

## **Evolutionary resilience**

An approach to in situ slum upgrading  
in a post disaster community

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## **Evolutionary resilience**

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# Abstract

Over the past decades, the global trend of urbanization has taken up new forms. The massive rural to urban migration has shifted mainly from the north to developing cities in the global south. Since 1950, the urban population has risen from 746 million to 3.9 billion people. With other words, from 30 to 54 per cent of the total world population. It is further projected that this number will rise to 66 per cent by 2050, adding another 2.5 billion of people living in cities worldwide (UNDESA, 2014, p.1).

This continuous arrival of new urban citizens entails an excessive demand in new housing stock. "Unfortunately, [...] supply is often limited by inadequate governance systems and human resources deficiencies, as well as by institutions and regulations which are either obsolete or lacking capacity, or are poorly informed" (UN-Habitat, 2014). Consequently, most governments in poorer nations seem to not be capable of responding to this immense demand of affordable housing. Inevitably, what we could perceive as one of the most visible outcomes of poverty urbanization is the explosive formation of slums.

"For many countries, urban growth has become synonymous with the growth of slums" (UN-Habitat, 2013, p.135). By the end of 2030, about 3 billion people, which accounts for 40 per cent of the global population, will be in need of basic housing, infrastructure and amenities (UN-Habitat, 2013, p.138).

Using the most common operational definition retrieved from *The Global Assessment of Slums* undertaken by the UN-Habitat, a slum household is defined as a group of individuals living under the

same roof in an urban area who lack one or more of the following five indicators; durable housing of permanent nature; sufficient living space; easy access to safe water; access to adequate sanitation and security of tenure (2003, pg.12).

Over the past decades, especially since the 50's, governments have tried to solve this issue of informality. "These measures include benign neglect; forced eviction and demolition; resettlement or relocation; slum upgrading programs; and, most recently, the adoption of enabling strategies" (Arimah, 2010, pg.2). To recapitulate in short, "there is no common planning framework for upgrading these settlements. [...] So the dominant approaches tend to focus on principles and best practices [...] yet neither of these has yet provided a convenient basis for replicability on a significant scale" (Abbott, 2001, pg.317).

In-situ slum upgrading approaches tend to have shown the most impressive results, yet have failed to incorporate long-term solutions embracing the topics of ownership and responsibility (Arimah, 2010 p.4). There have been numerous studies undertaken to try and capture a plausible theoretical basis that "appears to define the essence of interventions" for informal settlement upgrading and "convert these to a structured methodology" (Abbott, 2002b, p.307).

The reason why an effective approach has not yet been stipulated is perhaps due the fact that these structured methodologies tend to remain at an organizational level. The UN strives to support governments in seeking methods to significantly improve the lives of the poorest city dwellers. At this managerial level, numerous actors



are involved ranging from policymakers, city authorities, communal institutions to urban planners. This might contribute to the reason why the existence and/or documentation of successful, implemented projects still remain scarce. (Abbott, 2002a, p.317) It is therefore important to convert these policies into a practical and explicit strategic approach that fits the specific actor, in this case the architect or urban planner.

Looking at in-situ slum upgrading processes from an architectural point of view, a crucial observation is the frequent hazardous settings in which informal settlements are usually found (UN, 2013b, p.150). Due to the continuous threat of the possible occurrence of a disaster, these communities are restrained from the ability of physical, social and economical improvements. It is therefore essential to confront the topic of risk reduction before thinking of any form of intervention.

Evolutionary resilience is introduced as a plausible approach to in situ settlement upgrading. It centralizes on two key aspects: reducing levels of vulnerability and identifying opportunities. The term resilience derives from the Latin word *resilire*, meaning to spring back” (Davoudi, Brooks and Mehmood, 2013, pg.308). This term is used to describe a city’s ability to recover from a disaster. Within the specific case of informal settlements, you would not want to return to the situation prior encountered to the hazard, but use this misfortunate event to recover and improve the living standards. Evolutionary resilience revolves around the ability to turn a crisis situation into a safer place creating new opportunities for the existing residents.

The depiction of this approach becomes considerably more related with the profession of the architect. Peterson in his essay, *Mobilizing Mainstream Professionals to Work for the Public Good*, describes his architectural profession as “public architecture that acts as a catalyst for public discourse through education, advocacy, and the design of public spaces and amenities” (Peterson, 2008, p.96).

”We have limited our potential by seeing most major human concerns as unrelated to our work” (2008, p.10). Most projects within the architecture curriculum prepares its students to work for wealthy clients leading to the design of a private studio, the expansion of a faculty or the transformation of a church into a hotel. Bearing in mind that “architects only directly affect about 2 to 5 per cent of all that gets built”, this paper could be considered to form a discourse towards the current system of architectural education and a call to start designing for the other 95% (Fisher, 2008, p10).

This does not mean we should depreciate ourselves and become humble architects. Instead, we can expand our knowledge, use our expertise in challenging circumstances and create good buildings which serve a much larger scope of users than it currently does.

In order for an architect to design for informal settlements which are frequently settled on precarious grounds, a strategic approach is inquired to act as a guidance to form a suitable design solution. The regular design process that is often applied, though not necessarily explicitly, is adjusted to work in high risk circumstances.

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# 01

## Introduction

A fire raged through this slum community in Manila on July 14th, 2013  
They rebuild to become as vulnerable as before (Celis, 2013)

## Problem description

Back in 2008, the quantity of urban residents exceeded the number of rural inhabitants resulting in the majority of us now living in cities worldwide (UNFPA, 2014). What we perceive as one of the most visible outcomes of poverty urbanization is the explosion of slums. Households in rural settings seeking for a better economic life often cannot afford the city standard living conditions and are forced to enter through its back door. “One out of every three people living in cities in developing countries lives in a slum” (CitiesAlliance, 2014).

Apart from the main characteristics like inadequate housing, high densities and the lack of basic service provisions like sanitation, infrastructure and access to safe water, informal settlements tend to appear to have another similarity. They are often settled within hazardous situations (UN, 2013b, p.150). Due to the continuous threat of the possible occurrence of a disaster, countless communities are restrained from the ability of physical, social and economical improvements.

Since the 1950's, governments have tried to solve this issue of informality. “These measures include benign neglect; forced

eviction and demolition; resettlement or relocation; slum upgrading programs; and, most recently, the adoption of enabling strategies” (Arimah, 2010, pg.2). Many authors agree, of all these measures, In-situ slum upgrading approaches tend to have shown the most impressive results, “yet it remains far from clear as to what is the most effective way to achieve this” (Arimah, 2010, pg.2; Abbott, 2002b, p.317).

Informal settlements are frequently found in hazardous settings, like steep slopes, near dumpsites, deep gullies or flood-prone areas (Arimah, 2010, p.6). Thinking of in-situ architectural solutions therefor needs a solid approach in terms of risk reduction.

This paper will attempt to stipulate the importance of public-interest architecture within informal settlements. The object of this study is to examine the concept of evolutionary resilience as a plausible in situ settlement upgrading approach which could help support the architectural profession to work within a challenging setting to help transform an informal settlement into a pleasant and safe neighborhood.

## Scope

### Informal settlements

This paper addresses the issue of informal settlements, also referred to as slums. In the first chapter, it will give a brief introduction to the proliferation of slums and the specific characteristics that are frequently encountered. More specifically, this paper examines informal communities that are settled on precarious grounds, in hazard prone areas.

### Post disaster

It could be argued that it is more profitable to consider pre disaster solutions to prevent a future hazard from having an enormous impact. Though the reality is often different, in which hazards do happen and they often do leave a tremendous impact on poor communities. There are various approaches that try to prevent a post disaster community from entering into similar deprived conditions prior encountered to a disaster.

### In situ-settlement upgrading

In-situ settlement upgrading can be defined as an intervention in which the residents are not required to relocate or rebuild their homes elsewhere in the city peripheries. Within this specific slum upgrading approach, again, there are various forms of interventions. Some focus on the upgrading of housing, while others focus on the built environment.

### The built environment

This paper only addresses in situ settlement upgrading processes with the focus on the built environment. This incorporates anything but the housing ranging from social infrastructure such like public amenities to the actual physical infrastructure like roads and sewage systems.

## Methodology

The method used to gather in-depth understanding of the specific topics that form the center of this paper was obtained through qualitative research.

## Objectives

The objectives of this theoretical paper are twofold. The first objective is to understand the global phenomenon of informal settlements. The aim is to get an in-depth understanding of the proliferation of slums and the different methodologies concerning the informal settlement upgrading processes.

The second objective is to assess the concept of evolutionary resilience as a suitable approach within the in situ-settlement upgrading methodology. The aim is to generate a strategy that revolves around the essence of evolutionary resilience.

Many methodologies remain at quite an organizational level aimed for policymakers like the United Nations or governmental institutions. The primary goal is to create a strategic approach aimed at the architectural profession to form a helping tool to be able to design within a challenging environment like informal settlements.

This paper will attempt to create such strategy by adjusting an already existing and common design process, familiar within the field of architecture.

Research question

**How can evolutionary resilience be used as an in situ settlement upgrading approach within the field of architecture?**

## Thesis structure

This paper consists mainly of a literature study. Chapters one and two are supporting sections that introduce the main topic and structure of this paper.

**Chapter three** introduces the topic of the global phenomenon of urbanization and the corresponding manifestation of urban poverty. It introduces figures on the current state of the world and its projections for the near future. It also reveals new ideas of the United Nations trying to promote the city of the twenty first century, one that fosters prosperity. It then introduces the the specific topic of informal settlements, also referred to as slums. Conforming statistics derived from the United Nations, this paper explains the proliferation of slums and the various characteristics that are frequently encountered.

**Chapter four** considers the different perceptions of slums in the past six decades. There is a wide range of different interventions being applied to either the removal, relocation or upgrading of informal settlements. This chapter gives an overview of some these different approaches.

**Chapter five** specifically gathers an in-depth understanding of one of these approaches, namely in situ-settlement upgrading. There is a broad agreement that in situ-settlement upgrading is most appropriate for upgrading an existing slum community. Some examples are shown to give an impression what in situ settlement upgrading could entail.

**Chapter six** introduces the concept of evolutionary resilience as a plausible approach to in situ settlement upgrading. It revolves around the idea of turning a crisis situation into an opportunity.

**Chapter seven** introduces the strategic approach for in situ settlement upgrading. It is based on a general design process, which designers often implicitly use to shape their design. It is adjusted to suit the specific circumstances that are frequently encountered in informal settlements. This strategy will be tested with a specific pilot case. The case of Valparaiso, in Chile, is presented in the second part of this graduation project, the design paper. The strategic approach will be evaluated in order to seek for generic elements which can create a level of replicability to be applied in other similar situations.

**Chapter eight** is a concluding chapter, which gives a critical look at the obtained literature study with its corresponding resources. General conclusions will be explained in the design paper, where the strategic approach is tested to the specific case of Valparaiso. Any recommendations for further research is placed in this chapter.

Each chapter starts with an introducing paragraph followed with a quotation specifically chosen to depict each topic.



# 02

## Relevance

Cardboard Church, Christchurch, New Zealand.  
designed by Shigeru Ban (Goodenough, 2014)

**“We are working for privileged people who have money and power. But because money and power are invisible, they hire us to show off their power through monumental architecture. I am not criticizing this, but we should also use our knowledge and experience for the general public and for people who have lost their homes due to natural disasters. They are not *natural* disasters. An earthquake does not kill people. The collapse of the building does and that is our responsibility as architects”.**

Shigeru Ban upon receiving the Pritzker Price on June 13th, 2014



Shigeru Ban (Designboom, 2014)

## Relevance

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These words of Shigeru Ban upon receiving the Pritzker Prize in June 2014, perhaps exposes the current prospectus of architectural education worldwide.

Most projects within the architecture curriculum prepares its students to work for wealthy clients leading to the design of a private studio, the expansion of a faculty or the transformation of a church into a hotel, just to name a few. Though bearing in mind that “architects only directly affect about 2 to 5 per cent of all that gets built [...] too many architects are skilled at designing museums and mansions and too few are able to work with indigent people and communities in need of basic housing, sanitation and security” (Fisher, T., 2008, p10).

*Expanding Architecture* is a collection of over thirty essays in which all authors suggest, “Good design has the potential to benefit many more people than it currently does. Design can play a direct role in addressing critical social issues that we face. The process of creating the built environment can allow communities and individuals to improve and celebrate their lives” (Fisher, T., 2008, p.10).

Some may argue these challenges do not fit the current field of architecture and should not and simply cannot merely be the responsibility of an architect. “To make design more relevant is to reconsider what “design” issues are. Rejecting the limits we have defined for ourselves, we

should instead assume that design could play a positive role in seeking answers to many different kinds of challenges. We have limited our potential by seeing most major human concerns as unrelated to our work” (Fisher, T. 2008, p.10). “The gap continues to grow between what millions of people need and what the current system of housing and building provides. For that reason, change is inevitable” (Fisher, T., 2008, p.10).

Luckily, this change is already starting to take shape. The Pritzker jury of this year recognizes the potential new role of the architect. “Through excellent design, in response to pressing challenges, Shigeru Ban has expanded the role of the profession; he has made a place at the table for architects to participate in the dialogue with governments and public agencies, philanthropists, and the affected communities. His sense of responsibility and positive action to create architecture of quality to serve society’s needs, combined with his original approach to these humanitarian challenges, make this year’s winner an exemplary professional” (Pritzker jury, 2014).

This paper addresses complex issues within informal settlements that are to be found in many developing economies. This hopefully encourages other students to shift their focus to public-interest architecture that influences the “other 90%” (Smithsonian’s Cooper-Hewitt, 2014).



# 03

## Poverty Urbanization

Torre David, a vertical slum in Venezuela (Baan, 2011)

*This chapter starts with the introduction of a global trend called urbanization. Although this population shift has been a familiar movement for the past decades, there have been some significant changes on the global scale. Since 2008, for the first time in history, the majority of the world population is living in cities. The vast migration from rural to urban causes cities to respond with new housing stock to accommodate the urban residents. Yet, in many developing economies, “urban growth has become synonymous with the growth of slums” (UN, 2013, p.135). This chapter continues to explain the proliferation of slums. It draws upon the specific characteristics that are frequently encountered and gives a definition retrieved from the UN-Habitat.*

“Sometime in the next year or two, a woman will give birth in the Lagos slum of Ajegunle, a young man will flee his village in west Java for the bright lights of Jakarta, or a farmer will move his impoverished family into one of Lima’s innumerable pueblos juvenes. The exact event is unimportant and it will pass entirely unnoticed. Nonetheless it will constitute a watershed in human history, comparable to the Neolithic or Industrial revolutions. For the first time the urban population of the earth will outnumber the rural. Indeed, given the imprecisions of Third World censuses, this epochal transition has probably already occurred”

*Mike Davis, 2006, pg.1*

Urban and rural population of the world, 1950-2050 (based on UNDESA, 2014, p.7)

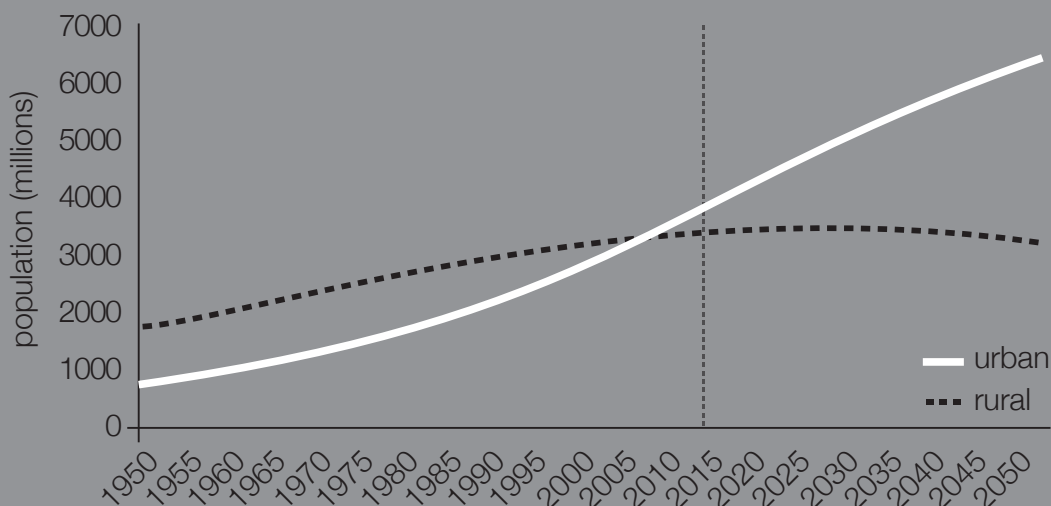


Figure 1.

