Live/Work Architecture
An alternative to high-rise development in Addis Ababa

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Live/Work Architecture

Figure 1 :Addis Ababa

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Abstract

Figure 2: Graph- Population increase in Addis Ababa

As cities become denser the tendency is to continue the trend and urban morphology of building vertically in response to the shortage of land and the growing economic needs. Addis Ababa in Ethiopia is a city that has seen its population increase dramatically over the last two decades, from 2.1 million in 1994 to 2.9 million in 2002¹, with a significant increase in high-rise buildings to 3.3 million today.²

High-rise building has taken over the city, often completely erasing the existing cityscape, and eliminating traditional networks and street-shop relationships. This is also erasing traditional city dynamics. Where smaller shops and businesses add to the security of the street they can also preserve the cultural and historical significance of the streetscape.

New architecture with urban sensibilities can play an important role in retaining the city dynamics, and in preserving the cultural and historical relationship of residents. By exploring historical live-work arrangements in different parts of the world this thesis will look into the two separate but connected elements of low-cost housing and market conditions. Addressing the two issues of affordability and ownership, emphasis will be on the market as the intermediary element between the private residences (living) and the city (work). The question this thesis takes on is how architecture can offer new solutions to rapid urbanization, and improve the dynamics of city living, without defaulting to high-rise building.

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PROLOGUE

In the last ten years Addis Ababa has seen rapid transformation at the neighborhood and urban levels which has displaced many residents. This is a result of the changes to the city plan to attract more investment. So far, relocation is approached on a purely economic term, and thus various new constructions in the city have forced re-location of many residents, often far out in the outskirts of the city where the cost of land is low. The re-location is done with the sole intention of providing housing at low cost, often without consideration to the livelihood of residents, helping retain their source of income. Without, too any attempt at maintaining existing *iqub* (a traditional association of a small group of people to provide a rotating funding to be used for various needs) or *idir* (a traditional association of neighbors or workers to raise funds for emergencies).³ The transformation of the city has thus meant loss of social and economic ties that have taken decades even centuries to build.

In addition to the relocation of residents, new developments can and have become simple adaptations of densification solutions from Europe and North America seeking to accommodate as many people per square meter as possible. The new Addis Ababa is thus becoming a jungle of high-rise buildings. The high-rise solution has been adopted for both residential and commercial buildings and has meant a loss of relationships and disintegration of social ties. Neighbors are scattered throughout the city and important vendor-buyer relationships are lost. The city-scape as a whole is changing, as shops are brought into buildings leaving the streets empty. Alternate developments are needed to allow residents that have long-term ties to neighborhoods to remain on or around central city sites like Adada to allow continuity of social and economic ties.

GLOSSARY

Derg regime: Coordinating Committee of the Armed Forces, Police, and Territorial Army that ruled Ethiopia from 1974 to 1987.⁴

Gebbi: a settlement consisting of a main house or palace and its out buildings.

Main palace at Arat kilo, near *Arada*. Was the first home of Emperor Menilik and subsequent leaders of Ethiopia.⁵

Hanoks: Korean-style house, commonly refers to various traditional Korean dwellings.⁶

Also refers to traditional houses that use natural materials such as wood, earth, and tiles.⁷

Hanoks have different shapes and configurations in different parts of South Korea.

Figure 3

Buckchon: North village- Architectural characteristics of Hanok include impermanence of materials and modular spatial organization. Stones were rarely used, usually only for foundation of sites. Use of wood, tiles and other impermanent material meant that replacement had to be made regularly. Tiled roofs were replaced every 20 – 40 years.⁸

Remodeled/ Regenerated Hanoks: attempt to integrate the old and new, traditional Korean dwelling with all the convenience of contemporary living.⁹

Hutong: bystreet or a lane with private courtyard dwellings.¹⁰

Figure 4

Idir: is an association established among neighbors or workers to raise funds that will be used during emergencies, such as death within these groups and their families.¹¹

Iquib: is an association established by a small group of people in order to provide substantial rotating funding for members in order to improve their lives and living conditions.¹²

Iquib and *Idir* can be characterized as traditional financial associations. While *Idir* is a longterm association, *Iquib* can be temporary or permanent, depending on the needs of the members.

