königk 2009). Possibly then it is an open building system that could render the initially provided superstructure to a low-income household more effective? This chapter analyses the reasons behind the revival of modernist concepts and the surge in the use of open building systems in both design and construction. The guiding question of the chapter is: what are perceived advantages of open building systems and in which context? To answer this, open building systems are not only traced back to their origins, but also figuratively transferred to rapidly urbanising contexts outside its original embedding. The concept 'legitimacy' in particular is at the heart of the analysis and findings.

6.1 Perceived pragmatic advantages fit the European, North American and Japanese contexts best

It is revealing to do a fictitious exercise and "transfer" the perceived pragmatic advantages and motivations of the use of the open building system to a non-European, North American or Japanese context. There are: 1) economics of scale in manufacturing of multiple similar units, 2) speed of installation relative to site-intensive construction, and 3) improved quality and accuracy in manufacture (see Chapter 2.2). Indeed such an exercise sheds a new light on the contemporary surge of open building systems and proves that the revival of modernist concepts is closely interwoven with the central opportunities and limitations offered in the markets and socio-political and -cultural contexts of their origins. What is their potential effectiveness for low-income housing in rapidly urbanising contexts outside Europe, North America or Japan?

Economics of scale

The first pragmatic advantage perceived is the economics of scale in manufacturing of multiple similar units. The precondition implied is the presence of high capital investments as well as the availability of highly qualified labourers. Clearly, in Europe, North America and Japan, both preconditions are met. In order to be cost-productive, demand for the units produced must be large in numbers. The need for at least some large distance transport is almost implied in the open building system as for every different design of a system the components are commonly assembled from a different combination of manufacturers. Indeed even in the European, North American and Japanese contexts, 'production plants for the prefabrication of building elements are seldom near the relevant building sites, which often means that elements must be transported long distances to the location where they are assembled and erected' (Staib et al. 2008:41).

It is quite likely that the international competition is too tough both in terms of quality and price to make setting up a local factory a viable option in a developing country, leading to the conclusion that components are most likely to

have to be imported. The point is proven for instance by the experience of André Buitenhuis[71] who, as a project leader for a globally operating building solution corporation, developed a modular house for the upper band of the low-income household sector in Surinam. The house can be extended over time by prefabricated extensions[72], is competitive on the local market and offers certain benefits above traditional construction such as better climate intelligence. Components are chosen from various suppliers in Europe. Whereas the production of most components - sandwich panels and steel products - is located in Belgium, other components may come from France and India. Via Rotterdam the components are then shipped to Surinam. The company aims to establish a local manufactory over time, yet for the time being this is premature as the selling numbers do not justify such a capital investment yet. The price tag of even this entrepreneurial search for lowest costs to ensure an affordable house is such that the product cannot target lower income households, as the house cost does not suit their effective demand.

If a local manufacturer would succeed in running a profitable factory for the local market, there is the danger of too rigid, centralised and top-down implementation for the sake of economic efficiency. A manufacturer will be keen to mass supply multiple similar units - or at least units that have the same basic components – within a radius of distance that is still profitable. Such rigidity is unlikely to effectively respond to the particularities of various residents' demands in a rapidly urbanising context with changing aspirations and effective demand due to increased welfare. Inflexibility and lack of variety is particularly inherent to en masse implementation of housing based on a closed system. Yet rigidity may equally endanger open building systems when used for low-cost housing whereby choice is limited due to the tight budgets for implementation as the households themselves have little effective demand. The historical experience of the post-war prefabricated housing experiment in the U.S.A. serves as a warning sign. The experience is emblematic of the difficulties of making a significant impact on the housing industry in a time of tremendous housing shortage within a quickly modernizing society (Anderson & Anderson 2007:10). The destruction of World War II, the return of veterans and the pre-war housing shortage combined to create an unprecedented demand for housing (Stohr 2005:39). The problem of not being able to solve that housing shortage certainly wasn't a lack of experiments. The 'concept of prefabrication reached its climax in the 1960s with the diverse urban and architectural utopias of that era' (Staib et al. 2008:5). But a rigid, centralizing industrial organization completely missed the mark in a society and economy that was modernizing more rapidly and in a far more decentralized and individualized structure. 'Ultimately, the cost per unit of off-site manufactured housing made most prefabricated dwellings prohibitively expensive for those living on the economic margins' concludes Stohr (2005:41). And this cost-ineffectiveness continued to plague prefab experiments.

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[71] André Buitenhuis, Surinam - Skype interview, December 29, 2010.

[72] It is too early still to assess the effectiveness of these extensions in the project as the option has not been accessed yet by current buyers of the house as they are not yet in a next phase of consolidation in terms of adding space and privacy.

Speed of installation

The second perceived advantage of the open building system is the speed of installation relative to site intensive construction. Modular and off-site construction technologies take most of the production away from the construction site, with the idea to replace the 'essentially the slow unproductive site activities' by 'more efficient faster factory processes' (after Lawson et al. 2011:50). Prefabrication, referring to the offsite making of the elements prior to installation at the site, is an important step in the construction of every building but especially integral to building systems. The greater the level of prefabrication, the lower the amount of assembly work on site and subsequent the shorter the construction time.

In Europe, North America and Japan the development of industrial prefabrication in industry is encouraged by the 'continually increasing (…) efforts to shorten the design and construction periods' (Staib et al. 2008:40). Time cuts are justified first of all by the expensive labour. In the context of the private sector projects delays in starting up the business mean major losses, also vis-à-vis investors and loans taken for the construction. Such is the quest that for capital development of buildings, where finances and time allow, mobile factories are temporarily set up in close proximity to the building site for the duration of the production of building elements (Staib et al. 2008:41). A prerequisite are fully automated specially developed production techniques that are supported by the use of robots that can carry out the assembly work autonomously. Japan particularly boasts in a high level of development in the area of computer-operated assembly and finishing plants 'which are considered standard procedure for construction sites there' (Staib et al. 2008:41).

Yet the very same argument of efficiency may in another context be perceived as a primary reason to indeed (for the time being) refrain from speedy off-site construction in a factory. For instance in South Africa, where housing construction is perceived as a key strategy for job-creation (RDP 1994, 2.3.8)[73]. In the face of massive unemployment, labour-intensive construction that is accessible to builders and craftspeople with little or no formal qualification is purposefully sought after. One of the basic principles of the democratic government has been linking reconstruction to development, which is seen by the Mandela government 'in contrast to the argument that growth is needed before development is possible' (RDP 1994, 4.3.1.). The Policy Framework states that it aims at 'boosting production and household income through job creation, productivity and efficiency, improving conditions of employment and creating opportunities for all to sustain themselves through productive activity' (RDP 1994, 2.4.2). Clearly, macro-economic considerations are very different here, and so are the financial considerations as – contrary to the context of origin – labour is cheap and widely available. Thus in the South African context it is likely to be more legitimate and even economically viable to use traditional building methods and prefabrication by hand[74].

[73] I am indebted to Dr. Mark Napier, Urban Landmark, for pointing this out to me as a problematic feature of modular construction within his country, South Africa.

[74] Building systems and their elements can indeed be prefabricated by hand, as is the case for example in half-timbered buildings (Staib et al. 2008:42).

At the household level it is strongly doubted whether formal construction can ever compete with the speed of installation and flexibility of buildings already offered by the informal market. One of the first things one will observe when driving into Khayelitsha via the main route is the modules being offered for sale by various informal entrepreneurs (see Picture 2). Choice starts with a one-door-one-window module and goes up to larger modules. Sizes vary from 3x2.4 meter up to 6x3 meter. Finishing depends on a buyers' budget. The modules are delivered to the plot within a day and include everything but servicing or insulation, "It is a shelter", explains the most well-known dealer[75].

Picture 2 **"Local modules" being sold at 'Greenpoint', the entrance to Khayelitsha.**

Picture by author.

Picture 3 **Head of a household on plot#I1 points out where the shack of the renter had been standing; the module had been bought from 'Greenpoint'.**

Picture by author.

[75] Dumisoni Lagumás, Expert interview, August 6, 2011, Khayelitsha.

More precisely these modules are a form of prefabrication of the backyard shacks seen everywhere across Khayelitsha, and may be used for instance by renters. A main household will then 'lease' part of the plot to the renter, and if the renter is lucky, will make a slab foundation (see Picture 3)**.** The module will then be delivered to this foundation and habitation can start the very same day. With the same ease, the module may be gone within a day, being taken elsewhere – although of course time will run down the quality of the structure and render moving futile.

Improved quality and accuracy

The third pragmatic advantage perceived is the improved quality and accuracy in manufacture. As Staib et al. (2008:40) analyse: 'as conditions on site are often less than optimal and cannot match industrial production standards this can lead to construction delays and loss of quality'. 'The primary purpose of prefabrication is to produce building components in an efficient work environment with access to specialized skills and equipment in order to reduce cost and time expenditures on the site while enhancing quality and consistency' (Anderson & Anderson 2007:7). Yet the improved quality and accuracy also have a price tag, not only in the needed modern, computerised planning and production but also in the highly skilled labour required and the resourcing and transport of the components. The high quality end product consequently is increasingly expensive, and may well be out of reach for most income groups. Indeed the history of the modernist experiment in Europe is illustrative of how difficult it is to go from high quality prototypes to commercially viable houses for modal income groups.

Producing a house that targets the needs, preferences and aspirations of low-income households themselves – within their stringent affordability criteria[76] - is an incredible challenge. Particularly so, since considerations of residents may not all be rational from the point of view of an architect. Legitimate demands to a house design may be related to very specific trade-offs low-income households are willing to make to reach the aspired extension to the house in terms of privacy and space. An excellent analysis of the clash between the qualitative design considerations of professional and pragmatic design solutions in self-built houses comes from Khan et al. (2010). The study adopts ethnographic methods to find the implicit reasons behind pragmatic decisions during initial as well as different stages of consolidation of the houses.

The researchers give an insightful analogy of a square to illustrate what happens when the resident and the architect are in dialogue (see Figure 4). Six squares - ranging from a blurred to a perfect one (a-f) – are drawn to show that the concept of a square can be flexible. Based on their observations of architects drawing building plans for residents, Khan et al. (2010: 55) explain that 'an architect might like to choose 'f' to define a square, but the 'subjectivity value' of family life at a given time 'might lead users to select 'e', 'd', or even 'c' as a

[76] For instance, Access to state provided core-housing in contemporary South Africa is intended for households which earn a maximum of ZAR 3500 per month, meaning a yearly income of around ZAR 42,000, €4,780. Surely, income levels may change after occupation. Source: Tissington (2011) and http://www.etu.org.za/toolbox/docs/government/housing.html [Accessed August 18, 2010].

square'. Khan et al. (2010:50) suggest that knowing the 'subjective values' can be one of the basic ways 'to bring architects closer to these users' as 'it is the flexibility responded to social responsibility that will draw the professional decision close to pragmatic decisions' (Khan et al. 2010:55). The analysis is insightful, yet the question that immediately comes to mind then is: how can the dialogue between the resident and the architect be realised if they are not in such direct contact?

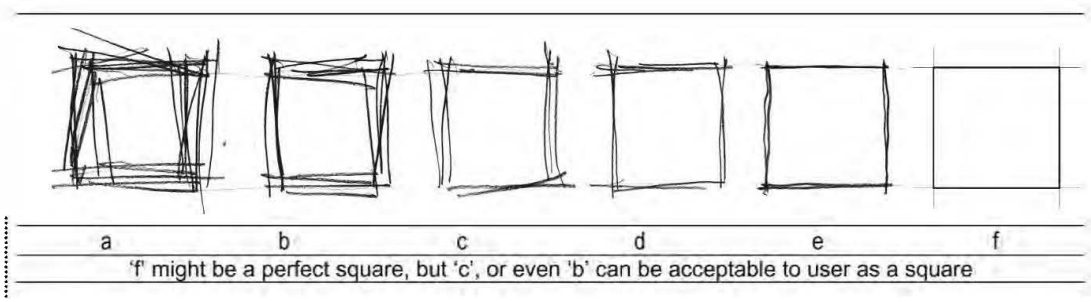


Figure 4 The concept of a square can be flexible.
Source: Khan et al. (2010:55).

6.2 Ideological motivations are interwoven with central threads of Western European socio-cultural legacies

What then about the three ideological motivations identified in the (predominantly) Western European context? These were: 1) flexibility and adaptability of the open building system, 2) the drive to experiment & perceived aesthetics of modernist construction and 3) the possibility to combine the implementation of an open building system with climate mitigation (see Chapter 2.2). What follows is a brief discussion of the main issues involved with taking these ideological motivations outside their context of origin.

Flexibility and adaptability of the open building system
Three aspirations are commonly related to the adaptability of a building: "deconstruction", "disassembly" "dismantling", although definitions seem to overlap (Osman & Herthogs 2010 in Osman & Sebake 2010). Basically the focus is here on the process of removing building components and materials from an existing built structure and the requirements for reprocessing the salvaged components and materials in order to reintegrate them into another built structure (Sassi 2002 in Osman & Sebake 2010). The motivation is twofold – although practitioners may focus on either one of them: decreasing environmental impact and/or tools for adaptability from the building user's point of view (Osman & Sebake 2010).

The perceived advantage of the adaptability[77] – particularly for a residential building - must be approached with some caution due to the way it fits into the specific European, North American and Japanese contexts in which the concept in its modernist understanding emerged. Indeed, the idea of the adaptability of a house can be traced back to European modernist aspirations with

[77] Adaptability here mustn't be confused with the concept of 'climate adaptation' as used in the discourse of sustainable development (see also Annex 10).

Fuller (in Schwehr 2011:16) claiming "a room should not be fixed, should not create a static mood, but should lend itself to change so that its occupants may play upon it as they would upon a piano". Not only architects, but also the public has developed aspirations of adaptability. In the U.S.A. for instance, from the early 1920s onwards, the prefabricated mobile home has been filling a growing niche in the housing market and 'quickly became a part of the American vernacular' (Stohr 2005:38). Importantly then, the popularity of the 'mobile home' is legitimate in the public eye as it is interwoven with the American history of the Great Depression. To migrant workers, the mobile home was an outcome as land could be rented at a nominal fee and no complicated applications needed to be submitted for government hand-outs. As such, the adaptable systems in housing construction may reflect a certain aspiration in lifestyle that has legitimate historical roots but may not necessarily be legitimate in other contexts.

Browsing through the icons of open building systems for residential units (e.g. Staib et al. 2008), it quickly becomes clear that they are case studies designed and built for higher bands of middle class income households who aspired a personalised house. In other words: even in contemporary Europe, one of the origins of the modernist concepts, housing projects for lower-income households are seldom or never realised on the basis of open building principles. One of the reasons for that is inherent to the open building approach itself, namely that it is particularly suited for projects whereby residents at least take partial responsibility for the maintenance and also co-invest in that. In the "West" this almost per definition implies a higher-educated target group with a common social profile. To date, such a profile does not match the expectations project implementers have of lower-income households, and it is believed to be a safer investment to assure maintenance through standardisation and structural soundness. [78]

Interestingly, in the fieldwork conducted for this thesis in Khayelitsha South Africa, it was found that many of the low-income households included in the sample aspired to build a "family house": a permanent and solid structure where "the children can always come back to"[79]. The idea of a "family house" is very much part of the local discourse; no one seems to need explanation on what is meant by the word. During the focus group discussion, participants moreover responded in disbelief about the material use of one of the designs architects had made for core-housing. The shared deep concern was: how long is this house going to last? Participants also explained they had little interest in constantly adapting a house. "It is already enough of a struggle to get the extensions in the first place!"[80] Indeed, permanency is at the heart of the meaning of a "family house". Aspiring it may have internal as well as socio-political roots.

Sometimes the needs of the next generation are that much important that house size and design after consolidation are likely to reflect factors other than current household size. In many developing countries 'the likely needs of the next

[78] Frederik Groos, expert interview via email, August 25, 2011.

[79] Respondent plot#J20, head of an extended family, semi-structured interview, Khayelitsha, Cape Town (South Africa), July 26, 2011.

[80] Focus group discussion, August 5, 2011. Boardroom KDF, Khayelitsha, Cape Town (South Africa).

generation, and how best the house can serve them, appear to be very important in the decision to transform' (Tipple 2000:46). A conventional hypothesis is that a contracting household of an older couple may choose to move to a smaller house, or at least refrain from further extending the house. Tipple (2000) however observed that in various developing countries relatively old people are increasing the size of their houses – often with non-financial help from heir grown-up children. In several countries the older generation has the responsibility to give the next an especially good start in life; which 'is often expressed in terms of a house to live in' (Tipple 2000:46). The construction of several rooms to convert a single household dwelling into a suitable family house also has a benefit for the ageing owner and his/her spouse. As Amole et al (1993 in Tipple 2000:58) report, 'being a head of a house or an elder in the house gives the old folks a useful role in life long after they have ceased to be physically active'. Tipple (2000) also discusses the potential for passing ownership rights down the income scale to the next generation who does not yet have enough resources to acquire a house in the market.

Consolidators are expressing not only housing needs but also the desire for identity, a sense of belonging, dignity and acceptance. A search for status among neighbours may be an important motivator (see e.g. Kellett 1995 in Tipple 2000:41). Yet, socio-historical and political dynamics may also give the construction of better housing a much deeper meaning: a search for acceptance as a fully participating citizen. Thus 'the question arises as to whether affordable housing is a suitable place to experiment with materials or new technologies', write Osman & Sebake (2010:246), since 'people generally do not want to stand out in the neighbourhood as those living in a "weird experimental box". Such "standing out" (…) 'exacerbated the separateness'.

When it comes to the design of a residential building, the 'low-income user' possibly is most interested in: adaptability and maintenance of the house. Yet, low-income households have themselves become incredibly resourceful in managing the adaptability and maintenance of their own houses. Or as Davidson[81] puts it: "The brick is probably the most flexible module ever invented". The adaptability of building components and the building as a whole are evident in the incremental approach to housing. The problems in the maintenance of "housing solutions" implemented in developing countries moreover prove that unless the construction of the house is in tune with local skills and local material, the house is not able to stand the test of time[82].

The problematic legitimacy issues related to building system / modular "housing solutions" and their key relevance for implementation processes are confirmed in the reflexive-learning experience of Open-Source House (OS-House)[83]. A winning design for the proposed 'eco-affordable modular house' was taken to a test case in Ghana and its construction is now almost finished. The intention is to reproduce it on a larger pilot scale of 100 houses. Two recent

[81] Forbes Davidson, Expert interview, April 14, 2011, Rotterdam (The Netherlands).

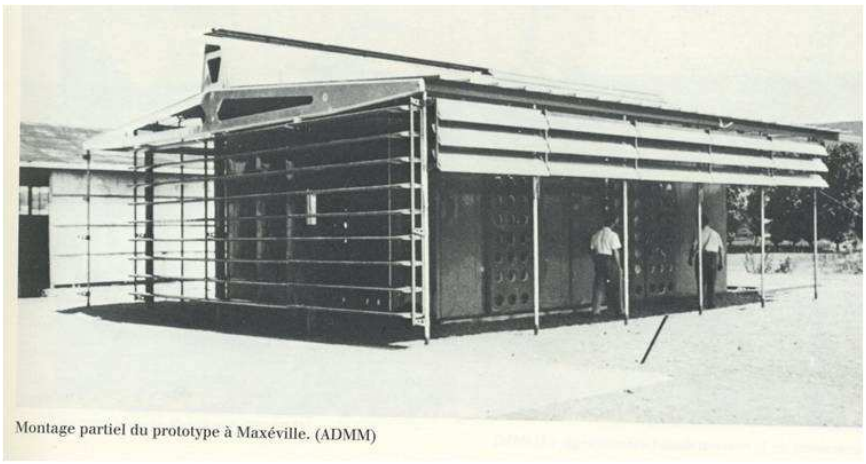
[82] See also Chapter 2.1 and Annex 11.

[83] Where I have been involved as a volunteer. See also Chapter 5.

workshops with some 50 key local stakeholders however primarily pointed out legitimacy issues of the test case house. As stated in the newsflash to people involved: 'overall learning from the first workshop is that designs are not reflecting the expectations of the end users – it seems that the (…) designs are too radical for Ghana. (…) The second workshop 'was organised to get the end user involved in the process of co-creating the design as they would like their houses built', yet 'the problem left is that the price of the current house is still not affordable to our target group'[84]. OS-House is looking for solutions as the point of departure is the accessibility of the house, not its design. In retrospect, this experience highlights the key relevance of early and meaningful co-decisions by the targeted beneficiaries.

Drive to experiment & perceived aesthetics of modernist concepts

Looking at Prouvé is insightful to realising just how interwoven contemporary open building systems are with the central threads of modernism – *not* only in pragmatism. The remarkably simple and flexible system developed by Jean Prouvé hasn't lost its relevance for contemporary thinking about open building systems[85] (see Picture 4 and 5).



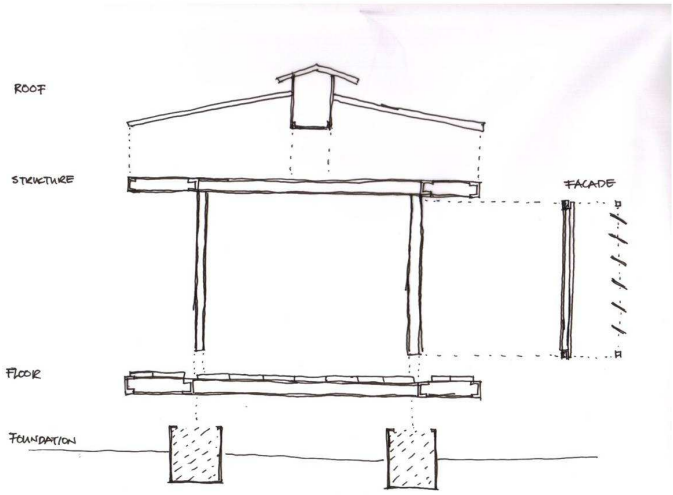
Picture 4 Prefabricated 'Maison Tropical' by Jean Prouvé.
Source: http://www.lamaisontropicale.com [Accessed, August 21, 2010].

From the 1930s Prouvé had been experimenting with factory-produced temporary shelter. After the war his attention turned to developing a more complex structural system in which the distinction between frame and infill was progressively eroded. Prouvé introduced 'a sheet metal design in which the ridge pole of the house provided the basic spatial envelope to which a series of panels provided at once enclosure and rigidity' (Bergdoll 2008:22). It was a system that could be adapted to vastly different climates, sites and scales through modular expansion or pavilion-like additions. Prouvé still inspires European designers, not only for his

[84] OS-House Newsletter October 2011. Available http://www.os-house.org/english/os-house/News?postid=151 and http://www.os-house.org/english/os-house/News?postid=153 [Accessed 27 October, 2011].

[85] There is an ballooning literature on Prouvé 'particularly since the seminal 1981 exhibition at the Museum Boijmans van Beuningen in Rotterdam' (Bergdoll 2008:26).

system, but also for his social engagement and – importantly – for his pragmatic approach to design.



Picture 5 Sketch of a proposed eco-affordable modular design for Open-Source House.
Visual by Van der Meulen 2010.

Picture 6 'La maison tropicale' by Jean Prouvé at TATE in London.
Source: http://www.lamaisontropicale.com [Accessed, August 21, 2010].

Yet, from a different angle, it becomes clear that the pragmatic approach is also culturally tied to a certain perception of aesthetics. Today, by the wider public, Prouvé's experiments are predominantly cherished as an architectural art form and considered as an integral part of the European history and culture. The prototype of the 'Maison Tropical' (see Picture 6) for instance, after having been open for the public at the TATE museum in London, was auctioned in New York in 2007 for an estimated price of up to $6 million (Rawsthorn 2007). The example is illustrative of the legitimacy of the aesthetics of prefabricated systems in Western Europe and North America. Japan already had more minimalist aesthetics interwoven in its culture (see e.g. Staib et al. 2008).

One ought to be particularly hesitant to experiment with "housing solutions" for low-income households, as they are tremendously vulnerable due to their stringent affordability criteria. Again, even the European experience itself proves that hesitation is the most realistic approach. Even in France Prouvé's success was limited, and few houses were built outside the experimental site of Meudon. Only three of Prouvé's tropical houses were ever mounted in the clever system of airplane delivery that he hoped would make life in tropical climates more comfortable for the French bureaucrats in decolonizing Africa (Bergdoll 2008:22; Rawsthorn 2007).

Picture 7 **Pontetower in Johannesburg South Africa, architectural consequence of modernist concepts.**
Source picture and text: http://atlasobscura.com/place/ponte-tower [August 15, 2010].

Moreover, the legitimacy of modernist concepts is burdened by the strong images produced by 'the "architectural" consequences' (after Staib et al. 2008:9) of the modernist approach to housing in the 20th century which are indeed very real to the public. The negative associations and images have started in Europe and North America. The post-war years in both continents saw the continuation – and expansion – of the slum-clearance programs begun during the 1930s Depression continued in the name of 'urban renewal' (Stohr 2005:41). Still holding on to the idealism of the new, ordered city, post-war policies continued to be enacted at the national level and carried out locally: a centralized, top-down approach. In the beginning many of these new developments consisted of low-rise apartment buildings, but over time Le Corbusier-inspired high-rises and slab apartment

blocks of the kind designed by students of the Bauhaus school became the norm. Poor siting, cost cutting and shoddy construction compounded the problems associated with the new housing developments. By the 1970s it had become clear to many that the post-war approach to public housing had failed. Slums had not been replaced by "new towns" or "radiant cities" but by "vertical ghettos" (Stohr 2005:41). 'As a result, in the public eye at least, the modernist tower block became the scapegoat for an era of flawed housing policies' writes Stohr (2005:41). A visualisation of this flawed implementation can be found in Johannesburg, South Africa, where the Pontetower over time resulted in a vertical slum (see Picture 7).

Strong images such as the Pontetower[86] are key in the perceived legitimacy of the use of modernist concepts for the sake of low-income housing. Modernism - in its own turn too - has come to be regarded as a paradigm that needs to be broken with in housing design. Indeed Staib et al. (2008:9) in their overview of contemporary modular construction deliberately start their introduction with reference to what they call "the first emotional reaction" to the terms 'components' and 'systems', explaining that 'these terms evoke – not only for architects – associations with industrial production, serial fabrication and assembly lines; more precisely, post-war construction techniques. That is, images dominated by technology, uniformity, indeed even monotony'. The history of the Pontetower in South Africa is physical proof of just how burdened 'components' and 'systems' are by examples from more recent architectural history. And despite the optimist call to reconsideration of Staib et al. (2008), indeed prefabrication and other modular concepts may encounter strong resistance for use for low-income households.

The possibility to combine the implementation of an open building system with climate mitigation

Roberts (2010) shows how in *realpolitik* - especially so within quickly urbanising and socio-economically diversifying contexts - adaptation strategies have more chance to be acted upon. Her analysis is based on a longer term study of the city of Durban, South Africa – an "early adapter" (Carmin et al. 2009 in Roberts 2010:397). As Roberts (2010:399) explains from within this context: 'Mitigation's focus on carbon is abstract, often poorly understood and raises equity issues about who caused and who should be responsible for addressing the problem'. Besides that, climate change is often perceived as 'a distant and unlikely threat, with much less urgency than other development challenges or pressures' (Roberts 2010:401). Roberts (2010:399) analyses that for the South African case, the mitigation work that does occur within the municipal structures is merely a by-product of

[86] The Ponte-Tower in Johannesburg was built in 1975 to a height of 173 m, making it the tallest residential skyscraper in Africa. "Life in the building became truly brutal after the fall of Apartheid. As crime rose in the once-upscale Hillbrow neighbourhood, numerous gangs moved into building. Ponte Tower became a centre of organized crime activity, and life in the building become extremely unsafe. Owners all but abandoned the structure to decay. At one point the garbage piled five stories high in the open inner courtyard of the building" (Desai 2010). The building was under complete redevelopment for high middle class by a private developer since 2007– but his project failed due to the economic crisis that hit the world in 2009.

economical development relevant interventions[87], or driven by international funding that offers opportunities for economic development.

By contrast, a key reason for adaptation achieving such prominence in Durban is that adaptation or resilience-focused interventions offer the potential for development-linked co-benefits that 'are responsive to a context of poverty and underdevelopment' (Parry et al. 2007 in Roberts 2010:399). Roberts moreover – based on the experience in Durban – argues that as events linked with climatic uncertainty increase, political support for climate change adaptation interventions will also increase – particularly after events that result in rapid onset disasters. Roberts (2010:398) adds that in Durban there is 'the added pressure of ensuring that post-apartheid development gains are not undermined or lost, and that the escalating and urgent development challenges still facing the city are not further exacerbated by climate change'.

Satterthwaite[88] tackles the over-optimistic position that mitigation and adaptation will automatically follow through market responses and smart technology greatly understates the impacts of climate change and their cumulative nature and wrongly assumes that those most vulnerable will be thus protected. Meaning that resilience at the core house level must be actively designed too. Discourse does matter, because it allows two seemingly different worldviews to find common ground – even between departments as Roberts (2010) case study proves[89].

6.3 Summary

This chapter rises the question what the potential effectiveness of the open building system is when taken into rapidly urbanising contexts outside Europe, North America and Japan, and applied to low-income housing implementation. Clearly, such contexts face very different challenges, while low-income households are moreover tied to very stringent affordability criteria.

The exercise has been rather disenchanting. Primary perceived advantages of the open building systems lose much of their legitimacy in rapidly urbanising contexts. When it comes to economics of scale, various doubts have been raised to its legitimacy outside European, North American and Japanese contexts, amongst which: high capital investments and highly qualified labour may be absent,

[87] Roberts (2010:399) here gives the example of the energy crisis, which is the product of the South African government's decision in the 1990s to privatize all new generating capacity and the subsequent 'procrastination in implementing this decision'. This measurement resulted in inadequate maintenance of the existing electricity infrastructure and a lack of development of the required additional generating capacity. Partly as a response to this crisis, the mitigation strategy then has been formulated as 'the national goal of reducing electricity consumption by 10 per cent'.

[88] David Satterthwaite, senior fellow with the Human Settlements Group, International Institute for Environment and Development (IIED). Satterthwaite contributed to the Third (2001) and Fourth (underway) Assessments of the IPCC. Lecture at the Institute for Housing and Development Studies (IHS), Rotterdam January 2011.

[89] For a more thorough analysis of sustainable development in the light of mitigation and adaptation, as well as resilience see Annex 11.

dependency on import of components may further raise the price tag - placing it outside the effective demand of low-income households, and the danger of the inevitability of rigid, centralised and top-down supply of multiple similar units due to the need for cost-effectiveness – quite opposed to the variety required to meet diversifying housing needs and aspirations in rapidly urbanising contexts. The perceived pragmatic advantage of speed of installation likewise runs into legitimacy issues when transferred to a rapidly urbanising context. Reasons given are amongst others that the opportunity offered by cheap and widely available labour is not taken advantage of through off-site assembly, while political-economical considerations may seek to use couple relief in housing backlogs with employment generation in the construction sector. The preconditions that lead to improved accuracy – and the rational improvement of adequacy - further push up the price tag of components of open building systems. Faced with inevitable trade-offs, subjective values and considerations of the household itself – such as space, privacy, future needs and aspirations – may be more legitimate and urgent for investments than accuracy.

The ideological motivations that further explain the revival of open building systems, may involve introducing an alien concept altogether. Mitigation is a contested concept and may not be perceived as a legitimate motivation to aspire flexible systems. Instead, it is quite likely that in *realpolitik* design that tackles immediate issues of adaptation to climate change and that enhances resilience is welcomed as more legitimate 'housing solutions'. "Deconstruction", "disassembly" and "dismantling" may alienate low-income households who themselves may aspire a house that radiates 'permanency', possibly even as a symbol of their acceptance into society and an expression of their dignity. It is hard or even impossible for prefabricated units to compete with the low-costs by which extensions are realised by households themselves and the sheer variety of types orchestrated by residents. In a context of a soft state, such incremental housing usually takes place entirely outside municipal control, leading to the inevitable conclusion that in fact almost the consolidation process is also outside the building control of the architect. Aesthetics of the modernist concepts proposed for 'housing solutions' moreover are interwoven with socio-cultural legacies in Europe, North America and Japan. But modernist design is defiled by strong images produced by the "architectural consequences" of modernist approaches to housing low-income households in the past. These consequences are very real and may lead to strong resistance to the use of modernist concepts – contemporary interpretations of the open building systems alike.

The question is raised whether low-income households are the right target population for experimentation with open building systems altogether. Even in the European context, the profile of the user needed better fits that of middle-class income groups. Moreover, the stringent affordability levels of low-income households make them very vulnerable and little capable of coping with the consequences of design failures in experimental housing projects, while the appearance of it may exacerbate their feeling of separateness. There is ample evidence that effective implementation requires early and meaningful co-decisions by stakeholders – primarily the targeted beneficiaries – to assure both legitimacy and affordability of the design proposed. If anything, this chapter proved that the fieldwork must have a very open-minded perspective to open building approaches.

Chapter 7 Case study analysis: discussion of findings

Now that the case study has been introduced, and the methodology explained – as well as a first assessment of the potential of open building systems for low-income households in rapidly urbanising contexts - here the findings of the fieldwork will be analysed. Insights of Napier (2002) are integrated but with an eye to how the consolidation process proceeded over time, in the sense that there is the advantage of the temporal dimension in retrospect. There is a strong suggestion that it is not so much the core house as it is the plot that must be the unit of analysis of consolidation processes if the sustainability of the project is assessed. The chapter is split in three. The first part gives a broad brushed impression of how the consolidation process of the households proceeded, now 26 years into consolidation of the core-housing project. The second part discusses five major trends observed. In the final part, based on the analysis, a translation is made to several considerations for future core-housing implementation. Put as bold statements, the considerations discussed aim to trigger further thinking on contemporary implementation of the core-housing concept. Again, it is highly recommended to use the annexure as a constant reference to get a more lively insight in the issues discussed.