Population of the world, 1950-2100, according to different projections and variants (based on UN-DESA, 2013)

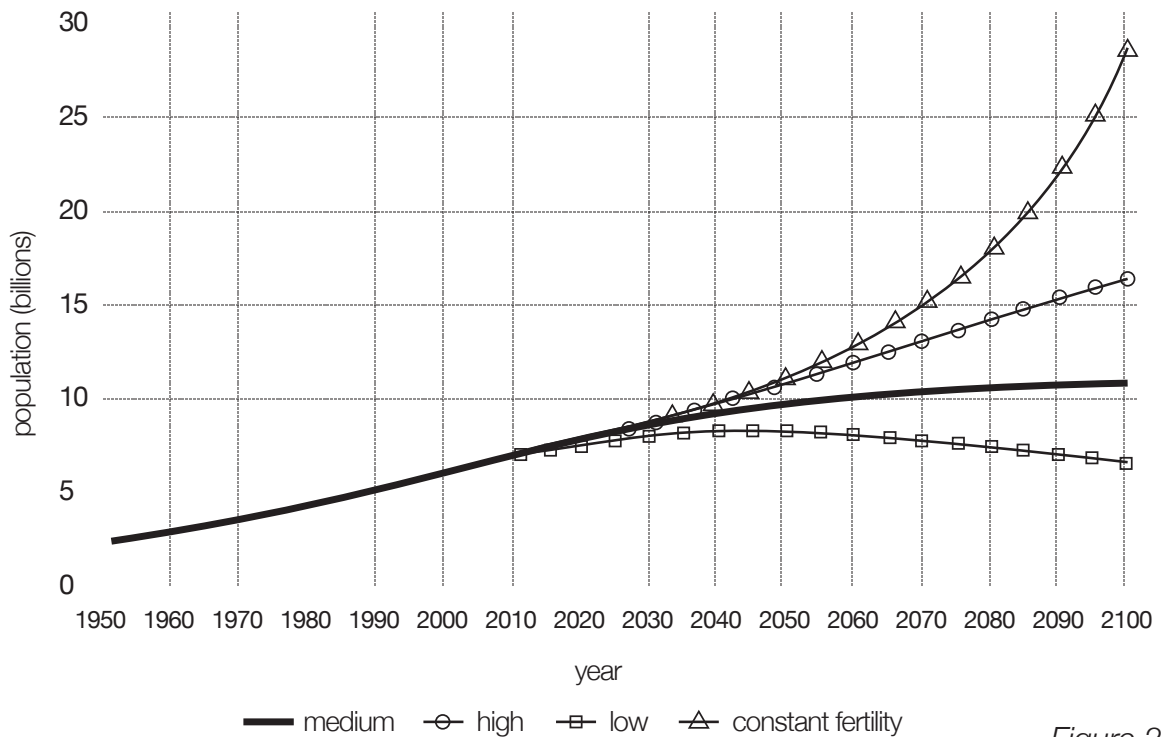


Figure 2.

### Global trend called urbanization

And Mike Davis was right. What he described back in 2006 in his book *The planet of slums*, did indeed happen and we are now at this stage where the majority of us are living in cities worldwide (UNDESA, 2014, pg.2). Figure 1. on the left shows a prediction of the rural versus the urban population growth in the coming decades. The lines intersected around 2008, where for the first time in history more people were living in cities than in rural areas. In *the 2012 World Population Prospect Revision*, prepared

by the UNDESA, it is predicted that the current world population of an estimated 7.2 billion people will continue to grow and reach about 8.1 billion in 2025, a growth of one billion people in only ten years time, like figure 2. shows us (UNDESA, 2013, p.xv). “Almost all of the additional 3.7 billion people from now to 2100 will enlarge the population of developing countries, which is projected to rise from 5.9 billion in 2013 to 8.2 billion in 2050” (UNDESA, 2013, p.xvi).

In a recent publication *Time to think Urban*, the UN-Habitat tries to promote a certain image of the new city of the twenty first century (UN-Habitat, 2013, p.6). Before speculating the objectives of this new twenty first century city, it is fundamental to examine why people move to cities in the first place. “Initially understood as a transitional process, urbanization has become a positive force for transformation that makes countries more advanced, developed and richer, in most cases. Today, as many centuries ago, human beings regroup together in order better to exchange, learn, produce, enjoy and protect each other. [...] The fostering of prosperity has been one of the main reasons that explain the existence of cities” (UN-Habitat, 2013b, p.x).

of the twenty first century however, has developed more towards a continuum model illustrated in figure 3. This model based on figures from the Worldbank shows how various intermediate cities and towns have become parts of the mega urban region. The recognition that this rural to urban migration in the years to come does not necessarily need to be taking place in the core city center has become one of the objectives of the prosperous city of the twenty first century. “They play an important role as nodes within urban and territorial networks, and as potential hubs for local development. However, they often lack the financial and technical clout of larger cities to ensure proper planning” (UN-Habitat, 2013, p.29).

This regrouping before the turn of the millennium can be perceived as a mere dichotomy where rural households were seeking for the best opportunities, choosing to migrate to the city. The city

One of the general objectives of the UN-Habitat model is to promote this role for intermediate cities and market towns to become a valuable juncture within the urban and regional framework.

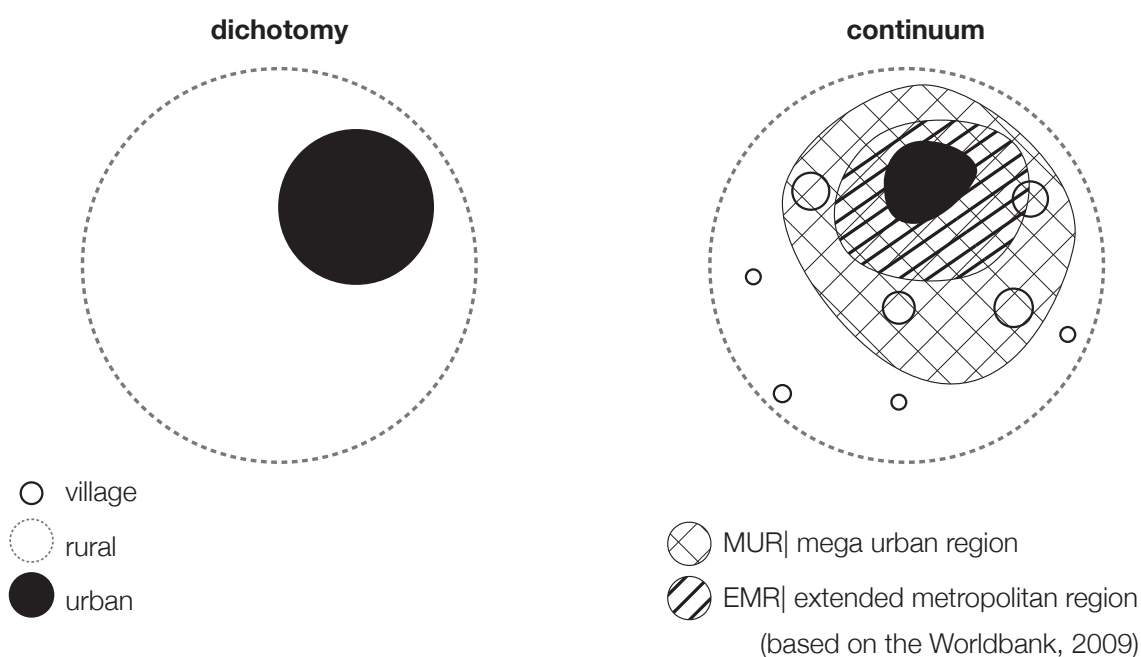


Figure 3.

By the end of 2030, about 3 billion people, which accounts for 40 per cent of the global population, will be in need of basic housing, infrastructure and amenities (UN-Habitat, 2013, p.138).

The fostering of prosperity is one that might be somewhat idealistic in poor nations. Many governance systems in developing countries have difficulties providing for the basic planning of infrastructure and services to meet the needs of the existing city residents. It is only going to be an even greater struggle knowing the doubling of demand is inevitably imminent (UN, 2003, p.58).

Other objectives of the city of the 21st century are placed in figure 4. The third objective mentions five dimensions of prosperity. These are further explained in appendix A. To recapitulate in short, a city that fosters infrastructure development, environmental sustainability, high productivity, quality of life, and equity

and social inclusion is considered to be a prosperous city (Clos, 2013, p.iv).

The twenty first century city is one that builds resilience to any adverse forces of nature. The ingredients for building resilience are to reduce the levels of risks and vulnerability (UN-Habitat, 2013b, p.xii). Together with the stimulation of job creation, they form the key ingredients for evolutionary resilience, a city that also adapts and improves after it has been struck by a hazardous event. This topic will play a crucial role in the second part of this paper.

A key essence of the city of the 21st century is that it “safeguards against new risk and provides for opportunities in terms of provision of public goods, creative spaces for imagination and social interaction” (UN-Habitat, 2013b, p.xii). This calls for our attention as designers and will be further specified in chapter seven.

The 21st Century city is one that:

- **reduces disaster risks and vulnerabilities for all, including the poor, and builds resilience to any adverse forces of nature;**
- **stimulates local job creation, promotes social diversity, maintains a sustainable environment and recognizes the importance of public spaces;**
- **creates harmony between the five dimensions of prosperity and enhances the prospects for a better future;**
- **comes with a change of pace, profile and urban functions and provides the social, political and economic conditions of prosperity.**

(UN-Habitat, 2013b, p.xii)

*Figure 4.*

## The bottom billion

Both the rapid population growth and the massive rural to urban migration occurring in developing countries, raises some serious concern. “For many countries, urban growth has become synonymous with the growth of slums and informal settlements. Slums are a clear manifestation of a poorly planned and managed urban sector and, in particular, a malfunctioning housing sector” (UN-Habitat, 2013, p.135).

Figure 5 illustrates the cities of Mumbai, Rio de Janeiro, Caracas and Santiago to offer an impression to what extent these numbers could magnify in relation to the city’s total population. It is important to become familiar with the word slum.

Historically, this term described former city centers that have become deteriorated and occupied by poor households (UN, 2003, p.9). Ever since the 1960s, this term “describes a wide range of low-income settlements and poor human living conditions” (UN-Habitat, 2002, pg.2).

Back in 2001, this “enduring manifestation of urban poverty” was translated into

approximately 924 million people, or thirty two per cent, of the world’s urban population living in slums (Arimah, 2010, pg.1). According to the UN back in 2003, It was projected that “in the next 30 years, the global number of slum dwellers will increase to about 2 billion, if no firm and concrete action is taken” (2003, p.26).

Figure 6 on the next two pages presents data that is showing the vast migration from rural to urban is now namely occurring in developing countries. This continuous arrival of new citizens entails an excessive demand in new housing stock. “Unfortunately, [...] supply is often limited by inadequate governance systems and human resources deficiencies, as well as by institutions and regulations which are either obsolete of lacking capacity, or are poorly informed” (UN-Habitat, 2014).

Consequently, most governments in poorer nations are not capable of responding to this immense demand of affordable housing. Inevitably, what we could perceive as one of the most visible outcomes of poverty urbanization is the explosive formation of slums.



Total Pop: 16.0 m  
Slum Pop: 10.0m  
(55%)



Density:  
27,384 ppl/km<sup>2</sup>



Total Pop: 6.3 m  
Slum Pop: 1.4  
(22%)



Density:  
4,781 ppl/km<sup>2</sup>



Total Pop: 6.0 m  
Slum Pop: 3.0m  
(50%)



Density:  
13,856 ppl/km<sup>2</sup>



Total Pop: 5.5 m  
Slum Pop: 0.12m  
(2%)



Density:  
8,464 ppl/km<sup>2</sup>



(Varma, 2013)  
Figure 5.