Kebele: community organization formed during the Derg regime (1974 – 1987).¹³

Sefer: a settlement and later an urban neighborhood, usually named after the name of the chief of the land, or by the name of the parish church or by the dominant ethnic group that settled in the area.¹⁴

It is an area similar to a military settlement or neighborhood, which is allocated to a chief or a state dignitary and is distinguished from other similar areas by a buffer zone. In the old days one had to cross steep slopes, streams and winding paths to go from one *sefer* to the other. The main inhabitants of the *sefers* were soldiers of a warlord, associated artisans, priests and civil servants who were related or acquainted with the chief. The residences of the chiefs were usually located on higher ground, surrounded by more modest traditional circular houses. Incoming people usually settled close to their kin, and this helped to keep the *sefers* fairly homogeneous.¹⁵

Figure 5

Siheyuan: A Chinese ‘courtyard’, written as *Siheyuan* - *Si* means ‘four’, which stands for four sides of the *siheyuan*. It means ‘coming together’. *Yuan* refers to ‘a yard’. *Siheyuan* literally means a four-sided closed yard.¹⁶

Figure 6

Tera: a part of a market specializing in the commerce of a particular commodity.¹⁷

Figure 7

Hanoks: Korean-style traditional dwellings

Buckchon: North village Hanok

Remodeled/ Regenerated Hanoks:
integrated old and new traditional Korean

Hutong: bystreet or a lane with private courtyard dwellings

http://www.get-top-news.com/

Idir: an association to raise funds for emergencies, such as death within groups and their families.

Iquib: an association to provide substantial rotating funding for members to improve their lives and living conditions.

Kebele: community organization

Fasil Giorgis and Denis Gérard, 2007

Sefer: settlement and later urban neighborhood

Fasil Giorgis and Denis Gérard, 2007

Siheyuan: Chinese four sided 'courtyard'

Yang Qingqing, 2014

Tera: area of market specializing in commerce

Fasil Giorgis and Denis Gérard, 2007

CURRENT SITE

Living Spaces
Typologies:

- Formal housing
- Kebele housing
- Illegal housing
- Slums

Existing

Aim

Legal

- built on registered land
- secure tenure

Confirms with Building Standards

- access to amenities:
water, electricity, sewage
- enough space
- sustainable and permanent materials

Maximize units per square metre
Empty streets

Market
Street facing

Existing

Replaced by

Social coherence
encourage interaction
exchange

Aim: to retain dynamics
Living - Work relationship

'MODERNIZATION'

CURRENT SOLUTION/ APPROACH

Living Spaces:

Maximize units per square metre

DENSIFICATION

Densification

Denser: having parts that are close together;
crowded with people

Market

Shops brought into malls,
Empty Streets

'MODERNIZATION'
CURRENT SOLUTION/ APPROACH

Addis Ababa Today

Iqub: is an association established by a small group of people in order to provide substantial rotating funding for members in order to improve their lives and living conditions.

Idir: is an association established among neighbors or workers to raise funds that will be used during emergencies, such as death within these groups and their families.

For success:

- overcome ownership restrictions
- ability to change/ expand household (within framework)

- Issues:
- OWNERSHIP
 - EXPANDABILITY
 - FRAMEWORK
 - IDENTITY- Vernacular

Affordability
Ownership
Strengthen relationship between vendor and buyer
Traditional social ties
Iqub, Idir
Neighbors, Coworkers

Open System: a system allowing change/ modification

Incrementality - Incremental: of, relating to, being, or occurring in especially small increments

ELEMENTAL
- half a house

ABC approach of INCREMENTALITY focusing on:
A. Initially building what is more difficult
B. What cannot be done individually
C. What will guarantee the common good in the future

- Five design conditions as the **ABC of incremental** housing identified by **ELEMENTAL** :
1. **Good location**: dense enough projects able to pay for expensive well located sites.
 2. **Harmonious growth in time**: strategical building of essential portions of a house (plumbing, circulation, roof and structural) that permit expansion. This allows for customization instead of decline for neighborhood.
 3. **Urban layout**: introduction of private and public spaces with a manageable number of families
 4. **Provide structure** for the final scenario of growth (middle class) and not just for the initial one.
 5. **Middle-class DNA**: plan for a final scenario that elevates the value of individual houses to middle-class houses.