7.1 A sample of households in 2011

How did the consolidation of the core houses proceed, now 26 years after implementation? To allow for analysis of the fieldwork material in the next chapter, here a first description of the main households included in the sample as well as the level of building development on their plot is given. For further details please refer to Annex 6.

Main households included a nutshell
The 2011 sample includes 25 plots (see Table A1 – A3). Occupying them are 7 nuclear main households with an average of 3.4 people, 3 single-person main households and 15 extended family main households with an average of 5.8 people. Looking at the gender of the heads of the main households, the picture of Eyethu as a whole – KPRU (2005:41) speaks of a "pronounced gender-gap" with the ward population made up of some 67% for females - is reflected in the finding that a disproportionally large amount of the households is headed by single women (14 out of 25 main households).

It is particularly striking that 21 out of the 25 main households included in the sample have lived on the same plot for at least 24 years, which in turn echoes the low mobility found through the 2005 enumeration (see KPRU 2005). Interestingly, it was possible to make a distinction into 1st and 2nd generations [90] to the core house and plot, whereby, as an operational term, 1st generation refers to the head (and spouse) of the main household who first moved into this core house and plot, e.g. "original residents" since implementation. 2nd generation refers to a (adult) child of the original head - who has passed away/moved out - now representing the new head of the main household occupying the core house (and

[90] A distinction inspired by Kader Abdolah's (2005) novel *Het huis van de moskee* {The house of the mosque}.

extensions). This hierarchy of the core house was for instance observed when on one of the plots, the 1st generation head had passed away, and the secondary household living in a backyard, moved into the core house, now forming the 2nd generation to the plot. Possibly then, 1st and 2nd generations to the house can be used as a complementary indicator of mobility within the project – or the lack thereof.

With regards to the income levels of the households in the sample, the overall picture is that of impoverished families with a struggle to make a living (see Table A4). 13 main households have only 1 regular income from formal wage, while 10 have none. Irregular forms of income prevail, meaning the income is quite unpredictable. 10 main households use the plot for commercial entrepreneurship, having either a business on it or renters. Indeed, in the neighbourhood there are few formal local job opportunities, there is a huge reliance on transport because of its distance from economic nodes, and little retail and lifestyle provision. In such a context, small 'informal' businesses are key to survival (Brown 2009: 6). But the informal economy is not a good employer either as the market is saturated with existing small scale activities. There is a lot of duplication – people offering the same services or products – which means it is harder to make a living out of retail. In retail anyhow, little value adding activity is going on (Brown 2009:6). Having renters on the plot seems to be one of the few demands in the market.

The fieldwork identified that households often depend on so-called 'social wage'[91] to meet ends. The general picture of impoverished households is confirmed by the finding that 10 main households receive at least 1 form of social wage. For many a household the pension and the child wage was the only really predictable and stable form of income. As the son of the head of the main household on plot#H23 puts it, speaking of his mother and her pension "If she dies, we also die of hunger with her. Because we live on it". Adding to it: "Sometimes I go fixing something for others in their house, at least I will get some cents, in order for me not to go out and rob some people". This family was found to be the most impoverished by far. The 2005 enumeration, proves this point, showing an amounted 2,563 (19%) of recipients of social welfare grants in ward 94 (KPRU 2005:43). It becomes clear that households have very stringent affordability criteria for extensions – while successful extenders may be exceptions that merely confirm the rule.

Level of extension achieved on the plot

The level of extension on plots included in the 2011 sample overall has proceeded over the past years, and is starting to include more prominent and advanced levels of extensions (see Chapter 5)**.** It is safe to conclude this, based on the observation that the most successful extenders in the neighbourhood have achieved a level of extensions that was not yet observed 15 years ago by Napier (in 1996). It is likely that the more successful a household has been in extending, the more it has been able to direct the house towards its own preferences and aspirations. After all,

[91] I am indebted to Dr. Mark Napier for introducing me to the term, interview August 11, 2011.

space and privacy are only two aspects of many possible motivations to extend (see Model A2).

Six of the plots were intentionally selected as they included an ´upstairs´ - the local name for a house with both a ground and a first floor. The upstairs represents, with quite certainty, the most successful level of extension achieved in the neighbourhood in 2011: it is both the most costly extension, as well as the extension requiring the most advanced skills and time investment (see Annex 7 for a photo collage). It is striking that the upstairs extension is primarily built to relief housing stress and indeed a very good option too. In total 16 bedrooms were added by the 6 main households on the additional floor. The 'upstairs' may serve other purposes too. One of the households with an ´upstairs´ runs a tavern and added the upstairs to allow for the use of the ´downstairs´ for commercial purpose only. Another household ran a rental entrepreneurship, whereby the bedrooms on the additional floor were built for the purpose of renting them out to couples that would share services, which were also added upstairs.

13 Of the plots included detached extensions. 3 Plots even included a total of 4 ´flats´ - a local name to refer to a detached extension of conventional material, commonly with one bedroom and placed behind or at the side of the core house. One of the flats included separate servicing; the main household had intentionally built this structure with good quality, in order to accommodate renters as an income generating strategy. Relatives inhabited all other flats. The flat is an interesting development, as in 1996 no detached structures of conventional material were yet identified (Napier 2002).

If this sample is any indication, 'backyard shacks´ are still most common form of detached extension, in this case on 10 plots. This local name refers to a detached small structure of (predominantly) impermanent material behind the core house (e.g. not within visibility of the street side), only including a bedroom (see Annex 8 for a photo collage). All types of detached extensions primarily included bedrooms, with a total addition of 18 bedrooms.

Interesting is the finding that 8 of the 25 plots had added a carport, a trend indicating the improvement in lifestyle. Clearly the need to park a car was not anticipated by the original project implementers as the positioning of the house makes the construction of the carport quite difficult.

Non-extending perceived from a temporal dimension

The only "non-extender" included in the 2011 sample, appears to be an interesting case with regards to the plot development (see Picture 8). On this plot (#H25), extension activity was going on in 1996, namely a small, attached impermanent extension (this can be established on the maps provided by Napier 2002, see Map A1). 15 years later the extension has disappeared. The current residents have only been living here for 3 years now, renting it from the owner who had moved out to the rural areas, having removed the impermanent extension before he left.

This example highlights that when at a certain moment in time no extension activity is taking place, one cannot conclude that the plot has been "underutilised" since implementation. Such a moment indeed is merely a 'snapshot'. It also stresses that an evaluation of the effectiveness of a core house

project that takes the temporal dimension seriously, must focus not primarily on the households but on the plots, as households are mobile.

Picture 8 Underutilisation? A snapshot of plot#H25 along the consolidation process of the core house.
Picture by author.

Relief of housing stress in terms of space

To what extent did households included in the 2011 sample manage to relief housing stress? The table in the annex (Table A10) gives an overview of the ratio of habitable space per person upon occupation and in 2011 for every single main household included in the 2011 sample. This sample thereby indicates that 23 of the 24 extenders were able to reduce the housing stress in terms of space quite considerably, even as years of occupation vary among them.

Housing stress in terms of privacy

As for the rooms added, the same logic as identified already earlier by Napier (2002) is apparent in the type of room added, with a priority to firstly add space, then privacy as the initial core house had a high housing stress in both regards (see Table A5). Top priorities in type of extension found among extenders (24 in number) included in the 2011 sample are:

1. bedroom(s)
2. living-dining room
3. detached extension with bedroom(s)
4. toilet(s)
5. a passage to allow for extensions

While the addition of bedrooms primarily indicates the priority to add space, the sheer number of bedrooms added also indicates the need for privacy. Indeed, smaller rooms may be preferred over several larger ones, as already observed by Tipple (2000). From this angle, non-extenders and those who could only extend

little are likely to experience very high levels of housing stress, not only in terms of space – but also in terms of privacy.

The more rooms a household was able to add (albeit small in most cases), the more likely it is that the main household has been able to direct the level of privacy towards more culturally accepted situations. This supports the finding that in cases of detached extensions the bedrooms are always occupied by males and never by females - unless a woman is living together with a husband or boyfriend (see Table A6 – A9). The rule of thumb in this sample even applies to non-relative renters, whereby no female renters were found to stay in a detached extension, whatever the material use thereof is. As residents explained, a young man needs his own privacy, to be able to welcome friends and go in and out as he pleases. Or to put it the other way around: women are considered too vulnerable to live 'detached' from the core house where the main household stays. Also, cultural gender rules are involved relating to the honour of (young) female and the family as "rumour may spread" of her whereabouts if the family is not seen as capable of keeping an eye on her – although a male is also not supposed to "mess around"[92]. The most important reason given was that the neighbourhood is perceived as particularly unsafe and families are trying to protect vulnerable members first.

There is a strong suggestion from this sample that an 'upstairs' – being of conventional material and more importantly, being attached to the house of the main household – is able to provide a certain level of privacy and perceived safety to adult female members of the household (see Table A7 – A8**).** It seems that indeed women will be the first priority for these upstairs conventional attached extensions. Young male adults may also stay upstairs, yet the urge to provide for a detached extension for adult male seems a difficult trade-off. One plot with an upstairs (#J3) for instance also included a backyard for the son of 38 years old in order to provide for a detached place for him (he formed a secondary household).

The impression is that, particularly for extended families, it is not even so much possible to speak of "certain moments in the lifecycle" (see also Annex 10) as shocks and triggers seem to be more like a cycle with no specific ending. As children/relatives grow older (triggers), grandchildren are born (shocks) – within this sample of 25 main households now including 13 grandchildren. The fact that all 13 grandchildren stay in attached extensions seem to prove the point that detached extensions are considered 'less safe' or 'more vulnerable'.

The lack of privacy for the main household who hosted an either relative or non-relative secondary household (paying or not), as well as the hardship for members of these secondary households themselves is clearly shown by the place these persons must share services with other households. Most renters used services of the main household or had to refer to another plot for servicing, or were sharing services with other renters. Only in one case, notably the conventional detached rental extension, was servicing private. Relative secondary household members all had to use the services of the main household. The situation is also observed by Brown (2009:8-9), who reports that ´there are some

[92] The interpretations of the observation given are confirmed by the Human Settlement Department of KDF (Khayelitsha Development Forum), Validation of research outcomes at meeting with the Human Settlement Forum of KDF, August 8, 2011.

tensions with sharing services with backyard structures or extensions and the main house, where in the case of core-housing only the core is provided with a tap inside or just outside the house structure'. Merely considering secondary households – whether paying or not – would however grossly underestimate the densification that is taking place. This matter is taken up in the next chapter.

7.2 Trends identified 26 years into consolidation

The qualitative nature of the fieldwork has been particularly suitable for identifying possible trends. The term 'trend' is introduced here to indicate a possible direction in which the consolidation process of the core houses and their plots are developing. The term also intends to stress the fact that any patterns identified can by no means be generalised into a general tendency as the selection of plots has been intentional with a bias towards successful extenders (e.g. not random) and the total sample is too small (see Chapter 5). Instead, the five trends identified here may be an interesting entry for further detailed studies and hint to considerations for future – hopefully more effective - implementation.

7.2.1. Trend 1: Alternative densification and incremental verticalisation

Implementation of housing – of any type - has thorough spatial implications which impact the direction of urban development and whether that direction moves towards more sustainability – or not (see Chapter 2.4). In that light, careful consideration of planned densities ought to be an integral part of low-income housing implementation as well.

(In) efficient plot-use: which perspective?

It is important to notice that current debates on spatial planning in South Africa take place within the dominant paradigm of 'compact cities' (see Chapter 2.4) and uses this discourse. The "traditional delivery" of housing to low-income households in South Africa, which, with little variation since 1994 delivered 40m2, mostly free-standing, freehold houses is under pressure as it 'does not represent a comprehensive or responsive solution to existing demand patterns' (Urban Land Mark & SHF (2010:12-14). This implies that the core-housing concept too, in its 1970s interpretation (see Chapter 2.1) – and the interpretation in the Khayelitsha project in the 1980s – is under pressure.

Contemporary analysis of apartheid housing – thus also referring to the core houses in Eyethu - illustrates the line of thinking in the analysis of the sustainability of low-cost housing. Notably, the standardized Apartheid houses used the idea of detached one-story, one-family units on plots of 200-300m2 (Vestbro 1999 in Gren 2006). To indicate the 'ineffectiveness' and 'unsustainability' of the Apartheid housing provided, a rough estimate is given of the floor area ratio (including streets and other open spaces) which was 0.1 to 0.2 – as Vestbro (1999 in Gren 2006:1) concludes 'a very low density, even when compared to middle and upper class areas with one or two-story bungalows on large plots and ample space for greenery along meandering roads'. The line of thought is to then move on to the many negative consequences – explicitly also for low-income households themselves – which are the outcome of overall low-density development (see also Chapter 4.3). There is of course a fallacy in simply correlating the quality of the living environment with density, as argued first by Alonso (1973 in Richardson et al. 2000).

In the light of these (rather heated) debates, an important question becomes: how do the households use the plots included in the 2011 sample? There are strong suggestions that the key to truly valuing the densification that has taken place in the core houses of this case study over the past 26 years since occupation lies in understanding the plots from their embedding in a quickly urbanising context. With very limited access to the house- and land market by (members of) low-income households, and being located in a settlement with little income generating opportunities, plots have – by several main households included in the sample – been put to optimal usage.

Secondary households

Interestingly, among the plots included in the 2011 sample more people occupy the plot than are included in the main household. As an indication: of the 25 plots in this sample, 8 plots included a total of 14 additional separate households, meaning that their members did not pool incomes with the main household.

A total of 6 relative secondary households were identified on 4 of the 25 plots (see Table A6). Generally, heads of the relative secondary households are older and if this sample is any indication, they may tend to live in a detached extension on the plot. This would be an indication also of the use of *empty* space in between superstructures as a demarcation of privacy/intimacy and dignity between households.

13 paying non-relative renters were identified on the 5 plots intentionally included in the sample because the main households were known to have renters (see Table A9). Interestingly, renters in this sample would stay anywhere on the plot; in an attached extension to the core, in a detached impermanent extension, in a detached conventional extension or even upstairs.

One rental entrepreneur is included in the 2011 sample (plot#F19), who has multiple rental rooms and even owns a plot further on down the road with rental rooms only (e.g. no members of the main household live there). For all other main households, it seems that having rental rooms is an income generating strategy to complement other strategies while if the household had the choice, it would probably opt for other employment that doesn't affect the intimacy of the house.

Tipple (2000:51), drawing on the work of Gilbert & Varley (1990), writes that though commercial renting is seen to be a very poor business, indeed the ability to rent rooms out for profit is an important source of income for home-owners. Low-income households seem to find this source of income both convenient and profitable, even though it may mean that they have to crowd or endure relative strangers sharing some of their domestic space. Drawing on the work of Korboe (1993) and Amole et al. (1993), Tipple (2000) argues that in some contexts, the house has a role as a social safety net for the poorer members of families. 'Indeed, in some circumstances, it is regarded as very anti-social not to allow others to rent space in your house for money or gratis because of family or other connections', writes Tipple (2000:51). Here rooms tend to be rented out only when family members do not need them or as a means of raising sufficient money to keep the house in repair (f.i. in Ghana). Main households have occupied the lion's share of the habitable space in their houses, occupying the original house while accommodating any extra households in the extensions (Tipple 2000:50). In

contrast, in other contexts, renting is a business venture for at least some profit and may motivate extensions to the house (Tipple 2000: 49, 116).

Alternative densification

The most revealing finding of the 2011 fieldwork is that an – primarily involuntary - alternative form of densification taking place at the plot level, which is not accommodated for, in conventional indicators for measuring densification. The phenomenon was first highlighted during a meeting called in by the community-based organisation KDF Human Settlement Forum, as part of the start-up of the fieldwork for this thesis. The Chief of Housing[93] opened the meeting by saying:

> "Our government promised a lot, and when we came into Khayelitsha our children were very, very young. But now, our children are adults and they have no where to go and live in backyard shacks. Our children!"

Alerted by this distinction between young and adult children within main households and the hierarchy of superstructures on the plot, a closer look was given to the composition of the main households as well as the space individual members were occupying (e.g. where are their bedrooms located?). Based on the findings from conversations with heads of the main households, as a rough indicator, the age of 21 was taken as a point of departure – which was later confirmed by the Human Settlement Department of KDF[94] to be the age young adults (male members in particular) would be considered independent and able to start their own life elsewhere. The semi-structured interviews had revealed that, particularly in extended families, other relative young men and women ought to be included in the analysis as well.

To better analyse the household composition an additional indicator was added to the analysis, namely: 'adult descendants'. The term 'descendant' is used on purpose to allow for a broader interpretation that merely children or even relatives. Particularly amongst extended families, the concept of 'family' has been identified as a very broad interpretation. To illustrate, the head of the main households of plot#J3 for instance, an elderly woman, adopted a non-relative orphan as part of her extended family. This indicator, in a working definition, refers to 21+ aged persons who have been raised as part of the main household from childhood onwards or throughout their teenage years and – importantly - now still live on the plot. Using this perspective of 'adult descendants' an even closer look to the household composition, shows that many members are at an age (21+) to leave the house, but haven't.

Using the indicator of 'adult descendants' a different picture altogether emerges of perceived densities on the plots (see Table A7, A8). 19 Male adult descendants can be identified among the total of 25 plots. 17 Female adult descendants are identified in this sample, with them a total of 13 children.

Staying is both fate *and* relief to these adult descendants. Looking at income levels of the separate main households (see Table A4) it would for many

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[93] Meeting with the Human Settlement Forum of KDF, July 15, 2011.

[94] Validation of research outcomes at meeting with the Human Settlement Forum of KDF, August 8, 2011.

adult descendants be a sheer impossibility to be disconnected from at least the steady flow of income provided by social wage of (mostly) pensioners and children's' grants. For many an adult descendant it is therefore a *rational* trade-off to stay for some relief in their personal financial situation. Finance is not the whole problem however in a rapidly urbanising and socio-economically diversifying context where the ´non-availability and high cost of housing units in the affordable housing market´ also contributes to the issue of people falling through the cracks. The market is constrained by 'complex and high-risk processes' that result in 'time delays, increased costs, uncertainty and limited supply of housing units' (Sikhakhane 2010 in Tissington 2011:41). Accessing a government house through the state-regulated system of allocation in South Africa takes around 1,173 days, in contrast, it takes only an average of 34 days to access a shack in a backyard and some 69 days to access a shack on its own plot in a squatter settlement (Urban Land Mark 2007[95] in Napier 2010:3). Constraint access to land, housing and services is confirmed by Brown (2009:8) who reports that 'shortage of land is very real in T1 V2 [Eyethu]', while 'no new housing has been built in the neighbourhood since the 1980s, meaning that subsequent generations have few housing options – especially in competition with all the newcomers in the peripheral informal settlements'. The result is, reports Brown (2009:8), that young people overcrowd with their own families in their parent's houses in T1 V2 or live in a backyard structure or extensions.

To truly value what goes on here, it is insightful to consider trends in the housing backlog in South Africa as a whole over the past years. 'Notwithstanding the provision of 2.3 million housing units[96] to nearly 11 million people', reports Tissington (2011:8), 'South Africa still has a housing crisis after 16 years of democracy, with over 2.1 million households lacking adequate housing (and millions more lacking access to basic services'. The housing backlog has grown exponentially since 1994, and continues to increase' (Tissington 2011:34). It is revealing to dig further into the reasons for the prevailing backlog. Gradually the picture emerges of a modernising, urbanising country with changing lifestyles and aspirations – whether or not this is still a "catch-up" after the end of Apartheid[97].

Changes in household structures have serious implications for housing backlogs (Tissington 2011:34). Urban Land Mark & SHF (2010:14) report that: 'On average, about a third of all households generally considered to fall into the "housing backlog" statistics comprise single-person households, one-third comprise two-member households, and the remaining third comprises households of three or more members'. The report groups them as "small households", and explains that many of them are not small out of necessity, but 'result from normal

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[95] Report *Urban Land Markets: how the poor access, hold and trade land.* Available: http://www.urbanlandmark.org.za/research/x41.php [Accessed: September 25, 2011].

[96] A rough indication. The Department of Human Settlements (DHS) (2009 in Tissington 2011:30) admits that data it relies on to estimate the housing backlog in South Africa on is most likely unreliable.

[97] Factors reported by (Tissington 2011:34) include: changes in household structures, rapid urbanisation, migration to cities and large towns and large towns, lack of opportunities in rural areas, structural unemployment, more households falling into the subsidy income band and less access to housing finance.

demographic trends and include singles such as unmarried people, students, widows and widowers and temporary migrants, and two-member household units including young couples, couples without children, same-sex partners and single parents'.

The increase in "small households" as society diversifies socio-economically, is closely tied to aspirations. For younger generations, Khayelitsha is the end of the filtering process, and indeed there is a lot of mobility *within* Khayelitsha and surrounding informal settlements. People move from one neighbourhood to another, reports Brown (2009:7), 'as their prospects improve or decline, going from informal to formal housing, and some vice versa'. Yet, there has also been a movement out of the area by professionals to neighbourhoods which are close by, but safer, and have better commercial and public facilities and transport infrastructure (Brown 2009:7). Young people are 'particularly under pressure to ascribe to middle class norms of urbanity' (Brown 2009:7), which in the case study analysis have been linked to a strong aspiration for inclusiveness and status.

The aspiration to 'move out' is possibly best reflected in the lifestyles of the "Black Diamonds"[98]. The study 'Black Diamonds on the move' shows how the new black middle class in South Africa achieves to fulfil their aspiration to move out of the townships into the suburbs based on their increased access to finance. According to this study, between 2005 and 2007, the number of black middle-class families living in suburbs in South Africa's metropolitan areas grew from 23% to 47%[99]. The people studied claimed that "their hearts were still in the townships", but gave pragmatic reasons for making the move to the suburbs, such as: making a sound property investment, tighter security and better-resourced schools for their children, while some also reported feeling societal pressure to move to the suburbs as it represented a visible mark of success[100]. It is likely that as soon as income levels go up – (urban land) consumption levels will go up as well. In the case of middle and higher income residents in South Africa, this means that the plot is often large enough to include individual garages, spaces for parking and individual yards. It is this essential modernist characteristic that is currently under attack; the strong pro-suburban ethos, which involves a focus on the free-standing building, surrounded by private space as the basic building block of settlements. In South Africa, as Dewar (2000:210) argues 'the single freestanding house on its own plot has been entrenched as the image of the 'good urban life', even in the case of the lowest income communities'. The

[98] One of the first larger (and private) channels to use the term was the University of Cape Town's Unilever Institute of Strategic Marketing, in its 2006 Black Diamond research. Source: http://www.unileverinstitute.co.za/index.php?Itemid=34&id=72&option=com_content&task=view [Accessed November 28, 2010].

[99] Source: http://www.southafrica.info/about/people/blackdiamonds-230507.htm [Accessed: November 28, 2010].

[100] Source: http://www.southafrica.info/about/people/blackdiamonds-230507.htm [Accessed: November 28, 2010].

materialisation of this ethos is one of the main reasons South Africa has the lowest density of urban forms in developing countries[101] (Jenks 2000:4).

Suddenly, the main households involved in the 2011 sample shed a new light on the "efficiency of the land use". Imagine all adult descendants within these households would have the means to leave and inhabit a separate household. This would lead to a situation of 36 additional houses with a much lower or very low – namely single-person - occupancy rate. Even if the females were excluded, since it is possibly less culturally acceptable for them to live alone without an extended family if they have no partner, then still, an additional maximum of 19 separate houses would be needed to accommodate all these males. For them, a formal house is practically out of reach unless time is used for waiting – probably better framed as 'coping'. Thus, it is fate that leaves them little option to move – as well as fate that in some respects keeps the general housing backlog from growing even more exponentially.

Incremental verticalisation

It seems that within the dominant discourse on compaction, verticalisation is only approached as medium-density apartments, whereby separate households live on separate floors. If that would be the only way to perceive verticalisation as a form of densification, then this type of densification is hardly taking place in Eyethu – apart from possibly some rental entrepreneurship as is the case on plot#F19 (see Annex A7 for pictures).

The alternative approach to densification however also leads to a different appreciation of 'incremental verticalisation' that is taking place, stemming from the housing stress perceived by the main household. Within conventional compaction paradigm detached houses on separate plots seem to be considered as problematic as such, whereby verticalisation as observed by the successful extenders in Eyethu would not be considered a form of densification as it only accommodates one and the same household still needing the entire plot[102]. Yet, the fieldwork conduced suggests that verticalisation on a detached plot may be another alternative form of densification as it allows for multiple - otherwise possibly separate households of to also be accommodated on the very same piece of land. In the 2011 sample this even resulted in more adequate housing as all upstairs were built of conventional material. This need not necessarily be the case elsewhere (see also Picture 13, Zillman 2000).

Incremental verticalisation reliefs housing stress particularly also in terms of privacy as more rooms can be added (albeit small) and in more culturally dignified ways of co-habitation. It may even be one of the contributing factors allowing adult members to stay. The housing journey of the household members on plot#F6 is a point in case (see Picture 9). Here, the head of the family, an

[101] The metropolitan area of Pretoria, for example, stretches over roughly 100 km from north to south, and 75 km from east to west; while it is more than half the area of for instance the metropolitan area of São Paulo, it houses only 1.5 million people, equivalent to a tenth of the population of metropolitan São Paulo, and only 45% of the total area of Pretoria is built up (Schoonraad 2000).

[102] At least, in all the compaction literature (e.g. Jenks & Burgess (eds.) 2000) studied for the sake of this exploration, such an approach was never encountered.

elderly woman, is building what is locally referred to as a “family house” (see also Chapter 6). Her daughters both still live in an informal settlement with their boyfriends and children, in backyard shacks. They are gradually moving to her family house now, as the upstairs proceeds. Like other extended families in the 2011 sample, the once separate households are already starting to pool their incomes, now forming 1 single main household. An additional benefit is that the grandchildren and the grandmother receive social wage so a pooled effort will allow sharing the predictability of at least some money flow over the household members. What is happening on plot#F6 illustrates that statistics may be quite deceiving: this plot will include 3 households merged into 1, both as an outcome and for the lack of options in the land- and housing system. Here, alternative densification is taking place.

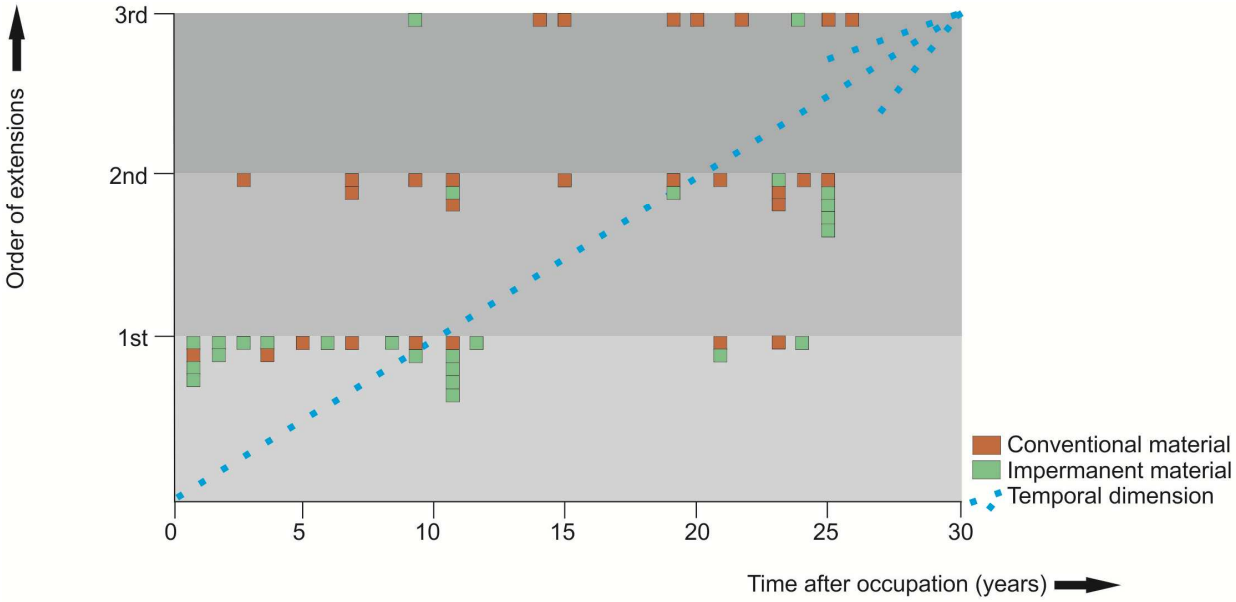
Picture 9 **Grandmother on plot#F6 is co-coordinating the construction of a ‘family house’, which will give home to 3 previously separate households.**
Picture by author.

7.2.2. Trend 2: A steady shift towards the use of conventional material

When a household manages to extend over the years of occupation, as the 24 extenders included in the 2011 sample did, is there any pattern identifiable in the use of material for extensions? To answer this question the extension trail of the 25 main households included in the 2011 sample has been analysed both qualitatively and quantitatively.

Order: first impermanent

The graph (Model 3) gives a brushed impression of the use of material for each next extension by the 24 extenders (intentionally) included in the 2011 sample, in an attempt to identify a pattern - should there be any. Importantly, the starting point is occupation by current main households – not implementation of the core-housing in 1983 (see also Table A10).



Model 3 Broad brushed impression of the order of material use for extensions by the 24 extenders included in the 2011 sample along their extension trail since occupation.
The material use of each extension (1st, 2nd, and 3rd) is visualised with a colour. The blue line aids the direction of interpretation along the temporal dimension**. Visualisation by author and Beudeker.**

In the analysis of the extension trail, percentages within the sample are given for the sole purpose of a quick reference as a potential pattern is explored. Such percentages can by no means be generalised as the sample is far too small in numbers to allow for that. The same holds true for the time lapses between subsequent extensions, even more so as they are closely tied to socio-historical and political dynamics over the decades after implementation of this specific core-housing project (see Napier 2002). On the other hand, no core-housing is implemented in a vacuum and for every project there will be many factors which are out of the control of the implementers but seriously impact their consolidation process.

Obviously, all 24 extenders undertook a first extension. This first extension followed on average 8.8 years after occupation. Two households simultaneously built both an impermanent and conventional extensions. Even if these two are excluded, 14 out of a total of 22 first extensions are of impermanent material (64% in this sample). This figure corresponds with the finding of Napier (2002), that 11 years into consolidation, impermanent extensions prevailed among extenders (see also Figure 4).

A second extension was undertaken on average 18.8 years after occupation. 12 out of a total of 20 second extensions undertaken were of conventional material (60% in this sample). Of them, 4 replaced an impermanent extension. On 8 plots, the use of material went from impermanent to conventional. Only on 3 plots the reverse happened: after a first extension of conventional material, the second extension was of impermanent material. 3 Other plots continued to use conventional material. In 6 cases, the material use stayed impermanent. One main household had simultaneously coordinated the construction of two 1st extensions of different material and is therefore excluded

here (hence a total of 19 plots of which the order is analysed). With these figures, the order of first extending with impermanent material and then moving to conventional material seems to be further confirmed.

Eight main households had constructed a third extension, while a 4th extension was only identified once in this 2011 sample. As an indication: the 3rd extension was undertaken on average 19.3 years after occupation. 6 of them were of conventional material (75% in this sample), of which 5 had already been using conventional material for the 2nd extension as well.

Push and pull motivations to aspire for "conventional extensions"
Despite the small sample, the qualitative nature of most of the information acquired during the 2011 fieldwork supports the pattern found. The most interesting finding is possibly that there is such a strong, legitimate (e.g. internal motivation and demand) aspiration to construct with conventional material. What are the main motivations to aspire conventional material found during this fieldwork?

'The imperative to extend usable *indoor* space is increased in Khayelitsha by adverse weather conditions and less opportunities to use outdoor space for living', analyses Napier (2002:220). The site on which Khayelitsha was planned, the Cape Flats, has quite particular geographical and climatic characteristics – which make habitation a challenge. The area has a Mediterranean climate, with warm dry summers and cool, damp winters, yet since the area is generally exposed to ocean winds, sudden changes in temperature may easily occur. Dewar & Uytenbogaardt (1991:89) call the wind a major environmental problem of the Cape Flats, coupled with the lack of ground cover. This at times results in savage sand storms that may at one time almost cover the houses. Cold wet spells, especially in August and September, can make life very difficult for those living in sub-standard housing.

Indeed, the first extension of impermanent material – particularly in the light of the strong aspiration for conventional extensions – can perhaps be best understood as an "emergency housing solution". There is a key a relationship to the availability of material and the type of extension. Based on his case study Napier (2002:218-219) concludes that:

> Consolidation activities in Khayelitsha were taking place in a locality where the availability of informal builders and materials meant very cheap space could be built using informal materials. As a result many households who could not afford formal [e.g. conventional] extensions nevertheless were enabled (although not consciously by the original developers) to consolidate.

Thus the availability of impermanent material and informal builders made it possible for people to relief their most urgent housing stress, which in Khayelitsha clearly was 'space'. The speed of constructing such impermanent extensions surely adds to their attractiveness as at least some form of solution. The speed of building an impermanent extension among the extenders in the 2011 sample, took a maximum of 2 months, and a minimum of 1 day[103] (see Table A10).

[103] The fastest cases involve the delivery of a ready-made backyard module to the site, purchased from a local informal businessman who sells standardised shacks.

Then again, among the strongest motivations to aspire for conventional extensions is no doubt the terrible indoor climatic condition of many impermanent extensions – particularly the backyard shacks. When constructed with zinc roofs, the "climate intelligence" is such that in summer the indoor environment is smoulderingly hot, while in winter it is freezing indoors. Electricity, being privatized, was a high utility cost for almost all households included in the sample, meaning that the indoor climate wasn't mediated by either ventilation in summer and heating in winter was postponed as long as possible. A considerable part of impermanent extensions seems to include salvaged material, meaning the structure is in fact not new and material is already worn down somehow, implying maintenance issues start already right after occupation. Insulation is particularly cumbersome, and the strong Cape winds tend to blow through every small opening in the structure. With hard rains, which abound in the Cape, many residents complained about leaking and were very worried about the health condition of those who had to sleep in it.