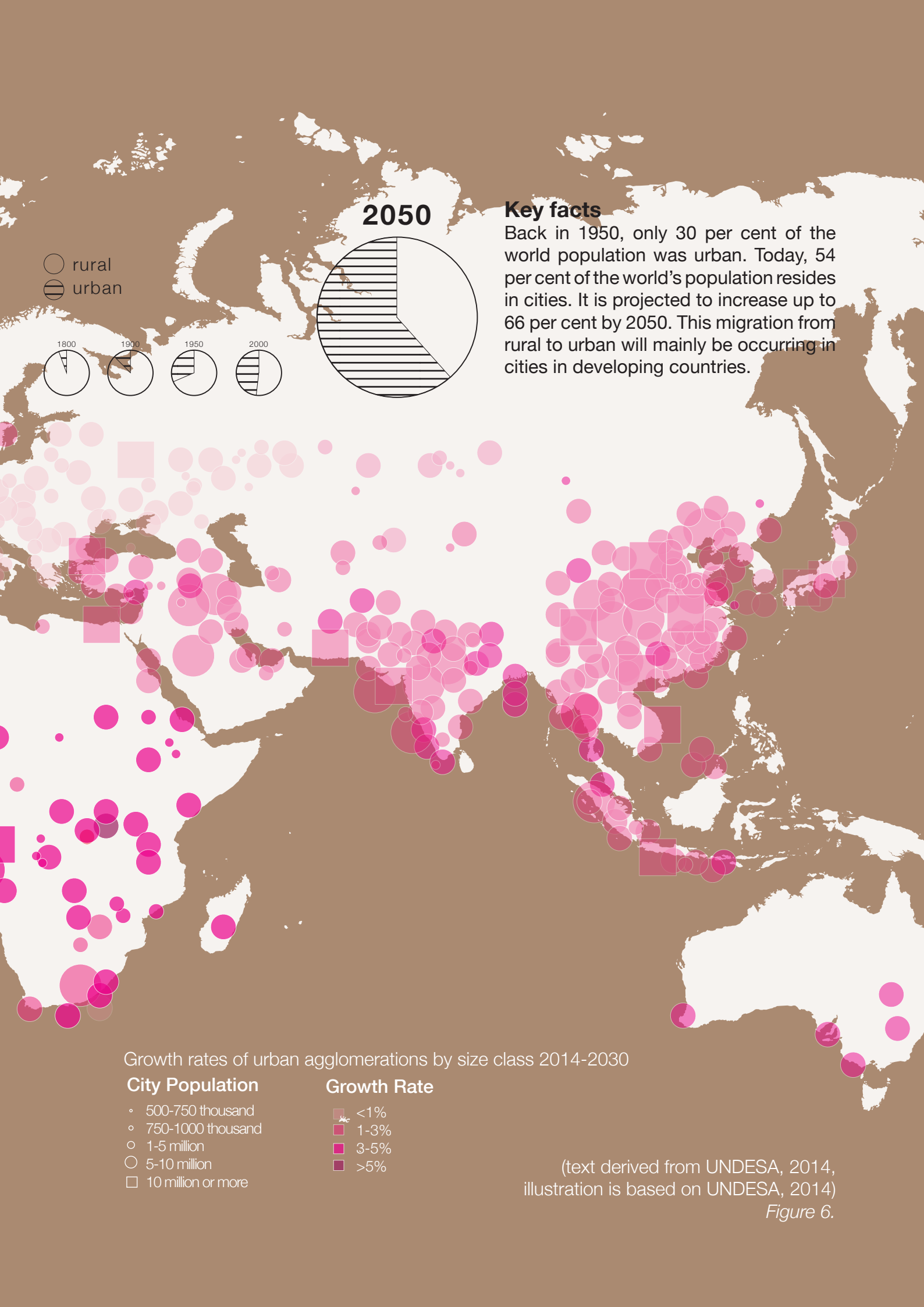
A world map where the landmasses are light beige. Overlaid on the map are numerous pink circles of varying diameters, representing urban settlements. The circles are most densely packed in North America, Europe, and East Asia, with some large circles in South America and Africa. The background is a solid dark brown color.

## Percentages

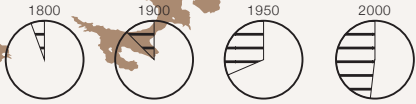
Today, regions that have the highest number of urban settlements include North America, Latin America, the Caribbean and Europe with percentages around 80 per cent. The total urban population has grown rapidly. From 746 million back in 1950 to 3.9 billion people living in cities in 2014.

## The Global South

A few decades ago, the majority of the world's biggest urban agglomerations were to be found in the more developed regions. Today, this has shifted to the cities in the global south.



○ rural  
 ◐ urban



2050



**Key facts**

Back in 1950, only 30 per cent of the world population was urban. Today, 54 per cent of the world's population resides in cities. It is projected to increase up to 66 per cent by 2050. This migration from rural to urban will mainly be occurring in cities in developing countries.

Growth rates of urban agglomerations by size class 2014-2030

**City Population**

- 500-750 thousand
- 750-1000 thousand
- 1-5 million
- 5-10 million
- 10 million or more

**Growth Rate**

- ◻ <1%
- ◻ 1-3%
- ◻ 3-5%
- ◻ >5%

(text derived from UNDESA, 2014, illustration is based on UNDESA, 2014)

Figure 6.

## Slum definition

Using the most common operational definition retrieved from the global assessment of slums undertaken by the UN-Habitat, a slum household is defined as a group of individuals living under the same roof in an urban area who lack one or more of the following five indicators; durable housing of permanent nature; sufficient living space; easy access to safe water; access to adequate sanitation and security of tenure (2003, pg.12).

Worldwide, there are a broad number of names used to describe the term slum. Favelas, shanties, kampungs, bidonvilles, barrios, squatter areas and informal settlements all embrace similar definitions. Although most poor communities share these characteristics, it is important to remark that they are by no means congruent. Figure 7. shows four images of four very distinct slum communities. “Slum dwellers are not a homogeneous

population, but a diverse group of people with different interests, means and backgrounds” (CitiesAlliance, 2014). It is therefore important to acknowledge that these five indicators presented by the UN-Habitat are mainly to “promote a comprehensive approach in an effort to try and contribute to the realization of the Millennium Declaration goals” (UN-Habitat, 2002, pg.3). An example of one of these goals is for instance Goal number 7, Target 11 (MDG T 11): ‘By 2020, to have achieved a significant improvement in the lives of 100 million slum dwellers” (UN, 2003, p.241).

Specific information on these development targets is presented in appendix B. When determining a proper slum upgrading approach, these five indicators are used as a common strategy in finding a replicable solution that hopefully reaches a wide range of distinctive communities.



(f.l.t.r. Momeni,2012; Studio Casanove, 2011; Baan, 2011; Baan, 2013)

Figure 7.

The words 'informality' and 'slum' have become arguably umbrella terms, almost always with a negative connotation. But ever since the UN openly drew attention to these topics in their publication *The Challenge of Slums* in 2003, many cities have shifted their perspectives and started looking for alternative interventions.

To a certain degree, cities have also become aware of the significance of the existence of slums since they realized the informal economy has a direct influence on the formal sector. An example is Harare, the capital city of Zimbabwe. Back in 2005, government officials decided to get rid of its informal settlements through a "clean up campaign" called "Operation Murambatsvina" (Arimah, 2010, p.5). It involved the demolition of an entire slum community of 700,000 residents.

Apart from them losing their personal goods and homes, another 2.4 million people were affected. "It also led to the destruction of the informal sector, which, in 2004, accounted for 40 per cent of all forms of employment" (Arimah, 2010, p.5). In some cities, the informal economy occupies even 60 per cent of the total employment in urban areas (Mumtaz, 2001). This experience verifies to an extent that forced evictions are not a suitable solution to the proliferation of slums neither to the city's own economic prosperity.

**“ A slum is defined as an urban area who lack one or more of the following five indicators;**

- 1. access to water;**
- 2. access to sanitation;**
- 3. structural quality of housing;**
- 4. overcrowding;**
- 5. security of tenure ”**

**(UN, 2003, p.12)**

Most slum dwellers earn their living in the informal sector but "many informal sector entrepreneurs whose operations are located within slums have clienteles extending to the rest of the city" (UN-Habitat, 2003, p.27). This means that the formal sector is dependent on the existence of slums.

Recently stated in the Habitat Debate: Slums "play a useful role in providing cheap (though not necessarily cheerful) housing for those who cannot or, as likely, will not, want to spend any more on housing than they possibly can" (Mumtaz, 2001). Referring back to the explanation given on the World Urban Forum: "The existence of slums is thus closely linked to employment and wages" (UN-Habitat, 2002, p.3).

# 04

## Slum Upgrading



Quinta Monroy social housing programme,  
by Elemental in Iquique, Chile (Hetnieuweinstituut, 2015)

*This Chapter introduces various measures that were taken to deal with the impoverished areas within the inner city. Over the past decades “these measures include benign neglect; forced eviction and demolition; resettlement or relocation; slum upgrading programs; and, most recently, the adoption of enabling strategies” (Arimah, 2010, pg.2). A timeline is presented to show the different methods independent of their level of success. To recapitulate in short, “there is no common planning framework for upgrading these settlements. [...] So the dominant approaches tend to focus on principles and best practices [...] yet neither of these has yet provided a convenient basis for replicability on a significant scale” (Abbott, 2001, pg.317).*

“It would be foolish to pass from one distortion- that the slums are places of crime, disease and despair- to the opposite: that they can be safely left to look after themselves”.

Jeremy Seabrook, 1996, p.197

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Consider the following proclamation; Slums are “places of opportunity or places of desperation, poverty and social exclusion” (UN, 2003, pg.58). Looking at the measures that were taken by city authorities in the past six decades, we have come to see that these appear to be more fixated on the slum’s undesirable aspects rather than the sometimes surprisingly numerous positive features.

In *The Challenge of Slums*, this dichotomy is further described. “They are adept at producing the services and commercial activities that the formal sector fails to provide through the mobilization of local enterprise and industry. They are places in which the vibrant mixing of different cultures frequently results in new forms of artistic expression, while – on the

negative side – they are the recipients of the city’s externalities: noxious industry, waste materials, ill health, crime and social dysfunction, and fragile, dangerous or polluted land that no one else wants.” (UN, 2003, pg.57).

The United Nations tries to promote this idea of the new city of the 21st century, like mentioned in the previous chapter. A city’s prosperity implies “success, wealth, thriving conditions and well being as well as opportunity” (UN-Habitat, 2013b, pg.10). In many developing countries, governance systems often tend to have a predominant interest in the cities economic wealth rather than the citizen’s well being. Consequently this frequently ends up in the eviction of poor communities for land that is sought for new investments.

On the following pages the various measures that were implemented to deal with the issue of slums are discussed and placed on a timeline in figure 9. The timeline starts in the middle of the 20th century. Although the term 'slum' was first introduced in Europe in the 1820s, the debate on this worldwide phenomenon was only initiated in the 1950s. As previously mentioned in chapter 3, the term slum described former city centers that have become deteriorated and occupied by poor households.

Ever since the 1960s, this term "describes a wide range of low-income settlements and poor human living conditions" (UN-Habitat, 2002, pg.2). The word 'slum' therefor addresses

two types of living conditions. "Slums of despair" are declining communities that have been neglected and which are undergoing a process of deterioration (UN, 2003, p.9). These areas may have become appealing for the execution of problematic activities. This reinforced the global disapproval of slums since many societies refer them as "the breeding grounds" for criminal activity (UN, 2003, p.76).

The second type of poor human living conditions was thought to be only a temporary issue that would gradually disappear with economic growth. "Slums of hope" refer to poor settlements, which can be identified by self-built structures, usually set on illegal and precarious grounds (UN, 2003, p.9).

## **Mass eviction**

Mass evictions were held during the 1950s throughout the 1970s, shifting the problem to another part of the city, not solving the real issue of poverty urbanization.

Although it is largely recognized in many parts of the world, till this day various governments are still convinced this type of intervention benefits their economy, just like the example that was given in the previous chapter on Zimbabwe, which only dates back to 2005 (Arimah, 2010, p.4).

## **Relocation**

A vast majority of the measures shown on the timeline include the movement of the current dwellers to a peripheral area within the mega urban region. The first of its kind was public housing, which, due to the high subsidies, attracted only middle-income households.

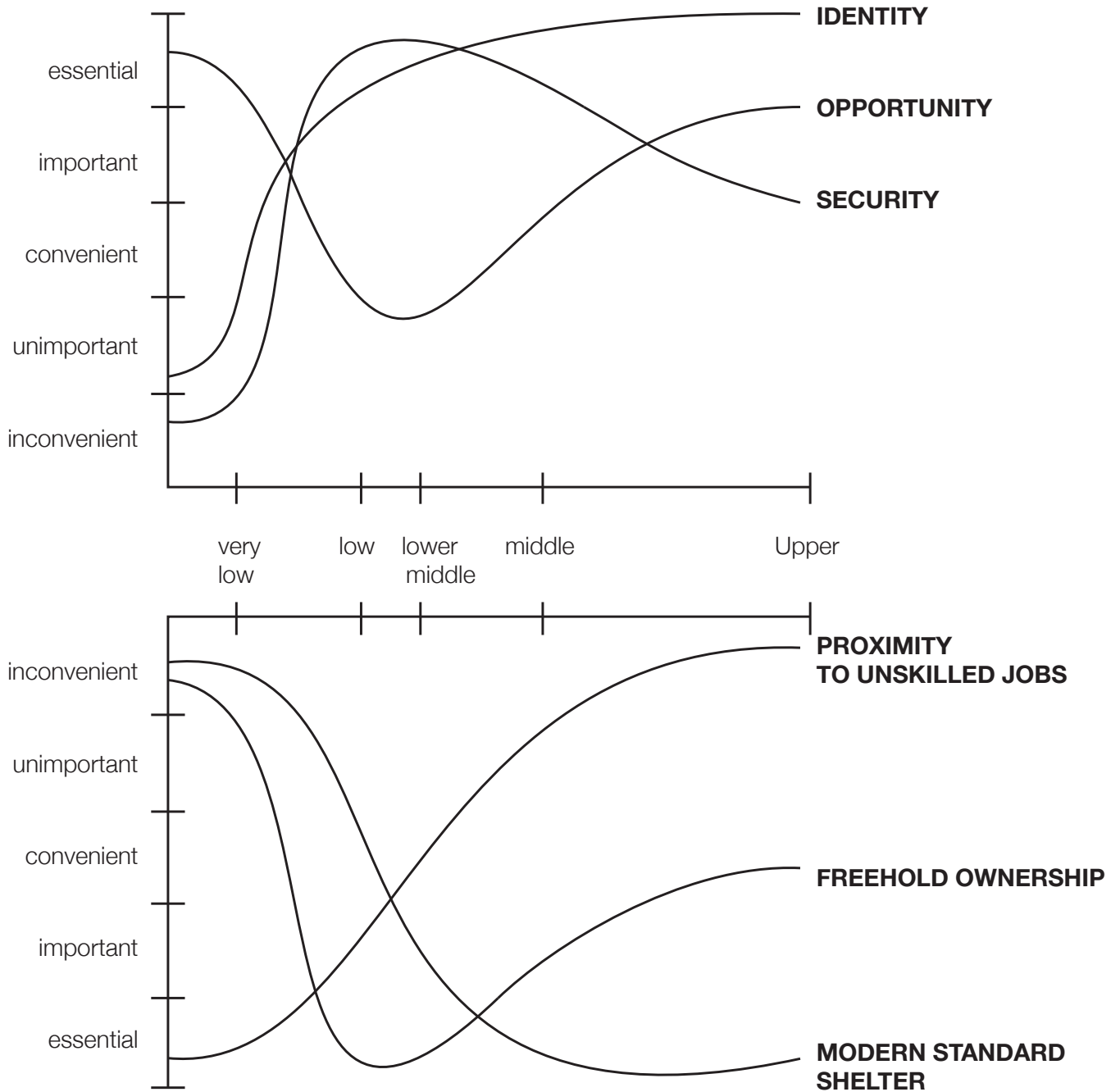
Other relocation programs often entailed two replacements, people were either expected to rebuild their homes on an appointed plot which was partially serviced with amenities, this came to known as sites and services projects and self-help housing, or they were provided with low-cost housing (Arimah, 2010, p.5).

The problems with these types of interventions however, were countless. “The resettlement of a population anywhere else other than where they originally lived is the least preferred option for shelter response, as it involves moving people away from their homes, livelihoods, and ancestral areas. In other words with most of what they identify with” (IFRC, 2012 p.13).

When a city chooses to relocate entire slum communities, they often do not give the full financial capacity to deliver fully equipped infrastructure and amenities (Akhmat and Khan, 2010, p.56). Together with the disruption of the existing social structures, this newly formed community on the city outskirts has lost its prior connections with the inner city, making it extremely difficult to seek for new job opportunities. “Unfortunately for such initiatives (but not surprisingly), poor people tend to remain poor even when their houses have been demolished” (UN-Habitat, 2002, pg.3).

When looking at a model by John F. Turner, showing priorities for vital needs according to the levels of income, opportunity is most essential to the poorest communities. They are willing to live on extremely precarious land in order to have good proximity to unskilled jobs to provide for their families (Turner, 1972, p.167).

John F. Turner's Matched Priority of Needs in *Freedom to Build*



(Based on Turner, Fichter and Macmillan 1972)

Figure 8.

# 1950

## Benign neglect

'Laissez-faire" attitude thought to be a temporary phenomenon that would disappear with economic growth (Arimah, 2010,p.2)

+

# 1950

## Direct housing

Provision of direct public housing little planning with regards to matching the needs of the locals (Weseka, 2011, p.241)



(wordpress, 2009)

+

+

# 1960

## Mass eviction

Mass forced evictions the removal of people and demolishing their homes started in the 1970s and early 80s but it is still method used by governments (Arimah, 2010).



This picture was taken only in 2012. Mass evictions were carried out by the government in Phnom Penh, Cambodia (Guardian, 2012).

+

+

# 1970

## Upgrading

Upgrading of housing funded by the Worldbank based on the theories of John F. C. Turner in 1972. Also known as self help housing(UN-Habitat 2002).

+

+

# 1980s

## Sites and services

Supported and funded by the World Bank focusing like sites and services and provision within the built environment.

Providing communities with safe water access, improved sanitation, garbage collection and proper drainage for example (Arimah, 2010, p.3).

The underlying principles of sites and services projects, influenced by Turner's theory, were based upon affordability, cost recovery, and replicability (Pugh, 2000, p.327).

+

+

# 1980s

## Resettlement

Either dwellers were assigned a plot in the outskirts of the city with basic services or they were provided with low cost housing. Most had grossly insufficient housing, too distant from job opportunity and still lacked basic services (Arimah, 2010, p.3). This proved to be unsustainable for the poor. Due to high subsidies involved, it attracted mainly middle income households to live in these new neighbourhoods.



(Ethiopiabay, 2014)

Today, this type of housing is still often constructed in mass production to try and level with the high demand of new housing stock that is needed in many developing cities.

+

+

# 19 90

## The enabling approach

Ensuring security of tenure by maximizing contributions of all actors in housing production process and supportive legal regulatory framework (UN-Habitat, 2002).

In 1999 the UN-Habitat and the Worldbank, adopted the Global Campaign for Secure Tenure (Arimah, 2010, p.3).

# 19 97

## Cities without slums

Launched in 1997 by the World Bank and UN-Habitat, the Cities Without Slums action with the key objective of mobilizing capital for the upgrading of slums (Arimah, 2010, p.3).

# 20 07

## Public Building

The project was an initiation since the city of Medellin is struggling with a severe drug traffic network since the 80s. The design was part of a master plan, combined with the metro cables built by U-TT. Working on different scales, the city hopes to influence a large scale of city residents to offer more social and economic opportunities.



(Arch Daily, 2007)

# 20 08

## Incremental growth

Incremental growth created by Elemental in Quinta Monroy, Chile. Social housing for the former 100 slum dwellers.

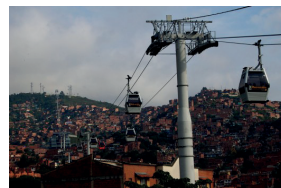


(Arch Daily, 2008)

# 20 13

## Physical Infrastructure

The city of Medellin has a prime focus on implementing innovative transport systems which includes a metro-cable and urban escalators



(Arch Daily, 2013)

# 20 ??

## Public space

U-TT office focuses on three scales of intervention. The metropolitan, the urban and the architectural scale. Their work aims at "reversing the top-down hierarchy of governance in the public sphere in favor of bottom-up, locally driven action" (U-TT, 2014).



(Arch Daily, 2013)

Figure 9.

## Slum upgrading programmes

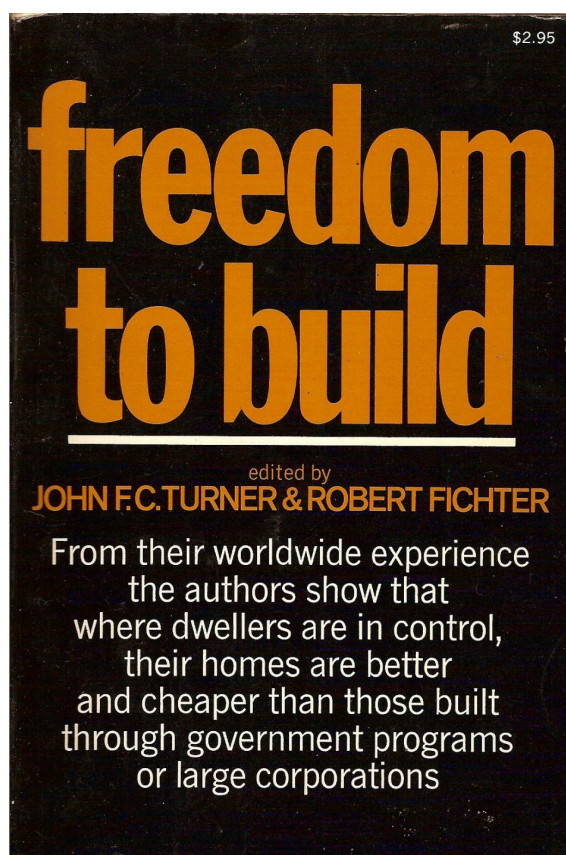
Given the failure of both eviction and relocation schemes, many governments shifted their focus in the 1980s to slum upgrading programs through the provision of services like proper sanitation, safe water, waste collection and other amenities like schools, playgrounds and public space (Arimah, 2010, p.6).

The writings of John Turner, a British architect, influenced a great range of organizations including the World Bank who initiated the first generation of large urban development plans focused on slum upgrading projects (Werlin, 1999, p.1523). Back in the early 1960s, Turner noticed that local residents improve their own dwellings incrementally according to their earnings and savings (Pugh, 2000, p.327).

On the cover of his book *Freedom to Build*, Turner's prime argument is exposed that "wherever dwellers are in control, their homes are better and cheaper than those built through government programs or large corporations" (Turner and Fichter, 1972, cover) His theory minimizes the position of city authorities, limiting it to merely providing for necessary amenities, all focused on the built environment, leaving the slum dwellers improve their own homes incrementally (Werlin, 1999, p.1524).

These types of interventions could be considered as a successful approach to slum upgrading had it not failed to consider the "necessary follow-up maintenance" (Arimah, 2010, p.6).

Apart from this apparent lack of responsibility, no communication was



Bookcover (Spatial Agency, 2015)  
figure 10.

involved with the local residents leading to the "absence of any clear focus on poverty reduction" (UNCHS, 1996, 2003; Werlin, 1999).

There is a fundamental dichotomy in the writings of Herbert Werlin's essay *The Slum Upgrading Myth*. On the one hand, he supports the ideas of John Turner while on the other; he opposes this idea of minimal government contribution. "I can certainly agree with Turner's hostility towards high-priced condominiums and subdivision units (Turner, 1996, p.339). Yet I have trouble with his hostility to state-based and market based housing solutions" (Werlin, 1999, p.1533). Werlin identifies the main lack in Turner's theory, namely the need for strong administration.

## Time to think Urban

The role of the government should not be a minimal one; it should be able to develop property rights to force the regularization of insecure tenure (Arimah, 2010, p.4). Werlin's view is shared among other authors whom have reflected on the writings of Turner.

In *A double irony: the originality and influence of John F.C. Turner*, author Richard Harris describes this influence as an ironic twist, since his most noteworthy argument, "an emphasis on dwelling control, has proved to be the least influential" (2003, p.246).

### Enabling strategies

The best lesson learned from Turner's approach is to ensure ownership and responsibility. During the 1990s, this focus shifted to security of tenure, also called the enabling strategies. But like Amaral explains in his essay *Community organization, housing improvements and income generation*, "The ownership of slum land tends to be very complex" (1994, p.85). They are rarely owners of both their house and the land they occupy. "While many residents may simply be casual squatters, illegally occupying vacant land, they are sometimes part of highly planned invasions or informal arrangements worked out with landowners" (Amaral, 1994, p. 85).

Over the past decade, there is a growing recognition to promote a much-needed top down combined with a bottom up approach to seek for new replicable slum upgrading solutions.

Like previously mentioned, John Abbot in, *A method-based planning framework for informal settlement upgrading*, concludes that "the dominant approaches tend to focus on principles and best practices" (2002, p.317).

Mass eviction through these so-called slum clearance campaigns has proven to be by no means a proper solution to the issue of poverty urbanization. These types of interventions tend to "address the symptoms rather than the underlying causes" (Arimah, 2010, p.3).

Relocation programs have also failed in terms of reducing poverty urbanization in existing slum communities. Yet it could be argued that projects such like sites and services could form a plausible solution to rural migrants that are still arriving in the city on a daily basis. "Migration from rural areas is the root cause of increasing slums" (Srivastava and Singh, 1996, p.58)

Instead of a proper answer to poverty urbanization in existing slum communities, this approach could possibly contain a solution in addressing poverty urbanization at an earlier stage, when rural migrants have left their homes, seeking for new opportunities closer to the city.

Lastly, In-situ slum upgrading approaches tend to have shown the most impressive results, yet have failed to incorporate long-term solutions embracing the topics of ownership and responsibility (Arimah, 2010 p.4).

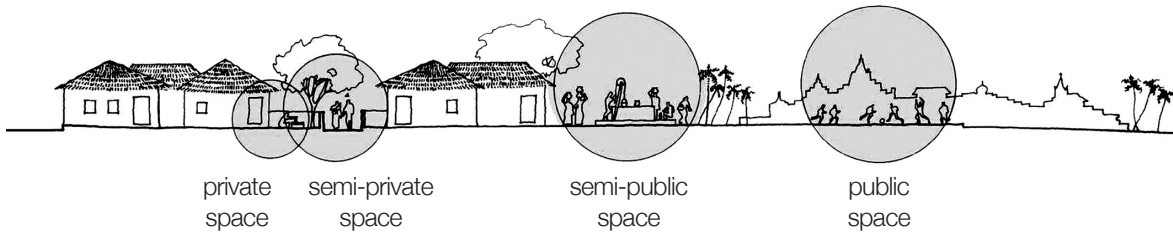
# 05

## In Situ Settlement Upgrading

Floating school in Makoko, Lagos Nigeriga  
by Nle Architects (Baan, 2014)



*This chapter goes into more depth of a specific type of intervention. It uncovers the ideas of in situ settlement upgrading. The key essence of this approach is that it involves any intervention without relocating the slum community. It can, for instance, be the provision of new housing or the improvement of the social or physical infrastructure. The scope of this paper is reduced to in situ interventions of the built environment. The first paragraphs underpin this idea of pursuing interventions within the built environment. It continues with the topic of physical infrastructure provision, in terms of how this type of intervention could be accomplished. Several articles are stated to detect differences and similarities of the different writers. Within this comparison, common facets are identified that reinforce the significance of infrastructure in informal settlements. In the last paragraph, the in situ settlement upgrading approach is appointed as a form of public-interest architecture. In situ settlement upgrading and the potential expansion of the profession of the architect are banded together and links back to the overall relevance of this paper within the faculty of architecture.*



Charles Correa's Hierarchy of Spaces

Correa, 1989  
*Figure 11.*

“There is much more to housing than just building houses. Urban living involves more than just the use of a small room of say 10 sqm. The room, the cell, is only one element in a whole system of spaces that people need.”

*Charles Correa, 1989, p.33*

---

### **The hierarchy of spaces**

Charles Correa is a distinguished Indian architect who, apart from his widely influenced work in post-independence India, also became known as a devoted architect for the urban poor (Charles Correa Association, 2014). In his book *The New Landscape, urbanization in the third world*, he dissects the problems of the urban landscape we have come to face and explores the duality of the architect's profession.

His aspiration for an expansion of the role of the architect “as experts, rather than executioners in policy and decision making” resembles with the ambitions of this year's Pritzker Price winner Shigeru Ban (Correa, 1989, p.81).

Instead of high-rise building blocks, he emphasizes the importance of low rise housing as a preferable method for

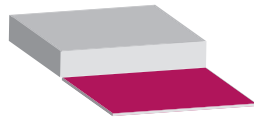
affordable housing. It does require a much larger area to house the vast majority of poor households than it would when merging a community into a 20-storey unit.

“For too long we have allowed the densities of our cities to be determined in the narrowest context by the random and self-interested decisions of commercial developers” (Correa, 1989, p.44-45). It is principally an issue of density, where higher densities have motivated higher land values causing governments to allocate the poor on the smallest strips of land, all mounted up in high rise condominium blocks which are sometimes separated by only a 3 meters wide gap.

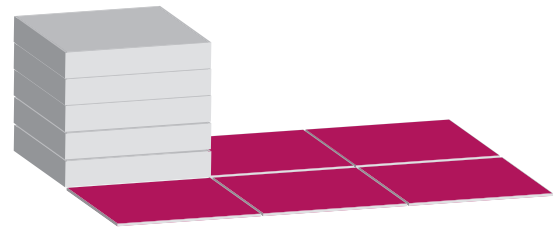
Figure 12. on the next page shows the birth of high-rise, low cost housing blocks in Hong Kong, conceivably the new recipe for slums, the vertical slum.



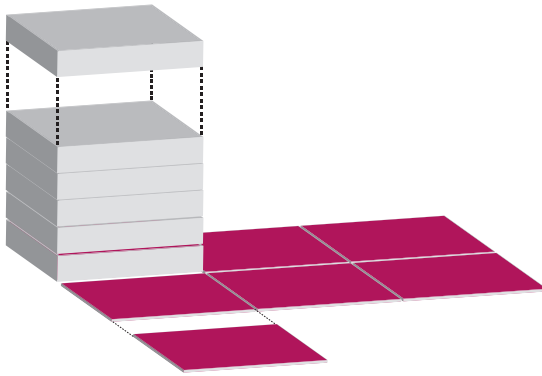
High density housing blocks in Hong Kong  
"a20" by Michael Wolf, 2014  
*Figure 12.*



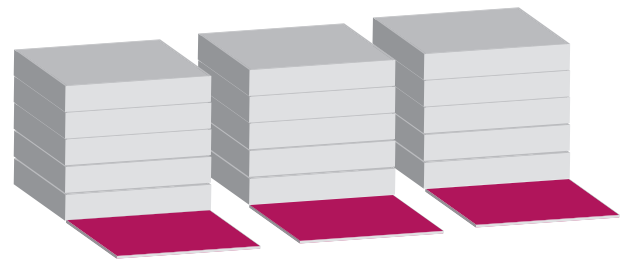
one footprint of housing, and desired space for amenities



more housing on one footprint but more space needed for schools, public space, parking, healthcare, etc.



the desired outcome for relocation programmes. High density housing and sufficient space for social and physical infrastructure



the ugly truth of redevelopment plans. High density housing, but insufficient space for amenities.

Author's own creation based on lecture given by Charles Correa, 2014  
*Figure 13.*

Yet it is not necessarily the issue of high-rise that concerns Charles Correa, but the apparent missing footprint to accommodate the housing blocks with amenities such like infrastructure, recreation, social activities, schools and public space. If you look at figure 13 on the right, a scheme is drawn to demonstrate a housing unit with its corresponding needed space for basic facilities like for instance a parking lot, a playground, a school and a hospital.