Added to that is the (perceived and real) vulnerability of living in – particularly detached – impermanent structures. Safety and security are indeed at the front of the service needed (Brown 2009:9; SJC 2011). The high influx of predominantly poor people to Khayelitsha exacerbates tensions over resource allocation, as well as other fractures such as class, place of birth, "cityness" and political party affiliations (Brown 2009:6). Crime is pervasive – including organised crime - and affects business and residents alike (Brown 2009, Standing 2003). Impermanent material is not capable of stopping bullets from harming its occupants, and easy to break into. Living in 'shacks[104]' of wood and corrugated metal poses serious challenges to fire resilience, and regular fires cause high numbers of casualties (BBC 2011). Vulnerability to fire increases as an area densifies and neighbours build close to each other using wood (for examples of its impact see Aboobaker 2011 and Steyn 2011). Implied by the analysis above of the situation of males and females (particularly 21+ children/relatives) it becomes clear that the situation is particularly dire/inadequate in terms of space and unhealthy/not climate adapted and unsafe for young men.

Apart from the push factor out of impermanent extensions due to their inadequacy, the pull factor of conventional material is further strengthened by a black South African cultural value attached to 'status' and 'appearance' (see e.g. Devpruth 2011). The strong desire for conventional material can be recognised for instance in the way people speak about houses of successful extenders, using terminology expressing *awe*, *admiration* and *respect*. The value of appearance can also be physically observed in the careful attention given to the facades of the houses of successful extenders (see also e.g. Bronchart 2000), and the relative investments – compared to the total cost of the extension – made in it.

The cultural values attached to 'status' and 'appearance' is not confined to this context, but also observed elsewhere. For instance Price (1974 in Tipple

[104] A local term for extensions made of impermanent material. Yet, the use of it is not very precise when it comes to contiguity as it may refer to backyard shacks (e.g. detached structures) and extensions to the core alike (e.g. attached). Moreover it is not a neutral term. Therefore it is not used as an operational term in this thesis.

2000:61) calls it ‘the big man – small boy syndrome’ with regards to his findings in the Ghanaian contexts. Or Holston (1991 in Tipple 2000:41), who, studying the Brazilian contexts in which people build their house, sees ‘the expression of different levels of relative affluence in the design and construction of the dwelling as means of creating differences among the poor’. Yet, the ‘big man syndrome’ may not reflect the deeper longing of these expressions.

Possibly deeper even than ‘status’ and ‘appearance’ is the deep longing to be integrated into society as a full citizen and to achieve a ‘sense of dignity’. In South Africa this longing has a particular painful socio-political history of segregation of black and coloured people from the fabric of the society, economy and “democracy” during Apartheid. As a consequence, the term ‘dignity’ is now, in relation to housing for low-income households, almost interchangeable with ‘adequacy’ and its use abounds in governmental resolutions and public expressions alike. Politically too there is considerable pressure to offer houses that have a `decent´ image. In South Africa, *adequate housing* and *dignity* are even both enshrined in the constitution: ´Everyone has the right to have access to adequate housing (section 26) ´ and ´everyone has inherent dignity and the right to have their dignity respected and protected (section 10)’ (Tissington 2011:12-13).

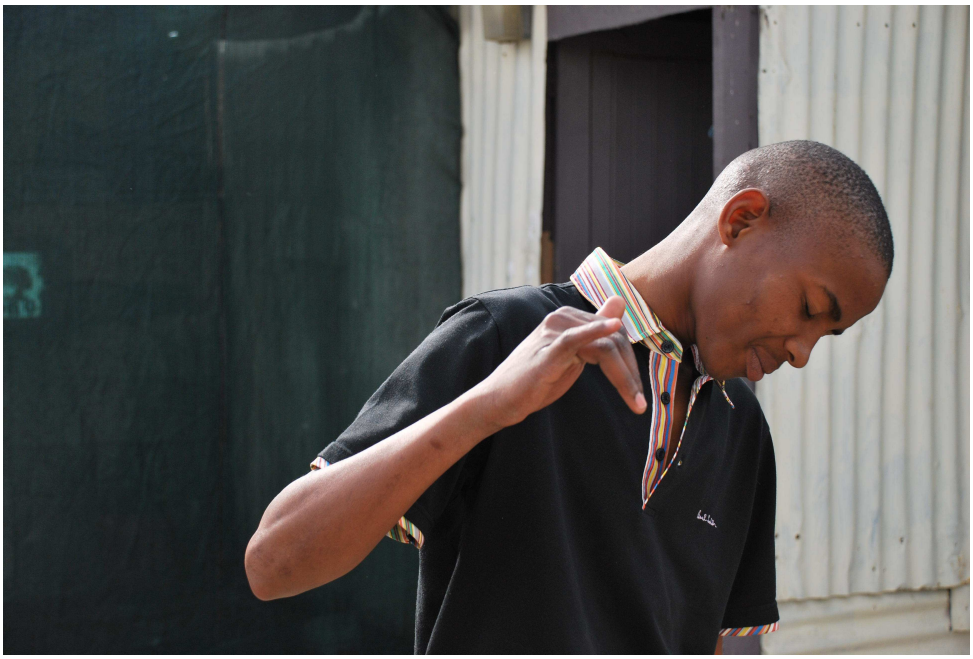
It is not unlikely that the desire to break with past exclusion is very present among low-income households in other urban contexts (e.g. outside South Africa) as well, as poverty usually has powerful structural causes inherited from the past. The use of conventional material – in this light - becomes, after Holston (1991:462 cited in Tipple 2000:41) a ‘representation of a passage from disrespect and denigration to competence and knowledge’ through ‘the production and consumption of what modern society considers important'.

The other side of the coin of ‘status’ and ‘dignity’ is a deeply engrained sense of ‘shame’ and ‘exclusion’. Napier (2002) already signalled to the difference in positioning of impermanent material – behind the core house – and conventional material – to the street side. The qualitative nature of the 2011 fieldwork allowed explaining this positioning more in-dept. Even among the most successful extenders in the 2011 sample, careful consideration was given to hiding impermanent material or construction chaos from the street side.

Most painful was the situation of those who themselves felt they were living in a state of deep shame because they were living in backyards. Here, the act of extending itself was not at all perceived as a “victory of the people’s housing process” as Turner (1972, 1976) would possibly see it, or Brillembourg et al. (2005). It is also quite opposite to the legacy some revolutionary writings left in certain parts of Central America; a discourse of “the victory of the poor” that engrains a sense of dignity in a poor man’s way of making a living by what is at hand, even when it differs so much from middle class appearance[105]. As one young male member of the household on plot#H23 exclaimed, referring to the – quite skilfully - constructed two detached bedrooms he and his brother had built out of salvaged material collected for free: “Are you kidding? Only when I am

[105] Such as the impact of liberation theology in the 1940s-70s. For further reading one can for instance refer to Ernesto Cardenal (e.g. 2002) or Gustavo Gutiérrez (e.g. 1996).

drunk I think it is beautiful"[106] (see Picture 10). Like other 'shacks', their structures – even though they run a barbershop in between them – is hidden from the street view as good as it gets.



Picture 10 Shame. "Are you kidding? Only when I am drunk I think it is beautiful". Picture by author.

The deep sense of 'shame' as opposed to 'status' and 'dignity' engrained in the black South African culture alerts to the difficulty of establishing just how much of the material would be 'salvaged'. Residents would be hesitant to acknowledge the use of salvaged material, and stressed the sourcing with formal material suppliers. Particularly successful extenders would be proud when they were able to hire formal contractors and builders, seeing it also as a guarantee for better quality construction. Based on these findings, any figures on the use of salvaged material must be approached with caution as they may be considerably biased.[107]

7.2.3. Trend 3: The adequacy of initial layout and positioning of the core loses a lot of its relevance over time – but not for (prolonged) non-extenders

Architectural analyses that had been studied prior to the fieldwork all stressed the key importance of a thoughtful positioning of the core in direct relationship to its design, whereby the combination of design of the initial core and its positioning was seen as a key enabler – or constraint. Architects express concerns related to the positioning of a core house with an eye to the construction of extensions as well as to its adequacy. Bronchart (2000) analyses the efficiency of all the varieties possible in the positioning of a core relating it to the habitable spaces that can then be added later on (see Annex 9a). Positioning is also linked by architects to the orientation of the provided core in relation to climate intelligence and to ´obeying basic rules of decency'. As Cooke (2009:25) analyses in reference to

[106] Youngest son, age 19, living on plot#H23, semi-structured interview, July 27, 2011.

[107] It is for this very reason that the survey outcomes of the use of salvaged material of neither Napier's (2002) fieldwork, nor the 2011 fieldwork are included in the quantitative tables of this thesis.

RDP houses, the consequence of a positioning in the middle of the plot is that 'space for additions at the front and back are limited', while on top of that, houses are ´facing the street on the north side´ and have ´side windows that look straight into each other across a narrow, unusable gap´.

Thus, a rather unexpected outcome of the fieldwork conducted 26 years into consolidation of the core-housing project was that the initial house layout was no longer of much relevance to (successful) extenders, neither was its original positioning. The temporal dimension had rendered both quite irrelevant. Particularly in the case of attached extensions of conventional material original walls had become less and less useful to the residents. Over time commonly at least two original external walls had been knocked down – up to the entire house (plot#H21).

In that light it is perhaps more precise to state that for the initial years of the project - and for those who cannot extend at all - the initial design of the core house and its positioning are indeed essential in relation to their basic adequacy and cultural legitimacy related to values on dignity, privacy etc. Professionals dread the lack of design quality that has characterised the first decade of state funded housing delivery (Napier 2005). As Ikhayalani-Andy Bolnick, a Slum Dwellers International (SDI) representative from Cape Town, puts it[108]: "In the governments' housing programmes, design is almost not thought about. The projects focus on land, tenure security service etc. etc. The result: Matchbox ghetto's as far as the eye can see". The term 'matchboxes' pops up in various publications, referring to the overwhelming ´uniformity´ and ´paltry dimensions´ of the low-cost housing implemented (see Picture 12, also e.g. Silverman 2007:29). The quality of the material use and the soundness of the structures initially provided are equally contested, by professionals as well as by residents.

Picture 12: Matchbox ghettos?
Source: National Department of Housing (1994 in Napier 2005).

It is easy to overlook just how long it has taken even successful extenders to add more space to the initially provided house up to a more reasonable level. In Khayelitsha, 11 years into consolidation, many households had still not extended at all: 23% of the households, almost a quarter, did not manage to add space. For

[108] Ikhayalani-Andy Bolnick. Open interview, May 19, 2010, Eindhoven (The Netherlands).

them, 'coping with housing stress' possibly best reflects their situation, and their quality of life was impacted as a result of non-extension argues Napier (2002:219). This 'coping' is still recalled by 1st generation heads of households today during the 2011 fieldwork, for instance when the head of plot # F17 tells that she and some other adults in the household would sleep on the kitchen floor at night, while the others slept in the only 1 bedroom. There was no privacy for the married couple whatsoever. Looking at her 'extension trail' (see Table A10), this situation lasted for 6 years with 10 people. Most important, in the light of this exploration, is that the woman felt abandoned and mislead by the government who had implemented this house bereft of space and privacy.

7.2.4. Trend 4: More advanced extensions may be inaccessible due to investments required in solving a physical constraint of the initial core

Once residents start to consolidate the logic of extensions stems primarily from the needs, priorities and aspirations and – crucially - trade-offs with regard to resources. There is a sheer variety in the physical metamorphoses core houses undergo when in the hands of successful extenders (commonly those with enough resources for it). Bronchart (2000:49-92) for instance categorized extensions (and consolidations in general) she observed in East London, leading to the following nine categories:

1. Volume extensions to the core house
2. Rearranging the plot to introduce a hierarchy of the extensions (e.g. backyards behind the core)
3. Arranging/finishing the interior of the extensions
4. Extensions with a veranda
5. Extensions under construction
6. Modification of the roof
7. Improvement of the quality of the core house/rooms
8. Extensions with mixed materials (e.g. conventional and impermanent)
9. Constructive/ aesthetic details (such as facades)

Yet, even as it is a good start to direct observations, the list cannot simple be transferred to other contexts (for instance: in Eyethu hardly any veranda was observed). More importantly, the list is not extensive as time proceeds – similar to the level of extensions observed and categorized by Napier (2002) based on aerial photography, which now, 15 years later, needs even more categories.

In fact, even households themselves are unlikely to already know in which direction their extension trail will move as years go by, as their needs and preferences are determined experimentally. Or they may suddenly be offered an opportunity within their embedding in a tight land- and housing market and rationally seize it, possibly even before they reach their threshold in coping with housing stress, rendering all careful considerations of housing needs quite meaningless (see Chapter 3.1, Annex 10).

Among successful extenders included in the 2011 sample, the roof proved problematic to those who had both the willingness and the effective demand for an ´upstairs´ in the 2011 sample as well as it posed a major constraint. The roof of the initially provided core rendered the vertical extension the most expensive among all the extension level observed, as this roof first had to be demolished and a new solid ground floor had to be laid to allow for the structural soundness

required. As such, the roof cut off the option of an 'upstairs' for most households due to the major investment required to remove this constraint.

It was observed that quite to the contrary, the walls of the initially provided 'Apartheid house' were physically a lot less constraining to successful extenders. The way they used their core house in some respects is an analogy of an open building system, as the walls seemed to serve as a primary system infill – e.g. extension material – could be plugged into. There is a conscious attempt among extenders to exist external walls intact as much as possible as it saves out material. In that respect, the external walls didn't constrain the consolidation process.

Based on this analysis, it seems possibly more useful[109] with an eye to the longer-term consolidation process – to focus on 'physical constraint' as an indicator of the 'potential environment' (after Gans 1972) provided by the initial core. A constraint is (after Longman 2003):

> -Something that limits the freedom to do what one wants, a restriction
> -Control over the way people are allowed to behave so that they cannot do what they want

It is also closely related to an 'obstacle':

> -Something that makes it difficult to achieve something
> -An object which blocks your way, so that you must try to go around it.

Physically constraining cores made extensions unnecessarily expensive, as they required that part of the initially provided superstructure is demolished before the extension can be commenced. In a working definition physical constraint therefore may be defined as an obstacle in the initial core designed and implemented by the professional which increases the costs of extending since the initial core needs to be partly altered to allow for the extension, thus making the aspired extension more inaccessible to the very same users the initial design intends to target.

7.2.5. Trend 5: The slow pace of extending with conventional material is primarily related to the strategies of 'stored asset' and the use of the temporal dimension to ensure affordability

The model of the extension trail (see model 3) visualises the temporal dimension of the consolidation process. If anything, the time lapses between extensions reveal that consolidation of the core house indeed is no speedy process.

A quick glance at the extension trail of the households included in the 2011 sample (see Table A10) already suffices to notice that apparently residents are still in the middle of their consolidation process. With the strong aspiration for conventional material in mind and considering that all but 4 households included in the 2011 sample turned out to live in the area for some 25 years (see Table A1 –

[109] After Weaver & Rotmans (2006) who argue for 'sustainable development' that another way to reach consensus and operationalisations – and often an easier way – is through identifying *unsustainable* conditions and could also be applied to the concept of 'adequacy'. See also Chapter 3.

A3) the question arises: what explains the slow pace of realising the conventional house aspired?

Extending as a struggle

Could it be that the slow pace by which conventional consolidation of the core houses takes place is related to the speed of construction of individual conventional extensions? Among extenders in the 2011 sample, the construction of a conventional extension took a minimum of 2 weeks, up to a maximum of 22 years++ for an 'upstairs'. The latter extreme is the case of a grandmother who aspires to build a family house for her children and grandchildren, building an upstairs. During the Focus group discussion she sums-up the past 22 years of extending as "a real struggle"[110]. Her and other residents' own accounts nevertheless reveal that it is not the construction itself that is such a struggle, nor finding the material or the skills needed to realise it.

Semi-structured interviews revealed that the pace of construction followed the logic of money coming in. A striking observation made during the fieldwork was that residents would already start constructing, but that long pauses would follow after commencing. The consequence was that houses were 'under construction' for prolonged periods of time. Visiting the inside of the houses of conventional extenders during the 2011 fieldwork revealed that several parts of the house more resembled a "perpetual construction site". Bronchart (2000:3) highlights the situation of families who are regularly confronted with periods of no employment: 'the construction {of extensions} often finds itself in a stand still for shorter or longer periods, waiting for new revenues which will make it possible to continue the construction'[111]. Clearly, the use of the time dimension to effectively ensure affordability may result in hick ups in the construction.

Only 4 households who built conventional extensions were able to access upfront finance through a loan and thus ensure "speedy finalising". All the other "conventional extenders" have in common that they use the temporal dimension as a strategy to afford the conventional extensions (see Table A11)**.** According to Tipple (2000:109-110) 'the phasing [of consolidation] represents the most *effective* way for low-income households to invest: to build as much as can be afforded for cash at any one time.' If at least part of the pooled income was predictable and consequent every month, for instance if member(s) of the household had a formal job or if one or more of the members of the household received social wage, the possibility to join a saving group was opened as well as a method to use the temporal dimension with a little more pressure towards saving.

What is the logic of already starting to buy material and construct while one knows that one cannot finalise it? The pattern was found to be so prevailing that it was taken to a focus group discussion[112]. Participants explained that already commencing construction even in the face of the unpredictability of follow-up

[110] Focus group discussion, August 5, 2011. Boardroom KDF, Khayelitsha, Cape Town (South Africa).

[111] Translation from French by author.

[112] Focus group discussion, August 5, 2011. Boardroom KDF, Khayelitsha, Cape Town (South Africa).

income – should it ever come - was a strategy to literally materialise any spare resources at any given moment. Napier (2002:181) already analyses that this observation is 'similar to informal building habits observed in many other parts of the world where residents stockpile their own materials as a form of stored asset prior to construction'.

Several participants related the strategy to their embedding in an extended family where "money evaporates as soon as it comes in". Heads of these households explained they have so many trade-offs to make with income that is not used for food or servicing (e.g. education for the children, helping out family members as a cultural responsibility etc.), that "disposable income" for extensions is particularly difficult to come by – especially so as incomes are usually highly unpredictable (see Table A4, A11**).** In several respects the surprisingly high incidence of this method confirms the need to avoid that all the money evaporates before it is put into use for the extensions. Possibly, the cultural obligation to take care of others as soon as "it goes well with you in life" plays an important part in the reasoning behind stored assets in the form of already commencing construction.

It was also observed that as soon as an extension had at least walls and a roof and windows, it would be already used – if not for extra bedrooms, then at least for storage. Thus, the long pauses in between proceeding with the extension did not prevent them from being used already to relief housing stress as soon as possible. Moreover, one could never know whether the extension would be finalised anywhere soon anyhow.

Consolidation efforts are an integral part of the capital market

One should not be mistaken to conclude that the consolidation efforts of low-income households take place completely outside the capital market – or never include financial objectives (Burgess 1982). Analysing Turners' concept of housing, Burgess (1982) argues that Turner fundamentally fails to see the relationship between a house's use-value (utility) and its market value (exchange-value), falsely polarizing them. Instead, argues Burgess (1982:66), in the self-help form of petty-commodity housing production, the producer and consumer are one and the same and the resident has not altogether escaped capitalism – 'he is merely in another part of it'. Thus, although surely the informal sector can also serve this need for affordable material, if material is scarce, this has a direct impact on the consolidation of housing, which may take even longer. The reason is that, as Burgess (1982) argues fiercely against Turner, the accessibility and availability of tools materials, land and finance are themselves also functions of the capitalist market 'with its relations of production, consumption and exchange' (Burgess 1982: 77-78). This analysis may echo in some residents´ motivation to at least start construction - even before one is able to afford to finalise it - ´as prices go up all the time´.

Picture 11 Local craftsman working on modules being sold at 'Greenpoint', entrance to Khayelitsha. Picture by author.

Whether the actual construction can be afforded by the household will also depend on the levels of building skills that households have free access to - e.g. without payment in money - either within the household or within their network (Napier 2002:345). If residents rely on services outside their own household or network, they may again phase the construction – using the temporal dimension. Bronchart (2000:26) observed how residents in East London use family members for the first stages of the consolidation, and then – if means allow for it – may hire a local craftsman to continue the construction (see Picture 11). It is not necessarily a smooth construction process, as Bronchart (2000:26, 103) reports:

> Construction {by an artisan or a qualified bricklayer} is proceeding in very irregular phases (as a function of the means of the family, and the regular phases of un-employment amongst most of them); the main chunk of the work is done from day to day and paid per day or per half a day.
>
> (…) The construction of an extension is always a prolonged process, evolving gradually and to the pace of the means that are at the family's disposal.
> (…) A very important aspect of the optimalisation of the plot concerns the evolving character and successive phases of the extensions to the core house. It is actually only exceptional that an extension is realized in one go with the assembly on the plot; such rare cases correlate with exceptional means and do not concern the most dispossessed population seen in our {Bronchart's} work[113].

Woven through all the consolidation efforts of low-income households is the primary requirement to ensure day-to-day affordability.

It is the resourcefulness of low-income households that leads to cost saving (Turner 1978). Resourcefulness is used here to refer to the efficient use of

[113] Translation from French by author.

available resources by low-income households 'with particular attention to the differences between capital and income and to the rule of spending less than is earned' (Turner 1978:87). The materials supply process and the construction process is bound to vary from locality to locality. Consolidation studies show that residents can be quite inventive in adjusting themselves to their available (e.g. local) material resources.

Spreading investment throughout time – mortgage analogy

There is in fact a strong analogy between incremental housing and the principle behind a mortgage loan[114] that is: spreading the investment through time. To buy a full house, a household would have to take a loan since it most likely doesn't have the equity to pay the full house at once. But: for the low-income majority there is an absence of viable mortgage sources (Tipple 2000); either because low-income households do not have access to such a loan (see Model A2**)**, or because the economy does not have a well-developed formal financial system. In both cases housing will have to be *self-financed* or *directly financed* (Lea 2009:29-30; Tipple 2000:114). Self-finance, analyses Lea (2009:29-30) can be provided 'either by equity acquired through many years of prior savings – in most countries the majority of real estate transactions remain financed by cash - *or through incremental construction'*. The latter is echoing the pattern found among conventional extenders in the 2011 sample.

First of all, there is an analogy with a down payment. A bank usually requires a down-payment before a mortgage loan is given to a household, meaning that the household will have to save for a considerable time before it gets access to the house. In incremental housing, acquiring the plot is a form of down payment. Plot location is key; it is the only factor that can never be changed afterwards – especially so in housing systems with little mobility. Preferably the plot is in a relatively good location to access the economic activities undertaken by the household, and possibly the plot also includes services. Yet, high demand in the market for serviced land in good locations and with secure tenure will increase the price of the down payment. The temporal dimension can be used to save for more equity – or in the case of public housing, be on a waiting list longer to access an affordable plot on a good location with secure tenure (e.g. the most adequate housing). As a household cannot wait forever, or may even be desperate to access housing, it is most likely that the household needs to make considerable trade-offs in location, and start to prioritize or even just go for that piece of land which is accessible to them[115] (see Chapter 2.3, model A2).

Once the plot is acquired, the "instalments" to the house can commence through consolidation towards the full house. And as the 2011 case study showed, residents may opt to make the "instalments" in the form of already starting to

[114] I am indebted to Carlos Morales-Schechinger, Mphil, for this analogy in all its detail related to location, transport and incremental construction. Here I further work out the analogy to core-housing and fill in the incremental strategies with the experiences of the households included in the 2011 sample. Interview May 3, 2011, Rotterdam.

[115] So much so that the households takes another mortgage, namely on the location of the plot – paying daily instalments for transport, again spreading the costs through time in the face of the inability to show upfront finance for a better location.

literally materialise it in the form of buying material and commencing construction – even when they know they cannot finalise the extension in one go. Indeed, the investments a family can make in extending – may not come regularly and the extensions may follow the pace of money coming in. Possibly one of the most interesting aspects of households' way of "doing consolidation" observed in the case study is that they would already be *commencing* construction as a form of stored asset.

Speed as legitimate demand?

Speed in finalising an extension may be a legitimate demand of low-income households themselves, but it is explicitly not the most urgent constraint to their consolidation process. When the most well known entrepreneur[116] selling the prefabricated modules at ´Greenpoint´ was inquired after the targetable niche of the local market he had found, his answer was: "Our business is for those who can only afford a deposit for buying a shack. We deliver the 'bungalow' to their plot and then my men come to collect small sums of the cost on a weekly basis". This explanation also makes sense out of the stripping of every possibly "luxury" – such as insulation – from the finishing of these basic shelters. "It is a terrible business," continues Lagumás, "sometimes the renters run and take the house with them. We make a lot of costs and never know whether we will be able to collect the money. It is also a dangerous business." The dangerous side of this market, as well as the analysis that this entrepreneurship was basically centred on the most fundamental constraint of all the extenders – money – may have or may not have been confirmed by the way this entrepreneur walked off, with two auxiliary crutches under his arms (see Picture 12). His left leg had been hit by a bullet in a violent confrontation and was amputated as a consequence.

Picture 12 **The most well known entrepreneur in modules at ´Greenpoint': "A terrible business".** Picture by author.

[116] Dumisoni Lagumás. Expert Interview, August 6, 2011, Khayelitsha.

7.3 Implications for future implementations

To what extent is the introduction of an open building approach expected to result in more effective core-housing (e.g. legitimate, adequate and sustainable)? Based on the exploration and analysis thus far in the second half of this chapter a translation is made into five rather bold statements. It is a conscious choice to formulate the findings in this way. There is no pretention whatsoever that these considerations are sufficiently explained here, nor complete or even completely accurate just yet. Rather, as has been the aim of this thesis al along, it is hoped that they may trigger (and perhaps even provoke) further thinking and more effective practice. Suggestions for further detailed study are made in the conclusion of this thesis, which follows in the final chapter.

7.3.1. Consideration 1: Don't reduce the plot below a reasonable size

Here is a powerful image[117] of core-housing implementation in Khayelitsha displayed in a journal to communicate the concepts' assumed effectiveness (see Figure 6). It is a misleading image too as it only communicates a snapshot of the project right after implementation, showing a "matchbox ghetto" on "empty plots" (e.g. low land-use efficiency).

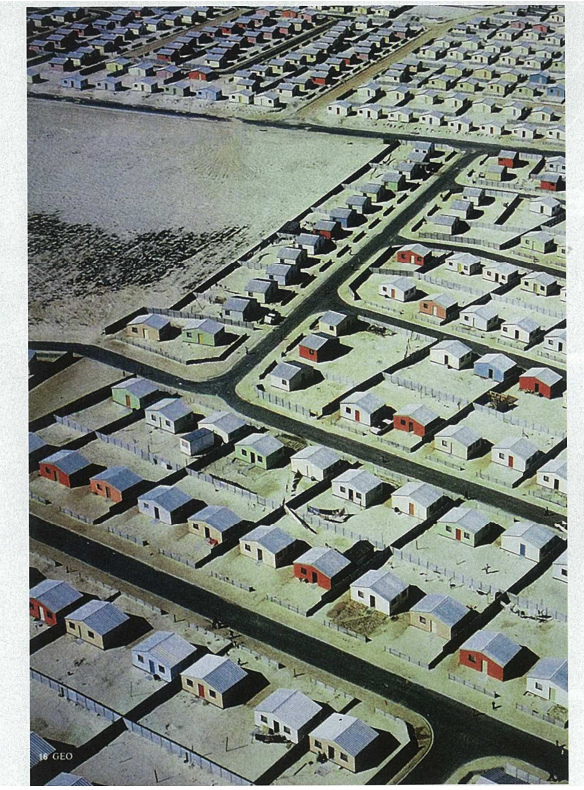


Figure 5 Powerful – and potentially misleading - image of core house implementation and its assumed effectiveness.

The subscript asks the reader of Architecture South Africa: 'Is this the city we want? Environments without the ability ever to transform and improve – Khayelitsha, Cape Town. Source: Geo in Dewar 2009:8.

[117] The image is of course also very powerful in bringing across the mono-functionality of housing implementation of this kind, the lack of variety in initial houses, lack of trees to enhance resilience to the climate conditions etc. all of which Dewar (e.g. 1991, 2000, 2009) must be credited for observing already during Apartheid period.

'Density is in the mind of the perceiver', as Acioly & Davidson (1996:6) state, referring to cultural backgrounds. Yet, density perceived is also dependent on whether the beholder has a time dimension in mind. This powerful image fails to communicate three primary pragmatic advantages of a reasonable plot size. In the discussion below, no specific size is given to avoid the pretention of universality, yet to give some indication, the discussion below is based on the analysis of consolidation on plots sized between 194 and 204 m2[118]. The fundamental point made is that the plot needs to have at least some future potential.

The plot is an enabler for alternative densification and for livelihoods

The first pragmatic advantage of a reasonable plot size is that it is an enabler. Core-housing implementation must not eliminate the flexibility offered by the plot. With much smaller plots, the absorption capacity of housing projects implemented as a whole would be considerably reduced, as alternative densification is restricted, further adding to housing stress of households thus in fact, making it only a short-term solution. Low-income households can use the plot's land coverage to progressively achieve culturally acceptable forms of relief in housing stress related to privacy, space and material use values (e.g. detached structures, upstairs etc.). The potential of the plot for income generating strategies – such as leasing a small part of the plot for another persons' business - mustn't be cut off either. It is a pragmatic consideration since, while ideally low-cost housing for the poor in the city is located close to the city centre and job opportunities, in *realpolitik* low-income housing projects tend to be implemented as residential dormitories on peri-urban locations, far from job opportunities. Although (at least in this case study) having renters as an income generating strategy may take a while to reveal itself as the area must first become more interesting from a location-perspective and more densely occupied, reducing plot sizes may indeed close off future opportunities for outsiders to at least have some form of affordable access to the city.

A reasonable size allows for higher levels of extension in the future

There is a second pragmatic advantage of a reasonable plot size, namely that it eventually allows for higher levels of extension, amongst which is incremental verticalisation. Bearing in mind that a settlement is in process, one should not plan for a 'static' situation (Davidson & Payne 2000) – and cutting the size of plots too far is exactly that: static. An interesting case is provided in the Ismailia Demonstration Projects. Commenced in Egypt in 1978, it aimed 'to develop a model for urban development which would be accessible to low income groups and which would echo the pattern of development in Egyptian cities' (Acioly & Davidson 1996:15). The way housing normally develops in Egypt is incrementally, depending on income and demand. This also poses particular challenges on how to plan for a plot that can accommodate these changes. In this project, the challenge was 'to design a system affordable to middle and low income families starting with one storey development, but assuming that average development would extend to two storeys within a 10-20 year period' (Acioly & Davidson 1996:15). A striking example of plot sizes relates to the trade-offs considered between smaller plots giving greater affordability, or larger plots with

[118] Faizel Amoo, Expert interview, August 4, 2011, Khayelitsha, Cape Town.

greater flexibility over time. Design professionals were the ones debating the trade-off and eventually decided on a plot with a frontage of 6 metres - designed to be economical for infrastructure provision. Later in the implementation phase the response of the local people to the plots was that they were too narrow; they argued that if the plots would have been wider – 7.5 or 9 m – people could have constructed two flats on each floor sharing the same stair access, and thus be more efficient. Acioly & Davidson (1996:15) conclude 'in this case the paradoxical result was that the approach which initially aimed at greater densities, in the end would have resulted in lower density'. Or as Gloria[119] put it during the Focus Group Discussion, referring to the 'upstairs' she is constructing in Eyethu: 'At least the plot here is large so I can build my family house on it'.

The plot must at least offer a "fair share"

The third pragmatic perceived advantage of at least a reasonable plot size is allowing for a "fair share". This is not merely an ideological motivation but has everything to do with coexistence and preventing the consequences of a lack of it in a city (see Chapter 2.4).

The concept "fair share" here introduced is taken from the climate change debate in relation to development of the poorest (see e.g. Satterthwaite 2009) and in a similar line of thought here applied to 'plot size'. Satterthwaite (2009:551) argues that 'it is not *fair* to equate increases in Green House Gas (GHG) emissions per person per among low-income populations (say from 0.1 to 0.5 tonnes of income populations per year[120]) with comparable GHG increases among high-income populations (for instance, from 7.1 to 7.5 tonnes per person per year)' The 'most fundamental point', argues Satterthwaite (2009:551, 558) is that increases in GHG emissions per person by people below the global "fair share" should be considered as 'qualitatively different from any growth in GHG emissions per capita among individuals or households above the "fair share" level'. 'Making provision for increases in GHG emissions for those people below the "fair share" level so that they can move out of what might be termed "energy poverty" cannot be considered in the same light as increases in emissions from those already above the "fair share" level' (Satterthwaite 2009:551).

The analogy becomes clear when 'climate change' is replaced by 'sprawl', 'global' by the 'urban land system' and 'GHG emissions' by 'plot sizes'. In South Africa, the sprawl caused by low-cost housing projects is matched by the spatial decentralisation of high-income groups– also on the periphery (Schoonraad 2000). New developments for high-income groups mostly take the form of walled enclaves and security villages; some of these developments contain lot sizes ranging from 1,000 m2 to 4,000 m2 (Schoonraad 2000:222). This sheds a totally different light on making provisions for low-income households to reach a plot-

[119] Focus group discussion, August 5, 2011. Boardroom KDF, Khayelitsha, Cape Town (South Africa).

[120] CO2e (carbon dioxide equivalent emission) is a measure of emissions where other greenhouse gases (such as methane) have been added to carbon dioxide emissions, with adjustments made for the difference in their global warming potential for a given time horizon (Satterthwaite 2009:551). A global fair share of emission is generally set around 2 CO2e tonnes per person per year (Satterthwaite 2009:551).

use that at least offers a reasonable potential - under current RDP policy a 250m2 plot (Tissington 2011) - whilst pointing out more precisely where the largest political task lies, namely in bringing the plot sizes of middle class housing (e.g. in new projects) more in line (e.g. compaction) with a negotiated "fair share". Napier[121], would even argue for a fixed minimum plot size for low-income household projects as a form of (ancient Greek) democracy: all get the same equal start and what is done with it after that is up to the residents.

7.3.2. Consideration 2: Don't repress impermanent extensions, guide them from the start

Achieving at least some form of housing through impermanent extensions are everything but romantic as one would almost start to think when reading about the 'people's process' (Turner 1976), the 'growing house' (Brillembourg et al. 2005), 'architecture without architects' (e.g. Olivier 2003) and the like. Without ever being introduced to ethnographic work or indeed personally enter impermanent extensions – that is: not on a sunny day, but in the midst of a fierce winter rain, or at night with little street lightening in a dodgy area – it is hard to get a sense of just how it deprives inhabitants of some very basic adequate living conditions related to health and safety.

Given the choice families would surely opt to accommodate all members of the household in conventional material extensions. Yet, due to unpredictability and only small flows of money of the majority low-income households, it is clear that trade-offs are inevitable and many households are 'coping' (see Chapter 2.3, Model A2). In that light, impermanent extensions are a first step towards more adequate housing in terms of occupancy rates per habitable room and privacy. To residents of core-housing along their consolidation process, the key question is whether their 'struggle' will be further frustrated by regulations – or not. Impermanent extensions also impact the safety of a settlement as a whole. A striking example from the case study is the frequent fires which are raging through townships, jumping from house to house as impermanent extensions catch fire.

There is however a complexity arising here from clashing interests. It is not all that surprising that when the Human Settlements Department of the KDF was confronted with the regulations for impermanent structures and the philosophy of 'safety and health', the first response was: "You may have been misinformed"[122].

Alertness is required when it comes to building standards for adequacy in a context of consolidation processes. Since housing is political, standards may be used as symbols of progress, not measures of achievements (Martin 2009:39). Moreover, there are many clashing interest involved between various income-groups within the city, such as property values, possibilities to recoup investments in extending, city image etc. Standards may defend the interest of the residents of urban areas against hazardous development – but they can also be used to condemn whole settlements that are 'below standard' (Martin 2009:39).

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[121] Expert interview and validation, August 11, 2011, Cape Town (South Africa).

[122] Mava Kenneth Nowala, Validation of research outcomes with the board of the Human Settlement Forum of KDF, August 8, 2011. Expert interview via email, August 15, 2011.

The rhetoric of housing by people will not be meaningful if the regulatory framework puts considerable constraints to impermanent and informal consolidation. It is an unrealistic approach too: informal construction is growing by a rate that is equal, or even exceeds, that of the planned growth of urban areas in rapidly urbanizing world, and more often than not in a context of a soft state that lacks capacity to control and enforce the following up of regulations at the micro level – the plot. 'Informal construction is a very urban phenomenon, indivisible from urbanization. It is an alternative way of urbanisation' (Zerjav 2009). For all the danger of romanticizing informal construction, what publications by Turner (e.g. 1979), Brillembourg et al. (2005) and Olivier (e.g. 2003) at least achieved is awareness of the sheer scale of it and the fact that it is completely outside the horizon of official planning systems. Or as Zerjav (2009:ii) puts it, an approach should be introduced in planning ´that would recognize this alternative way of urban growth – alternative because of the current rules of the game, but equal by numbers – (…) in order to overcome this bizarre situation {of still being frustrated}´.

Repressing impermanent extension may most likely only lead to further deterioration of living conditions in terms of housing stress, further stigmatisation and further frustration of the people's "struggle to extend" a core house. If it is unlikely that permission will be given for the type of extension a household has in mind, it is equally unlikely that a household will ask for it in the first place – certainly when the state is too soft to enforce consequences and the sheer numbers of ´illegal´ constructions in fact make the building permit somehow illegitimate by definition. Meanwhile, if the resident is lucky to enjoy *de facto security* from having impermanent structures bulldozed, there is hardly any pragmatic reason left to go and get a building permit. Thus, other more proactive approaches will have to be explored.

The second case study conducted by Napier (2002) in his comparative analysis – a core-housing project in Inanda Newtown – may offer some clues to 'alongside' guidance of extension activity. Here, 15 years after occupation, Napier (2002) observes a ´much more permanent product´ than in Khayelitsha. Napier (2002) analyses that this outcome can be – amongst others - directly related to building supervision and guidance right from the start. Most extensions in Inanda were built with local authority permission, while ´the local authority was seen as being supportive of consolidation and a much more permanent set of extensions had resulted´ (Napier 2002:192). Government or NGO involvement was painfully absent in the first decades of consolidation in Khayelitsha. Here, Napier (2002:220) sees a causal relationship between the fact that extensions remained predominantly impermanent in nature and the 'lack of enablement' from local institutional and legislative contexts at least during the 1980s and early 1990s.

While long-term involvement of an NGO is indeed beneficial (Napier 2002), it is also little cost effective and therefore not a permanent solution (see Chapter 2.1). Hence, finding an angle to guide impermanent towards conventional extensions is much more sustainable when sought from within the embedding in

the local municipality. Amoo[123] gives the example of supervisors coming to a plot to give indications, which do not cost to follow up, but do greatly improve the soundness of the structure, whilst also checking on the local builders to deliver a good job (not a free service, albeit in some cases subsidised by the government). Such an approach does require considerable staff capacity (both in numbers and skills) and the legal space to *manoevre* with regulations in order to fit into reality on the ground - to be able to be flexible with it, to perceive the temporal dimension, to not repress but guide.

7.3.3. Consideration 3: Give residents a level playing field in the trade-offs made in the initial superstructure

There is a striking warning in the Khayelitsha case which is the often seen situation in which a project is set up in such a way that it does not enable people, but cultivates a situation of "holding up your hand" and of "apathy" as opposed to entrepreneurship, ownership and enablement (see e.g. Salemink et al. 2004, Moyo 2009, Tissington 2011). Napier (2002:221) concludes on the core-housing project in Khayelitsha that:

> The lasting expectation that the government would still come back and extend the houses for the people was evidence that core-housing as a form of development had been misunderstood, or more likely, it had been seen for what it was in the way that it was originally offered: a way of coercing residents to participate in an undemocratic system. In the Khayelitsha case, there is little doubt that the original intensions of the 'inventors' of core-housing had been conveniently adopted by the State as a way to bring citizens within the control of its apparatus.

Napier (2002:121) analyses that 'the sense of ownership of the project by residents, both literally and psychologically, was not present to the same degree as in Inanda Newtown {the other case study in Napier's comparative analysis}'. The perception that others would come in to extend the houses for them, revealed 'an exact inversion of what the planners had intended: that people be responsible for the establishment of their own housing' (Napier 2002:12).

Napier (2002:136-137) inquired in his surveys whether residents were at all aware of the core-housing concept, posing the question: "When you moved into this house, were you told by anybody that you would need to improve and add to this house yourself?" 90% of the original residents included in the survey said that they had not been told that they needed to improve their own houses. No wonder the entire project was perceived as a top-down consultant-driven implementation. The low level of participation in the design process is considered by Napier to be among the most obvious explanations for the lack of identification by residents with the core-housing project.

It is revealing to look at the South African housing grant to understand the trade-offs involved with the way funds for project implementation are approached. Current housing policy allows for a one-off capital grant per household[124] as a

[123] Faizel Amoo, Architectural Technician and Senior Building Inspector of the Building Development Management Department in Khayelitsha. Expert interview, August 4, 2011.

[124] The one-off capital grant involves $2,480 per household earning below $117 a month, and an income-based declining contribution to households earning less than $220 a month (Dewar 2000:216).

contribution towards land, services and some superstructure (Dewar 2000). This has a direct consequence for trade-offs made in the implementation, which of course seeks to be cost-efficient. An example of such a trade-off is that between plot size/location and quality/size of the superstructure. Impossible house layouts are submitted by contractors for 'little boxes' (after Harber 2010) under the State's subsidy programme (RDP), showing houses as small as 16m2 and without any consideration of their use by residents - even the need to put furniture inside – and with serious compromises of lighting and ventilation openings as well as minimum areas for habitable space (see Figure A1, Annex 9a). In an attempt to protect the resident and in the face of the political aspects of low-income households (see discussion dignity above), the political imperative of the South African government is to provide low-income housing with as much superstructure as possible. National housing policy thus prescribes that only 50% of the subsidy may be used for land and infrastructure costs, and a minimum of a 30m2 must be built (Todes et al. 2000:236) – by now commonly a 40m2.

'The land price becomes the softest variable' analyses Dewar (2000:216). Consequently, low-income housing projects continue to be erected on cheaper peripheral land. Dewar (2000:216) advocates that central government should encourage using part of the subsidy 'to write-down the cost of better-located land' which 'would in the longer term represent a far more effective form of subsidy'. After all, the plot location is the only thing that can never be changed and the most important "down payment" of the low-income household (see the analogy of a mortgage in 6.2.4.). It seems however that such a suggestion is almost moving in the direction of proposing a site-and-service project, instead of core-housing if the same ceiling of funds available stays.

In the case study analysis here, especially striking are the long pauses between extensions (see Table A10). This implies that for many years the house has not been adequate in terms of space and privacy considering the high housing stress levels upon occupation (see Table A10). Thus, the smallest core may quickly render the house inadequate in terms of space and privacy as the house fails to accommodate the internal growth of the household for as long as they see no openings to extend. During prolonged periods of non-extension, much more careful attention to initial design may greatly improve the living conditions of a household. Harber (2009) is among those architects ringing the alarm on "sneaky" designs by contractors applying for state subsidies while grotesquely distorting the adequacy of housing designs and not abiding even by the minimal requirements under the national Housing Code (see Annex 9b). Designers are urged to 'look inside the houses as well' to avoid replication of impossible trade-offs made merely on financial analyses (Habitat in Harber 2009:30).

Thereby it must be held in mind that the effectiveness of the initial design cannot just be rationally established, as it is also perceived relatively to the land- and housing system. Residents in the 2011 sample all expressed that they are relatively well off in the Apartheid core houses as at least it is "so much better than post-1994 RDP houses" whose quality is so poor that 'the majority will require major renovation and maintenance in years, rather than decades' (Dewar 2009:11). When asked what exactly is better, residents refer to the structural soundness and material quality of their "Apartheid house". Residents' perception

of the ‘decency’ of their house echoes reports on post-1994 houses, such as: ´Houses built for poor people under an RDP government development programme in Naledi, Soweto, are falling apart just months after residents took possession´ (Marinovich 2009 in Berger 2009).

Considerations on positioning are not approached merely rationally either, meaning that sound architectural considerations of efficiency need to be flexible to allow for legitimate demands of residents (see also Model A2, Annex 10). For instance, when asked about the positioning of the original core on the plot, most residents were quite satisfied with the positioning in the middle, expressing particular satisfaction if it was positioned say 2/3 from the back of the plot, leaving some privacy from the street side but allowing for the (impermanent) extensions to take place “out of sight”, while displaying the apartheid house to the street with its quality material (conventional) as long as they had no means to extend conventionally and further personalise the façade. Such reasoning renders several of the more efficient suggestions for positioning made by Bronchart (2000), in fact, not legitimate culturally. The exploration of other options of positioning in terms of efficiency is revealing nevertheless (see Annex 9a).

Broadly brushed this leads to the conclusion that targeted beneficiaries must have an early place at the decision table, with a level playing field amongst other stakeholders in trade-offs made in the initial structure. Not only may this give residents a better sense of ownership and identification with their house and the “struggle to extend” that they agree to take upon themselves within their available housing options. Given transparency about the possibilities and limitations of available funds, plot location and size etc. Such a form of implementation allows for a shared responsibility for the concessions made in the initial structure while together agreeing on what ‘basic adequacy and dignity is to start with’. Moreover, it is a pragmatic approach as a spectrum of aspects about the initial core can in fact not only be rationally determined in order to be effective – here particularly legitimate – in the longer term.

It is certain that the ‘best of worse’ trade-offs are highly contextual (e.g. settlement layout, project budget, access to land in the city) and interwoven with the expectation that society and targeted beneficiaries have of the housing programme. Providing the smallest core that is almost bereft of design in a context where people expect to be offered at least some ‘dignity’ and a ‘right to a full house’ may (quickly) render it both an illegitimate proposal as core-housing as a form of development will be misunderstood. Just how such transparency and ‘a level playing field’ can be pragmatically realised is subject for further study and comparative analysis. What is certain is that the core-housing concept itself faces a huge legitimacy challenge here in rapidly urbanising and socio-economically diversifying contexts.

7.3.4. Consideration 4: The initial superstructure must primarily attempt to less physically constrains on future extension

Incremental consolidation allows for development as time passes and needs and priorities for the household become clear – instead of relying on predictions which may be misguided or simply impossible to make yet. Using the temporal dimension in construction also has the added benefit – above a “full house” provision - of not necessarily having to know the eventual use and being able to

already use the current situation even when the building is not finalized. This use of the temporal dimension in one's advantage bears resemblance to the logic behind leaving parts of the land in a city open for later use (see e.g. Angel 2011). Could it not be that in fact the design of the extensions is most effective when left out of the control of the architect? And, could it not also be that there is just such a sheer variety of extensions possible once resources are there, that it is virtually impossible for an architect to try and control that?

For the long term consolidation process, there are strong suggestions that the focus of the design of the initial superstructure must shifts to finding ways to *least constrain*[125] households in the way they "do consolidation" to achieve their housing needs, priorities and aspirations. A good illustration of such constraints comes from Bronchart (2000), who studied 'truly very impoverished families[126]' in East London and the constraints of their initially provided core house. Bronchart highlights the key importance of the height of the walls of the core in relation to sloping roofs, showing that too low ceilings here do not allow for extensions to the side as their subsequent ceilings will be so low that one cannot stand there (see Figure 7). Thus in such an initial core design, first investment must be made in higher ceiling before the extension can be undertaken – a wasted investment which may have been avoided.

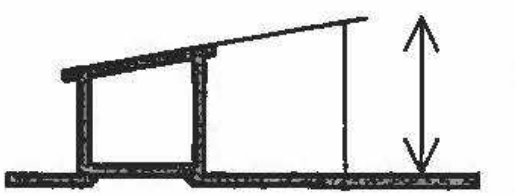

Figure 6 An enabling initial design of a core house as it does not constrain future extensions in relation to minimal height of the walls.
Source: Bronchart (2000:1, 108).

Earlier, in the context of this case study analysis, it has been discussed that an 'upstairs' implies a considerable improvement in the direction of both resilience and safety – adding to that cultural values of privacy and dignity. As observed by Zillman (2000) in Caracas, where verticalisation is taking place through informal incremental housing processes, second storeys are potentially more hazardous to its residents if the construction is not sound (see also Picture 13) so that it is interesting to explore the possibilities of guidance. As Ramsay (1995:3) already analysed in an early stage of elemental housing implementation: 'the upward extension of a house to provide for an additional floor or dwelling is difficult to accommodate unless prior provision is made in its design and construction'. The design may be able to guide incremental verticalisation through reducing the costs to achieve that level of extending. In practice probably this will imply a very modest – yet structurally sound – core house.

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[125] I am indebted to Alonso Ayala, supervisor of this thesis, for highlighting to me this approach to an enabling core-house, with reference to the "people's process" Turner (1972, 1976) and Tipple (2000) observed in respectively informal settlements and state-provided housing.

[126] Sophie Bronchart, Belgium, interview over email, October 30, 2010.

Picture 13 Verticalisation of 'shacks' in Khayelitsha.
Source: http://www.capetown.dj/Regions/CapeFlats/Khayelitsha/Khayelitsha.html [Accessed May 30, 2011].

7.3.5. Consideration 5: The principle of *zeggenschap* may serve as a tool for flexible and participatory core-housing implementation

While open building systems have been promoted and perceived within the construction system as a way out of the incapability of traditional building processes (see Chapter 2.2) open building can in fact be taken to a much more fundamental approach which moves away from traditional approaches and leads to a new *tool* of articulating the interface between various levels of building control. 'This particular approach to the design of the built environment (…) has financial, physical and management implications' (Osman & Königk 2009:55). More specifically, using the principle of *zeggenschap* – distributed decision-making on building control at the various levels of the built environment - may be a tool to sharpen thinking on core-housing implementation (see Chapter 2.2).

Napier (2002:341) warns that to use the information from studies on preferences prior to designing new housing may overlook the need for participation of the actual beneficiaries in the design of a project. Moreover, participation is not about asking people what they want – as their wants are experientially determined (Dewar & Uytenbogaardt 1991). The latter confirms the importance of participation throughout, as needs, preferences and aspirations reveal themselves in the course of time and cannot be predicted by the low-incomes household in advance either.

Indeed, the built environment is not static and provides an interesting context in which to study the relationship between stability and transformation, argue Osman & Königk (2009: 54). 'Dewar and Uytenbogaardt (1991:35) refer to a process of 'negotiated reactions' whereby continuous transformation is achieved within a stable environment. This is perceived as a common characteristic of successful urban places'. Likewise, 'a house or residential unit is a changing organism, adapting throughout its lifetime to suit changing social status, economic status and lifestyles'.

It is in disentangling the various levels of the superstructure that *zeggenschap* may aid thinking about participation throughout the lifetime of the core house. The focus is on transparency and dialogue throughout, as explained by Osman & Sebake (2010:246):

> The concept of participation, as an accepted paradigm in development, is explored through methods that allow for user participation in design decision-

> making. Such design-aiding techniques optimize the contribution of role-players in housing through maximum transparency and effective communication. (…) Adopting a democratic process in decision-making processes regarding the built environment and acknowledging the large number of participants in its development. (…) The concept of participation is thus, not only confined to "once-off" consultation in initial stages of design where in some cases communities participate in decision-making processes, but also as an on-going process where the built environment allows for future adaptations (Osman & Sebake 2010:246).

Incremental housing must be well planned but not controlled (Davidson & Payne 2000, Combrie 2009, Dewar & Uytenbogaardt 1991:88). *Zeggenschap* possibly offers a new tool for approaching participation of residents as well. 'The approach differs from those where end users are involved in decision-making at the outset (reference here can be made to Ralph Erskine) as it acknowledges that participation is ongoing throughout the life of a project and not once-off at the beginning of a project' (Osman & Königk 2009:55).

The initial core house must clearly and visibly identify different levels and systems to make it possible for future residents to understand which parts are supporting and in fact enabling them to extend at lower investments (after Osman & Sebake 2010, Osman & Königk 2009). This results in the creation of a primary level – base building or support structure – allowing for the manipulation of the secondary levels, such as infill by impermanent material and local building skills, gradually moving to conventional material if extenders are fortunate to be able to access the required resources for that. This transparency in building control to the resident ought to be an integral part of the dialogue with all relevant stakeholders – not the least of them the users themselves - before occupation. Possible ways of realising this must be taken into further detailed studies and are of course highly contextual – being not only dependent on the embedding in a specific land- and house system, but also the project at hand.

To explain how the principle of *zeggenschap* can be used as a *tool* for the core-housing concept it must be translated to a specific core-housing implementation project context. In fact, one very interesting application of this principle has been made by several of the heads included in the 2011 sample of the fieldwork of this thesis: the "circle of ladies" – as the saving group calls itself - operating in Eyethu[127]. These ladies each month contribute a fixed sum to save up for (mostly) conventional extensions – the secondary system – to add to their initially state-provided core house – the primary system. The ladies are being both extremely strict on monthly instalments to the saving group in culturally legitimate ways that only they understand best. The consequences of bailing out and letting other ladies down in the saving group are severe: the circle of ladies will come to get all the furniture and electronics inside the house – the tertiary system. The way they operate however never endangers the shelter of a family. It is morally wrong in their eyes to put the most elemental shelter of a household and its access to the city at stake as collateral for financial constructions. The ladies understand all to well "the struggle" that these households face, the

[127] Several semi-structured interviews with heads of households participating in this saving group (see Table A11) and the Secretary of the "Circle of Ladies", Focus group discussion, August 5, 2011. Boardroom KDF, Khayelitsha, Cape Town (South Africa).

unpredictability of their incomes and their vulnerability to whatever time will throw at them. The ladies are also well aware of the households' vulnerability to abuse within formal financial constructions due to ignorance/unfamiliarity to the implications and possible consequences of upfront finance when the house and plot are put as a collateral and insufficient understanding of the value of their title deed. Accordingly, when joining the "circle of ladies", participants of the saving group have given the other ladies building control over the tertiary system, but the building control over tenure and the superstructure remains in the hands of the head of the low-income household. Her shelter, and that of her children, cannot be taken from her or her family.

Thus applied, *zeggenschap* is a slower, yet ultimately more effective, process of achieving adequate housing than either the sweat-equity concepts of the 1970s (see Chapter 2.1) or clear-cut extensions proposed in contemporary experimenting on low-income housing by professionals (see Chapter 1). Some project contexts will allow for microfinance and upfront finance of extensions, some won't. Maybe there is access to formal loans; maybe there is reason to discourage that if residents are too vulnerable. Maybe impermanent material abounds, maybe it doesn't. Maybe there is an existing community that is targeted; maybe beneficiary households have no concept of each others existence. Maybe there is an NGO involved with the project to add to capacity building, maybe there isn't. Maybe socio-historical legacies make for a particularly complex situation; maybe the implementation is much less politically sensitive. Maybe the rights of the low-income households to the city are enshrined in the constitution; maybe they are very politically explosive. Maybe many instruments to promote coexistence already exist to aid Local Government, maybe this option is yet unexplored. Maybe there is a "circle of ladies"; maybe saving groups are alien still. And so on.

Clearly, the core-housing concept becomes much more effective if it is understood as a flexible building made up of various systems with different possibilities for building control. This allows for a form of implementation that is capable to be adapting to the particular embedding of both the plot and the core. *Zeggenschap* may be a tool to facilitate such a dialogue with the main actors involved with the plot and the superstructure over time – most importantly – its users.

7.4 Summary

The fieldwork of this thesis takes place in 2011, 26 years into consolidation of the core-housing project. Possibly the most remarkable development identified during the 2011 fieldwork is the establishment of the Building Development Management Department which may also hold important changes for the consolidation process of the core houses in Eyethu (T1V2). The new building regulations require a building permit not only for conventional extensions, but also for impermanent extensions. The regulation for the latter is still widely unknown, and building supervisors take a reactive approach as the consolidation process is largely outside of municipal control.

25 plots have been selected for the sample of households in 2011, based intentionally on their level of extension. With regards to the income levels of these

households, the overall picture is that of impoverished families with a struggle to meet ends. Irregular forms of income prevail, meaning the income is quite unpredictable which is observed to have direct impact on the process of consolidation. An interesting finding is that the most common form of regular and predictable income (e.g. every month the same amount) is social wage; grants provided by the government. At times whole extended families thrive on it, and it is an important factor in the ability to afford extensions.

Priority of extension among main households included in the 2011 sample has gone first to adding space then privacy, as the initial core house has a high housing stress in both regards. As for success of extension, the 'upstairs' is considered to be the most successful level of consolidation achieved, as it is both the most costly extension as well as requiring the most advanced skills and time investment. Even so, backyards still prevail. A cultural function of the attached and detached structures was identified, whereby no single females would be housed in detached impermanent structures, while the detached contiguity allowed males more of their 'own life'. Most importantly, families would be attempting to protect vulnerable family members first from the vulnerability and harshness of impermanent detached extensions, giving priority to housing children and females attached to the core. It is striking that the upstairs seems a fairly good option for relief of housing stress, both in space, privacy, and greater perceived security as compared to the vulnerability of detached structures of impermanent material to the (climate) elements and crime.

Particularly for extended families, it may well be that housing stress is not a matter of "certain moments in the lifecycle". Instead shocks - the arrival of new family members - and triggers - members growing up and requiring more (gender) privacy - are entering a cycle with no specific ending as the house passes on to the following generation and the household becomes ever more complex. Extended households thereby struggle to achieve some form of dignity to live together. Lack of privacy is especially prevalent in the case of secondary households on the plot, either relative or non-relative renters, as these commonly must use the same services as the main household.

Several new indicators to assess the effectiveness of the core house have come out of the 2011 fieldwork. It seems relevant to distinguish between 1st and 2nd generations to the core house - versus new households, as another indication of mobility of the target population over time. The positioning of bedrooms on the plot in combination with their occupants has been introduced as a possible indicator of hierarchy in relation to the main household – whereby empty space on the plot is also used as a demarcation. The indicator 'adult descendants' has been introduced, in its working definition referring to 21+ aged persons who have been raised as part of the main household from childhood or through their teenage years and now still live on the plot.

Using the newly identified indicators, and those already given in the methodology, five trends can be identified among the 25 households included in the 2011 sample: 1) Alternative densification and incremental verticalisation; 2) A steady shift towards the use of conventional material; 3) The adequacy of initial layout and positioning of the core loses a lot of its relevance over time – but not for (prolonged) non-extenders; 4) More advanced extensions may be inaccessible

due to investments required in solving a physical constraint of the initial core; 5) The slow pace of extending with conventional material is primarily related to the strategies of 'stored asset' and the use of the temporal dimension to ensure affordability.

The term 'alternative densification' is used to refer to those forms of densification observed which do indeed suppress the overall housing backlog but are not (yet) accommodated for in conventional ways of measuring densities. A growing proportion of adult descendants have no other option but to stay with the main household. Two factors have been identified that explain the process of alternative densification: fate due to external structural processes and relief based on rational trade-offs of opportunities, needs and aspirations of adult descendants themselves. The socio-spatial importance of the 'alternative densification' becomes even more relevant considering fulfilled middle-class aspirations whereby an increase in income is also matched by a considerable increase in land-consumption. The operational term 'incremental verticalisation' is introduced to refer to the construction of second (etc.) floors which relieves the internal housing stress of the household. Such incremental verticalisation is quite a successful form of relieving housing stress, allowing not only for more people per plot but also for a certain culturally legitimate level of dignity in terms of contiguity and privacy.

Within the 2011 sample, 65% of the first extensions were of impermanent material, while – to the contrary - 60% of the second extensions were of conventional material[128]. Interesting is the finding that there is a strong, internal motivation to construct with conventional material. The imperative to extend usable *indoor* space is increased in this specific case study by adverse weather conditions and less opportunities to use outdoor space for living. The very small initial houses moreover make extending by any means possible more like an "emergency housing solution", whereby impermanent material offers a quick solution. Yet, the terrible "climate intelligence" of many an impermanent extension – most importantly the backyard shacks – in its turn is amongst the strongest push factor to work hard to achieve conventional extensions. Added to that is the vulnerability of living in structures of impermanent material to crime but also to quick onset disasters such as fires or flooding – again particularly so in the case of backyards. The pull factor of conventional material extensions is strengthened by the presence of a powerful cultural dichotomy of status versus shame. Status is reflected in language as well as the physical appearance of the facades of successful extenders. Shame over impermanent material use is reflected in language as well as in the physical positioning of the extensions and the hesitation of revealing the use of salvaged material. Fundamental for grasping the dichotomy status-shame is the deep longing to be integrated into society as a full citizen and to achieve a 'sense of dignity'.

With the temporal dimension in mind, the case study shows that successful extenders may alter the original core altogether, so much so that it may even becomes unrecognizable when compared to its original design, positioning and orientation. Thus it is perhaps more precise to state that for the initial years of the

[128] Percentages here are only offered as a quick reference *within* the sample and cannot be generalised (see Chapter 5).

project - and for those who cannot extend at all - the initial design of the core house and its positioning are indeed essential in relation to their basic adequacy and cultural legitimacy. Once residents start to consolidate the logic of extensions stems primarily from the needs, priorities and aspirations and – crucially - trade-offs with regard to resources. In fact, the case study showed it may be most relevant to use 'physical constraint' as an indicator of the longer-term effectiveness of the initial core. Time may render intentionally designed adequacy and enabling aspects quite irrelevant, unless it would be possible to save costs of achieving a higher level of extension by building from there instead of first knocking (parts of) the initially provided structure down.

Among the 24 extenders included in the 2011 sample, the construction of a conventional extension took a minimum of 2 weeks, up to a maximum of 22 years++ for an 'upstairs' among the main households included in the 2011 sample. Yet the latter, the longest period, proves to be the result of the particular strategy, namely to stockpile materials prior to construction or even already start hiring builders and start construction as a form of stored asset - even when the extension cannot be possibly finalised yet. Reasons identified were, amongst others, to prevent money from "evaporating", particularly in the case of (cultural) obligations within extended households and the unpredictability of incomes, as well as being able to already start using the spaces to relief housing stress and that prices soar into time. The ´struggle to consolidate´ is not detached from the surrounding market; to the contrary, it is an integral part of it. It is the resourcefulness of low-income households that leads to cost saving. Extensions must abide by the rule of spending less than is earned, as access to upfront finance is commonly unavailable. Only through phasing investments over time can this fundamental criterion for affordability be guaranteed.

Based on the trends identified, five considerations have been given for future core-housing implementation. Each of the considerations is directly related to the three elements of the conceptual framework: sustainable, adequate and legitimate. To allow for a more comprehensive discussion of the outcomes of this research, the considerations raised in this chapter will be taken to the final chapter – which is the conclusion.

Chapter 8 Conclusion

Surely at first glance, the exploration in this thesis has been disenchanting when it comes to the potential effectiveness of applying contemporary open building practice to the superstructures that are part of core-housing projects. Figuratively transferring the perceived pragmatic advantages and ideological (eco) modernist motivations of open building systems within its context of origin - Europe, North America and Japan - to rapidly urbanising contexts was a humbling exercise that revealed serious issues of legitimacy. Here, very different opportunities, limitations, challenges and *realpolitik* may require other advantages and motivations altogether. The question is raised whether low-income households are the right target population for experimentation with open building systems altogether. Nevertheless, it was also a fruitful exercise, as the issues and dichotomies revealed offered a fresh discourse to the core-housing concept that sharpened the focus of the case study analysis that followed.

The case study analysis of 26 years of consolidation of the core-housing project in Khayelitsha highlighted another sobering realisation: it is primarily the plot potential (location, size etc.) - not the superstructure - which is the ultimate flexible building environment of the core-housing concept as time proceeds. This leads to the inevitable conclusion that neither a conventional 1970s core house design nor the most sophisticated adequacy of an innovative, contemporary design will ever become the primary enabler to the low-income household. It is the reasonable plot size that allowed for a spectrum of forms of densification on the plot, commercial activity and incremental verticalisation– to name a few. Especially relevant also is the use of *empty* space in between superstructures as a demarcation of privacy/intimacy and dignity, realised through contiguity of the attachments (e.g. attached or detached from the core house where the head(s) of the main household live(s)).

The temporal dimension further puts the importance of the initially provided superstructure into perspective when, in reality, what happens to it is likely to soon be outside the control of professional designers and project implementers alike – and possibly even outside municipal control. Time rendered initial design, layout and positioning of the core almost unrecognisable in the case of successful extenders. Khayelitsha is an interesting case to reveal this effect of the temporal dimension as for years residents were left to achieve their more adequate housing in isolation from almost all institutional assistance. Yet, even if considerable subsidies would have been involved to support consolidation processes of the users, in *realpolitik* elsewhere, their duration has proven unlikely to last long enough to witness the “normalisation” of the project site into displaying similar trends as observed in surrounding (informal) settlements - they may have even postponed such normalisation. Attempts to dramatically change the key characteristics of construction and housing implementation within a specific urban context - such as bypassing informal contractors and builders - have proven equally short lasting.

Incremental housing driven by “the people’s process” mustn’t be romanticized, as it best resembles an emergency situation. In Khayelitsha the rather extreme housing stress of the small core house (26m2) in terms of adequate

space and privacy led to a strong urge to extend by any means possible. Outdoor climate conditions further increased the imperative to extend usable *indoor* space. The availability of impermanent (either salvaged or bought) material and the inaccessibility of conventional material due to its price tag resulted in most households "opting" for impermanent extensions. Two major concerns low-income households themselves expressed during the fieldwork – apart from space and privacy – are climate resilience and safety of these extensions.

An interesting finding of the fieldwork – which in fact is no more than common sense – is the strong aspiration respondents themselves express towards the achievement of "permanent extensions". The fieldwork revealed that powerful socio-politic dichotomies are interwoven with the meaning of material use for extensions in Khayelitsha. Conventional material is associated not only with less vulnerability to the elements and crime/violence, but also with dignity, status/show-off and indeed proof of inclusion as a full citizen. Impermanent material thus begets strong, opposite and negative connotations such as: deep sense of shame, temporary status and separateness. The physical positioning of the extensions depending on their material use – either "show off" or "hide" - further proves the powerful connotations given.

While the use of salvaged material and local informal builders may have a completely different meaning in another socio-political context - indeed in some parts of Latin America it may be interpreted as the people's victory and creativity despite their poverty and oppression – an important friction comes up here. Governments' approaches to impermanent structures have been burdened by modernist concepts on urbanisation, leading them to perceive "slummification". Would it not be possible to – instead of focusing on repressing impermanent extensions - to work alongside residents themselves towards achieving conventional extensions, using their own strong internal motivation for it? Or, as respondents put it: "the struggle to extend", referring to the realisation of their right to adequate housing.