When a housing block raises its number of residents, its footprint remains. It becomes an appealing plan for governments to sell the remaining land to commercial

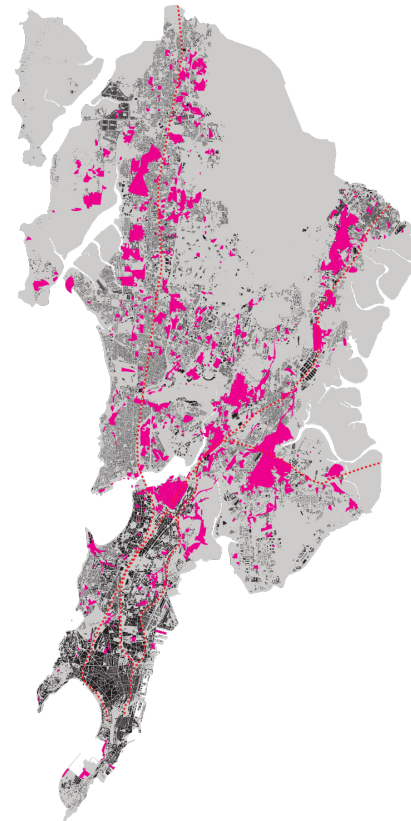
developers. The land needed to support these housing blocks with only basic necessities remains limited to the size of only the ground floor footprint (Correa, 2014b).

“Architects immediately start to design something. Why do we do this? Despite apparent good intentions, our attitude is quite ugly [...] it is an absurd situation, as if there were a famine, and in order to feed the great mass of starving millions, architects ran around writing cookbooks. If people are starving, it is not because they do not know how to cook, it is because they do not possess the ingredients” (Correa, 1989, p.48).

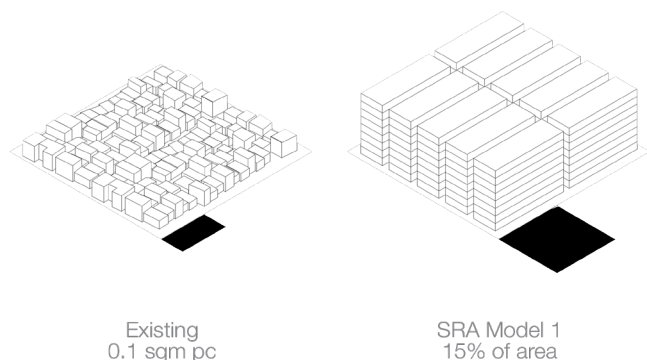
Dharavi is one of the largest slum communities in the world. It is set in the middle of the financial district of Mumbai, India. It is a low-rise slum community, threatened to lose its grounds due to the highly valued land they occupy. City authorities are being pulled at opposite ends in finding a plausible upgrading solution for the current slum on the one hand, which is home to hundreds of thousands of people, and on the other, fulfilling the wishes of commercial developers, all keen on buying the land that is located in a much desired area of the city of Mumbai (Yardley, 2010).

Recent redevelopment plans confirm Charles Correa’s concern on the apparent lack of a required “space as a resource” for the poor (Correa 1989, p.31). The plans show the intention to transform the 535 acres of land into partially social housing, residential and commercial use of space. The former low-rise housing will be demolished and replaced by high-rise low-cost housing blocks. The predominant interest is centered on new commercial space (Ramanathan, 2007) “If adequate housing is not appearing in our cities, it is a sign that something is wrong with the system” (Correa, 1989, p.48).

His call for low-rise communities corresponds with the theory of Turner, in terms of incremental growth. “It is incremental, that is, it can grow with the owner’s requirements and earning capacity” (Correa, 1989, p.49).

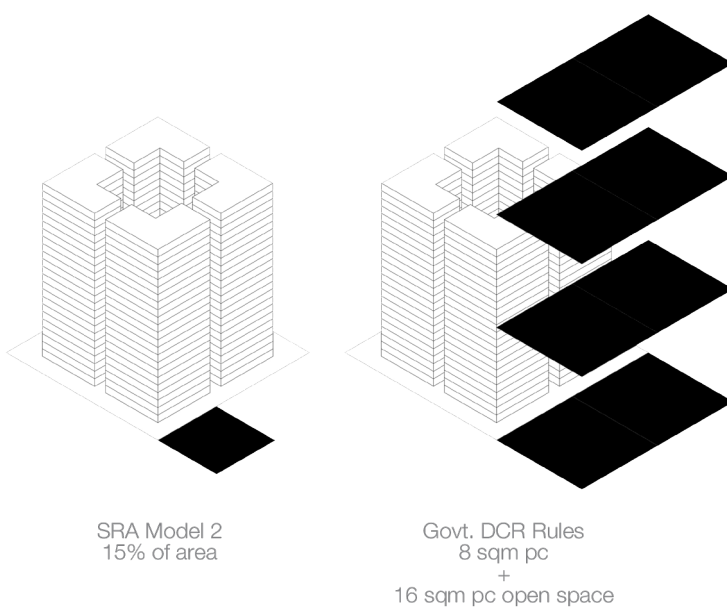


City of Mumbai with informal settlements marked in pink (Varma, 2013)  
*Figure 14.*



On the first page of this chapter, figure 11 presents the four key elements within a hierarchy of spaces. First, there is the space needed by the family for private use; second, areas of intimate contact; third, neighborhood spaces for people to interact and fourth, the principal urban space which is used by the entire community (Correa, 1989, p. 33).

The example of the redevelopment plans of Dharavi shows the misunderstanding of low cost housing “as a simplistic issue of trying to pile up as many dwelling units as possible on a given site, without any concern for the other spaces involved in this hierarchy” (Correa, 1989, p.36).



The needed space for amenities (Varma, 2013)  
*Figure 15.*

## Physical infrastructure provision

In John Abbott's essay, *An analysis of informal settlement upgrading and critique of existing methodological approaches*, three thematic methods are discussed which were identified according to findings of a five year project undertaken by the University of Cape Town on informal settlement upgrading (2002b, p.303).

The key objective of this research project was to capture a possible theoretical basis that "appear to define the essence of interventions" for informal settlement upgrading and "convert these to a structured methodology" (Abbott, 2002b, p.307). These three thematic approaches are as follows:

- 1| Physical infrastructure provision
- 2| Community action planning
- 3| Physical transformation through the holistic plan

The physical infrastructure provision can be viewed as a "progressive improvement model", which share similarities with the theory of John Turner (Abbott, 2002b, p.310). The first and prime objective is the improvement of the physical environment through the provision of proper urban infrastructure. As a second objective, "it follows upon governments ensuring security of tenure and paves the way for incremental growth of housing" (Abbott, 2002b, p.310).

Community action planning, or also known as micro planning, is a "project-linked methodology" in which it is subdivided into the distinct stages of "initiation, planning, design, implementation and maintenance" (Abbott, 2002b, p.310).

The third thematic approach is more of an "integrated method" that attempts to define specific potential interventions through the use of a GIS and spatial data to communicate with the slum dwellers to empower their position to legalize their settlement (Abbott, 2002b, p.311).

Although these three method-based planning frameworks are plausible in situ settlement upgrading approaches, "it still remains far from clear as to what is the most effective way to achieve this" (Abbott, 2002, 317). These theoretical foundations are the starting points for a more generic approach.

The widespread application within the complex issue of informality however can be still quite a challenge, since none of them provide a complete overview on how a sufficient level of replicability and sustainability can be achieved (Abbott, 2002b, p.314).

This paper will continue to focus solely on the approach of providing physical infrastructure.

### **Physical infrastructure provision**

The provision of physical infrastructure does not merely entail the actual structure to improved accessibility. It involves a much wider range of aspects. In *Ten Steps to Sustainable Infrastructure*, Choguill divides the term in two main components: the social and physical. Social infrastructure includes educational and health amenities like for instance a school, hospital or library. Physical infrastructure incorporates safe water supply, roads, waste collection facilities, proper sanitation, drainage, and land management (1996, p.391). He also suggests a series of ten principles to sustainable infrastructure to hopefully achieve a credible outcome of the progressive improvement model. These ten steps are placed in appendix C.

“The objectives of investing in physical infrastructure are multi-faceted. Such facilities contribute to the economic production and therefore are, not surprisingly, closely correlated with levels of development [...] It must be seen as a perquisite for the achievement of the sustainability of human settlements and of the meeting of basic human needs” (Choguill, 1996, p.391).

In 1996, Choguill recognized this need for the provision of on site infrastructure facilities. His argument coincides with the objectives of the prosperous city of the twenty first century, recently published by the UN-Habitat and discussed in chapter three (2013b, p.xii). Although the importance of progressive improvements through physical infrastructure has become widely recognized, the existence and/or documentation of successful, implemented projects still remain scarce.

The authors of *Key interventions to solve the problems of informal abodes of the third world*, due to poor infrastructure, embrace motivations equivalent to Abbott and Choguill. “To get optimum outcomes, the primary goal and central component of upgrading projects should be based on demand driven strategies and the provision of basic service infrastructure” (Akhmat and Kahn, 2011, p.57).

“Infrastructure is the foundation of society which links together different services and guarantees efficiency and ease of operation” (Akhmat and Kahn, 2011, p.57). Unlike Choguill, they subdivide the needed infrastructure not in terms of physical facilities, but in terms of four core targets, listed in figure 16.

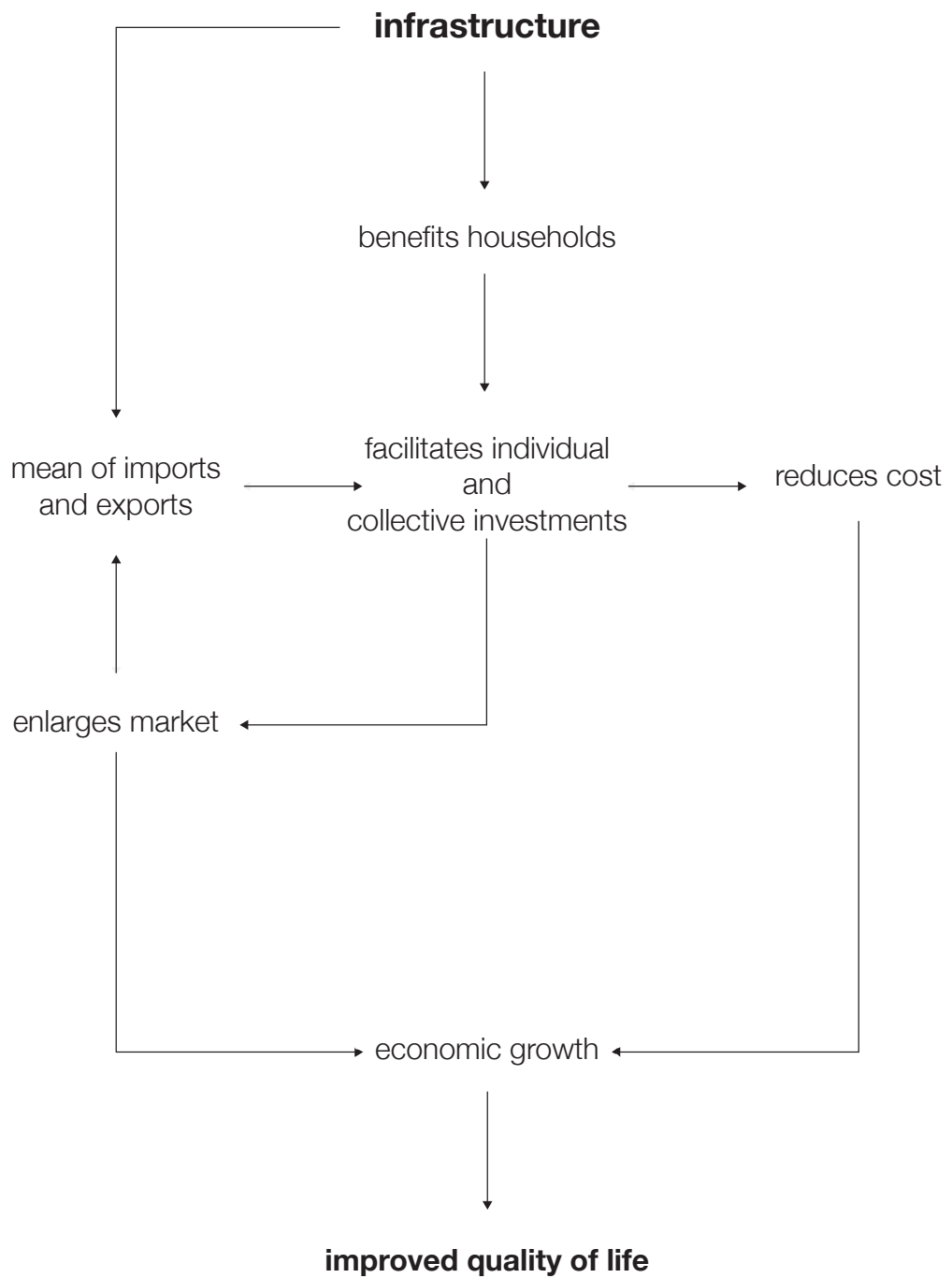
Figure 17 on the right represents the flow of progressive effects when the focus of in situ settlement upgrading lies predominantly at the provision of infrastructure. But what it also reveals might be the missing link between what has been said on paper and what has actually been implemented in practice (UN, 2003, p.27).

- 01| The improvement of opportunities to generate income, which directly improves the standard of living and influences the cost-recovery of an upgrading project.
- 02| The improvement of access to health care increases the quality of life and productivity.
- 03| The improvement of access to (primary) education to increase the quality of life and job opportunities.
- 04| The construction of roads, sewage facilities and market places improve the accessibility, hygiene and livelihood of the residents.

Four targets of infrastructure  
(Akhmat and Kahn, 2011)  
*Figure 16.*

It uncovers the extensive range of actors involved to manage national policy, to communicate with the local municipality and residents and the proposal of a design which includes factors like cost recovery, local skilled labor and the necessary follow-up maintenance.

Referring back to Charles Correa, in one of his lectures during his visit to the University of Delft, he reinforces his argument on the potential new profession of the architect. He acknowledges that the issues are far too big to solve by merely architects. But what we can do is “draw attention to these questions and act transformative in these critical urban areas” (Correa, 2014).



Flowdown of benefits of infrastructure  
*Figure 17.*

## Public- interest architecture

In literature, many planning frameworks, thematic approaches and improvement models have been shaped through the wide range of theories and best practices of previous intervention strategies. Though they may differ on one or two matters, they largely share similar values and all pursue the exact same goal, namely to reduce the levels of urban poverty.

When thinking in terms of practical examples, an even greater vocabulary comes into play. Community architecture, participatory urban design, place making, asset based design, public interest architecture, to name only a few. In the collection of essays in *Expanding Architecture, Design as Activism*, all authors, despite their own distinctive methodology in addressing the topic of poverty urbanization, share similar principles to accomplish a sustainable design.

Peterson in his essay, *Mobilizing Mainstream Professionals to Work for the Public Good*, describes his profession as “public architecture that acts as a catalyst for public discourse through education, advocacy, and the design of public spaces and amenities” (Peterson, 2008, p.96). Wilson describes the “practice of architecture as inherently social, weaving together the needs of patrons, users, and the greater community to create usable, beautiful spaces in the built environment” (Wilson, 2008, p.30).

The Hendler-Voss duo, in their essay *Designing with an asset-based approach*, avoid the usual needs-based approach to problem solving. Instead of stressing the scarcities and necessities of the

community, the process of an asset-based approach empowers communities, “shifting the focus from deficiency to strengths and possibilities” (Hendler-Voss and Hendler-Voss, 2008, p.124).

It is comparable to the story of the stone soup. A first person starts off by placing a few stones, a second person lends a pot. A third person fetches water and a fourth donates a carrot and so on, until in the end, a delicious soup is prepared that serves us all (Hendler-Voss and Hendler-Voss, 2008, p.125). In asset-based approach, the architect acts as “the instigator”, the person with the stones (Hendler-Voss and Hendler-Voss, 2008, p.125). “There is no set recipe, just a process of mutual discovery and contribution” (Hendler-Voss and Hendler-Voss, 2008, p.125).

This flexibility of the profession is also recognized in Aeschbacher and Rios essay, *Claiming Public Space: The Case for Proactive Democratic Design*, where “designers play a vital role in giving form to what is and imaging what can be” (Aeschbacher and Rios, 2008, p.85).

This call for imagination has already passed this paper. In chapter three, the key essence of the 21st century city is that it “safeguards against new risk and provides for opportunities in terms of provision of public goods, creative spaces for imagination and social interaction” (UN-Habitat, 2013b, p.13). This reappearance justifies our roles within the search for reducing levels of poverty urbanization.

“Slums require spaces with a versatility of uses. By assigning a place a particular activity it becomes unusable for others.

Instead, multi-functionality is crucial” (Bratel, 2011).

In the foreword of *Streets as Public Spaces and Drivers of Prosperity*, a recent report by the UN Habitat, Dr. Joan Clos, Under-secretary general and executive director explains how “prosperous cities are those that recognize the relevance of public spaces [...] Those cities that have failed to integrate the multi-functionality of streets tend to have lesser infrastructure development, lower productivity and a poorer quality of life” (UN-Habitat, 2013c, p.5).

This repeated call for imagination, creativity and the preferred multi-functionality of public spaces fits with the abilities of an architect. Our assets, like Vanessa Quirk describes it in her Arch daily piece *After the Meltdown: Where does Architecture go from here*, is that we are “agents of our own creative process, who can make visions come to life” (Quirk, 2012).

Apart from our flexible and creative qualities as an architect to work within complex issues like informal settlements, a final observation that stresses the importance of our profession is the latest trends in architecture in the developed world. “It has been claimed that private architecture firms only serve as little as 2 percent of the population” (Wilson, 2008, p.30).

Scott Timberg’s Salon piece, *The Architecture Meltdown*, describes the current position of numerous graduates who, after a rather costly study of the profession, are forced to accept whatever comes their path to “full-time employment

with internship wages” (Timberg, 2012). The economic recession has ensured “there is much less meat for the same amount of animals” (Timberg, 2012).

Thomas Fisher, one of the authors of *Expanding architecture* and dean of the College of Design at the University of Minnesota, responded to this article, with his own piece *Architecture for the other 99%*. He answers Timberg’s question where architecture will go from here, with the introduction of public-interest architecture.

Instead of the decline in job opportunities observed in most architecture firms, he points out that “non-traditional job opportunities for architects have never been better and we should see the decline of traditional jobs not as a “meltdown” (Timberg, 2012) of architecture, but as the beginning of its rebirth” (Fisher, 2012).



## architecture for humanity

A common though reasonable counter argument to public interest architecture is that it does not necessarily pay the bills, or does it? “It often takes the form of a non-profit, in partnership with other NGO’s, universities, foundations or government agencies” (Fisher, 2012).

But Fisher and Quirk also stipulate that while many well-known firms have shrunk in decent size over the past decade,

public interest corporations are on the rise, expanding their practices across the globe (Fisher, 2012; Quirk, 2012).

Figure 18 above shows a project realized by Architecture for Humanity. This office has grown from just a small setup into a “million-dollar business: a network of over 50,000 architects working with thousands of clients in 25 countries across the globe” (Quirk, 2012).

above: Architecture for Humanity (Inhabitat, 2011)  
 right: MASS Design Group  
 design of a hospital in Rwanda (Baan, 2014)  
*Figure 18. & 19.*

Figure 19 illustrates a project by MASS design group, founded in 2008 by Michael Murphy with his five classmates, all attending the Harvard Graduate School of Design. Hughes's post on the *Architectural Record*, *Does doing good, pay the bills?* questions whether serving for the underserved is sufficient enough to make a living and "for MASS Design Group, the answer is yes" (McGuigan, 2012).

Since their first successfully implemented health project in Rwanda in 2011, they gained such affirmative attention that it lead to paying commissions. "The firm has earned fees for its work on the design

of a 22,000 square-foot tuberculosis hospital in Port-au-Prince, funded by GHESKIO, a local charity" (McGuigan, 2012).

The main difference of a public interest firm is that you not only spend your time solely on the design, but also on business developments and the search for new donations and contributions. According to co-founder Alan Ricks, they receive "\$400,000 a year in contributions from private foundations, corporations and individual donors" which makes it achievable to "employ 21 people full-time with outposts in Rwanda, Haiti, Boston and Los Angeles" (McGuigan, 2012).





### **Floating school, Makoko by Nle Architects**

This image illustrates the floating school in Makoko, Lagos Nigeria by Nle Architects. Kulé Adeyemi, having worked at OMA for nearly a decade, he now uses his expertise to “bridge critical gaps in infrastructure and urban development by creating coherent networks and global exchanges” (Nleworks, 2014). His firm became widely known with his floating school in the Lagos slum of Makoko, Nigeria. One of the key strength of this projects, and of public interest architecture in general, is the provision of a design which can be constructed, managed, maintained and hopefully replicated by the locals themselves.



### **Community Center, Sao Paulo by Urban-Think Tank**

This design proposal by U-TT is situated in a very dense residential area. The design tries to equip the neighborhood with amenities through the multi-functional use of a community center and surrounding public space. The philosophy of the Urban-Think Tank team is to produce pioneering yet realistic solutions. This office is teaching “methodology that rethinks the former physical limitations of contemporary architecture and shifts the emphasis from form-driven to purpose-orientated social architecture” (U-TT, 2014). This complex project not only involves the design of a community and music center. It aims to integrate other needs such as infrastructure, water, sanitation and public space. Through the design of this center, people not only are able to enjoy the public building, but also are equipped with more attributes to create space for opportunity. The design won the holmium gold award in latin america which helps fund and build the project.

left: (Baan, 2014)  
right: (U-TT, 2014)  
*Figure 20. & 21.*



**Bridge school, Xiashi village  
by Li Xiaodong atelier**

Apart from a school, used on a daily basis, the bridge school in Xiashi village in China, also serves as a theatre during evening hours. Like Kunlé Adeyemi also water as the local asset to identify a concept, the bridge school is situated in a critical gap, a steep ravine that has previously made it impossible to cross to the next village. Through shifting the focus from looking at the deficiencies to an asset-based approach, the concept was found of a bridging school with supporting new infrastructure that connects both sides of the ravine. The multi functional use and the provision of physical infrastructure are two key concepts of public-interest architecture that make it a sustainable design. Apart from these two aspects, the architect also considered using existing materials and joints, in order for locals to construct and maintain the school (Li Xiaodong, 2014).



**Primary School, Gando  
by Francis Kéré**

Francis Kéré established his office in 2005 and quickly became well known for his public-interest architecture, many projects of whom are based in his home country Burkina Faso. The key to his success is his partnership and close relation with the community. Through the integration of local building material and knowledge, they achieve sustainable designs, which have made them win several awards and publications (Kere architecture, 2014).

left: (Li Xiaodong, 2014)  
right: (Kere, 2014)  
*Figure 22. & 23.*

# 06

## Evolutionary Resilience

A low level of resilience in Valparaiso  
6 month after a great fire stil living in tents (Author, 2014)

*In this chapter, evolutionary resilience is introduced as a plausible approach to in situ settlement upgrading. It centralizes on two key aspects: vulnerability and opportunity. It revolves around the idea of the ability to turn a crisis situation into new opportunities for the existing dwellers. Since most poor communities are frequently settled on precarious land, this approach may possibly become a replicable solution to in situ settlement upgrading. But in order to fully understand what is meant with evolutionary resilience, several terms are described in the first few paragraphs. Risk, hazard, exposure and vulnerability are important aspects to be frequently encountered when describing resilience. A formula is shown to support the idea of minimizing the levels of vulnerability in order to reduce the impact of a hazard on a community. The asset vulnerability framework is explained to stipulate this issue of vulnerability once more.*

## Indicators and thresholds for defining slums

characteristic	indicator	definition
Access to water	Inadequate drinking water supply [adjusted MDG indicator -30]	A settlement has an inadequate water supply if less than 50% of households have: an improved water supply; household connection; access to public stand pipe; rainwater collection which at least 20 litres/person/day available within acceptable collection distance
Access to sanitation	Inadequate sanitation [MDG indicator -31]	A settlement has inadequate sanitation if less than 50% of households have: improved sanitation; public sewer; septic tank; pour-flush latrine; ventilated improved pit latrine; the excreta disposal system is considered inadequate if it is private or shared by a maximum of two household.
Structural quality of housing	a. Location	<b>Proportion of households residing on or near a hazardous site.</b> The following should be considered: housing in geologically hazardous zones [landslides, earthquakes and flood areas]; housing on or under garbage mountains; housing around high-industrial pollution areas; housing around other unprotected high-risk zones [eg railroads, airports, energy transmission lines]
	b. Permanency of structure	Proportion of households living in temporary and/or dilapidated structures. The following factors should be considered when placing a housing unit in these categories quality of construction [eg materials used for wall, floor and roof]; compliance with local building codes, standards and bylaws.
Overcrowding	Overcrowding	Proportion of households with more than two persons per room. The alternative is to set a minimum standard for floor area per person [eg 5 square metres].
Security of tenure	Security of tenure [MDG indicator 32]	Proportion of households with formal title deeds to both land and residence Proportion of households with formal title deeds to either one of land or residence Proportion of households with enforceable agreements or any document as a proof of a tenure agreement

UN-Habitat, 2003  
Figure 24.

“Poverty reduction and upgrading of informal settlements will not be possible unless cities are productive and efficient and capable of providing the poor with economic opportunities to build their assets and incomes.”

*Nelson Mandela, 1999*

---

After the chapter on in situ settlement upgrading, which encompasses key focal points within the design process to obtain a sustainable design, it is important to look at the urban landscape when wanting to achieve on site facilities. When thinking of in situ solutions, one needs to carefully glimpse back at the five indicators introduced by the UN Habitat that give a global description of slums.

Figure 24 on the left displays a thorough indication of the thresholds defining slums. One of these indicators implies the often-hazardous situations slums are regularly found. The new and poor urban arrivals have to make a choice where they want to reside. This decision “involves

tradeoffs between proximity to economic opportunities, security of tenure, provision of services, protection from extreme events, and cost” (World bank, 2012, p.10).

Consequently, they are often found settled on precarious grounds. Due to the continuous threat of the possible occurrence of a disaster, innumerable communities are restrained from the ability of physical, social and economical improvements (UNISDR, 2007, p.1).

It is therefor important to stipulate the issue of vulnerability. Since their focus lies principally at survival, it is vital to consider an approach that initially centers on risk reduction.

**Risk =  
probability of hazard x vulnerability**

“There is now international acknowledgement that efforts to reduce disaster risks must be systematically integrated into policies, plans and programmes for sustainable development and poverty reduction, and supported through bilateral, regional and international cooperation, including partnerships” (UNISDR, 2007, p.1).

Through this integration, cities can respond better and faster when a risk assessment has been carried out and the certain types of risk are known (World Bank, 2012, p.5). More importantly, the chances to create a replicable approach have optimistically improved since interventions can be categorized by either kind of hazard or the specific topography.

Figure 25 on the right presents a formula derived from *Assessing Vulnerability for Climate Adaptation*. A hazard becomes a disaster depending on “levels of exposure of the population and its physical and economic assets [...] The higher degree of exposure and vulnerability of both people and infrastructure within cities is

a driver behind why natural hazards can have great social and economic impact” (World Bank, 2012, p.9).

According to this formula, to achieve minor levels of risk there are thus two options: reducing the probability of the occurrence of a disaster or reducing levels of vulnerability of the local community.

In most cases, the first option is inconceivable since humans cannot prevent or reduce the occurrence of a physical event like an earthquake or the eruption of a volcano. Even when we do have human influence, it seems likely that this is immeasurable thus insignificant. The second option however, can be drastically affected through the implementation of human interventions.

“Reducing vulnerability requires strengthening coping capacities to minimize the degree of loss emerging from a disaster” (World Bank, 2012, p.9). These can include some of the previously mentioned upgrading interventions, like improving the physical and social infrastructure.

**RISK = PROBABILITY OF HAZARD X VULNERABILITY**

(Downing and Patwardhan, 2004, p.71)  
*Figure 25.*

## The asset vulnerability framework

One of the objectives described in chapter three on how to accomplish a prosperous city of the twenty first century is through resilience. A prosperous city “reduces disaster risks and vulnerabilities for all, including the poor, and builds resilience to any adverse forces of nature” (UN-Habitat, 2013b, p.xii).

In the article *Evolutionary Resilience and Strategies for Climate Adaptation*, the authors have developed different perspectives on the topic of resilience. The term resilience derives “from the Latin word *resi-lire*, meaning to spring back” ( Davoudi, Brooks and Mehmood, 2013, pg.308). In the case of the event

of a disaster, a resilient city would want to spring back into its former conditions that were prior encountered.

An example of a resilient city is Manhattan illustrated in figure 26a. This image depicts half of the city without electricity after it got hit by hurrican Sandy in 2004. Although severely affected, the amount of time needed to return to its previous state is almost insignificant compared to other cities around the globe that have faced similar tragedies. Haiti is an example of a city that shows little sign of resilience. Today, it is still struggling with the recovery from the earthquake in 2010 (Adeyemi, 2014).



(Baan, 2013)  
Figure 26.

In order to make a city more resilient to disasters, the reduction of the level of vulnerability is highly prioritized. Yet, we first need to become familiar with what this term enfolds. Vulnerability is defined as “the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards” (UNISDR, 2004).

In Abbott’s essay *A method-based planning framework for informal settlement Upgrading*, there are four elements of vulnerability suggested from the viewpoint of possible interventions (Abbott, 2002, p.321).

First, people are often settled on precarious grounds since it incorporates the least land value for them to risk being evicted by city authorities. This first element involves the physical problems such as landslides, flooding, and subsidence. It also includes social problems like insecurity, risk of eviction and personal risk relating to theft or domestic violence (Abbott, 2002, p.321).