On the basis of the case study analysis it is suggested that for the sake of thinking about design requirements to the core house is relevant to break down the time after occupation into two periods. The first period is that of extension with impermanent material only - or even non-extension – awaiting the second phase where conventional extensions may get within the reach of the household. Material use is here an operational term. To illustrate: in Khayelitsha impermanent material refers to zinc plates and wood, while conventional material refers to brick and block. How long each period may last varies greatly per household as it is based on individual coping behaviour – the tolerance of housing stress until its threshold is reached and something must be done to relieve it. In fact, the case study reveals that the first period may be quite prolonged – well over a decade. For this period – and certainly for non-extenders – the initially provided core is of fundamental importance to its adequacy in terms of its space, privacy, climate resilience and safety. It is here where thoughtful consideration of housing layout by architects and project leaders is essential, as they balance trade-offs with the stringent affordability criteria of the target population as well as the project budget. There is every suggestion from the case study analysis that early dialogue with the prospected residents on these trade-offs may greatly enhance the

legitimacy of the project – particularly in the first (prolonged) period of little or no conventional extensions.

Any 'housing solution' however must bear in mind that the bottom-line of people's consolidation of the initially provided core in the period that follows is pragmatism, in the sense of real cost-benefit considerations low-income households conduct within their stringent affordability criteria. The main strategy most households have to ensure affordability of conventional extensions is: spreading the investments through time. Stockpiling materials and even already starting construction while no one knows when it will be finalised are common as a form of stored asset.

The exploration in this thesis has led to the consideration that it is exactly herein that thoughtful design of the initially provided core can be a powerful enabler of people, in that it puts *least constraint* to the way "consolidation is done" once the household enters the second period and starts a first conventional extension. Constraint has been operationalised as reducing the costs to achieve a higher level of extension. Instead of trying to find angles to implement an enabling design, it is suggested that a more workable approach is to accept that no one knows what time will throw at the project or which extensions a household will want to construct over time – probably not even the household itself as it's composition may be quite unpredictable and perceived decency is a moving target in time and relative to surrounding houses. Yet, in the phase that the professional still has building control – namely prior to implementation - it may be possible to be involved in an active quest for a design that reduces the costs to achieve locally desired extensions that may indeed also enhance resilience. A striking example is given by the 'upstairs' – a secondary storey of conventional material – which for the core-housing implemented in Eyethu, Khayelitsha implied removing the original roof and replacing it by a supporting floor first. This proves so expensive that this type of extension – as much as it may greatly enhance adequacy and resilience of the house – has been only accessible to some.

Most importantly, there is no such a thing of a best practice which can be universally implemented (after Pugh 2001:414, Napier 2002:19). If anything, the exploration in this thesis has revealed how important it is to consider effectiveness from the embedding of the core house in a specific land- and housing system. Even so, the core-housing concept, once again, proves 'to be able to serve the principles of the day' (after Napier 2002:24). Several common denominators in the discourse of the "people's housing process" and of "open building approaches" - respectively in Turner (1979 see also Harris 2003) and Habraken (1998 see also Osman & Königk 2009) in 'the particular way of seeing' kept on returning as a fresh approach to the core-housing concept. These common denominators centre around the principles of 'users', 'building control', 'autonomy' and in seeing 'the act of building' in the light of the 'temporal dimension'. These common denominators point to issues beyond a one-dimensional focus on the moment of completion of the initial core and plot or snapshots in time that merely focus on physical appearance.

It is suggested that the principle of *zeggenschap* - distributed decision-making in building control – may serve as a useful tool for more effective implementation that also included managerial, financial and participatory.

Zeggenschap urges to think about flexible interpretations whereby different agents can play various roles in various levels of the house design depending on the embedding, and may aid to think of more meaningful yet pragmatic approaches to participation of all stakeholders involved, not the least the residents themselves. Possibly then taking up the principle of *zeggenschap* as a tool to guide implementation may even help to get beyond the feeling of a déjà-vu with regard to the current revival in the interest for the core-housing concept. The tool developed in this thesis – using an intentionally simplified thus workable distinction between legitimate, sustainable and adequate – indeed proved helpful in balancing inevitable trade-offs in implementation, and is expected to be useful for further study on past or prospected core-housing implementation.

Recommendation for further study

It has been the explicit aim of this exploratory research to make suggestions for further detailed studies. What follows therefore are some considerations that can be taken into account in such follow-up studies.

The point is made that an assessment of the sustainability of a project – in terms of land-use efficiency - must jointly focus on the plot *and* on households that live (d) on it through time. Several additional indicators for density levels and perceived legitimacy have come out of the thesis which may aid further detailed study to plot-use optimalisation:

- Age and gender of household members in relation to material use and contiguity of the extensions in which they have their bedrooms as an indicator of their vulnerability and the need for privacy as well as culturally perceived hierarchy of the superstructures
- Secondary households on the plot, and their access to services
- 1st and 2nd generations to the house as a possible indicator of the mobility of the target population
- Adult descendants in relation to reasons behind the housing backlog in a city.

The case study of this thesis proves that plot-use must be *followed* over a prolonged period of time - not merely in the from of one snapshots of physical appearance at one moment along the consolidation process.

If the plot indeed is the most fundamental enabler of the core-housing concept, the core-housing concept itself requires innovative thinking which considers the plots' embedding in a quickly urbanising and modernising context. Possibly further comparative studies with site-and-service schemes may be a fruitful path for advancing the core-housing concept if indeed the plot is the prime enabler. It is *not* argued here that 200m2 (and over) plots are eventually the best size for core-housing implementation. Indeed the sizes implemented in Khayelitsha are quite a royale exception to sizes elsewhere. Plot sizes moreover cannot be determined in a vacuum but must be negotiated with the particular project embedding in a specific land- and house system and culture. More detailed studies are needed to analyse how plot optimalisation over time can be harmonized with the problems related to sprawl – which may have a huge negative impact on low-income households themselves just as well as on the city at large. The analysis in this thesis suggests that the 'room for the future' paradigm may be more useful in advancing the core-housing concept than too

rigid focus on compaction. The beholder of plot sizes and densities must have the temporal dimension in mind. Thus, if planned densities are already high upon implementation – depending on the desirability of the location and the speed of urbanisation - inadequate housing conditions may soon be the unwanted outcome.

A much larger sample of extenders is needed to establish whether the order in the use of material as observed among the households included in the fieldwork can be generalised. Quite a considerable sample of plots will be needed as a numbers' game is involved: with every next extension the number of households that managed to achieve that (e.g. a 3rd extension) is shrinking quickly. Moreover, it may well be that this order is only relevant in some urban contexts, whether in others all extensions are commonly constructed of conventional material.

Variety - which is essential to sustainable housing development (see e.g. Tipple 2000, see Chapter 2) – is endangered by two processes stemming from the embedding of the plot and its house in the city system: downraiding and the 'exodus' of upcoming middle class leaving behind an outcast ghetto. It was hoped to analyse the process of downraiding during the fieldwork, yet in practice, tracking down households that had left proved particularly difficult (e.g. current households would not have contact details – or be hesitant to provide these in case of informal arrangements, and possibly know little to nothing about former occupants). Stemming from the scope of the exploration, priority was given to other issues during the fieldwork, particularly in relation also to available capacity and time[129]. Further detailed study may be able to analyse this important and complex aspect of elementary housing projects.

The focus on the aspirations of household members – here possibly to imitate middle-class moving out into suburbs and land-extensive lifestyles - has been revealing nevertheless. When considered only from the perspective of the unit, then reselling or renting out the house by the intended low-income household may be considered ineffective-targeting. From the perspective of housing mobility studies, reselling or renting out can however be regarded as a normal process of citywide mobility. From the perspective of livelihoods, the possibility of renting out in a locality may be an essential part of the local income generating strategies of low-income households. Suddenly then, "tailored housing" may become a moral question: what gives the provider the right to decide for the household what to do with their own housing and how to fill in their strategies?[130] New approaches altogether may be required such as considering the settlement as a whole instead of individual plots when trying to implement variety in income levels right from the start[131]. Examples of experimentation and best practices with innovative

[129] This explicitly does not mean that downraiding is less of a challenge for core-housing implementation – to the contrary. If only in South Africa, numbers are huge. According to the Minister of Human Settlements, based on a random sample of 10% of the housing units completed between 1994 and 2008, of the approved beneficiaries since 1994, only 34% is still occupying houses allocated to them in terms of the National Housing Subsidy Scheme. Source: Parliamentary Question No 2692 (2010 in Tissington 2011:62).

[130] B. Hendriks, lecture at Institute for Housing and Urban Development Studies (IHS), June 7, 2011, Rotterdam (The Netherlands).

[131] In South Africa there is a restriction on reselling or "otherwise alienating" of the dwelling/site within a certain period – 8 years - from the moment property was acquired in

instruments in existing settlements can be found in Brazil, such as attempts to safeguard a territory of the urban poor by using ZEIS (*zonas especiais de interesse social, special zones of social interest*) (see e.g. Acioly 2007, Sandroni 2009). Whether such instruments can be applied to new projects is to be further explored. As for the application of the open building system, its use for low-income households is here found to imply serious legitimacy issues – possibly then it is more suitable for middle-income or public purposes.

The issue of impermanent extensions poses a major challenge to core-housing implementation – not only from the point of view of the occupants' health and safety, but also at the site level due to the risk for quick-onset disasters and lack of adaptive capacity, and even on the city-level where such activity may be perceived as 'slummification' with all the consequences of stigmatisation and market value of that. Yet 'resilience', it is best understood as a discourse - but less as a workable criteria for actual implementation projects[132]. Therefore, it is recommended that an operational definition is developed for each specific context into which the core-housing is implemented. Vulnerability to disaster in the context of housing may be the result of: unfavourable soil conditions, closeness to problematic elements, unfavourable situation for acquiring property, construction faults, unadjusted type of construction and materials, socio-economic problems, too many people living in the area, poor water, waste water and electricity services[133]. Further detailed studies are needed to be able to make a distinction between those disasters that ought to be tackled within the primary and secondary system of the superstructure on the plot (e.g. core house and residents' infill to that), and the key agents involved herein, and those that should be taken to other levels– as for instance done by Davis & Izadkhah (2006) in relation to building resilient urban communities – or beyond. The next step would then be to consider the municipal capacity of the urban context to which the housing is proposed.

Obviously, without residents even knowing what the intention of a core house is, its implementation completely misses the mark in making residents feel agents of those levels of the structure over which they are proposed to have building control and progressively attain more full housing. Still, among residents of Khayelithsa, 26 years after implementation, there was a general sense of resentment amongst respondents that these had not been "decent" houses to start with, as a full citizen is entitled to. This poses a serious challenge for future implementations of core-housing, but there is also a lesson learnt here – that targeted beneficiaries are given a level playing field in decision-making as early as possible in the housing process so that they may take ownership of the concept of core-housing.

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an attempt to protect beneficiaries from downraiding (Housing Act 1997 section 10A in Tissington 2011:15). Clearly in practice, the regulation still fails to ground low-income households or to avoid the site from gentrifying.

[132] For an analysis of 'sustainable development', including the discourse of 'resilience', see Annex 11.

[133] Laura Liuke, lecture 'Planning safe cities; the right to the city – a safe city is a just city', lecture at the Institute for Housing and Development Studies, May 18, 2011, Rotterdam (The Netherlands).

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Glossary operational terms

An overview of operational definitions as used within the context of this research. For a discussion see thesis main text, where reference is also made to the sources of the elements included in these operational definitions.

1st generation to the (core) house
The head (and spouse) of the main household who first moved into this core house and plot, e.g. "original residents" since implementation.

2nd generation to the (core) house
(Adult) child of the original head - who passed away or moved out - now representing the new head of the main household occupying the core house (and extensions).

Adequacy (working definition)
'Adequate' refers to the perception and considerations of the professional (e.g. architect, provider, building supervisor) on the quality of the house and its minimum performance requirements in terms of 1) structural status and integrity, 2) occupancy level, 3) level of servicing 4) resilience. Adequacy is moreover understood as an inherently political issue in direct relation to the human right to adequate housing and minimum standard requirements by regulation which the professional must take into consideration.

Adult descendants
21+ aged persons who have been raised as part of the main household from childhood or through their teenage years and now still live on the plot. May or may not be blood relatives to the head of the main household.

Adaptability (in relation to open building system)
Considers 1) the materials used to manufacture a building's components, 2) the components themselves and 3) the building as an entity. A key indication of the flexibility of a building.

Adaptation (in relation to climate)
Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects.

Adaptive capacity
Refers to the whole of capabilities, resources and institutions of a country or region to implement effective adaptation measures. As such it is the opposite of vulnerability.

Adequate
Refers to the perception and considerations of the professional (e.g. architect, provider, building supervisor) on the quality of the house (e.g. technical, functional, and aesthetic) and its minimum performance requirements. Adequacy is moreover understood as an inherently political issue, referring to relative perceptions of "decent housing".

Affordability (in relation to the house)
The concept of affordability measures the financial capacity of a household to purchase a housing unit. A rough measure of the affordability of a housing unit is the "price to income ratio"- which compares the average price of a housing unit with the yearly income of an average household (generally from 2.5 to 5 times). When a household has access to credit, a better ratio to consider is the "repayment income ratio" (or the "effort ratio") which compares the amount of the monthly repayment of an obtained loan and the monthly income of the borrower. This is also likely to be the best measurement for the affordability of consolidation "instalments". The majority of low-income households however have no access to such upfront finance.

It is important to not only look at housing costs, but also at utility costs and taxes.

Alteration
Rearrangement of the interior of the house.

Alternative densification
Optimal plot usage which allows for the accommodation of adult members of the household (e.g. 2nd generations to the house) which may have otherwise moved out and started separate households if it was possible for them to fulfil their aspiration to do so – adding to the general housing backlog in the country. 'Alternative' refers to the fact that this aspect of densification is not accommodated for in the dominant discourse of measuring densification of low-cost housing.

Backyard shack
A local name referring to a detached small structure of (predominantly) impermanent material behind the core house (e.g. not on the street side), in the back of the plot. The shack includes one bedroom only.

Compaction
To increase built area and residential population densities; to intensify urban economic, social and cultural activities and to manipulate urban size, form and structure and settlement systems in pursuit of the environmental, social and global sustainability benefits derived from the concentration of urban functions.

Consolidation
The investment of residents themselves in the improvement of their core houses, either extensions, rearrangements, alterations or improvements.

Contiguity (of extensions)
Whether extensions are built next to the original house, or separate from it on the plot.

Conventional material/extension (within the Khayelitsha context)
Extension using permanent material such as brick or block. Not necessarily sourced from formal contractors.

Coping behaviour
Tolerance of housing stress, up to its threshold - the point at which something is done to relieve rather than continue to tolerate it. Various forms of coping behaviour can be adopted while priorities in trade-offs are highly local and personal.

Crowding
Degree to which the number of people in an area exceeds an accepted level of occupancy; which implies that too many people live or work in a given neighbourhood, plot, dwelling or room. "Accepted" is, of course, a relative concept depending on cultural background and socio-economic status' (Acioly & Davidson 1996:23).

Indicators of crowding within buildings are: persons per dwelling and m2 per person.

Density of overall settlement

Population density: number of persons living in a certain area. Common indicator: inhabitants/ha.

Residential density: number of persons per unit (for instance a plot) within the residential areas of a settlement.

Gross residential density: number of persons living in an area divided by the total area. See also: gross area.

Net density: number of persons living in an area divided by the net residential area. See also: net area.

Perceived density: the level of density which people feel an area has. Dependent on the individual and his/her background culture as well as on the nature of the built up area (Acioly & Davidson 1996:23).

Dwelling density: number of dwelling units per hectare.

Direct finance
Often referred to as informal finance. Direct finance can be provided by friends, relatives, small savings and lending clubs, or housing cooperatives or landlords.

Down(ward)raiding
Higher income groups occupying housing and land intended for lower-income groups resulting in gentrification of the neighbourhood.

Dwelling
A housing unit originally designed to house one family.

Effective demand (in relation to housing improvement)
The ability and willingness of a household to afford a certain housing (improvement) proposed. The ability to pay depends particularly upon the economic conditions of the potential users of a house; usually expressed as a percentage of a household income. Willingness to pay in fact better represents effective demand (see under 'willingness to pay', see also utility costs).

Extended fungibility
Meaning that parts of the house can be converted swiftly, conveniently and without loss from one use to another. This has a spatial component because the distinction between reproduction (domestic activities) and production (economic activities) is not clearly drawn.

Extension
Refers to adding floor area in order to add space to the house.

Filtering (up)
Generally used to refer to a movement up the 'housing ladder' within a city housing system in which there is a process of moving to a more expensive or better quality property. Also associated with vacancy chains.

Flexibility (in relation to open building system)
An indication of long-term value retention of the building based on its adaptability to changing circumstances, requirements etc.

Floor Area Ratio (FAR)
Gives an indication of the height of the building in relation to the plot size. Commonly expressed as a decimal fraction which represents the total floor area (on all levels of the building, including thickness of walls) divided by the plot size.

Formal development
Development which is according to zoning and building regulations. (Acioly & Davidson 1996:23)

Ghetto
A separated area within the city which is the result of involuntary spatial segregation of a group that stands in subordinate political and social relationship to its surrounding society.

GIDI index
Indicates the income distribution in a society. If income were distributed with perfect equality, the Lorenz curve would coincide with the 45 degree line and the index would be

zero; if income were distributed with perfect inequality, the Lorenz curve would coincide with the horizontal axis and the right vertical axis and the index would be 100.

Gross area
The total settlement area, including all land uses (e.g. roads, public spaces, residential-use etc.).

Habitable space (and non-habitable space).
Broadly interpreted and refers to any room of the house in which people are likely to sleep, with the criteria of at least having a roof: bedrooms, living rooms, kitchens and spaces used for commercial purposes during the day. Non-habitable space, defined as rooms or spaces in which people are less likely to sleep (e.g. bathrooms, toilets, passages, staircases, stores etc.).

Household
Single person or multiple-persons - related and/or unrelated - who pool their incomes and may have a common budget. In other words: if certain people on the plot don't put all incomes together, it is a separate household.

Main household: The household living in the original core house with its extensions including the head who is in charge of the entire site.

Secondary household a separate household on the plot, e.g. its members do not pool the income together with the head of the main household.

Household characteristics
A broad sum-up of at least a) the composition of the household, b) the household type and c) its household history/journey.

Household composition
Commonly includes: number, age and gender of people in the household, the age of the household head (usually the senior income earner), and the household type. Sometimes the health of the household is also included (for instance referring to endemic diseases which may be attributable to environmental factors). In the fieldwork moreover, 1st and 2nd generations to the house, secondary households are also seen as indicators of the household composition.

Household lifecycle
The household lifecycle follows the household from its formation, through the growing phase of a family if applicable and then to the contracting phase to death; in a contemporary understanding possibly also including household dissolution and reformation. The moment in the lifecycle can be seen as a "snapshot" of the household composition at a certain point in time.

Household income
The income of the household members put together, whether through formal or informal activities – or a mixture of income generating strategies.

Household type
Whether it involves a nuclear family, an extended family or single person; in a contemporary understanding seen as "snapshots" in the household lifecycle.

Housing costs
Housing cost encompasses all cost related to '(1) the plot, (2) its servicing, (3) housing construction and (4) fees, overheads, financial cost of borrowing and yield on capital base.

Housing journey
The historical track record of a household in adjustments to location (e.g. moving house) – either positive or less fortunate in terms of area and the needs and preferences of a household. The housing journey may to a large extent determine the frame of reference through which a specific household will perceive its current housing situation. Also relevant to that are the length of residence in the project town/city, length of residents in the project site, birthplace of the household head, reason for migration to the project town or city and location and type of first residence in the project town or city.

Housing ladder
The concept of a housing hierarchy within a city housing system in which households can filter up and acquire more expensive/qualitative property or alternatively filter down and inhabit less expensive/qualitative property. Commonly associated with the 'exchange value' of a house on the market.

Housing stress
A gap between current levels consumption of housing and the demands and preferences of the occupiers. Perceived housing stress varies per household and may spring from changing socioeconomic circumstances, tastes and preferences, changes in housing attributes and prices – and other external influences such as public decisions relating to land use or transportation.

Housing system
Refers to all the complex interrelationships between peoples, needs, market values, construction industry capacity, legal framework, the existing forms of housing supply etc. Important related aspects are: institutional actors (who are responsible for the housing stock construction, the allocation of housing and the access to finance), competitive income classes (and issues related to gentrification) and the housing stock (vacancies, the hierarchy of stock, the availability of affordable alternatives, the exchange value of the current house/land and the possibility to recoup investment).

House type
The analysis of house types is a systematic way of studying the design of residential buildings by considering a limited number of factors implicated. It is a classificatory tool that allows presentation and comparison of key features in a standardized manner. Each house type can have many variations. Examples of house types in South Africa are: attached houses, row houses, town houses, courtyard type houses, perimeter block, multi-story walk-ups, high towers, high-rise building, and single detached house.

Impermanent material/extensions (within the Khayelitsha context).
Using materials such as earth, corrugated iron, plywood etc. Not necessarily sourced from informal contractors.

Improvement
Refers to enhancing quality of the house.

Incremental housing
Incremental construction and expansion of houses is a process in which homes are built or expanded over time by residents themselves – either in informal or in formal settlements.

Incremental verticalisation
The construction of second (etc.) floors on a plot stemming from the perceived housing stress of the main household, particularly also in terms of privacy and cultural dignity values. Incremental verticalisation may allow accommodating for alternative densification.

Inertia element
The hypothesis that people will rather stay where they are due to intangibles such as social ties (or the local network), the bother of moving, neighbourhood attachment etc.

Informal development (in relation to housing)
Development which is not according to zoning and building regulations. Normally refers to spontaneous housing and related commercial development (Acioly & Davidson 1996:23).

Impermanent extension
Extension using materials such as earth, corrugated iron, plywood etc. Not necessarily sourced from informal contractors.

Institutional actors
Associated with the supply side of housing, comprising housing authorities, private landlords/individual owners, sellers, the real estate industry, housing associations (etc.) but also involving the role of lending institutions to provide for finance (such as mortgages).

Intra-urban mobility
The movement of households within specific city boundaries. Often used to contrast with regional migration, conventionally understood as rural to urban migration and inter-urban migration (in between two different cities). Associated with vacancy chains within a city housing system.

Legitimate (working definition)
Refers to an actual demand for a housing solution by the specific households to whom it is proposed - the "users"; the implementation of a core that enables incremental consolidation strategies of the household.

Main household
See: household.

Mitigation (in relation to climate)
Technological change and substitution that reduce resource inputs and emissions per unit of output, meaning implementing policies to reduce GHG emissions and enhance sinks.

Nett area
The area allocated for residential use (e.g. the total area of land or building deducted by the non-residential areas).

Non-habitable space
See: habitable space

Nuclear (family)
A family unit that consists only of a husband, wife and children.

Occupancy rate
Ratio of occupants to the number of habitable rooms. See also: habitable room.

Outcast ghetto
A spatially concentrated area with residents who are excluded from the mainstream of the economic life of the surrounding society, which does not profit significantly from its existence. The ghetto is the result of involuntary spatial segregation of a group that stands in subordinate political and social relationship to its surrounding society, whereby ethnicity is combined with class.

Physical constraint (in relation to consolidation of a core house)
An obstacle in the initial core designed and implemented by the professional which increases the costs of extending since the initial core needs to be partly altered to allow for the extension, thus making the aspired extension more inaccessible to the very same users the initial design intends to target. May be used as an indicator of the potential environment from a longer term consolidation process perspective.

Plot coverage
The proportion of the total plot area occupied by buildings. This measure indicates the amount of open space that is left on a specific plot or area of land. Its value is commonly expressed as a percentage which represents the ground floor of the building divided by the plot size (Floor Area Ratio, FAR).

Pragmatism
'What is possible' as opposed to what is the best. In the context of low-income households primarily considered in relation to their stringent affordability criteria.

Prefabrication
The offsite making of the elements prior to installation at the site.

Progressive housing approach
Elemental housing whereby low-income households are provided with an initial house by which they themselves are intended to progressively attain adequate housing.

Rearranging the plot
Refers to changing the original way in which the house was put on the plot; changing the use of the plot.

Refurbishment
Describes personal action to improve the locality itself thus making the neighbourhood more liveable.

Residential mobility
See: filtering and intra-urban mobility.

Resilience at the plot/core house level
Increased climatic adequacy and increased safety (e.g. reduction of vulnerability) from violence/crime and familiar fast-onset disasters.

Salvaged material
Recycled material.

Secondary household
See: household.

Self-finance
Self-finance for housing can be provided either by equity acquired through many years of prior savings or through incremental construction.

Shack
A local term in South Africa referring to extensions made of impermanent material. Yet, the use of it is not very precise when it comes to contiguity as it may refer to backyard shacks (e.g. detached structures) and extensions to the core alike (e.g. attached). There is a negative connotation to it.

Shock (in relation to housing stress)
Discrete events which increase the household size, influencing housing stress. Typical examples of shocks are the arrival of children or other dependents (e.g. elderly) or a divorce but also obligations to accommodate members of the extended family.

Social exclusion
A process whereby people experience a progressive loss of their identity and involvement with the wider society; certain individuals are denied access to positions and resources to live a fully participative life. It is the opposite of coexistence.

Social wage
Income received from the State in the form of grants. Examples are: pension, disability grant, child support, foster child grant, care dependency grant etc.

Sprawl
Situation where land uses occupy more land than is required. 'A condition of land use that is represented by low values of one or more of the following dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity' (Galster et al. 2001:685 in Gren 2006:4).

Sustainable (working definition)
'Sustainable' refers to a process of qualitative improvement that responds to the challenges that face the urban land- and housing system and its residents in the long term (25-50 years, e.g. at least two generations) through promoting *optimal* use of land (plot size) and through implementing housing that is *accessible* for low- and middle-income households within the settlement, and *tailored* (typology/adaptability of superstructure, plot potential) to their needs and demand.

Threshold (in relation to coping behaviour)
The point at which the household takes action to relieve rather than continue to tolerate housing stress.

Trend
Indicates a possible direction in which the consolidation process of the core houses and their plots are developing; any patterns identified cannot be generalised into a general tendency but may be an interesting entry for further detailed studies.

Trigger (in relation to housing stress)
Refer to events may be seemingly less dramatic than 'shocks' but do bring about changing needs for space and privacy – for instance when children are getting older.

Upstairs
A local name in Khayelitsha for a house with both a ground floor - 'the downstairs' - and a first floor – 'the upstairs'.

Utility costs
The cost of using the house - e.g. charges and fees for services, transport costs to work etc.

Vacancy chain
The phenomenon that when one household moves into new housing, a second household moves into the housing left vacant as a result etc. resulting in a sequence of events. Associated with tracking households through the housing stock.

Vulnerability (in relation to disaster, climate)
The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity.

Willingness to pay (in relation to housing improvement)
Willingness to pay represents perceived utility and benefit of a service. Factors that are likely to affect willingness to pay include: the households income; the potential of

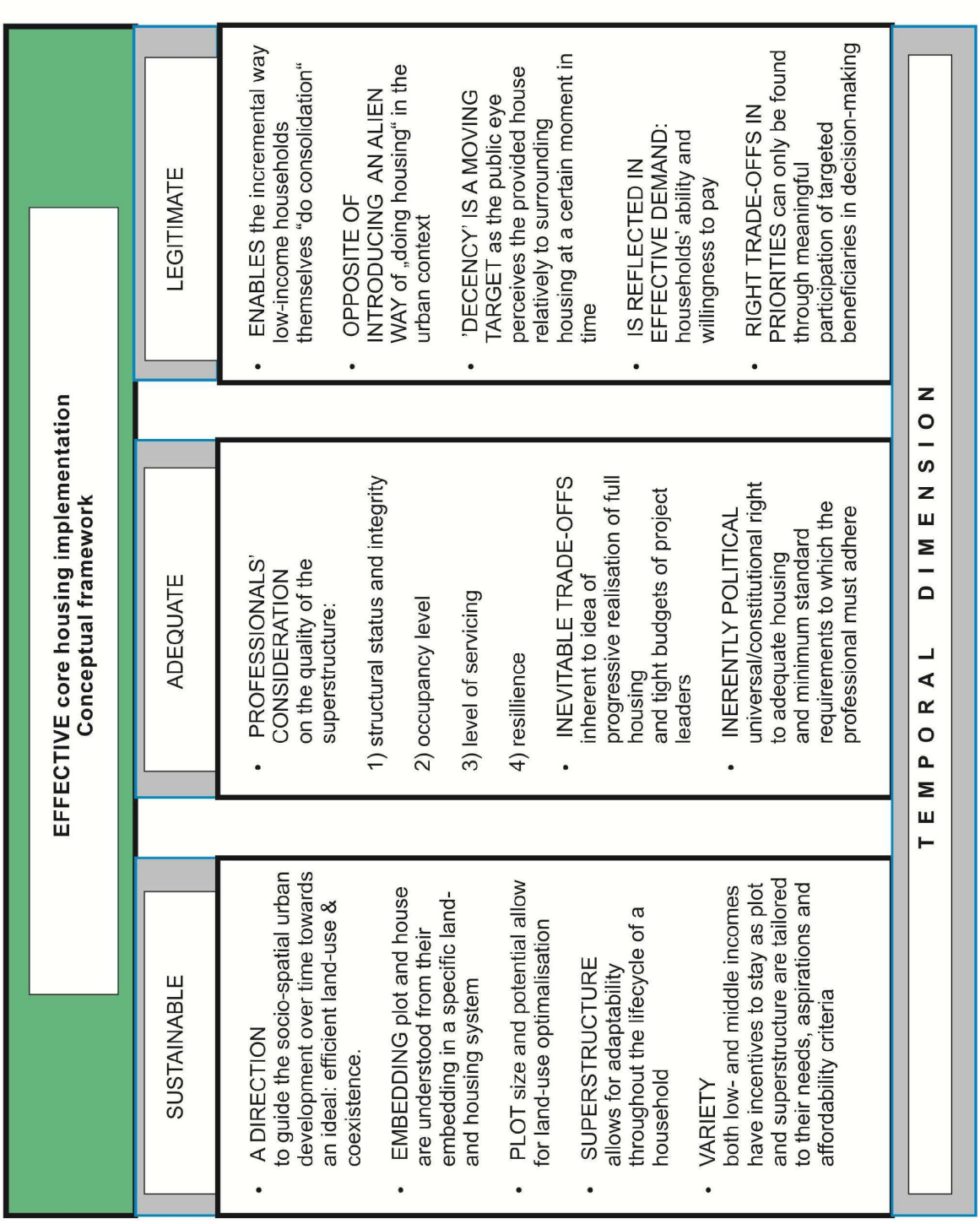
additional income or savings owing to the improved house or service; the level and value of time saved; the perceived convenience, reliability and quality of the improved house or service compared to the old house or service. Willingness to pay has found to produce a much more accurate estimate in cost-recovery calculations as it is a better representation of effective demand.

Zeggenschap (in relation to the built environment)
Dutch for the principle of distributed decision-making in building control at various levels of the built environment. Can also be used as a broader tool for implementation.

Annexure

Annex 1 Effective core housing: conceptual framework

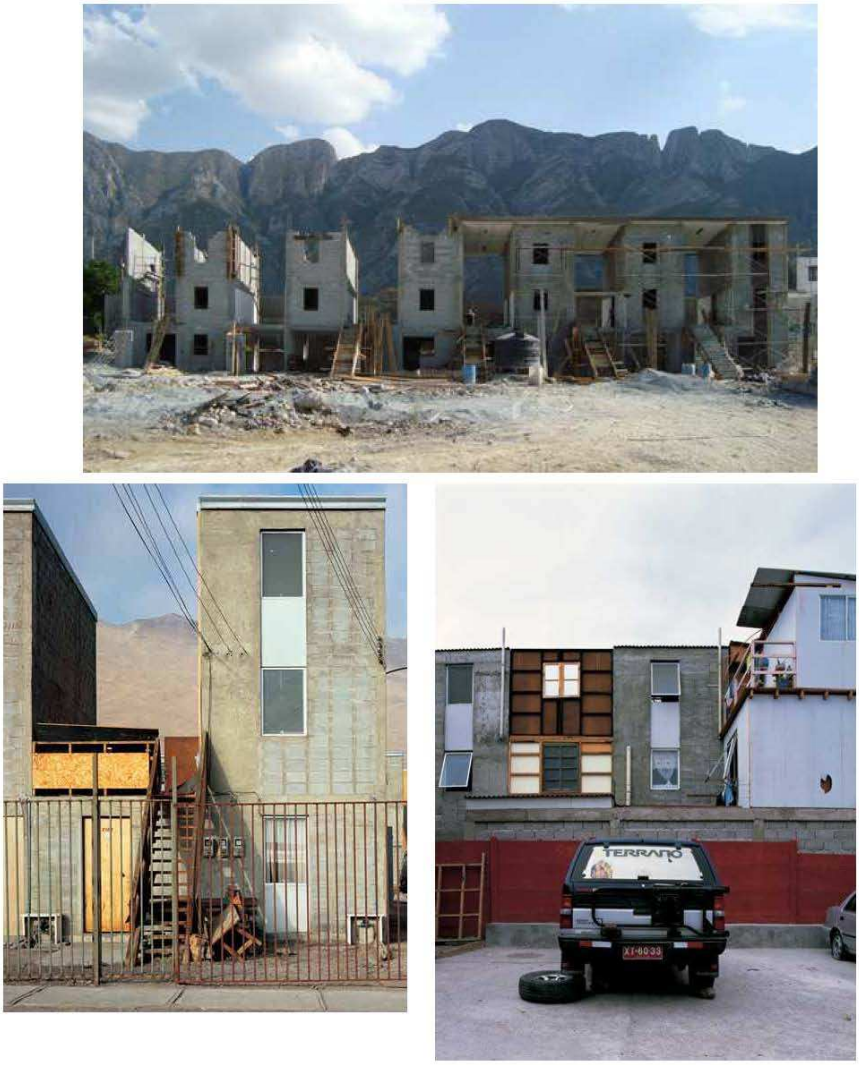
For an explanation see Chapter 2.3.



Model A 1 Conceptual Framework for effective core housing implementation.

Annex 2: Elemental, applying an open building approach to low-income housing.

By Aravena Architects, Chile (e.g. Aravena 2007).