The second element depicts “the absence of opportunities for asset retention and growth” (Abbott, 2002, p.321). There are various definitions of the term ‘asset’. In order to get a better understanding what it meant by this term within the context of this paper, two definitions will be clarified. Where Chambers speaks of the differences between tangible assets, “in the form of stores and resources” and intangible assets “in the form of claims and access” (Chambers, 1995, p.192),

Moser classifies the term into five capital assets; physical; financial; human; social; and natural capital assets (Moser, 2006, p.6).

In terms of the absence of opportunity, it is thus important to look at the presence of the specific assets within a poor community. The greater the amount of asset retention, the better there are prepared to cope with shock implying the less vulnerable there have become (Moser, 2006, p.2).

The third element of vulnerability focuses on the “perception of poverty” (Abbott, 2002, p.322). In Chamber’s essay, *Poverty and livelihoods: whose reality counts*, his main argument is the difference perceptions of poverty, in particular the difference between what professional view and what the poor themselves think of poverty. This plays a crucial role in defining proper upgrading interventions since, the “poor people’s criteria differ from those assumed for them by professionals” (Chambers, 1995, p.173).

The final element of vulnerability is the “compromised use of space” (Abbott, 2002, p.322). Referring back to the previous chapter, Charles Correa’s hierarchy of spaces shows us the additional spaces other than the single cell, where one might be spending only half of their daily activities.

Abbott suggests focusing on these four main principles when thinking of reducing levels of vulnerability within an informal settlement.

In *Time to think urban*, the UN has incorporated the urban vulnerability model. Their objectives are to assist cities in their preparedness to properly respond in the event of shock through hazard mapping and the performance of risk and vulnerability assessments (UN-Habitat, 2013, p.159).

When seeking a proper model to be practiced on a more operational level, Moser suggests the asset vulnerability framework. In her essay, *The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies*, she links back to the previously mentioned assets. The framework “facilitates interventions promoting opportunities, as well as removing obstacles, to ensure the urban poor use their assets productively” (Moser, 1998, p.1).

She identifies two dimensions of vulnerability; its sensitivity and its resilience. Sensitivity relates to “the magnitude of a system’s response to an external event” and its resilience relates to “the ease and rapidity of a system’s recovery from stress” (Moser, 1998, p.3). This can be compared to the objectives of public interest architecture.

Both enquire a more asset-based approach, emphasizing the potential resources rather than the confronted deficiencies. “The asset framework goes beyond a static measuring of the poor, toward classifying the capabilities of poor populations to use their resources to reduce their vulnerability” (Moser, 1998, p.14)

### **Turning crisis into opportunity**

A last bridging concept to complete the search for a suitable in situ settlement upgrading approach is that of evolutionary resilience. We have discussed the principles of asset-based methodologies through the asset vulnerability model of Moser, public interest architecture and the provision of physical infrastructure, the progressive improvement model.

Introduced in the first paragraph of this chapter, the term resilience means to “spring back” into the prior conditions encountered before the occurrence of a disaster. However, since we are talking about poor settlements that are often situated within critical hazardous situations, you would not want to go back to its previous conditions.

Instead of recovering and returning back to an equilibrium state, evolutionary resilience could be a preferred approach to poor informal settlements. “The emphasis on bouncing back as in engineering resilience, or even bouncing forth, as in ecological resilience, fails to consider the disturbance as a “window of opportunity” for transforming to a radically transformation” (Davoudi, 2012, p.300).

“The social learning process should focus as much on detecting potential opportunities as on finding out potential vulnerabilities” (Davoudi, Brooks & Mehmood, 2013, pg.315). Like previously mentioned, since most slum communities are settled within hazardous circumstances, their key concern is survival.

This approach of evolutionary resilience “involves attending to possibilities for life, not just survival” (Leach, 2008, pg.13).

The first step focuses initially on risk reduction through the reduction of levels of vulnerability. After assessing and responding to the potential factors that may affect the cumulative growth of risk, the second step in evolutionary resilience is through “turning a crisis into an opportunity” (Davoudi, 2012, pg.303).

There are two reasons why evolutionary resilience could form a suitable approach to in situ slum upgrading. Primarily, it is this two-fold topic of vulnerability and opportunity. An approach is sought that responds “effectively to both sudden and slower-moving disturbances. It draws on the frameworks of resilience, vulnerabilities and transition to identify some of the inherent attributes that cities require for a sustained growth and development” (Seeliger & Turok, 2013, pg.2109).

“Turning a crisis into an opportunity” could possibly become a suitable response to in-situ slum upgrading approaches where local poor residents are not jeopardized from losing their homes, not through threats formed by the government authorities nor by future hazards (Davoudi, 2012, pg.303).

The second motivation responds to the question on how to implement evolutionary resilience in a slum upgrading approach. “The grand challenges which the urban world faces, require flexibility, adaptability and innovation to foster

opportunities for transformation” (Chelleri, Kunath, Minucci, et. Al, 2012, pg.36). This approach “allows us to think in new ways about planning; ways that have a lot in common with interpretive planning and the relational understanding of space and time” (Davoudi, 2012, pg.305).

Previously mentioned in the chapter on public interested architecture, this call for imagination, creativity and the preferred multi-functionality of public spaces fits with the abilities of an architect. Our assets, like Vanessa Quirk describes it in her Arch daily piece *After the Meltdown: Where does Architecture go from here*, is that we are “agents of our own creative process, who can make visions come to life” (Quirk, 2012).

One of the benefits of evolutionary resilience in relation to “the limitation of an overly planned approach is the importance of the ability to improvise or to use your imagination. [...] Perhaps it is ultimately the human dimension, based on an intuitive, “sense-making”, approach to unfamiliar or chaotic situations that remains the crucial challenge in an era of profound uncertainty” (Shaw, 2012, pg.311).

Evolutionary resilience is a concept that is becoming a widespread term to policymakers in search for an operational strategy for slum upgrading. It also has the potential to function on a more operational level, embraced and converted into a strategic approach that fits the specific field of architecture.

# 07

## Strategic Approach

09/ Project Evaluation

08/ Design Proposal

07/ Design Development

06/ Identify Opportunity

05/ Detect level of Vulnerability

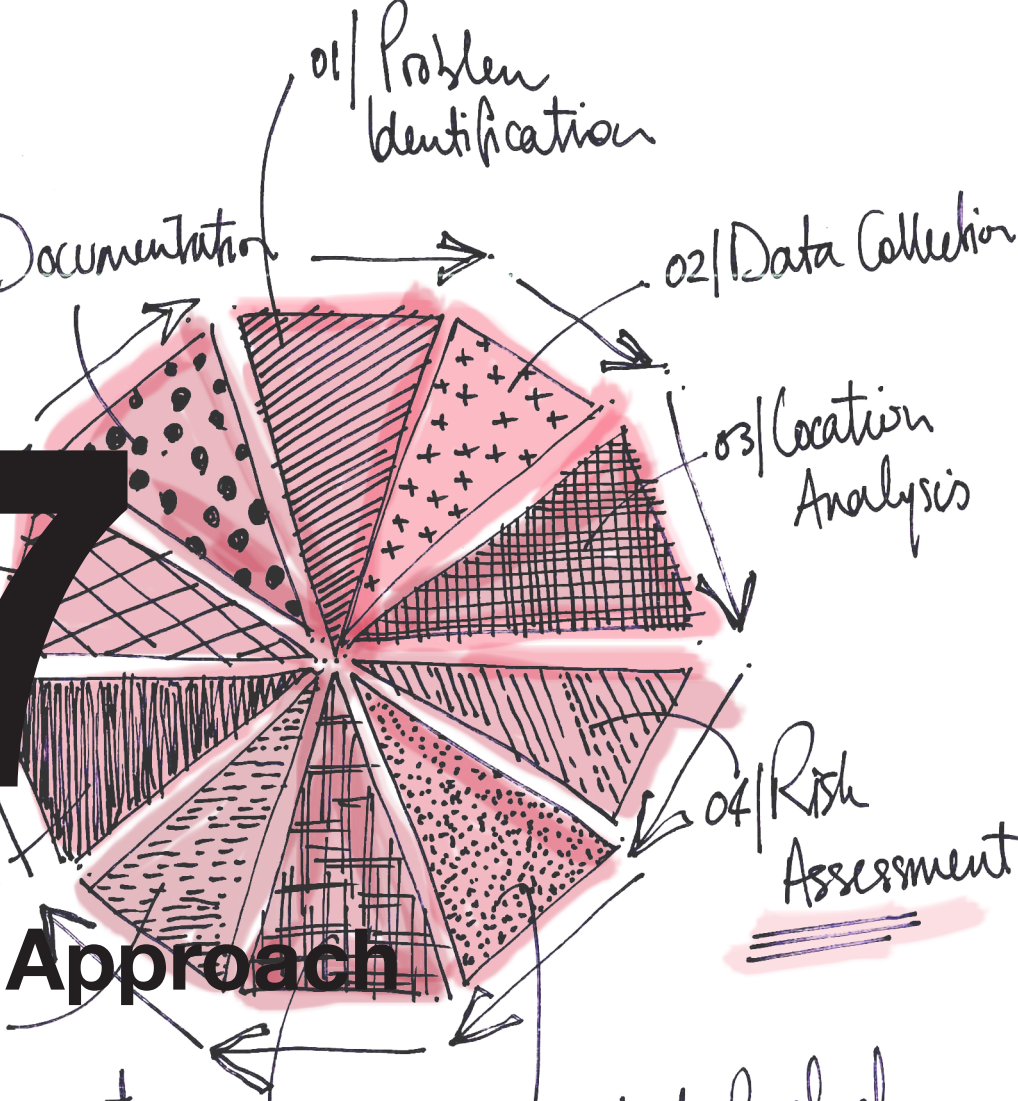
04/ Risk Assessment

03/ Location Analysis

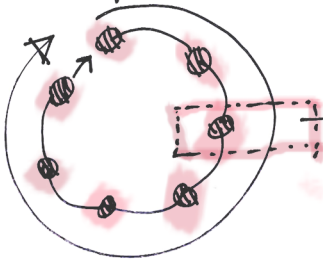
02/ Data Collection

01/ Problem Identification

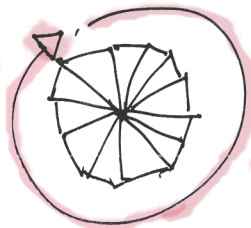
10/ Documentation



Regular Design Process



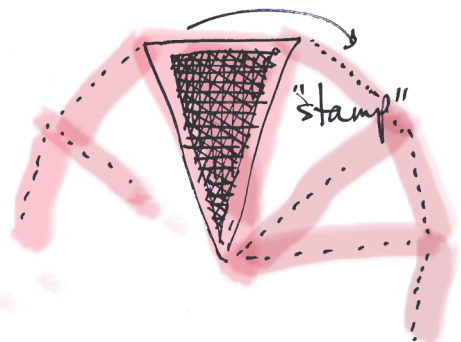
Risk Assessment Incorporated



In-Situ

Settlement Upgrading

Design Process



There have been numerous studies undertaken to try and capture a plausible theoretical basis “to define the essence of interventions” for informal settlement upgrading and “convert these into a structured methodology” (Abbott, 2002b, p.307). This chapter introduces a strategic approach to in-situ settlement upgrading for poor communities living on precarious lands. Although the importance of progressive improvements has become widely recognized amongst a wide range of professions, the existence and documentation of successful, implemented projects still remain scarce (Abbott, 2002a, p.317). It is therefore indispensable to transform the obtained literature into a more practical strategic approach suitable for the profession of the architect.

It has become widely recognized slum communities are excluded from participating in the economic, political, cultural and social spheres of a city. These spheres generally open up opportunities for citizens to improve their own living standards. Subsequently, poor communities are restricted in their growth through the various forms of exclusions they face (Arimah, 2010, p.2).

Ever since the term “slum” has become universally used to address the poorest communities within an urban environment, there is a global search for a suitable method on how to deal with these types of settlements. Many approaches which were implemented in the 1950’s, have been evaluated in terms of its levels of failure and success. Learning from these mistakes lead to new and improved ways of interventions (Weseka, 2011, p.238).

“There now appears to be a broad agreement among a variety of different actors that upgrading of the settlements in situ is the most appropriate. Yet, in spite of this consensus, it remains far from clear as to what is the most effective way to achieve this” (Abbott, 2002a, p.317).

The reason why an effective approach has not yet been stipulated is perhaps due the fact that these approaches tend to remain at an organizational level. The UN thrives to support governments in seeking methods to significantly improve the lives of the poorest city dwellers. City authorities create policies to state their development targets.

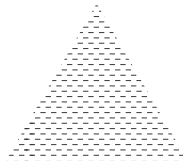
At this managerial level, numerous actors are involved ranging from policymakers, city authorities to urban planners. This might contribute to the reason why the existence and/or documentation of successful, implemented projects still remains scarce.(Abbott, 2002a, p.317) It is therefore important to convert these policies into a practical and explicit strategic approach that fits the specific actor, in this case the architect or urban planner.

In order to achieve a generic approach that is likely to become adaptable, it is important to remain within the familiar fields of architecture. It is sensible to use an existing design process and adapt it into a strategic approach to be applied within in situ settlement upgrading processes.

The figure on the right shows the six main steps that are frequently part of a designer’s process, though not necessarily explicitly addressed. A full background on how designers think exceeds the scope of this paper. More information on the design process can be found in Bryan Lawson’s book *How Designers Think: The Design Process Demystified*.



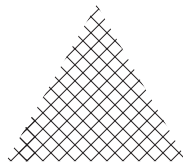
**Problem Identification**



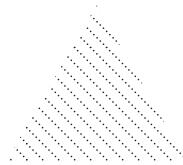
**Data Collection**



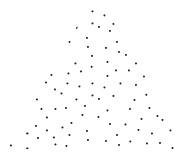
**Location Analysis**



**Design Development**

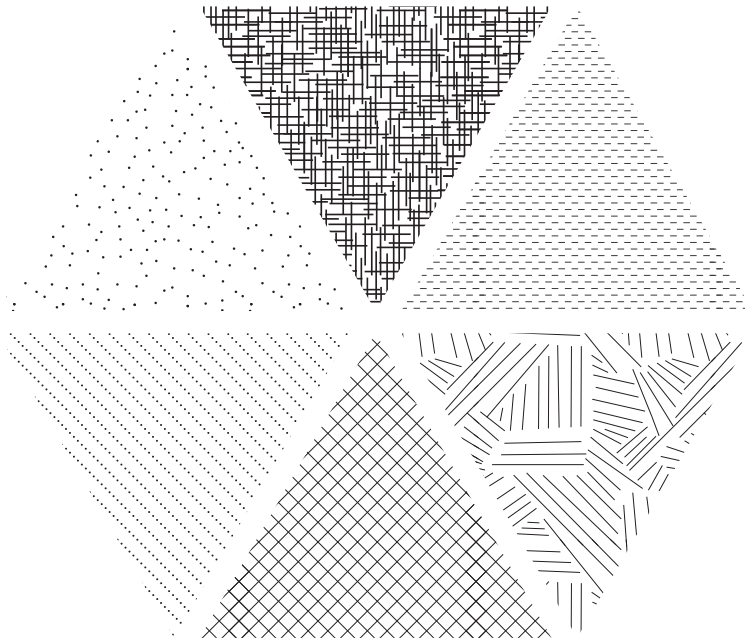


**Design Proposal**



**Evaluation**

Elements within a design process (Author, 2015)  
*Figure 27.*



**Design process**  
*Architecture*



### Problem identification

At the start of most design projects, a problem is identified to define the project and form a program with its specific information on size, functions, site, etc.



### Design development

During this phase, the design is being formed and slowly taking shape. It is a non-linear process where the architect is shifting between five generic elements making the design explicit (van Doren, 2012). Further information can be found in Elise van Doren's essay *Making explicit in design education: generic elements in the design process*, which is placed in appendix D. The five generic elements are briefly described in figure 28 on the right.



### Data collection

Data is collected to form an in depth understanding that supports the general knowledge of for instance the users, the site and its surrounding neighborhood. It is of crucial importance to gather information at different scales, ranging from the metropolitan area to the streetlevel. Typically, this means collecting maps, photographs, interviews, sketches, etc (Lawson, 1980).



### Design proposal

After all design decisions have been considered, the ultimate design proposal is revealed.



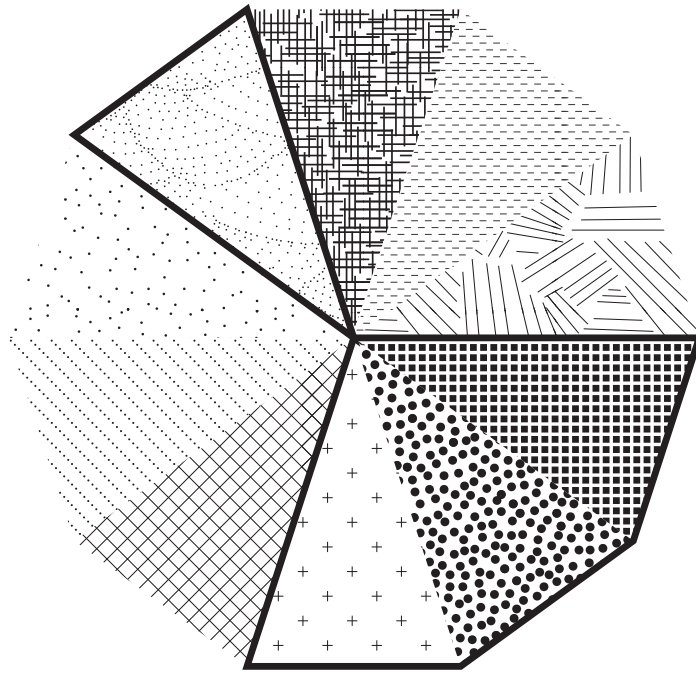
### Location analysis




A thorough analysis is usually executed to gain a better understanding of the information and form the first design startingpoints. Through the documentation of these ideas, a concept is formed.



### Project evaluation

As a final input, an evaluation is needed to make some final adjustments and/or to reflect back on the design sometimes giving recommendations for future projects.



- |   |                               |   |                        |
|---|-------------------------------|---|------------------------|
|  | Problem identification        |  | Identify opportunities |
|  | Data collection               |  | Design Development     |
|  | Location analysis             |  | Design Proposal        |
|  | Risk assessment               |  | Project Evaluation     |
|  | Detect level of vulnerability |  | Documentation          |

**Design process**  
*In situ slum upgrading*

## Evolutionary resilience

In order for this design process to operate within in-situ settlement upgrading, the concept of evolutionary resilience is introduced. The integration of evolutionary resilience within this process is to obtain a design proposal that consolidates with the ability to change and support the neighbourhood to become a resilient community. This phase can be further dissected into four new elements in the design process.



### 1| Risk assessment

A risk assessment entails an analysis of previous hazards in the close neighborhood. The lessons learned could be useful to get a better understanding of the impact of hazards on the physical landscape and residents. It also gives an idea on the current level of resilience, how long it takes for the community rebuild, or if there is any aid given by city authorities. The assessment also includes a thorough analysis of the current risk that is involved. This could be in terms of natural hazards, but also criminal or domestic violence in the neighborhood. Trying to define its roots may help formulate the design objectives.



### 2| Detecting levels of vulnerability

In order to thrive for a resilient community is to reduce the level of vulnerability.

After a disaster has struck, especially in poor communities, it becomes of crucial importance not to fall back into the previous status, yet instead use this misfortunate event or disaster to improve from its prior conditions. By examining the 4 elements of vulnerability suggested by Moser in chapter six, an improved perception could help form the design preferences in the further design process.



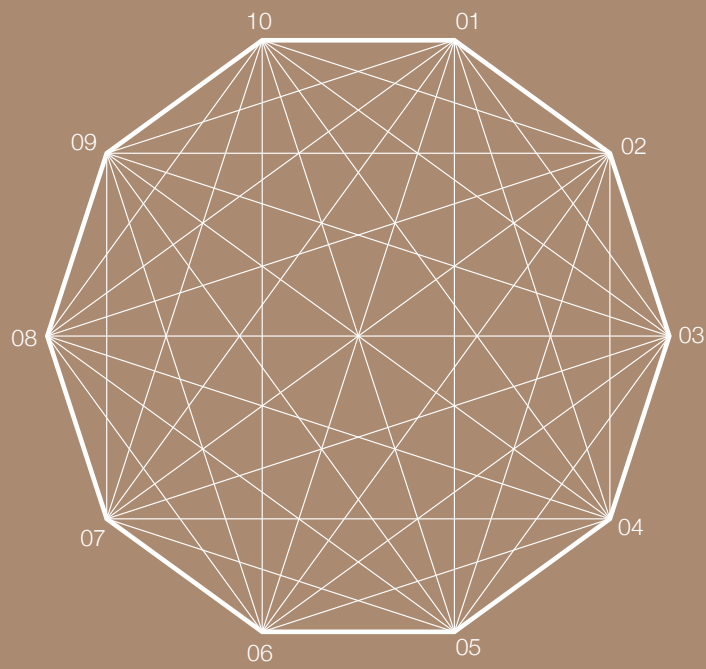
### 3| Identifying new opportunities

Identifying opportunity through an asset based approach could support formulating the first guiding points to start the design development. By putting an emphasis on the potential resources rather than the confronted deficiencies may contribute in seeking solutions for a sustained growth and development within the post disaster informal settlement (Seeliger & Turok, 2013, pg.2109).




### 3| Documentation

This last topic is a final input to the newly formed design process within in situ settlement upgrading. It entails the documentation of the project including its evaluation and possible recommendations. This is of crucial importance for the search of a level of replicability through the formation of generic elements.



**Strategic Approach**  
*in situ slum upgrading*

- 01| Problem identification**
- 02| Data collection**
- 03| Location analysis**
- 04| Risk assessment**
- 05| Detect levels of vulnerability**
- 06| Identify opportunities**
- 07| Design development**
- 08| Design proposal**
- 09| Project evaluation**
- 10| Documentation**



Ideas That Matter  
*The Worlds of  
Jane Jacobs*

08

Conclusions

“Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody”.

*Jane Jacobs, 1992, p.238*

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**How can evolutionary resilience be used as an in situ settlement upgrading approach within the field of architecture?**

A strategic approach has been formed which is based on the conducted research. Evolutionary resilience has been integrated within an existing design process to be applied for in situ settlement upgrading. To be able to fully reflect on the level of success of this strategic approach, it is important to test the approach to a specific case. That is why the concluding remarks are further described in the second part of this graduation paper.

**Recommendations**

There are three recommendations to this qualitative research paper. Although the importance of progressive improvements through physical infrastructure has become widely recognized, the existence and/or documentation of successful, implemented projects still remain scarce. This made it difficult to compare and contrast articles since most of them are based on theoretical findings only.

The first recommendation is support the research with several case studies. These case studies can be analysed according to the proposed methodologies. Since most “dominant approaches tend to focus on

principles and best practices”, it is crucial to work with the latest case studies to be able to adapt or adjust the methodology (Abbott, 2002b, p.317).

The second recommendation is similar but on the specific topic of evolutionary resilience. There is a lot of literature to be found on evolutionary resilience yet, in spite of this, a great lack in any physical examples of this concept. Although it is a relatively new concept within the field of architecture, it might be valuable to extend the search outside this field to find possible physical case studies.

A third and last recommendation is to conserve a good scope of your paper. This scope will help you keep the information limited and directed towards your research question.

Within this particular paper, the scope is confined to interventions within the built environment. The built environment however, entails everything but the housing within a settlement. This could be further restricted to a specific aspect within the built environment. Within the physical infrastructure provision, this could for instance entail the sewage system.

An example for the social infrastructure, providing public amenities, could be the specific focus of a healthcare centre.

# 09

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# 10

## Appendices

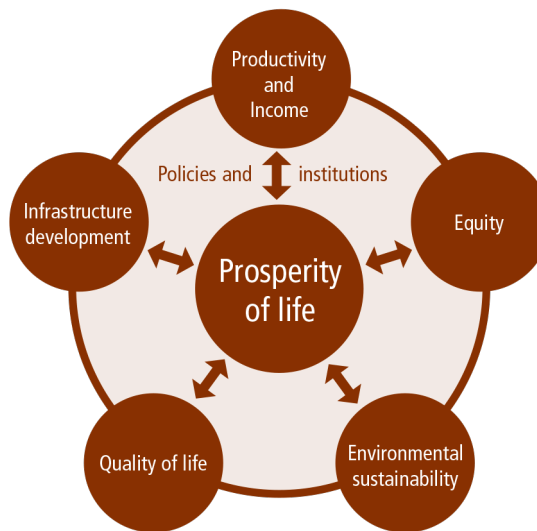
Floating school in Makoko, Lagos Nigieriga  
by Nle Architects (Baan, 2014)

## **Acronyms & Abbreviations**

<b>UNDP</b>	United Nations Development Program
<b>UNFPA</b>	United Nations Population Fund
<b>UN Habitat</b>	United Nations Human Settlement Program (former UNCHR)
<b>UNDESA</b>	United Nations Department of Economic and Social Affairs
<b>UNISDR</b>	United Nations International Strategy for Disaster Risk Reduction
<b>UNEP</b>	United Nations Environment Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>PPS</b>	Projects for Public Space
<b>WDI</b>	World Development Indicators
<b>CBO</b>	Community Based Organization
<b>LAC</b>	Latin America and the Caribbean
<b>UNRG</b>	United Nations Regional Groups
<b>MDR</b>	More developed regions
<b>LDR</b>	Less developed regions
<b>LDCs</b>	Least Development countries

## Appendix A | Dimensions of Prosperity

“The City Prosperity Initiative has been designed to assist cities in moving towards economically, socially, politically and environmentally prosperous urban futures through clear policy interventions. This is done by using “the City Prosperity Index” that focuses on individual cities and measures prosperity across five dimensions - productivity, infrastructure quality of life, equity and environmental sustainability” (UN,2013, p.19).



in Time to think urban,  
model projects 2012/13

UNHabitat conceptualizes urban prosperity as follows:

**First**, a prosperous city contributes to economic growth through productivity, generating the income and employment that afford adequate living standards for the whole population;

**Second**, a prosperous city deploys the infrastructure, physical assets and amenities – adequate water, sanitation, power supply, road network, information and communications technology, etc. – required to sustain both the population and the economy;

**Third**, prosperous cities provide the social services, education, health, recreation, safety and security, etc. required for improved living standards, enabling the population to maximize individual potential and lead fulfilling lives;

**Fourth**, a city is only prosperous to the extent that poverty and inequalities are minimal. No city can claim to be prosperous when large segments of the population live in abject poverty and deprivation. This involves reducing the incidence of slums and new forms of poverty;

**Fifth**, the creation and (re)distribution of the benefits of prosperity do not destroy or degrade the environment; instead, the city’s natural assets are preserved for the sake of sustainable urbanization.

## **Appendix B | The millenium Declaration Goals by the UN**

### **Goal 1: Eradicate extreme poverty and hunger**

Halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day  
Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

### **Goal 2: Achieve universal primary education**

Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

### **Goal 3: Promote gender equality and empower women**

Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015

### **Goal 4: Reduce under-five mortality**

Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

### **Goal 5: Improve maternal health**

Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio

### **Goal 6: Combat diseases including HIV/AIDS, malaria and other diseases**

Have halted by 2015 and begun to reverse the spread of HIV/AIDS

Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases

### **Goal 7: Ensure Environmental sustainability**

Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Halve, by 2015, the proportion of people without access to safe drinking water and basic sanitation. By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers (Goal 7, Target 11)

### **Goal 8: Develop a global partnership for development**

Address the special needs of the least developed countries and small island developing States. Develop further an open, rule-based, predicable, non-discriminatory trading and financial system Deal comprehensively with developing countries' debt In cooperation with developing countries, develop and implement strategies for decent and productive work for youth In cooperation with pharmaceutical companies, provide access to affordable and essential drug in developing countries In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

## **Appendix C | 10 steps to sustainable infrastructure**

*In 10 step to sustainable infrastructure*  
by Charles L. Choguill, 1996

*the progressive improvement model*

### **Principle 1.**

It must be recognised that within all cities in the developing world, two inter-dependent circuits exist, the formal and the informal.

### **Principle 2.**

It must be recognised that the town system of infrastructure, that which is based on conventional technology, should be operated by either a municipal authority or a private firm nominated by that municipality, on a full cost plus recovery basis.

### **Principle 3.**

Irregular land tenure issues should be resolved within the informal residential sectors of the city

### **Principle 4.**

Informal infrastructure should be designed and built using external technical assistance as required, to be upgradable from a basic standard to that which can be incorporated, with time, into the town system.

### **Principle 5.**

Informal infrastructure built by the local community should be under its Control.

### **Principle 6.**

The technology adopted for informal-sector infrastructure must be maintainable by the community

**Principle 7.**

The informal structure must be affordable by its low-income users

**Principle 8.**

Informal-sector infrastructure must be socially acceptable to the community involved

**Principle 9.**

In order to achieve city-wide coverage of infrastructure, including within the informal residential sector, it is necessary that government adopt the role of facilitator and enabler rather than merely as provider

**Principle 10.**

Non-governmental organisations can play a key role in assisting communities to develop infrastructure systems

## **Appendix D** | *Making explicit in design education: generic elements in the design process* by Elise van Dooren

*For the full essay, please refer to the International Journal of Technology and Design Education* by Elise van Dooren et al. (online 2013)

### **Abstract**

In general, designing is conceived as a complex, personal, creative and open-ended skill. Performing a well-developed skill is mainly an implicit activity. In teaching, however, it is essential to make explicit.

Learning a complex skill like designing is a matter of doing and becoming aware how to do it. For teachers and students therefore, it will be helpful to make the design process explicit. In this paper, a conceptual framework is developed to be more explicit about the design process.

Based on research of the design process, on differences between novices and expert designers, and on personal experience in design education practice, five generic elements in the design process are distinguished:

- experimenting or exploring and deciding
- guiding theme or qualities
- domains
- frame of reference or library
- laboratory or (visual) language

These elements are generic in the sense that they are main aspects and always present in the complex, personal, creative and open-ended design process.

**Keywords:** Design process, generic elements, design education, making explicit.