Picture A 1 Elemental Chile

From left to right:

Implementation in Mexico, clearly showing the common support system[134].

Two units on separate floors, implementation in Chile. Picture: Contal & Revedin (2009:117)

Residential infill with impermanent material in Chile[135].

[134] Weblog Designboom. http://www.designboom.com/weblog/cat/9/view/7306/elemental-architecture-las-anacuas-monterrey-mexico.html [Accessed: September 25, 2011].

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Annex 3 Town 1 upon implementation and occupation

Factsheet of the Khayelitsha Town 1 Village 1 and 2 (T1V1 & T1V2) project upon implementation and occupation. *Information based on Napier (2002) unless otherwise indicated.*

Implementing Agent: Administration Board of the Western Cape (ABWC) with Van Niekerk Klein and Edwards (VKE) consultants. **Government authority:** Western Cape Development Board.

Location: Location beyond the urban edge of Cape Town, at a distance of 35 km from the central business district. Site's climate/geography poses serious challenges to habitation. **Settlement layout:** A division into four 'towns' each comprising of four 'villages' (Town 1-4) was projected, but due to socio-political processes the project proceeded in an amended form resulting in the initial implementation of Town 1 Village 1 and 2, as well as site B and C (site-and-services)[136]. **Planned densities:** A 3,200 hectare site (32km2), levelled. For the core housing in Town 1 (village 1 and 2) about 5,000 plots were demarcated. Gross density - Village 1: 18 sites/ha, Village 2: 22 sites/ha. Nett density (e.g. area dedicated for residential use only) - Village 1: 55 sites/ha, Village 2: 49 sites/ha (e.g. per 0.01 km2 / 10.000 m2)

Construction: 1983/4, **Occupation:** October 1985, after having been standing empty for 2 years. Residents had no say in the location of the houses assigned to them.

Plot size: plot sizes varying from 144m2 to 160m2, laid out back-to-back. Although in 2011 plot sizes in Eyethu, T1V2, were found to be larger, namely between 194 and 204 m2[137]. The plot layout of T1V2 is displayed further on.

Core house type: a 4 room cores, with two habitable spaces (kitchen, bed/living room), a wet core which can be upgraded to a bathroom and a small passage. **Design***:* consultant design which was then translated by contractors into three core house types – see pictures next page. **Positioning:** in T1V2 (now Eyethu) usually at the front, close to the street side, in the middle between the two plot sides. See further on for an illustration. **Delivery:** mass housing by large contractors. **House cost:** direct costs of the houses were R9,400 ($11.750 at the time) per house with R5,000 being spent on the servicing and the rest of the building.

Level of servicing: At the settlement level – all roads tarred storm water. At the plot level there is water supply, flushing toilets and showers. No electrical connection.

Resident origin: backyard shacks in nearby townships – 82% (e.g. Gugulethu, Nyanga, Langa) and informal settlements - 15% (e.g. Crossroads), while 3% came from other areas such as rural areas. **Household characteristics of initial occupants (in retrospect):** presumably a mean size of 4.1 people, mostly living in situations of poverty. **Tenure upon occupation:** rental, heavily subsidized – residents only paid for servicing.

Support for consolidation*:* planned, but not implemented. **Participation:** initial contact with informal settlement community leaders, choice of site in very few cases, no further planned project participation after occupation.

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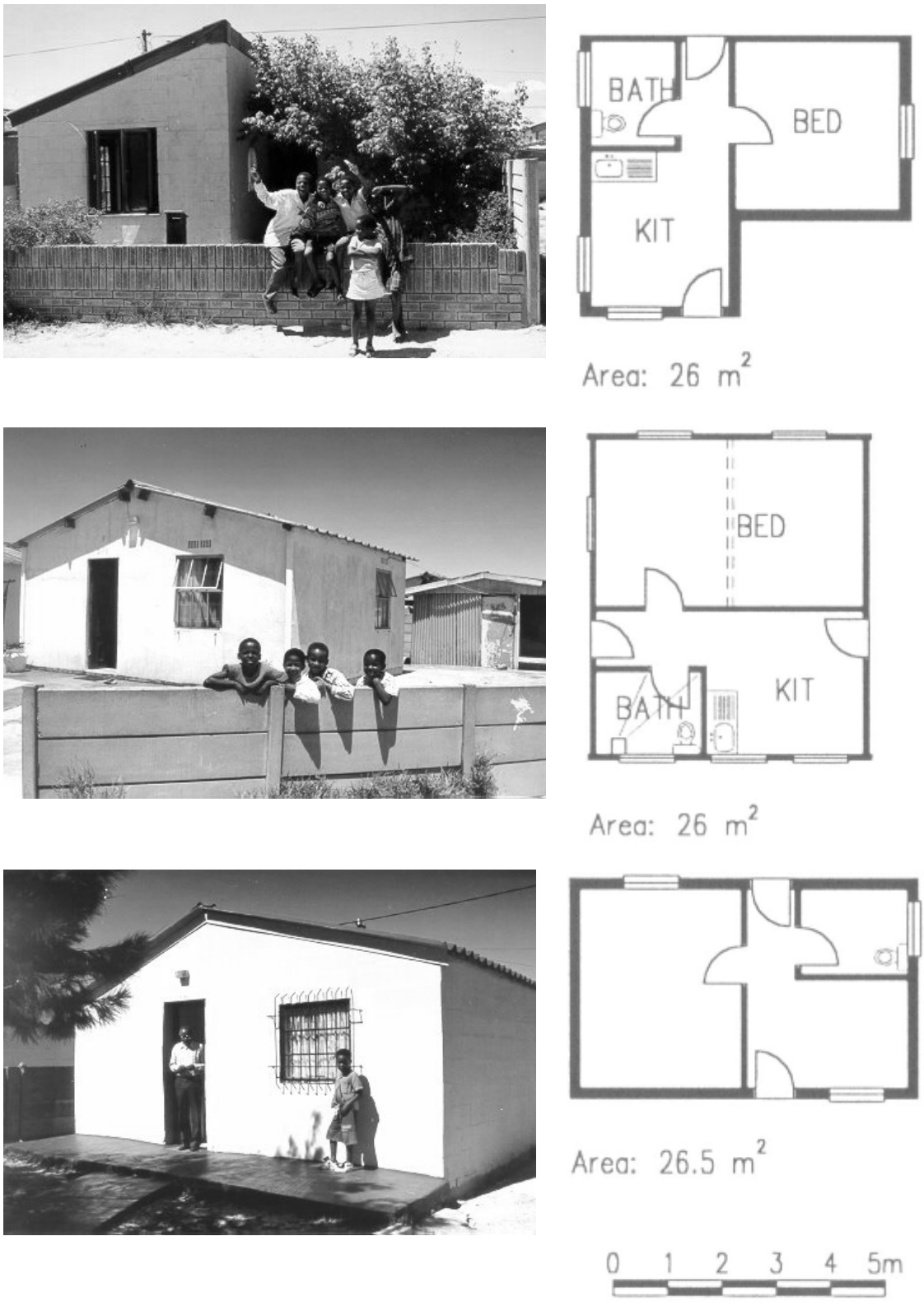
[136] Site B and C included respectively 4,250 and 4,600 site-and-service plots of 78-90m2. Quite soon these were taken out of temporary status by the government and further developed into formal housing (Cook 1992 in Napier 2002:114).

[137] Expert interview with Faizel Amoo, Architectural Technician and Senior Building Inspector of the Building Development Management Department in Khayelitsha. August 4, 2011.



Picture A 2 From top to bottom: core house designs by 'Wimpey', 'Murray and Roberts' and 'Besterecta' contractor. The latter is the house type implemented in Eyethu, where the 2011 fieldwork takes place.
Source: Division of Building Technologic CSIR in Napier (2002:118).

Positioning on the plot, example from T1V2 (Eyethu, H section)

Picture A 3 Satellite view of the positioning of a core house on the plot.
Source: screenshot Google Earth (2011).

Picture A 4 The same core house from the street side – Besterecta design.
Pictures by author.

Picture A 5 The same core house from the back; room to extend.
The concrete foundation which is visible has been laid by occupants, possibly to host a temporary shack in the past.
Picture by author.

Plot layout, example from T1V2 (Eyethu, I section)

The map is based on the aerial photography and used as a `snapshot´ of the level of extension in 1996. The numbers refer to various categories as can be found on in Table 2 (see also Annex 6). The two plots highlighted here illustrate how for the fieldwork of this research, every plot included in the sample of plots was identified, and its level of extension in both 1996 and 2011 was established. The maps do not include street names as none existed yet in 1996. Therefore the plot layout had to be compared with contemporary street names as displayed on a 2011 map (Map A1).

Map A 1 Illustration of plot layout and plot identification, as well as the establishment of level of extension in both 1996 and 2011.

Source original map CSIR in Napier (2002).

Annex 4 Map of T1V2 (Eyethu, Ward 94, section F-J) today

Map A 2 Kaya (T1V1) and Eyethu (T1V2) in today's Khayelitsha.
Source: Map Studio (2010:146).

Annex 5 Outline fieldwork methodology Mark Napier

Napier (2002) published a dissertation with the title 'Core housing, enablement and urban poverty' in which he studied the consolidation paths of households[138]. The study is retrospective and comparative of two settlements: a neighbourhood in Inanda Newton in Durban and a neighbourhood in the township of Khayelitsha in Cape Town. The two case studies were chosen[139] on the basis that they were relatively mature settlements[140] at the time of research (1996) and represented the delivery of core housing at scale in South Africa. For Khayelitsha the study focuses on the core housing which was constructed in Villages 1 and 2 (T1V1 and T1V2) in 1984.

The fieldwork of Napier (2002) includes:

- Aerial photography covering an almost[141] full house census of 4961 core houses, conducted in 1996 – 11 years into consolidation – as a "snapshot" of the level of extension achieved thus far.
- Follow-up physical inventories of 238 households to help analyse the quantitative data of the aerial photography.
- Questionnaires / structured interviews with some 235 respondent households.
- Written accounts of the projects, project documentation and interviews with key agents such as the project managers who implemented the projects and present day community leaders further added to the understanding and interpretation of the mainly quantitative data.

[138] Obviously, the research question of Napier's dissertation is much broader than the scope of this thesis. The central research question of Napier's dissertation is: Should core housing be accepted as a sufficiently supportive institutional and physical framework for allowing or enabling households to counter situations of urban poverty, achieve adequate housing and integrate themselves socially, economically and spatially into the city? (Napier 2002:3). As outlined in the theoretical framework **(see chapter 2)**, the definition of 'adequate' applied in this thesis differs from Napier's as in this thesis it was chosen to search for working definitions.

[139] The two settlements were chosen by Napier (2002:87) according to a set of criteria, namely: 1) availability sufficient historical and background information; 2) research accessibility to settlements and willingness of residents to participate in a survey, 3) availability of recent aerial photography records; 4) relatively similar development histories of the project areas to allow comparison; 5) preferably represent delivery of housing at scale; 6) cases should represent a mix of situations – successful and unsuccessful consolidators, a mix of core house types and a mix of institutional framework and delivery processes.

[140] Here understood by Napier (2002:101) as settlements of more than ten years old.

[141] The original project in Khayelitsha included 5,000 sites and the aerial survey picked up 4961, meaning that the household surveys covered a 4.8% sample.

Annex 6 Factsheet 26 years into consolidation (2011)

Based on the fieldwork conducted by author in Eyethu (T1V2).

Comments

- The plot it is taken as a unit of analysis, including all that is built on it as well as the people living on it. The plot number (plot#) is anonymous (e.g. it does not refer to an address), yet the section within Eyethu can be identified by its first letter (e.g. F, G, H, I or J).
- The tables take the main household that lives in the core house (and its extensions if any) as a point of reference.

Operational terms and coding of main-household (members') characteristics:

M	Male
F	Female
&	Forming a couple
+Hh	Number of additional households these persons form
1st	1st generation of residents occupying the house since implementation
2nd	2nd generation to the house, whereby the original head has passed away/moved out
New	A new household to the house altogether, no relative connection to former occupants

Plot # Survey	Size of main household	Years of habitation	Age, gender head	Generation / new	Age youngest member	Additional households	Age, gender head
I7	4	4	35 M & 31 F	New	2 F		
I8	3	26	48 F	1st	22 M		
G12	3	26	34 M & 26 F	2nd	3 M		
I13	3	16	55 M & 46 F	New	5 F		
H23	4	25	48 F	1st	19 M		
H21	4	25	43 M	2nd	6 M	2 non-relative renters (+1 hh)	23 M & 21 F
H25	3	3	30 F & 30 M	New	1 M		
Average	3.4 people	17.8 years					

Table A 1 Nuclear main households included in the 2011 fieldwork sample.

Plot # survey	Size of main household	Years of habitation	Age, gender head	Generation / new	Age youngest member	Additional households	Age, gender head
G15	1	9	53 F	New	N/a		
I9	1	24	75 F	1st	N/a		
I1	1	26	27 M	2nd	N/a	3 non-relative renters (+2 hh)	26 M 28 M & 24 F
Average	1 person	19.7 years					

Table A 2 Single-person main households in the 2011 fieldwork sample.

Plot # Survey	Size main hh	Years of habitation	Age, gender head	Generation / new	Age youngest member	Additional households	Age, gender head
F6	5	26	60 F	1st	2 M		
F10	8	26	70 M	1st	1 M	3 siblings (+3 hh)	50 M 41 M 34 M
F17	6	26	56 F	2nd	2 F		
F19	7	25	29 M	2nd	13 F	6 non-relative renters (+5 hh)	34 F 26 F 26 F 34 M & 34 F 27 F
G14	7	25	55 F	1st	4 M		
G16	5	25	45 F (& 53 M)[1]	1st	5 M		
G24	4	26	65 F	1st	18 F		
H22	3	26	79 M	1st	12 F	1 not yet paying non-relative renter (+1 hh)	23 M
I4	1	26	72 F	1st		2 non-paying relatives (son & girlfriend) (+1 hh)	38 M & 30 F
I5	7	25	59 M & 47 F	1st	5 F		
I11	8	25	45 M & 43 F	New	0 F		
I18	4	26	36 F (& 36 M)[2]	2nd	1 F	1 non-relative renter (+1 hh)	27 M
J20	7	26	44 F	1st	0 M		
J2	7	26	51 F	1st	1 M & 1 F (twin)		
J3	8	26	62 F	1st		1 non-paying relative (son) (+1 hh)	38 M
Average	5.8 people	25.6 years	aged 54				

[1] Head of the household is the woman. The man is a boyfriend. The woman explicitly states she is the head.
[2] Head of the household is the woman. The man is a boyfriend who came in later. The woman explicitly does not consider him as the head.

Table A 3 15 extended family main households in the 2011 fieldwork sample.

Operational terms and coding for pooled income of the main household:

Regular	Refers to a stable income of which the sum is the same every month. Here including: wage-employed (e.g. formal and predictable payslip), social wage (grant from the government, pension), family sending in money monthly.
Irregular	Refers to a form of income of which the sum varies every month or may be very incidental. Here including: self-employed people (e.g. spaza, dress maker, carpenter, tavern), occasionally employed people (e.g. piece work, construction), seasonal work (e.g. rural harvesting in summer, construction in summer etc.), and family sending in money at times.

	Regular income from:	**Names of members of households to whom this applies:**
-	Wage-employed (e.g. regular predictable payslip)	2 (F6), 1 (F10), 1 (F17), 1 (F19), 1 (G12), 1 (G24), 1 (H23), 1 (I7), 1 (I8), 1 (I11), 1 (I13), 1 (I18), 1 (J2), 2 (J3), 2 (J20) = 13 main households
-	Grant from government	3 children/grandchildren (F17), 1 for father who passed away (G12), 1 child (G16), 1 disability, 2 for children (H21), 1 grandchild (H22), 1 child (H25), 1 child (I11), 1 sick grant (J2), 1 orphan 1 widowers pension (J3), 1 (J20) = 10 main households
-	Pension	1 (F6), 1 (F10), 1 (G24), 1 (H22), 1 (I4), 1 (I9), 1 (J2) = 7 main households
-	Family sending money **monthly**	1 aunt (G16) = 1 main household

	Occasional / irregular income from:	**Number of members of households to whom this applies:**
	Entrepreneurship on plot (renters, hairsaloon, spaza etc.)	6 renters –and an additional plot with only renters (F19), 1 creche (G15), 1 hairdresser (G16), 1 renter (H21), 1 not yet paying renter (H22), 1 barbershop (H23), 2 renters (I1), 1 tavern (I5), 1 used to have a crèche now (temporary?) closed of bad health condition grandmother (I9), 1 renter (I18) = 10 main households
-	Self-employed as craftsperson in informal sector (e.g. transport, selling groceries/food, traditional healer etc.)	1 (H23), 1 (I13), 1 (J2), 1 (J20) = 4 main households
-	Occasionally employed formal sector (e.g. piece work, construction, transport, field research for university/commerce/municipality, cleaner)	1 (F17), 1 (H22), 1 (H25), 1 (I1), 1 (I11), 1 (J2) = 6 main households
-	Seasonal work (e.g. rural harvesting in summer, construction in summer, work in tourist season etc.)	1 (G16), 1 (I11) = 2 main households
-	Family sending money some times	1 children sometimes (G15), 1 mother (G16), 1 children (I9) = 3 main households

Table A 4 15 extended family main households in the 2011 fieldwork sample.

Rooms added

Comments

- The original included a bedroom, a kitchen, a bathroom and a passage. Thus, if for these type of rooms a number 1 is indicated here, that implies that, whether or not the room is the original, the result after 26 years is that there still is only 1 of this type in the house (e.g. 1 kitchen).
- Habitable space – in the (broader) operational definition in this thesis - has been highlighted.

Usable space:	**Number added on each plot# and total**	
NB: For upstairs or backyard: see further on		
1. Bedrooms	2 (F6) 3 (F10) 3 (F17) 6 (F19) 1 (G12) 3 (G14) 2 (G15) 3 (G16) 2 (G24) 2 (H21) 1 (H22) 1 (H23) 1 (H25) 3 (I1) 1 (I4) 3 (I7) 3 (I8) 1 (I9) 2 (I11) 1 (I13) 2 (I18) 1 (J2) 3 (J3) 2 (J20) = 51	
Of which rental	1 (I1) 1 (F19) = 2	
2. Living / dining rooms	1 (F6) 1 (F10) 1 (F17) 1 (F19) 1 (G14) 1 (G16) 1 (G24) 1 (H21) 1 (I1) 2 (I4) 1 (I7) 1 (I8) 1 (I11) 2 (I13) 1 (I18) 1 (J2) 1 (J3) 1 (J20) = 20	
3. Kitchen	1 (F6) 1 (F10) 1 (F17) 1 (F19) 1 (G12) 1 (G14) 1 (G15) 1 (G16) 1 (G24) 1 (H21) 1 (H22) 1 (H23) 1 (H25) 1 (I1) 1 (I4) 1 (I5) 1 (I7) 1 (I8) 1 (I9) 1 (I11) 1 (I13) 1 (I18) 1 (J2) 1 (J3) 1 (J20) = 25	
4. Toilet	2 (F6) 1 (I4) 1 (I5) 1 (I7) 1 (I11) 2 (J2) 2 (J3) = 10	
5. Bathroom	1 (F6) 1 (F10) 1 (F17) 1 (F19) 1 (G14) 1 (G15) 1 (G16) 1 (G24) 1 (H21) 1 (H22) 1 (H23) 1 (H25) 1 (I1) 1 (I4) 1 (I5) 2 (I17) 1 (I8) 1 (I11) 1 (I13) 1 (I18) 1 (J2) 2 (J3) 1 (J20) = 25	
6. Passages to allow for extension[1]	1 (F6) 1 (F10) 1 (F19) 1 (G14) 1 (G15) 1 (I4) 1 (I5) 1 (I7) 1 (I8) 1 (I11) 1 (I13) 1 (I18) 1 (J3) 1 (J20) = 14	
7. Storage	2 (G15) 4 (I5) 1 (I11) 1 (J2) 1 (J20) = 9	
8. Commercial attached (e.g. spaza, crèche, tavern – not including rental entrepreneurship)	1 (G15) 1 (G16) 1 (I5) 1 (I9) = 4	
9. Veranda downstairs (roofed open space)	1 (J3)	
10. Backyard shack (detached, impermanent)	**Room type:**	
	Bedroom	1 (F17) 1 (G12) 2 (H22) 2 (H23) 1 (I1) 1 (I4) 1 (I8) 1 (I11) 1 (I18) 2 (J3) = 13
	Of which rental	1 (H22) 1 (I1) 1 (I18) = 3
	Storage	1 (F17) 1 (G24)
	Kitchen:	1 (G12)
	Toilet/bathroom:	
	Commercial	1 (H23)
11. Garage / carport	1 (F6) 1 (F10) 1 (F19) 1 (G15) 1 (H21) 1 (I5) 1 (I11) 1 (I13) = 8	
12. An upstairs (incl. stairs and passage indoors)	**Room type:**	
	Bedroom	1 (F6) 4 (F19) 3 (I5) 2 (I13) 4 (J2) 2 (J3) = 16
	Of which rental	4 (F19) = 4 (yet 1 plot)
	Living/dining	1 (I5) 1 (J3)
	Toilet	2 (I5) 1 (J2)
	Bathroom	1 (F6) 1 (F19) 2 (I5) 1 (I13) = 5
	Kitchen	2 (F19) 1 (I5)
	Balcony / veranda	1 (I13) 1 (J2) 1 (J3)
13. Flat (detached, conventional)	**Room type:**	
	Bedroom	2 (G14) 1 (H21) 2 (J20) = 5
	Of which rental	1 (H21)

[1] The original core also included a passage, yet in many cases has been altered in such a way that the passage is now gone. The figure here thus shows passages added to allow for extensions only, not the original passage.

Table A 5 Usable space added on the plot.

Various forms of densification on the plots included in the 2011 sample

Operational terms and coding of material use:

I = Impermanent	Extension using materials such as earth, corrugated iron, plywood etc. Not necessarily sourced from informal contractors.
C = Conventional	Extension using permanent material such as brick or block. Not necessarily sourced from formal contractors.
M = Mixed	A combination of impermanent and conventional material used for the extension.

Coding of extension types - contiguity and material:

AI	Attached impermanent extension
AC	Attached conventional extension
DI	Detached impermanent extension (backyard)
DC	Detached conventional extension (flat)
UC	Upstairs conventional extension (attached)

Plot #	2nd household:	Bedroom in:	Servicing:	3rd household:	Bedroom in:	Servicing:	4th household:	Bedroom in:	Servicing:
J3	Adult son 38 M	DI 2 bedrooms	Using services in core/main house						
F10	Adult brother, household elsewhere 50 M	AC 1 bedroom.	Using services in core/main house	Adult brother, household elsewhere 41 M	AC 1 bedroom.	Using services in core/main house	Adult brother, household elsewhere 34 M	AC 1 bedroom.	Using services in core/main house
G12	Adult son, wife and child 34 M	DI 1 bedroom 1 kitchen	Using water in own kitchen, toilet and bath in core house.						
I4	Adult son and girlfriend 38 M	DI 1 bedroom.	Using services in core/main house						

Table A 6 Relatives who form a separate household and the place of their bedroom.

Plot #	Sons 21+ years	Bedroom in:	Daughters 21+ years	Bedroom in:
F6			F 34	AC
			F 30 & 2 children	UC
F10			F 32 & 3 children	AC
F17			F 28	AC
G14	M 35	AC	F 29 & 2 children	AC
	M 26	DC		
	M 22	DC		
G24	M 28	AC	F 35 & child	AC
H21	M 22	AC		
H22	M 45	DI		
H23	M 25	DI	F 23	AC
I5			F 32	UC
	M 22 (twin)	UC	F 22 (twin)	UC
I8	M 22	DI	F 24	AC
I11	M 24	DI	F 29 & 2 children	AC
J2	M 35	UC	F 26	UC
	M 22	UC		
J3			F 42 & 2 children	UC
			F 22	UC
J20	M 24	DC	F 27	AI

Table A 7 Children aged 21+ within main household and the place of their bedroom.

Plot #	Male 21+ years	Bedroom in:	Female 21+ years	Bedroom in:
F19			F 36	AC
	M 24	AC		
	M 22	AC		
G16	M 43	AC		
I18	M 27	AC		
J20	M 24	DC	F 42 & 1 child	AC

Table A 8 Other relatives (not children) aged 21+ within main household and the place of their bedroom.

Comment: 6 plots with an upstairs are included in the sample of 25 households. Of them, plot#I13 includes an upstairs with one child under the age of 21, while plot#F19 is used for rental entrepreneurship including only rental rooms in the upstairs.

Plot #	2nd household:	Habitable space:	Servicing:	3rd household:	Bedroom in:	Servicing:
H22	Renter (not yet paying), single male (23 M)	DI 1 bedroom	Using servicing of core/main household			
I18	Renter, single male (27 M)	DI 1 bedroom	Using servicing at the neighbors plot, where there is another shack with his brother			
H21	Renter, couple (23 M & 21 F)	DC 1 bedroom	Use servicing in core/main house			
I1	Renter, couple (28 M & 24 F)	AI 1 bedroom	Using servicing of main household.	Renter, single 26 M	DI 1 bedroom	Using servicing on plot of his own relatives, further down the street
F19	4 single female households (34 F 26 F 26 F 27 F)	AC[1] UC UC UC 1 Bedroom each	Sharing kitchen and toilet/bathroom with one other rental unit.			
	Couple (34 M & 34 M)	UC Bed – and living/dining room	Sharing kitchen and toilet/bathroom with one other rental unit.			

[1] The survey didn't identify which of the single female renters lived in which unit; 1 unit was downstairs, 4 were upstairs. All conventional material.

Table A 9 Non-relative secondary households (e.g. renters) and the place of their bedroom on the plot.

Operational terms and coding for the ORDER and TIMING of extensions and overall level of extension on plot:

Type	Description of consolidation level on the plot	Contiguity, material and size
0	UNIMPROVED CORE HOUSE With no other structure of any kind on the plot.	N/a
1	DETACHED STRUCTURE OF (predominantly) IMPERMANENT MATERIAL Detached from house, built of impermanent material[6]. May be a bedroom (Locally known as 'backyard shack' or sometimes 'bungalow') or another use (e.g. storage, garage, commercial).	Detached, Impermanent Any size
2	SMALL, ATTACHED IMPERMANENT EXTENSION In the form of a lean-to.	Attached, Impermanent Smaller than or equal size to original
3	LARGE, ATTACHED IMPERMANENT EXTENSION In the form of a lean-to.	Attached, Impermanent Larger than original
4	SMALL, ATTACHED CONVENTIONAL EXTENSION	Attached, Conventional Smaller than or equal size to original
5	LARGE, ATTACHED CONVENTIONAL EXTENSION	Attached, Conventional Larger than original
6	REMODELLED HOUSE Where the original starter house has been substantially remodelled so that the original is no longer distinguishable, or demolished.	Remodelled Any size
7	DETACHED STRUCTURE OF (predominantly) CONVENTIONAL MATERIAL Locally known as 'flat'. Must include at least one habitable space.	Detached, Conventional Smaller than original
8	SECOND STOREY OF CONVENTIONAL MATERIAL A second storey on top of original core or one of its conventional extensions. Locally known as an 'upstairs'.	Attached second storey, Conventional Any size

[5] Any types for Inanda Newtown exclusively have been left out as some obviously only apply to a different housing implementation with sites and services only.
[6] Very small shack structures of less than 1.5 m2 were disregarded in 1996. The criteria of a bedroom is for 2011.

Operational terms for relief in housing stress:

Ratio (p/h.s) an indicator of the number of people per habitable space. The ratio allows for comparison of the situation upon occupation and the current situation in 2011. It must be explicitly stated that this is not a ratio for the plot as a whole since implementation of the project, as some households are new to the plot. The ratio refers to the original housing stress upon occupation of the main household currently occupying the plot (e.g. of the 1st generation to the house, even if the original head may have passed away).

Comment on highlights in tables that follow below:

Extension material: indicates the trend for the use of material for the 1st, 2nd and 3rd extension. In other words: the most common use.

Ratio: the highlight indicates a relief in housing stress in terms of no. rooms per person.

Level of extension: the highlight indicates an increasing level of extension over the past 15 years (e.g. since 1996).

Comment on speed of construction:

++ indicates that the construction is ongoing, the extension not having been finalised yet although (usually) it is already occupied if it has at least walls and a roof and closed windows.

Plot #	People / habitable space upon occupation year	Ratio (p/h.s)	1st extension + Start year of construction	Material, speed of construction	2nd extension + Start year of construction	Material, speed of construction	3rd (&4th) extension + Start year of construction	Material, speed of construction	Type 1996 (+11 y):	Type 2011 (+26 y):	Current people/ habitable space	Ratio p/h.s.
F6	4 p. / 2 h.s. (1985)	2	+ 11 y later (1996)	C 1 month	+25 y later (2010)	C 11 months ++			Type 1	Type 8 (5)	5 p. / 5 h.s.	1
F10	6 p. / 2 h.s. (1985)	3	+2 y later (1987)	I 2 weeks	+11 y later (1996)	C 7 months **Replacing the 1987 shack**	+22 y later (2007)	C 1 year	Type 5	Type 5	5 p. / 5 h.s.	1
F17	10 p. / 2 h.s. (1985)	5	+11 y later (1996)	I 1 day	+11 y later (1996)	I 1 day	+24 y (2009)	I 3 years ++	Type 1	Type 3 (1)	6 p. / 6 h.s.	1
F19	10 p. / 2 h.s. (1986)	5	+6 y later (1992)	I 1 week	+11 y later (1997)	C 1.5 months **Replacing the 1992 shack**	+ 25 y later (2010)	C 1 year ++	Type 2	Type 8 (5)	13 p. / 14 h.s.	0.9
G12	3 p. / 2 h.s. (1985)	1.5	+11 y later (1996)	I 2 days					Type 0	Type 1	3 p. / 4 h.s.	0.75
G14	9 p. / 2 h.s. (1985)	4.5	+1 y later (1986)	I 1 day	+15 y later (2000)	C 2 weeks	+19 y later (2004) +20 y later (2005)	C 3 weeks C 3 weeks **Replacing the backyard**	Type 0[7]	Type 7 (4)	7 p. / 7 h.s.	1
G15	8 p. / 2 h.s. (2002)	4	+3 y later (2005)	I 3 weeks	+7 y later (2009)	C 3 weeks (donated)			Type 3[8]	Type 4[9] (3)	1 p. / 4 h.s.	0.25
G16	4 p. / 2 h.s. (1985)	2	+5 y later (1990)	C 2 months	+25 y later (2010)	I 1 day			Type 0	Type 4 (1)	5 p. / 6 h.s.	0.83
G24	5 p. / 2 h.s. (1985)	2.5	+11 y later (1996)	I 1 week	+19 y later (2004)	C 1 week **Change of use: shack now used as a storage**			Type 1	Type 5 (1)	4 p. / 5 h.s.	0.8

[7] Possibly the 1986 'hokie' was smaller than 1.5 m2 thus ignored in the categorisation of Napier in 1996.

[8] Possibly the former resident reassembled the material of the extension. Upon occupation in 2002 current resident did not encounter other constructions besides core.

[9] The only plot with a conventional extension made of wood. The extension involves a donated structure by a construction company for the use of a crèche. Since the formal company built it on the plot, using high quality skills and equipment, the extension is of good structural quality and here listed as conventional.

Plot #	People / habitable space upon occupation year	Ratio (p/h.s)	1st extension + Start year of construction	Material, speed of construction	2nd extension + Start year of construction	Material, speed of construction	3rd (&4th) extension + Start year of construction	Material, speed of construction	Type 1996 (+11 y):	Type 2011 (+26 y):	Current people/ habitable space	Ratio p/h.s.
H21	5 p. / 2 h.s. (1986)	2.5	+2 y later (1988)	I 1 month	+3 y later (1989)	C 3 months **Replacing the 1988 backyard**	+15 y later (2001)	C 1 month	Type 5	Type 7 (5,6) **Knocked down original**	6 p. / 5 h.s.	1.2
H22	5 p. / 2 h.s. (1985)	2.5	+9 y later (1994)[10]	I 1 month	+19 y later (2004)	I 1 day			Type 0	Type 1	4 p. / 4 h.s.	1
H23	2 p. / 2 h.s. (1985)	1	+24 y later (2009)	I 3 days	+25 y later (2010)	I 1 day **Adjusted space in between backyards**			Type 1	Type 1	4 p. / 4 h.s.[11]	1
H25	2 p. / 2 h.s. (2009)	1							Type 2[12]	Type 0	3 p. / 2 h.s.	1.5
I1	10 p. / 2 h.s. (1985)	5	+uncertain[13], likely latest +11 y (1996) 1996	I 2 weeks	+25 y (2010)	I 1 day **This shack will be taken with the renter when leaving**			Type 3	Type 3 (1)	4 p. / 6 h.s.	0.7
I4	9 p. / 2 h.s. (1985)	4.5	+21 y later (2006)	C 2 years	+23 y (2008)	I 2 years			Type 1	Type 3 (1)	3 p. / 5 h.s.	0.6
I5	4 p. / 1 h.s. (1985)	4	+10 y later (1995)	C 2 months attached I 2 months Backyard **(simultaneous)**	+23 y later (2008)	C 1 year **Replacing the 1995 backyard shack**			Type 5	Type 8 (5)	7 p. / 7 h.s	1

[10] Respondent unsure, yet backyard is so small that may have not been taken into account in Napier's study. But it is a bedroom for sure. Otherwise it may be that it was constructed after 1996.

[11] The commercial space is not included here as it is an open space with no wall, e.g. no one will sleep here at night.

[12] Former households may have removed their extensions to use material elsewhere. Currently the plot only hosts the core house.

[13] Respondent is uncertain about date, as the extension was conducted by the 1st generation – he is 2nd. His estimation is 1999. Considering the aerial photography in Napiers study it seems that the date must have been at the latest in 1996, so +11 years.

Table A 10 Extension trail main households included in 2011 sample.

Plot #	People / habitable space upon occupation year	Ratio (p/h.s)	1st extension + Start year of construction	Material, speed of construction	2nd extension + Start year of construction	Material, speed of construction	3rd (&4th) extension + Start year of construction	Material, speed of construction	Type 1996 (+11 y):	Type 2011 (+26 y):	Current people/ habitable space	Ratio p/h.s.
I7	4 p. / 2 h.s. (2007)	2	+1 y later (2008)	C 3 years ++					Type 0	Type 5	4 p. / 5 h.s.	0.8
I8[14]	2 p. / 2 h.s. (1986)	1	+21 y later (2006)	I duration??	+24 y later (2009)	C 3 months			Type 0	Type 5	3 p. / 6 h.s.	0.5
I9	3 p. / 2 h.s. (1987)	1.5	+1 y later (1988)	M 1 day (container, donated)					Type 1	Type 3	1 p. / 3 h.s.	0.5
I11	5 p. / 2 h.s. (1996)	2.5	+4 y later (2000)	I 4 days	+7 y later (2003)	C 5 months	+9 y later	I 2 years	Type 5	Type 5	8 p. / 5 h.s.	1.6
I13	1 p. / 2 h.s. (1995)	1	+7 y later (2002)	C 2 weeks	+9 y later (2004)	C 2 weeks	+14 y later (2009)	C 3 weeks	Type 0	Type 8 (5) **original intact as a statement**	3 p. / 6 h.s.	0.5
I18	10 p. / 2 h.s. (1985)	5	+23 y later (2008)	C 1.5 month	+25 y later (2010)	I 1 week			Type 0	Type 5	5 p. / 5 h.s.	1
J2	4 p. / 2 h.s. (1985)	2	+4 y later (1989)	C 22 years ++	+23 y later (2008)	C 3 years ++			Type 5	Type 8 (5)	7 p. / 7 h.s.	1
J3	7 p. / 2 h.s. (1985)	3.5	+12 y later (1997)	M 10 months I 10 months **Simultaneous**	+21 y later (2001)	C 10 years ++			Type 2	Type 8 (5, 1)	9 p. / 10 h.s.	0.9
J20	4 p. / 2 h.s. (1985)	2	+1 y later (1986)	I 1 week (attached) I 1 week (backyard)	+25 y later (2010)	I **attached extensions renewed for maintenance reasons**	+26 y later (2011) 1986 back-yard replaced by "flats"	C 1 week	Type 5[15]	Type 7 (3)	7 p. / 6 h.s.	1.2

[14] The head of the family to whom we spoke passed away just a week after we interviewed her. A double check of the information among familymembers on such short notice woulld have been utterly disrespectful, hence some information is missing.

[15] While Napier's team identified the extension as conventional, the resident herself claims it was impermanent material. She does acknowledge that this backyard shack and attached extensions were of relatively very good material, much better than the material they were able to now replace it with.

Operational terms and coding for the type of financing of conventional extensions:

T	Time factor is used as a strategy to ensure affordability
U	Upfront sum is accessed

Thereby using the following coding for the strategy used to access finance:

1	buying material and hiring builders as money comes in, constructing follows this logic
2a	joining a saving group and opting for annual pay outs which are used for proceeding with the construction
2b	joining a saving group and opting to wait till sum required is complete
3a	saving up material required prior to construction, storing it on the plot
3b	saving through the bank for the entire sum prior to commencing construction
4	taking a formal loan for construction (often excluding costs for finalising)

..and the following coding for the effect on the pace of construction of extensions:

P	On the go, (lengthy) pauses
F	Finalised in one go

The table below moreover:

Indicates the maximum time spent on one of the conventional extensions on the plot by this main household.

Excludes extenders who had been given the material (e.g. it was donated). The strategy of subsidiarity to the user (e.g. a renter) would in principle also be excluded – although no conventional extensions had been erected by renters in the sample of plots in 2011.

# Plot	Type	Explanation	Effect on pace of construction
F6	T1	Considering a loan for finalising the extension in one go now.	P max: C 11 months++
F10	U4	New household, loan possible due to formal job daughter	F max: C 1 year
F19	T1	Buying material as money comes in from the rental business.	P max: C 1 year++
G14	T3b		F max: C 3 weeks
G16	T1	Buying material as money comes in, hiring people, then waiting again.	P max: C 2 months
G24	U4	The loan was taken from the boss, who bought all the material and hired the constructors. Then monthly payments to pay off the loan. Respondent was unaware of need to pay interest.	F max: 1 week
H21	U4	The Loan was taken by the former head (parent) who then passed away and left the daughter with an unpaid debt which then doubled as the family couldn't pay off, was handed over by the bank to an agent which resulted in: loss of her property title and turning her into a renter from the agent with threat of eviction.	F max: 3 months
I4	T2a	Respondent started participating in the saving group in 2004 and continued until 2008, saving R600 per month and proceeding with construction annually until material was finished and she would buy again. She stopped after finalising first extension, primarily as her income wasn't enough anymore to bring in the monthly sum required.	P max: 2 years
I5	T3a	Steadily buying the material needed as business went well. Then hiring a large company to construct in one go.	F max: 1 year
I7	U4	Including the extensions in the mortgage on the house (new household to the house). The finishing is done on the go.	P max: 3 years ++
I8	T2b	Respondent started participating in the saving group in 2002. She stopped when finalising the extension.	F max: 3 months
I11	T1		P max: 5 months
I13	T3a	Respondent first collected all the required material from second hand suppliers and stored it in his garage. The construction of the garage first follows this logic. Respondents has a pick-up and is self-employed in transport.	F max: 3 weeks
I18	T3b		F max: 1 ½ months
J2	T1		P max: 22 years++
J3	T2a	The 1997 structure was made possible by a government subsidy to extend the core. Respondent started participating the saving group in 2001, putting in R500 every month, sometimes R700 or R1500.	P max: 10 years ++
J20	T3a		F max: 1 week

Table A 11 Main households with at least one conventional extension who sourced their own material their main strategy for affording it as well as the effect of that strategy on the pace of construction.

Comment on highlights:

The highlight indicates the use of the time factor as a strategy to afford the extensions.

Annex 7: Most successful extenders in the 2011 sample

Picture A 6 Highest level of extension among plots included in 2011 sample.

From left to right, top to bottom:

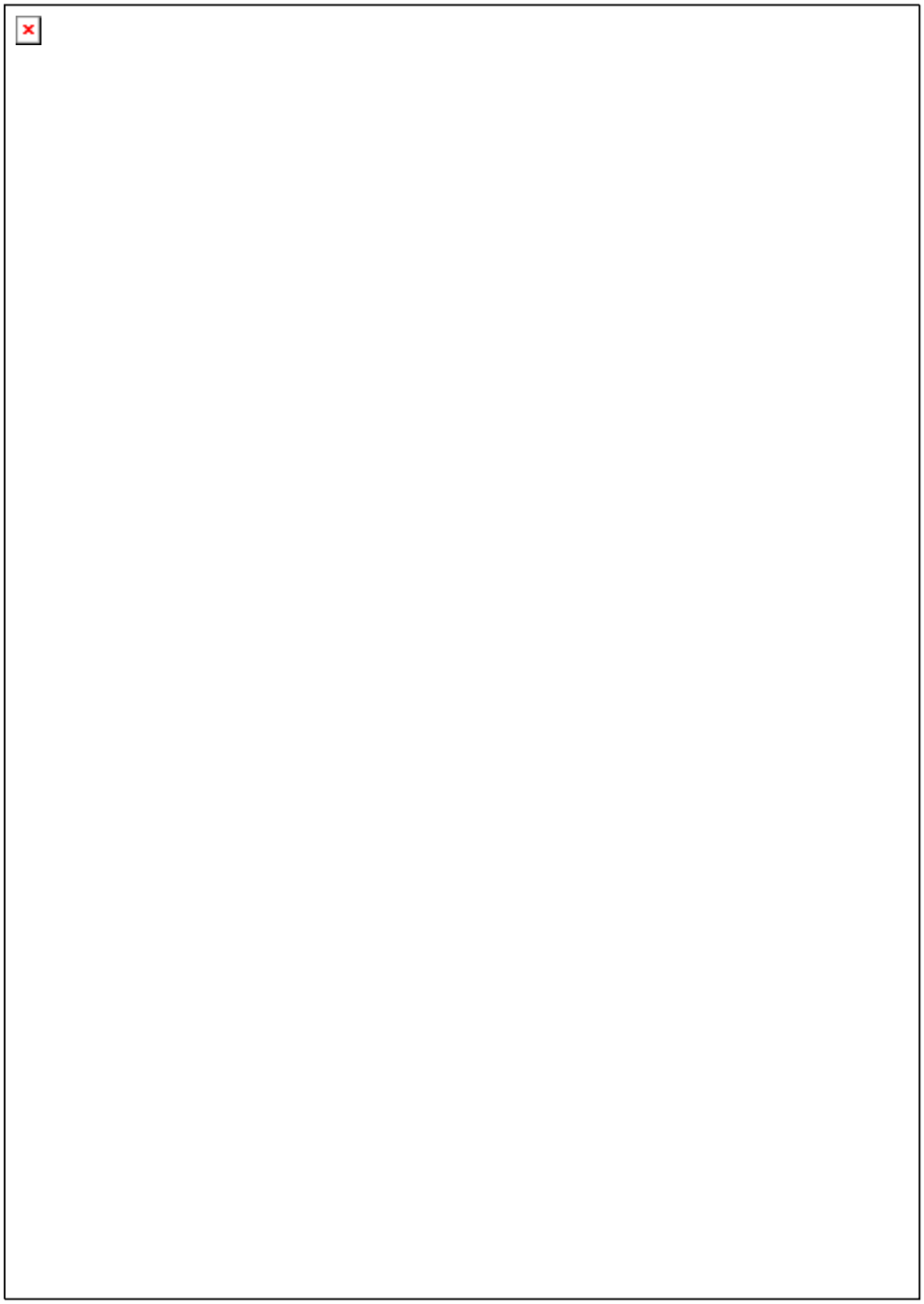
Plot # 2G, Plot #3J

Plot #6F, Household on Plot #F19, here a picture of some of the rental apartments on another plot that is also theirs and better shows the level of extension achieved.

Plot #I5, Plot #I13

Annex 8: Backyard shacks in the 2011 sample

Plot #H22, visualising the positioning and continuity of ‘backyards’ (e.g. detached of the core, placed outside the view from the street side). The pink module includes a single bedroom and was bought from sellers at ‘Greenpoint’, the entrance to Khayelitsha, and delivered within a day. Currently it is used for a not-yet-paying non-relative renter. The picture collage attempts to give an impression of the of the lack of climate intelligence and resilience of this backyard structure in real life. Clearly on this plot, the initial core house has not been placed effectively as it leaves little room behind the house to “hide” impermanent structures from the view from the street.



Picture A 7 Contiguity, positioning of extension of impermanent material.
Picture by author.

Annex 9a Professional analysis of the adequacy of the internal layout of a core house

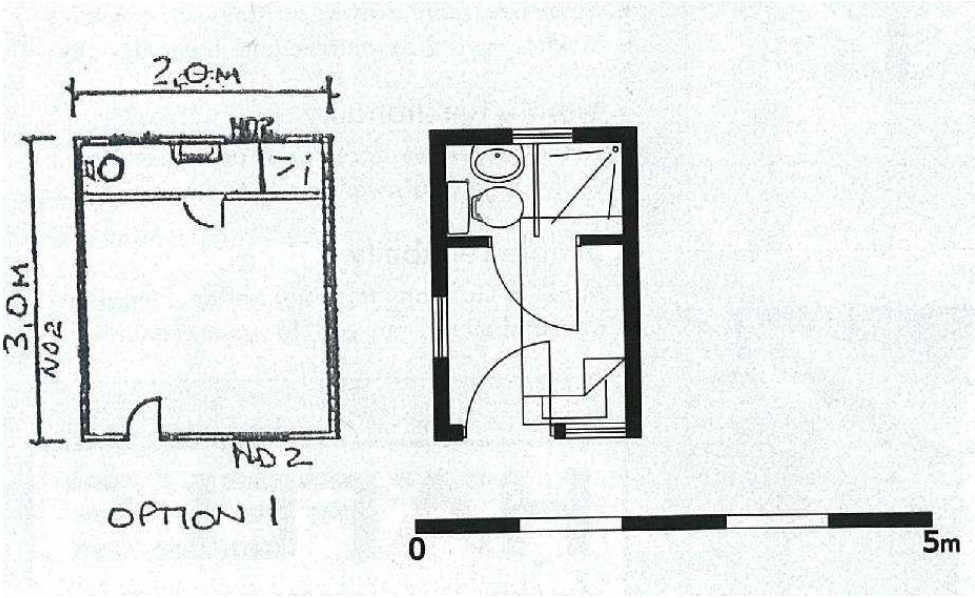


Figure A 1 Housing layout plan submitted for funding under RDP state provided housing schemes for low-income households, flanked by a sketch drawn up to scale to illustrate how even a bed couldn't fit into the living space.
Source: Harber (2009:30).

Comment by Harber (2009:30): 'The submission for funding {of this housing layout} is serious, yet the house {proposed} only measures 6m2. It couldn't even accommodate a standard single bed if drawn to real scale.'(…) ´This reveals an important rule - all designs need to include furniture and bear in mind that there are generally only double beds in townships. Beds are shared, couches are also used and floors are slept on´. (…) 'The Housing Code calls for a minimum of 5m2 plan area per resident, yet sometimes this is ´as low as 2.5m2, not much more than the area of a door or a bed for that matter!'

Annex 9b Efficient positioning of the core house according to professional analysis of adequacy and potential.

Bronchart (2000) analysed various initial core designs and their positioning. The house design displayed here resembles the initial core provided in Khayelitsha. The case study analysis in this thesis reveals that legitimate positioning is dependent on the socio-cultural embedding of the core house. In Khayelitsha for instance there is a direct relationship between the material used for extensions and their preferred contiguity, based on the perceived status/dignity of the structure and the vulnerability of its users.

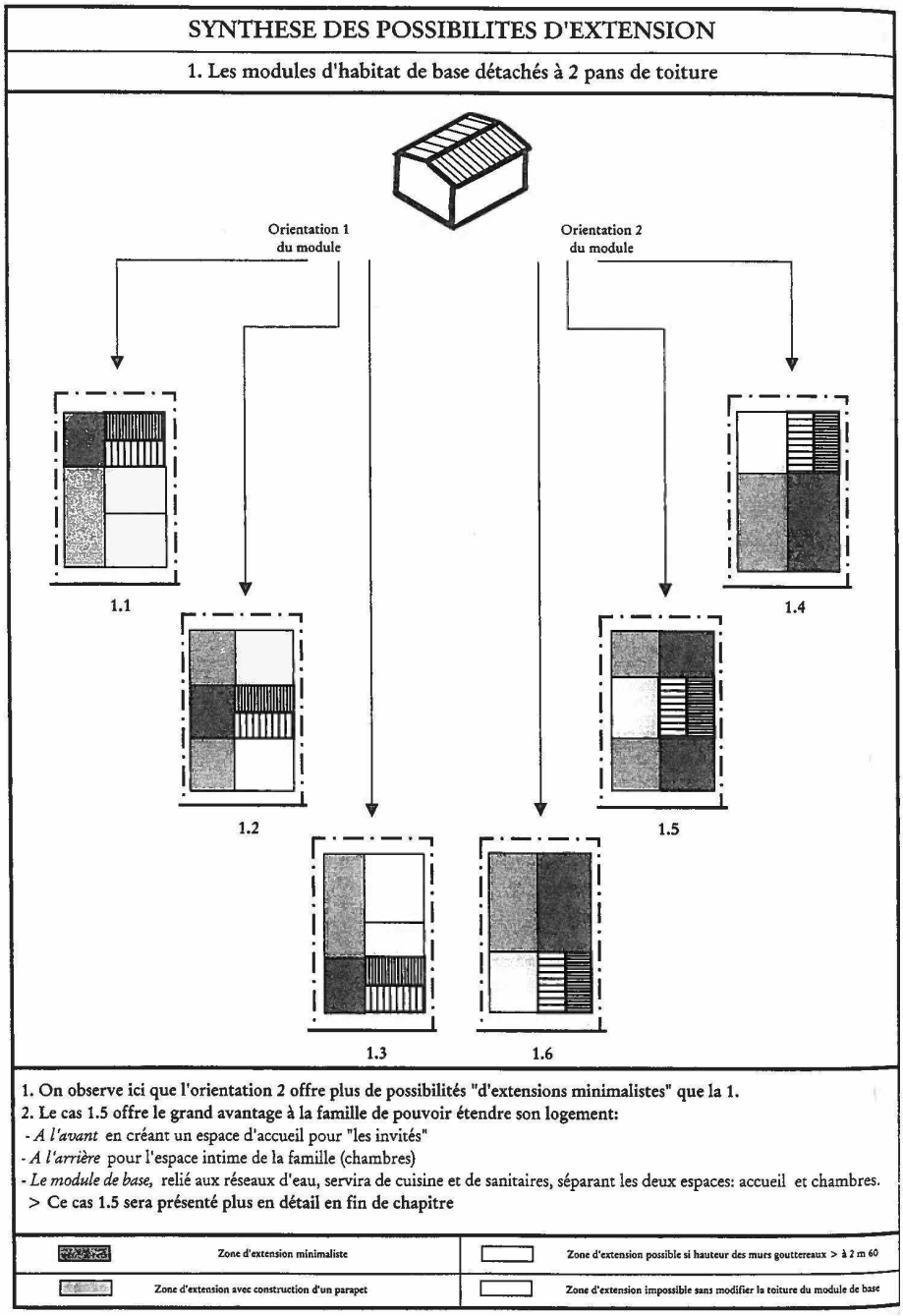
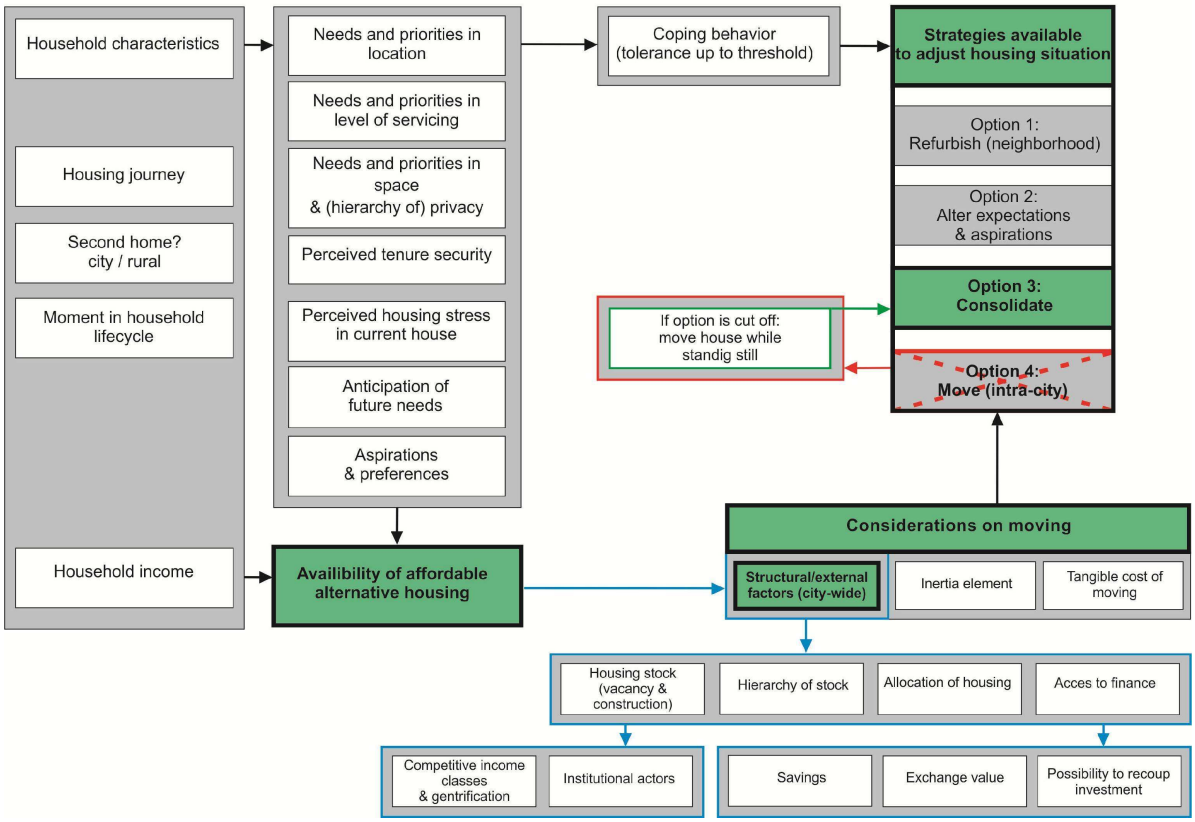


Figure A 2 Suggested efficient positioning of a core house with sloping roof.
Source: Bronchart (2000:120).

Annex 10 Further readings: Motivations to consolidate



Model A 2 Motivations to consolidate.

Visualisation by author and Beudeker.

BLOCK I: the household

The concept of 'household' is based on the arrangements made by people – individually or in groups – for providing themselves with food or other essentials for living (UN-Habitat 2011:190). Such a household may be either: 1) a one-person household or 2) a multi-person household. In this broad interpretation, the latter category may constitute of related or unrelated persons - or a mixture of the two – who pool their incomes and may, to a greater or lesser extent, have a common budget. Especially relevant is the understanding that one housing unit is not automatically home to one household; the housing unit may also be occupied by more than one household or by a part of a household (UN-Habitat 2011:190). The latter is especially relevant within the context of this research, whereby the unit of analysis is not only the core house but also – importantly – the plot.

Household characteristics

Household characteristics are most fundamental to perceived housing stress. Housing characteristics are related to three aspects: 1) housing composition - number, age and gender of people in the household and the age of the household head (usually the senior income earner); 2) the household type – e.g. single person, nuclear family or extended family household; and 3) health of the household - referring to endemic diseases factors (Davidson & Payne 2000:20).

Housing journey

The historical track record of a household in adjustments to location (e.g. moving house) is called 'housing journey'. In reality, strategic housing moves are often constrained by factors that are beyond the direct control of households (Thorns 2002:174-175). Therefore, the concept of a 'housing journey' – suggested by Thorns (2002) - is explicitly different from the conventional concept of 'housing career' which implies a 'clear intentionality over which capital is carefully acquired through strategic moves' (Michelson 1977 & Gosling et al. 1993 in Tipple 2000:24).

Depending on where the household comes from, it may perceive the house as more or less ideal and have or not have experience with its consolidation already (see e.g. Napier 2002). Davidson & Payne (2002:20), though not themselves using the term 'housing journey, also include the following aspects which provide insight into the attitude that households may have to their provided housing and whether they will see a need to consolidate: length of residence in the project town/city, length of residents in the project area, birthplace of the household head, reason for migration to the project town or city and location and type of first residence in the project town or city.

Moment in household lifecycle

Most mobility studies use categorizations of household types - i.e. nuclear, extended or single person - as a building block for their assessments and predictions of mobility patterns. Others however chose to track the household through its lifecycle. The household lifecycle follows the household from its formation, through the growing phase of a family - if applicable - and then to the contracting phase to death; in a contemporary understanding possibly also including household dissolution and reformation. A moment in the lifecycle can then be seen as a "snapshot" of the household composition at a certain point in time (Lansing and Kish 1957 in Tipple 2000:24).

Household income

A household's income as understood in this research refers to the income of the (extended) household members put together, whether through formal or informal activities, or through a mixture of income generating strategies. It is almost a given that poor and low-income earning families will express a need to improve their housing conditions; therefore a households' need must be clearly distinguished from the *effective demand* for such improvements – e.g. the ability to pay for the perceived need - as well as the *willingness* to pay or borrow for them, which represents *perceived* utility and benefit of a service (Daphins & Faulhaber 2004). Turner (1972) argued extensively just how relative costs are and how inflexible the incomes of poor households. Willingness to pay has found to produce a much more accurate estimate in cost-recovery calculations as it is a better representation of effective demand (UN-Habitat 2005, Daphins & Faulhaber 2004).

Second home

Interestingly, Napier (2002) highlights how in many African contexts, the household living on an urban site does not necessarily represent the whole of the

household since the household may have a second home – either in the city or in rural areas. Such a home may be an inherent part of livelihood strategies.

BLOCK II: requirements to the house

Households needs and priorities in location

The main priority of the household is access to a stable income for a livelihood. Only then do priorities in housing build up. In other words: the household may agree to live with a lower standard house (e.g. very small, bad servicing, insecure tenure etc) and economize on other needs to be able to afford the plot. Since a location in good proximity to the city centre or the hub of economic activities is expensive or may be even completely out of reach to low-income households, the low-income household is likely to opt for cheaper and accessible land at the periphery. An exception is a low-income household that is willing to make enormous concessions on housing needs, if indeed more central land is available and accessible in the first place. Transport costs to the location of income generating activities form part of the utility costs of the house.

Needs and priorities in level of servicing (water, sanitation, electricity etc.)

Servicing commonly refers to water, sewage, electricity etc. – and there are many gradations in level of servicing. Residents' own priorities vary between settlements and over time. For instance, 'services to houses may be ranked far ahead of the need for tenure with residents who prefer services first – before housing (Stevens, Marshall, Morrison and Rule 1998 in Napier 2002:345). The level of servicing bears essential consequences on utility costs as well. Usually as incomes go up, expectations are raised and new effective demand is created for more sophisticated servicing.

Needs and priorities in space and (hierarchy of) privacy

A major motivation of low-income households appears to be for more space, followed by the need for greater external and internal privacy (Tipple 2000:29, 39). It is relevant to notice possible (unwritten) cultural codes for the hierarchy of privacy in spaces, going from the very intimate to overly public spaces. It is likely that essential cultural-religious male-female codes (e.g. Costello 1977) are interwoven through this hierarchy, as well as codes of dignity/shame in relation to private/public display. If anything, Turner (1972, 1976, 1986) has continually stressed just how personal housing needs – including the need for space and privacy – are, and how personal the trade-offs a household is willing to make.

The hypothesis of 'shocks' and 'triggers' prove to be useful in analysing the households' need for space and privacy. It is clear, writes Tipple (2000:114), that the increases in demand for space caused by increases in household size are a major generator of decisions to increase or decrease housing consumption. Seek (1982) called these discrete events 'shocks'. Typical examples of shocks given in these studies are the arrival of children or other dependents (e.g. elderly) or a divorce. Obligations to accommodate members of the extended family, albeit not in their own households but in an extension of the house, could also be credibly grouped under shocks (Tipple 2002: 115-116). The term 'triggers' (Gosling et al. 1993 in Tipple 2000:24) has been later coined to refer to events may be seemingly

less dramatic but do bring about changing needs for space and privacy – for instance when children are getting older.

In urban contexts where formal - and even informal - employment is hard to come by, residents may come to see their house beyond its value as merely a dwelling and consider it also for its commercial *rental* value and for its use as a base for a *commercial enterprise* – the so-called home-based enterprise (HBE) (see e.g. Neuwrith 2005, Davis 2006, Bronchart 2000). For both uses, the modification of existing space and the addition of extra space through consolidation can be essential prerequisites (Tipple 2000:51). Lipton (1980:190-191 in Tipple 2000:53) stresses the advantage of using a house as a HBE: it allows the household to treat resources fungibly, meaning that a resource can be converted swiftly, conveniently and without loss from one use to another. For many low-income households, the dwelling is one of the few resources they have for generating income so that sometimes, housing conditions may have been worse without commercial renters or HBE's, since residents need the income generated to be able to afford the housing in the first place (see e.g. Strassmann 1986 in Tipple 2000).

Level of housing stress in current house

Housing stress is a gap between current levels consumption of housing and the demands and preferences of the occupiers. Perceived housing stress varies from household to household. As it is relatively difficult for low-income households to change housing, the gap will grow gradually but with increasing intensity over time (Tipple 2000:23-24). The growing housing stress may also spring from changing socioeconomic circumstances, tastes and preferences, changes in housing attributes and prices – and other external influences such as public decisions relating to land use or transportation (Seek 1983 in Tipple 2000:24-25).

Perceived tenure security

The level of tenure security is an essential consideration of a household, as it effects whether it is worthwhile to invest in the house as well as the perceived security of accommodation. As secure tenure may also be either too expensive or completely out of reach for a household (e.g. the household has no accepted collateral for a loan, acquiring a formal title is a prolonged and expensive process etc.), this is a common trade-off. The household may even find it completely unnecessary to invest in acquiring formal secure tenure if there is sufficient protection against eviction (Payne & Majale 2004). The result is that often perceived *de facto* security – such as the guarantee that one will not be forcefully be evicted, a prospect for regularization or strong social legitimacy – is considered as “good enough” to be willing to start investing in one’s house (Payne 2002).

Anticipation of future need

The anticipation of a household to future demand is first of all related to the moment in the lifecycle, and the housing shocks and triggers the family already foresees. The likely needs of a next generation, and how best the house can serve them also appears to be very important in decisions of low-income households in developing countries (Tipple 2000). The household is even likely to anticipate

future 'shocks' in order to lengthen the time before another adjustment has to be made (Seek 1983 in Tipple 2000:25).

Aspirations & preferences
Housing preferences within income groups are not uniform but vary even from household to household in the same neighbourhood. Preferences may stem from housing journeys. Examples are (sub)cultural values and aspirations - e.g. an image of 'modernity', or a continuation of rural practices – or more individual aspirations such as the use of the house for commercial purposes. The activity of *building a home* can be seen a socially vital part of integration into urban life. Consolidators are expressing not only housing needs but also the desire for identity, a sense of belonging, dignity and acceptance. A search for status among neighbours may be an important motivator (see e.g. Kellett 1995 in Tipple 2000:41). Yet, socio-historical and political dynamics may also give the construction of better housing a much deeper meaning: a search for acceptance as a fully participating citizen.

BLOCK III: coping behaviour
Tolerance up to threshold
Coping behaviour is the tolerance of housing stress, up to its threshold. Michelson (1977) conceptionalised the idea of 'coping behaviour' to explain how households will vary in their threshold of housing stress, 'the point at which some action is taken to relieve rather than continue to tolerate it' (Tipple 2000:24). To be meaningful and useful for analysis and action to relieve housing problems, people's housing needs must always be stated in terms of *priorities* (Turner 1976: 96-97). Turner's fieldwork proves that there is an enormous local and personal variety of housing priorities which affect trade-offs. Indeed, household coping strategies may not be as easy to generalize as is often assumed. Instead, as Napier (2002:342) advocates 'housing adjustment studies need to redefine the basic concepts of theories and hypothesis for each context or locality study'. Turner (1976:96-97) goes even a step further and points out that it is actually only at the individual household level that housing demand can really be understood – and only best by that specific household itself.

BLOCK IV: Strategies available
Many of the assumptions about mobility which have been developed in cities of Western Europe/USA are not transferable to cities in developing countries (Napier 2002:52). In well-developed housing markets households who wish to adjust their housing situation throughout their lifecycle have the option of either moving or improving. The choice between moving or improving - or a combination of both – will depend on the balance of costs and benefits associated with each alternative (Seek 1983 in Tipple 2000:23). More often than not, the situation in developing countries is a different reality altogether: formal housing shortages are extreme, personal choice is much more limited by resource constraints and the types of strategic intervention such as new State housing production are very limited. As Napier (2002:338) concludes, the arguments made in Conventional Studies are 'very constrained in the light of the complexity of decision making in real situations and in the face of the alternatives to moving, which are not considered'. Therefore, argues Napier (2002:52), it is clear that a much wider set of options

needs to be considered to extend the models usefully to explain behaviour in the urban contexts of the developing world. These can be grouped into four options.

Option 1: move (intra-city)
If the current house and location of an individual household do not meet its needs, preferences and aspirations, the household may opt to move – e.g. change location and house. Yet, with regard to low-income households it is fundamental to realize that most households do *not* have the mobility option, so that their choices are limited and they must refer to alternative strategies. In the context of low-cost housing projects, for most low-income households, as Napier (2002:342) observed in South Africa, 'access to State built or assisted self-help housing tends to be the end of the filtering road, 'and then the consolidation processes begin to predominate'.

Even so, it can *not* be argued that there is no mobility whatsoever among low-income households. Households may have strategic ways of using mobility, for instance in and out of regularized settlements. Kellett (1995 in Napier 2002:342) shows for instance how households move into and out of regularized settlements, depending on what strategies most suit their needs at the time. And UN-Habitat (2005) reports on circular mobility at the peripheral of cities of Southern Africa, connecting rural areas with the city. Moreover, as Edwards (1983 in Napier 2002:341) demonstrates, people respond rationally to the opportunities presented by the housing market. Edwards argues that rather than looking at purely at the household unit and their needs and aspirations, one needs to take a wider view of what is available on the supply side. Households may seize an opportunity for fulfilling a housing demand in an era where there is a sudden availability of such an opportunity – if this is normally suppressed. This means even before the threshold of a household's coping behaviour has been reached, household members may 'seize the moment' if opportunities appear, particularly so in situations of sever housing shortage or lack of access to land.

Option 2: consolidate
Consolidation can be likened to 'moving house while standing still' (Gosling et al. 1993 in Tipple 2000:25). This reinforces the idea that the decision to extend is likely to be explained in the same terms as residential mobility'. In other words: In cases of low or absent mobility the housing stress experienced by households is *absorbed within the location* (Gilbert 1999 in Napier 2002:340). An important difference between consolidation and mobility is that a change of location can increase access to the opportunity to fulfil aspirations and preferences. 'Modifiers can only attempt to bring opportunities nearer to themselves' (Napier 2002:342). The benefits derived from relatively costly consolidated can be increased by long residence: 'the use-value of the work done' (Tipple 2000:46).

Option 3: alter expectations and aspirations
Financial or other circumstances may make it impossible to change housing conditions. In such a situation, the tolerance level must rise and the household may have to adapt to the situation by changing its housing aspirations' (Michelson 1977 in Tipple 2000:24). In other words: the household decides to live with the

inconveniences arising from mismatches between current housing and their needs, preferences and aspirations for shelter, location and tenure.

Option: Refurbish the surrounding area
Refurbishment is personal action to improve the locality, making the neighbourhood more liveable. Floor and Van Kempen (1997 in Napier 2002) add the strategy of refurbishment to the options available to low-income households, offering an alternative that may be exercised in the virtual absence of the option to move house as well as a strategy to complement consolidation.

BLOCK IV: considerations on moving
Tangible costs of moving
Given the choice, an important hypothesis is that most households will improve rather than move because of the high tangible costs involved with moving. Seek (1983 in Tipple 2000:24-25) concludes that if only for financial reasons, improving is more rewarding to increase residential space. Some tangible costs of moving are: meeting the price of the new house compared to the (lower) value of the current dwelling, the costs in the transactions (legal fees, duties, commissions etc), the costs of moving furniture and other household goods and changes needed to make the new house suit the new occupants.

Inertia element
The hypothesis of the 'inertia element' is that people will rather stay where they are and that changes to their situation – in particular a change of location - will meet resistance. The fundamental importance of the 'inertia element' to low-income households must not be overlooked, especially for those who are inherently dependent on their local economic network for survival. Examples of (primarily) intangible factors are social ties or the local network, the bother of moving, neighbourhood attachment etc (Seek 1983 in Tipple 2000:25).

Structural / external factors (city-wide)
What people aspire is not always what they get. Unfulfilled aspirations are especially true for households with very low incomes within a housing system where alternatives in housing only open up as incomes increase. In his dissertation Napier (2002:52; 337-347) sums up a spectrum of limitations and biases of conventional mobility studies. As Napier analyses, the models proposed applied *only* to contexts in which there was:
- usually an adequate housing supply (or even a surplus)
- a high quality stock
- a highly controlled or regulated housing market
- a wide choice amongst alternative housing circumstances (although differential access to housing markets was acknowledged)
- high degrees of personal freedom

Such circumstances are so rare elsewhere that they 'cannot be credibly applied to the urban contexts of developing countries' (Napier 2002). It is even doubtful whether they can still be applied in Western urban contexts, as here too, the land and housing systems have changed considerably over the past years.

BLOCK V: The supply of housing

Finely tuned demand-based models of housing adjustment evolved for First World cities will mean little in contexts of extreme housing shortage (Napier 2002:341). Whether alternative housing will be affordable to a large extent depends on the income of the household relative to the cost of living in that alternative housing. Housing cost encompasses all cost related to ' (1) the plot, (2) its servicing, (3) housing construction and (4) fees, overheads, financial cost of borrowing and yield on capital base (Baharogly & Lindsfield 2000:8). Utility costs (e.g. municipal charges and fees for services, transport costs to work) and taxes (e.g. property tax) are also a crucial factor in the affordability of alternative housing. This last block highlights the main structural factors constraining the option to move. As space is limited, a short explanation will be given followed by resources for further reference.

Institutional actors

The supply side can be grouped as 'institutional actors' (Blauw 1991:397, 401), comprising housing authorities, private landlords/individual owners, sellers, the real estate industry, housing associations and so on that supply housing but also involving the role of lending institutions.

Housing stock (vacancy & construction)

The housing stock involves a fixed supply of constructed housing. Alternative housing may become available as new houses are being constructed, or as vacancy chains are set off. A vacancy chain is set off when one household moves into new housing, a second household moves into the housing left vacant as a result etc. There is actually a wide variety of 'change events' which may result in such a sequence of events, such as 'new construction, the sub-division of single units into multiples units, the conversion of non-residential structures into residential units, the out-migration of households and household death or dissolution' (Emmi & Magnusson 1995:1362 in Napier 2002:337). Most quickly urbanising and modernising urban contexts in developing countries experience serious housing backlogs (see e.g. UN-Habitat 2005; Tissington 2011).

Allocation of housing

Institutions that are in charge of available housing stock, particularly in the case of public housing, often also allocate newly available housing – either themselves or they outsource that task. Usually such institutions apply criteria to select households. In practice, regulatory and procedural constrains may block access of low-income households to appropriate housing products offered on the private market in the form of supply of both rental and ownership housing (Hoek-Smit 2009). The regulatory framework may also make access to state provided housing cumbersome (see e.g. Payne & Majale 2004). Thus in reality, the allocation of housing may be such that a low-income household may not have access to affordable housing anywhere in the near future and thus can only look at the private sector for vacancies – which is generally much more expensive, or indeed informal housing.

Hierarchy of stock
The hierarchy of stock is primarily related to the hierarchy in the housing system in the city, according for instance to location, level of servicing and tenure security (see e.g. Payne 2002). There may be an equilibrium of tenure security within a city-system for example, leading to middle class not aspiring to live in housing that doesn't have a secure tenure for their investments. More often than not however in quickly urbanising and modernising urban context, the middle class may itself experience a huge lack of suitable housing (see e.g. Tissington 2011).

Access to finance
Institutions have a key role to play in the access of low-income households to finance. Low-income households often find it hard – if not impossible – to access finance (credit) via the banking and mortgage system. These households cannot gain loans from the formal sector because: they have no formally recognized collateral (e.g. a house with a title, assets), there is little market information, and loans are not available for the amount they want to borrow over periods that they regard as manageable (UN-Habitat 2005:29). Specific constraints are: informal employment, lack of wealth or savings, uncertain collateral due to poor property rights, registration and cadastre systems, neighbourhood risk factors – which are critical in determining house-value movements and form one of the most important barriers to lending in low-income markets, inefficiencies and incompleteness of housing finance markets (Hoek-Smit 2009). In most cases therefore housing will have to be *self-financed* or *directly-financed* – an arrangement that is often referred to as informal finance between individuals (Lea 2009:29-30; Tipple 2000:114). Direct finance can be provided by friends, relatives, small savings and lending clubs, or housing cooperatives or landlords.

Savings
By far the greatest financial resources of low-income households are the actual and potential savings from earnings – and 'these are under the households own direct control' (Turner 1976:84). Whether or not the household is able to accumulate savings to a large extent depends on the costs associated with their current housing situation.

Exchange value of current house & the possibility to recoup investment
While exchange value is important as a notion, the importance of the *use value* of the house for the household predominates. The exchange value of a current house depends to a large extent on its location, tenure and quality. With little upward mobility, relevance of financial exchange or the possibility to recoup investment of consolidation efforts as a way to access finance are also limited (see e.g. Tipple 2000, Napier 2002, Daphnis & Faulhaber 2004). It was Turner (1976) who swung the focus away from the importance of exchange value, towards recognition of the importance of the usefulness of a house to a low-income household (Gough 1998 in Napier 2002:339-340).

Competitive income classes
Competitive income classes – such as the upper bands of the low-income classes or the low middle class- are perhaps the most serious threat to the accessibility of

low-income households to affordable housing. Downraiding of housing which was initially intended to target low-income households in contexts of severe housing shortages is most likely when middle class income groups themselves too lack affordable alternatives themselves (e.g. Payne 2002). Downraiding is not necessarily an involuntary situation; poorer households may employ the mismatch between demand and supply as an income generating strategy (see e.g. Turner 1976, Payne 2002; Tissington 2011).

It is clear then that the availability of affordable housing options for low-income households – as well as the whole issue of housing demand - can only be understood from the perspective of the city-system as a whole (Payne 2002; Davidson & Payne 2000).

Annex 11 Further readings: Sustainability – a contested concept

When it comes to the implementation of prospected 'sustainable projects' it is especially essential to be aware that 'the aspect of environmental concern has been – and continues to be - an issue of polarization and misunderstanding between the West and development countries' (Dresner 2002:28). In the 1970s environmentalism was a Western idea of little interest to the developing world. It is interesting moverover, as Dresner (2002:27) analyses, that environmentalists and the World Council of Churches 'invented the concept 'sustainability' in an attempt to overcome hostility to their concerns in the developing world' (Dresner 2002:27). Yet, the seeds of the approach the so-called 'Brundtland Commission'[142] was to successfully take were also laid in the early 1970s (Dresner 2002:29). Their phrase on 'sustainable development' in the 1987 publication 'Our Common Future' has become probably the most common and well-known definition internationally (Oktay et al. 2010; Dresner 2006). The report coins the essential components of the concept in the following terms:

> 'Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs' (WCED 1987:8)

The strength of the "Brundtland phrase" according to Dresner (2002:31), is that it is both simple and vague – which is at the same time also its weakness[143]. It is probably the most common and well-known definition of 'sustainable development' (Oktay et al. 2010; Dresner 2002); the single phrase has been repeated, misquoted and rewritten countless times since. Indeed, as Dresner (2002) argues, the greatest achievement of the Brundtland Commission has been its success in the task of making the idea of sustainable development *politically* acceptable.

The first essential component of 'sustainable development' concerns physical sustainability and the realization that our ability to meet needs is bounded by the limitations of the earth's resources – often debated as the 'carrying capacity' of the biosphere in relation to the management of resources (Oktay et al. 2010:26). The UN Conference on the Human Environment held in Stockholm in 1972 first revealed tensions between the West and developing countries. Initially, developing country governments regarded environmental concern as a luxury for the rich, while the environments of people in the developing world were blighted by poverty – "the worst pollution" as Indira Ghandi, prime minister of India told the conference (Dresner 2002:28). Moreover, they regarded it as hypocritical of Western countries to warn them about pollution.

The term 'sustainable development' now also emerged in the World Conservation Strategy of 1980 published by the International Union for Conservation of Nature and Resources, a strategy foreshadowed many of the ideas associated with Brundtlant (Dresner 2002:30-31). Development was explained as

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[142] After its chairman, the Norwegian Gro Harlem Brundtland who chaired the WCED since its setup by the UN General Assembly in 1983.

[143] For a working definition of 'sustainable development' within the context of this research, see Chapter 2.

a threat - unless resources (e.g. biodiversity, non-renewable energy sources) were effectively conserved. Conservation was defined as 'the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations' (IUCNNR 1980 in Dresner 2002:30). However, the problem with the Strategy was that it was written by a group identified as being Northern environmentalists (Dresner 2002). As Dresner (2002:31) analyses 'its concern for habitat conservation was ultimately based on a *moral framework* that was not universal'. Hence, the political acceptance of the new definition of sustainable development was problematic.

The second essential component of 'sustainable development' is that of equity (Oktay et al. 2010); a cornerstone of the Brundtland Report's approach which is laid as early as 1974 at an ecumenical study conference that was convened by the World Council of Churches (Dresner 2002). Here the concept of a 'sustainable society' emerged. The concept is notable because it starts not with environmental conditions, but with the principle of equitable distribution and also involves the concept of democratic participation. It is important to notice that this world Council of Churches was a platform where the developing world had a meaningful say. Many developing world clergymen thought that the environment was a distraction from justice and development and 'saw environmentalism as a 'bourgeois' concern' (Dresner 2002:30). To them, the idea of a sustainable society – one that would not self-destruct – 'sounded more serious and also had less tension with the concern for justice' (Dresner 2002:30). The conference on Science and Technology for Human Development resulted in the 1977 publication of *The Sustainable Society* which explored the issue of how to reconcile limits to growth with concern for social justice. The publication concluded amongst others that in a period of growth it is much easier to direct more of the benefits to those at the bottom, while without growth, improving the lot of the poor would require bringing down the rich, which is politically very difficult. Dresner (2002) analyses how very few people were aware of the work in the World Council of Churches, but how among some academic environmentalists though, the idea of 'sustainability' was beginning to catch on and it verbally reconciled some of the polarization and misunderstanding between Western and developing countries. As Dresner (2002:32-35) analyses, the reconciliation of the desire for development and environmental protection (coined as 'ecodevelopment'[144]) is one of the main reasons why the later Brundtland report has been so influential.

The disagreement between 'northern' and 'southern' countries at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 again illustrated the highly contested nature of the 'sustainable development' concept (Jenkins et al. 2007). The disagreement was over the conceptualization of sustainable development and the setting of priorities for achieving it. The northern countries advocated steps to protect the 'natural' environment, particularly at the global level. This required 'mitigation'; 'technological change and substitution that reduce resource inputs and emissions

[144] Coined by the Executive Director of the conference, Maurice Strong as a verbal reconciliation.

per unit of output, meaning implementing policies to reduce GHG emissions and enhance sinks' (UN-Habitat 2011:5). Southern countries however saw this approach as 'denying them the opportunity to undergo development processes already embarked on by the 'developed world', thus denying their societies the possibility of reaching comparable living standards' (Jenkins et al. 2007:185).

The tragedy is that there is very little association between the people that cause climate change and those facing the most serious impacts[145] (Moser & Satterthwaite 2008). It is already too late to stop many negative impacts of climate change, communities have to adapt even as the need to mitigate gets more pressing. Thus, though logically it seems to be most justified to prioritize mitigation strategies, the realities of climate are already impacting cities and it is clear that adapting to change already is inevitable (IPCC[146] 2001 in Dresner 2002). The effectiveness of housing implementation in a developing country can only be improved if the concept is adaptable to the *realpolitik* and linked to tangible improvements in living conditions of low-income households, directly and on the ground.

In recent years attention in developing countries has shifted to adaptation strategies (e.g. Schipper & Burton 2009; UN-Habitat 2011). Whereas mitigation aims first of all at protecting the climate from people, adaptation[147] primarily aims at protecting the people from the climate. Adaptive capacity refers to safety at the regional or country- level (UN-Habitat 2011:5) – while at the level of the community and at the household-level the opposite of 'vulnerable' has been coined as 'resilient'. Adaptation and mitigation need not to be polarized; they are intertwined, argues OECD (2008:14), since after all, the more the climate changes, the larger investments cities must make for adaptation. In practice, it is more effective to plan adaptation measures with a bottom-up approach concentrated on local stakeholders and priorities, and mitigation measures with a top-down approach focused on global agreement (Jones 2004 in OECD 2008:14). The reason being that while the effects of climate change will vary locally – the causes are global (Jones 2004 in OECD 2008:14).

The way 'resilience' is understood in the current paradigm reveal the new conceptualisations of poverty which emerged during the 1990s. Poverty was recognised to be not just about income or expenditure levels but as a multifaceted reality, 'covering a wide range of aspects: prospects for earning a living; deprivation and exclusion; basic needs; social aspects; psychological aspects etc' (Jenkins et al. 2007:200). These new approaches to the study and assessment of

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[145] David Satterthwaite, senior fellow with the Human Settlements Group, International Institute for Environment and Development (IIED). Satterthwaite contributed to the Third (2001) and Fourth (underway) Assessments of the IPCC. Lecture at the Institute for Housing and Development Studies (IHS), Rotterdam January 2011.

[146] The Intergovernmental Panel on Climate Change (IPCC) is an independent body of leading scientists advising the United Nations. Established in 1988 by the World Meteorological Organisation and the UN Environment Programme it has published four reports up to date (1990-2007), while the fifth is underway.

[147] The official definition includes 'initiatives and measures to reduce the vulnerability' of both 'natural and human systems' against 'actual or expected climate change effects' (UN-Habitat 2011:5).

poverty have developed concepts such as vulnerability (e.g. Moser 1996 in Jenkins 2007:200), asset ownership (e.g. Moser 1996 in Jenkins 2007:2000) and livelihood (e.g. Chambers & Conway 1992 in Jenkins 2007:200). The IPCC (Parry et al. 2007:880 in UN-Habitat 2011:149) gives the following definition of resilience: the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation and the capacity to adapt to stress and change. UN-Habitat (2011:149) adds to this that perhaps the building of resilience 'should be understood as a way of enabling not only coping with added shocks and stresses, but also addressing the myriad challenges that constrain lives and livelihoods'. Thus, concludes UN-Habitat (2011:149) 'a key part of building resilience is facilitating poverty reduction and more general improvements to the quality of human lives'. Accordingly, safety from climate disasters and security from violence and crime are also inherent aspects of being less vulnerable, and more and more integrated with the dominant paradigm on 'sustainable cities'[148].

Resilience then, made up of these concepts, is in fact better understood as a discourse - but less as a workable criterion for actual implementation projects.

[148] Laura Liuke, lecture 'Planning safe cities; the right to the city – a safe city is a just city', lecture at the Institute for Housing and Development Studies, May 18, 2011, Rotterdam (The Netherlands).

Annex 12 Expert interviews and validation

Triangulation of findings of the case study analysis:

- **Dr. Mark Napier**, dissertation research on consolidation process in Khayelitsha 11 years after occupation of the core housing, currently programme director of the Urban Land Markets Programme Southern Africa ('Urban LandMark'), a UK AID programme based in Pretoria. Interview, open conversation, verification via email.

Joint discussion of first findings of the fieldwork and their interpretation:

- **Focus group discussion with key respondents**, boardroom Khayelitsha Development Forum, Khayelitsha, Cape Town.
- **Meeting of the board of the Human Settlement Department of a local CBO,** Khayelitsha Development Forum, Khayelitsha, Cape Town.

Expert validation of key findings and their interpretation – as referred to with footnotes:

- **Frederik Groos**, architect applying and experimenting with open building approaches, both in The Netherlands and in South Africa. Open conversations, verification via email.
- **John Habraken**, emeritus professor Cambridge Massachutes Institute of Technology (MIT), Nederlands Architecture Institute (Nai), Rotterdam. Conversation after lecture.
- **Mava Kenneth Nowala**, Secretary of Khayelitsha Human Settlement Forum, Khayelitsha Development Forum (KDF). Several meetings and verification via email.
- **Forbes Davidson**, senior expert Urban Policy & Planning, Institute for Housing and Urban Development Studies (IHS), Rotterdam. Interview.
- **Moegsien Hendricks**, Programme Manager at the Development Action Group (DAG), a leading non-profit organisation operating from Cape Town. Verification via e-mail.
- **Prof. dr. Jeremy Seekings**, director of the Social Surveys Unit in the Centre for Social Science Research (CSSR) at the University of Cape Town (UCT). Verification via e-mail.

The following experts have been interviewed, using semi-structured interviews on specific topics, as referred to with footnotes:

- **Carlos Morales-Schechinger**, Mphil, senior expert urban land management and policy at the Institute for Housing and Urban Development Studies (IHS), Erasmus University, Rotterdam (The Netherlands).
- **André Buitenhuis**, Project leader Reno International nv, entrepreneur in modular housing solutions for low-income households in Surinam.
- **Faizel Amoo**, Architectural Technician and Senior Building Inspector of the Building Development Management Department in Khayelitsha.
- **Dumisoni Lagumás**, dealer in "bungalows" at 'Greenpoint' Khayelitsha, running a business with 4 employees for the actual construction and delivery of the modules.

More informal, open conversations on specific topics within the exploration – as referred to with footnotes:

- **Sophie Bronchart**, architect, conducted a case study on core housing in East London, South Africa, now moved away from the topic.
- **Ikhayalani-1Andy Bolnick**, Slum Dwellers International (SDI) representative from Cape Town. One of the speakers at Innovation 4 Design (I4D) conference, Eindhoven University of Technology (TU/e) (The Netherlands)
- **Johnny Astrand,** architect, Director of the Housing Development & Management department of the Institution for Architecture & Built Environment, Lund University, Lund (Sweden).
- **Cameron Sinclair**, co-founder *Architecture for Humanity*, focus group meeting after the Open-Source House Award ceremony (www.os-house.org).

Annex 13 semi-structured interview – questions used

Core house and extensions – Semi structured interview, fill in form for researcher use only

Make sure you don't skip any questions but fill in every single one.
Name researcher:.....
Date of inventory:..... Day:.....

Bold letters are communication to the researcher filling in the answers.
Regular font are questions to the respondent.
Underscored letters indicate a section caption

A. Identification:
1 Address:
Street..... House number:..... Section:..... in Eyethu (V2)

2 Name of the respondent:.....
3 Telephone number:.....

B Housing journey, mobility and tenure of current household:
1. In what area did you live before moving here?
Geographical location.....

2. In what kind of settlement? **Circle the right answer**
- Rural, township
- Rural, farming
- City centre
- Township of a city
- Outside South-Africa (urban? Rural?)
- Khayelitsha itself
- Other.....

3. In what kind of house did you live before moving here? **Circle the right answer**
- A government provided house (ownership)
- A shanty/shack
- A rural house
- A formal rental apartment
- An informal rental apartment
- Other....

4. a) Do you have another home in the city or in the country? **Circle the right answer**
- No **Go to next question**
- Yes, in the city centre
- Yes, in a rural village
- Other, namely.....

b) **If yes:** How does this influence your decisions to invest in extending this house?
.....

c) Do members of your household stay away for longer periods of time to the city centre or rural areas?
- No **Go to next question**
- Yes

d) **If yes:** what is the reason, to whom does it apply and how long do they stay away?
Reason.....
number of members..... months per year they are gone.....

1

Core house and extensions – Semi structured interview, fill in form for researcher use only

5. a) When did you come to live here? Year:.....

b) Of which people did your household exist when you came to live here?
Please fill in the number: **if non applicable, write: N/A**
Head (= respondent)....., Spouse:.....
Adult family otherwise:.....
Number of children:....., Number of other relatives that were still children:.....
Number of non-relatives :.....
Conclusion, total number of people upon occupation:.....

c) How long has your household been living here in this house?..... years
To double check the year of occupation

6. Do you know anything about the families that lived here before you?

a) **Circle right answer** :
- My household has lived here since implementation **Go to next question**
- No **Go to next question**
- Yes

b) **If yes:** How many households followed up since it was constructed and before you came in?
Number: .....

c) Do you know why the last family left?
Reasons: .....

7. How did you first get this house? **Circle the right answer:**
- I bought it from the municipality
- I rent it from the municipality
- I bought it from the previous owner
- I rent it from the owner who used to live here
- I inherited it from .....
- Other, namely.....

8.What is the situation now? **Circle the right answer:**
- I am the owner of the house **Go to next question**
- I rent from the municipality **Go to next section**
- I rent from the owner who also lives in the house with me

ps a signal that you have the wrong respondent!
- I rent it from the owners who does not live here now **Go to the next section**
- Other, namely.....

9. a. Have you finalised paying off the loan/mortgage?
- No, I am still paying monthly instalments to .....(e.g. municipality, bank) **Go to next question**
- Yes, I don't have any expenses for the house itself apart from servicing. **Go to question b**

b) In which year did you finalise the last payment?.....
To whom? .....(bank, municipality etc.) **Go to next section**

10. How does the fact that you still need to pay off your loan influence your ability to afford extensions? .....

Core house and extensions – Semi structured interview, fill in form for researcher use only

C Original state of the house implemented in 1985 and upon occupation

1. Which type was your original core house? **Show pictures on Photo page, circle the right number:**
   - **Starter house 1**
   - **Starter house 2**
   - **Starter house 3**

2. Did this house originally exist of a 26 m2 space with:
   I. a bedroom
   II. a kitchen with a sink
   III. a wet core which could be upgraded into a bathroom

   Circle the right answer
   - Yes
   - No, because: .....

3. Where is the original house positioned on the plot?

Draw a sketch of a plot with the positioning including the street. Then Chose:
- In the middle
- In the front, close to the street
- In the back, far from the street
- Other, namely:.....

4. **In case this is not the first household that lives here:**

a. Did the household before you already add any rooms to the house?
- Not applicable (the household lived here since the start) **Go to next section**
- No **Go to next section**
- Yes

b. **If yes:**: which extensions had been added already before you came to live here?

.....
.....
.....

c. Did you ever have to adapt or even knock down an extension by a former household?
- No
- **If yes:** why? .....

D Current state and process of extending

Walk around the plot with the resident, notice extensions to the house and their state, material use etc., ask which consolidations and extensions were conducted by current household

1.Indicate the plot coverage by the house including extensions:
- **0-25%**
- **25- 50%**
- **50-75%**
- **75-100%**

2.a) Did you extend the house as it was when you first inhabited it?
- Yes **Go to the next question**
- No.

b) **If not:** Why did you never extend yourself?

.....

Now go to the next section

Core house and extensions – Semi structured interview, fill in form for researcher use only

3.Think of the extensions (space) you added to your house.
What type of rooms have you added and in which order?

- **Use the table following the steps below**

STEPS:
1.Read out every single room to the respondent – from no. 1 to the end - to see how many s/he added to the house as it was upon occupation. Since you also walked around yourself, check it with what you have seen yourself, possibly asking additional questions.
Make sure you do not double rooms by only filling in any additional rooms for backyard and upstairs under 11 and 12.
2. For the extensions listed, ask the respondent in which order they were added.
3. Then ask the respondent in which year every extension was finalised
- double check the order, otherwise correct that
4. Indicate the material used: impermanent or conventional (see coding)

- **If the resident adjusted any original rooms, please describe this here:**

.....

- **If the resident completely changed the house, please also indicate here what s/he did:**

.....

4

Core house and extensions – Semi structured interview, fill in form for researcher use only

Extension types added by former and current households and order of adding space
For this section, extensions include every construction that adds space to the house
BUT NOT internal subdivision of rooms

	Current layout of the house. Indicate which rooms are original, which have been adjusted and which have been added e.g. +1	**Order of extensions by current household** Chronologically (e.g. 1st 2nd 3rd etc.) and year in which the extension was finalised. **and the material used for the extension** Code (I / C / M)*		
NB: For upstairs or backyard: fill in under 11 or 12.	**number of…..:**	**Order**	**YEAR**	**Material:**
1. Bedrooms				
2. Living rooms				
3. Dining rooms				
4. Kitchen				
5. Toilet				
6. Bathroom				
7. Passages				
8. Stores				
9. Commercial (e.g. spaza, workshop)				
10. Veranda (roofed open space)				
11. An upstairs	Room type: …. …. …. Stairs?……			
12. Backyard house	Room type: … …. Extra services? Namely:……			
13. Other	Namely:……			

***Material use coding**	
I = Impermanent	Using materials such as earth, corrugated iron, plywood etc. Not necessarily by informal contractors!
C = Conventional	Using permanent material such as brick or block. Not necessarily by formal contractors!
M = Mixed	A combination of impermanent and conventional

4. a. What is the logic behind this order of extensions for you?

.....

.....

b. What were your top three priorities in extending?

1.....

2.....

3.....

5.Where do you usually get the needed material for extensions?

Tick the boxes that apply (likely more than 1):

Material > **Sourcing of the materials ↓**	**Impermanent** materials such as earth, corrugated iron, plywood etc.	**Conventional** permanent material such as brick or block etc.
Formal material suppliers		
Local informal supplier		
Donated or salvaged (re-used and collected over time)		
Other (describe)		

6.a.Where do you find <u>most</u> of the needed construction skills?

- Construction skills within the household
- Construction skills within your network; these are people I know / friends
- local craftsmen/local contractors that I do not know personally
- Other, namely....

b. Why do you chose to employ them? Give three reasons

Reason 1:.....

Reason 2:.....

Reason 3:.....

7.Think of your MOST EXPENSIVE extension.

a) which extension is this?.....

b) How do you assess the structural quality of the end result?

Let the resident chose ONE box only for positive, and one box only for negative, and explain:

Positive about this extension:	**Negative about this extension:**
▪ Decent because:....	▪ Sub-standard (e.g. ventilation, lightening, leaking, isolation etc.) Because...
▪ Structurally adequate, because...	▪ Inadequate / not sound (e.g. structure cracks, falls apart etc.) Because.....
▪ Here to stay, Because.....	▪ (very) temporary, Because.....
▪ Pride, Because.....	▪ Low status Because.....

c) If negative: Who of what is to blaim for this negative end result?

.....

Core house and extensions – Semi structured interview, fill in form for researcher use only

E. Household(s) composition

Ensure the respondent once more that this information will be kept strictly private and is anonymous. No one will be able to know that s/he gave these answers.

1. How many people slept in all the rooms on this plot last night?
   Number.....

2. Counting only people who spend most of the time in their lives here (at least more than half a year every year), how many people usually live on this site / property?
   Number.....

3. a) Do you have any lodgers staying on your site?
   - No **Go to next question**
   - Yes

   b) **If yes: what is your relationship to them:**
   - Family
   - Non-paying lodgers
   - Paying renters

   c) What is your motivation to accommodate them?
   .....
   Only if respondent is hesitant, give idea: income generation, obligation etc.

4. We would like to know a bit more about the people on this site so we can try to predict your housing needs.
   Fill in the table on the next page and indicate:
   - **Whether a person is part of the main household, or a second household**

For the research assistant - note that:
The housing unit may also be occupied by **more than one household** or by a part of a household.

A household here is: a single person or multiple-persons - related and/or unrelated - **who pool their incomes and may have a common budget**. If they don't put all incomes together, it is a separate household.

The **main household** is here: the household living in the original core house with its extensions including the head who is in charge of the entire site.

A **secondary household** is only the case if this household does not pool the income together with the head of the main household.

Example: if a son lives in the backyard shack, but gives any income he earns to the head/main household to use together, this son is not a second household but part of the main household.

Core house and extensions – Semi structured interview, fill in form for researcher use only

Current household(s) composition

Use coding:

Relationship to head:

FAMILY:
- **H** Head
- **S** Spouse
- **C** Child
- **B/S** Brother or sister
- **P** Parent
- **G** Grandchild
- **F** Family relative (other)

NON-RELATIVE:
- **R** paying renter
- **L** non-paying lodger

Place a person stays:
- **O**riginal house and extensions **attached** to it with same entrance
- Extension of the original house but with a **Separate entrance**
- **B**ackyard / **F**lat
- Other, namely

People usually on the site:

	First name	Relationship to head **(coding)**	Sex **M / F**	Age in years	**M**ain household** / **S**econdary household / etc.	Person sleeps in: **O / S / B / F / other, namely**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

F. Predictability of income and ability to save

We would like to know what forms of regular income you have and what forms of irregular income – of all the persons all together in **your** household:

Make clear that we are only asking about the MAIN household, all the members PUT TOGETHER

1 a) What forms of regular income do you have as a household put together?
Meaning every month the same amount .....
b) Which members of your family contribute this form of regular income? **Ask for names**

Use the table to fill in the answers:

	Regular income from:	**Names of members of households to whom this applies:**
-	Wage-employed (e.g. regular predictable payslip)	
-	Grant from government	
-	Pension	
-	Family sending money **monthly**	
-	Other, namely	

2a) What forms of irregular or occasional income do you have as a household put together?
Meaning: the amount varies every month.
b) Which members of your family have this form of regular income? **Ask for names**

Use the table to fill in the answers:

	Occasional / irregular income from:	**Names of members of households to whom this applies:**
-	Self-employed (e.g. spaza, dress maker, carpenter)	
-	Occasionally employed (e.g. piece work, construction)	
-	Seasonal work (e.g. rural harvesting in summer, construction in summer etc.)	
-	Family sending money some times	
-	Other, namely	

3.a) Are you saving money for extensions?

- No, because..... **Go to next question**
- Yes

b)If yes: in what form do you do this saving?

- Through the bank
- I save it myself, at home
- I participate in a saving group, namely:.....
- Other, namely.....

Core house and extensions – Semi structured interview, fill in form for researcher use only

G. Future aspirations

1.a)How long do you expect to still live here?

Time period:.....

b) How does that expectation impact your willingness to investment in this house?

.....

2. Do you consider selling the house?

- Yes, because.....
- No, because.....

3. Will you pass on the house to another generation?

- No
- **If yes**: How does this impact your priorities in extensions and consolidations?

.....

4. Do you consider renting out rooms in the house?

- No, because.....
- Yes, because.....

5. Do you consider further extending

- No
- don't know yet
- **If yes:**

What type? .....

What will it depend on whether you can realise it? .....

6. Do you consider: **Circle the answer:**

- double storey? Yes / No / Don't know yet
- backyard shack for paying renters? Yes / No / Don't know yet
- a home business? Yes / No / Don't know yet

H. ENABLE PEOPLE's PROCESS

LAST OPEN QUESTION:

a) How can you be better enabled to extend if you want to?

.....

.....

b) By whom would you suggest?

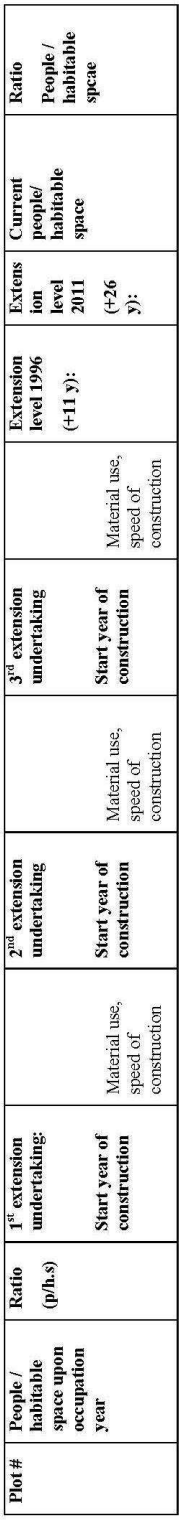
.....

Thank you very much for your cooperation!
Don't forget the voucher.

10

Figure A 3 Semi-structured interview with head of the main household.
Source: Author and Ntshunthse.

Follow-up visit:
Structure used for conversation on extension trail:



Plot #	People / habitable space upon occupation year	Ratio (p/h.s)	1st extension undertaking: Start year of construction	Material use, speed of construction	2nd extension undertaking Start year of construction	Material use, speed of construction	3rd extension undertaking Start year of construction	Material use, speed of construction	Extension level 1996 (+11 y):	Extension level 2011 (+26 y):	Current people/ habitable space	Ratio People / habitable spcae

Figure A 4 Semi-structured interview on extension trail with head of the main household.
Source: Author and Ntshunthse.