MONTERREY
Monterrey, Mexico

VILLA VERDE
Constitucion, Chile

QUINTA MONROY
Iquique, Chile

Framework laid out:
Structural
Plumbing

INCREMENTAL Approach:

Individuality

Aldar Central Market, The Souk,
Abu Dhabi Central Market

'City within a city'

Barcelona's Santa Caterina Market
Barcelona, Spain

Relationship

Vernacular

Incorporate local building techics and materials

Vernacular: “attributes of traditionality”
Of, relating to charasteristic of a period, place or group
<Vernacular architecture>
Of, relating to or being the common building style of a period / place

The Market in the City

Advantages:
Open spatial layout- strengthen social ties
Feel of village community

The City of Addis Ababa since 1886

Introduction

Figure 8: Map of Arada in Addis Ababa

Founded in 1886 Addis Ababa is a city located 2,355m above sea-level. The first settlers were Emperor Menilik and his chiefs surrounded by their followers. Like previous capital cities of Ethiopia (cf. Ankober, see images below) Addis Ababa's topography allowed a panoramic view from the palace. City settlers occupied areas around the palace which resulted in the organic growth of the city, with the palace at the center; no primary 'city center' like in other cities but a multi-centered settlement.¹⁸

Figure 9: Early settlement, Addis Ababa

Settlement map of Addis Ababa, early 20th Century showing the first settlements, the Emperor's palace surrounded by his followers.

Arada, a marketplace a short distance from the palace, has operated first as an open air market where merchants come to offer their merchandizes and residents come to buy. Eventually buildings reflecting the times started to be erected with small shops open to pedestrian interaction, continuing the feel of an open air market.

In the early years after the first settlement *Arada* used to be an open market. Merchants would gather on market days to offer their merchandise to customers.

Figure 10: Open-air market

Arada district is a historically significant commercial area. Since the late 1800's when the first settlers occupied the area, it has retained its importance as the commercial district of the city. It has also been home to specialized retailers who settled in the area from different parts of the country, known for providing specialized goods and services, such as custom hand-loomed, ceramics and woodwork. The site located only a kilometer from the palace is more recently also a famous stop for tourists for purchasing artifacts and souvenirs.

Arada
Population Density: 22,320.21
Total population: 212,009
Percentage Distribution of City Land Area: 2%
Percentage population size: 8% of total city population
Gender ratio: Female 53%, Male 47%

Arada in Addis Ababa, is the second most densely populated district of the ten districts in the city.

Figure 11: Population Density Map

Key words: Arada, Market

Arada: historical market place in Addis Ababa

Market: a place where products are bought and sold
 a meeting together of people for the purpose of trade by private purchase and sale and usually not by auction

Because of the rapid changes in the city, in an effort to ‘modernize’ the existing substandard houses (*Kebele* and other illegal settlements), this area surrounding the palace *gebbi* is among the areas allocated for re-development.

Figure 12: Proposed Land-use and Land Development Plan

In Addis, re-development has often taken the form of *tabula-rasa* – a complete erasure of what existed. This results in the displacement of residents, and loss of social and economic ties with neighbors and clients. Taking into account that *Arada* is a historically significant commercial area with residents that have lived on and around the site for over a century, a re-development taken up on this site should strive to preserve the existing city dynamics and preserve the cultural, historical and social memory whilst improving life-work relationships in a more contemporary manner.

Figure 13: Market in Arada

As buildings began to take root they were built to house the shops but keep the dynamic of an open market.

Arada is home to craft-makers producing items such as hand loom products, woodwork and pottery. Often different family members are tasked with different roles that support one another. A father may be a craft maker, having learned the trade from a parent, while his wife is the merchant, with children and extended families assisting in various roles at home in childcare and elderly care, all working in the shop or learning the ways of the craft. This makes a live-work environment an

ideal type for preservation and development as it combines work space with living quarters, an ideal condition for craft makers and family members with the necessary ease of support and fluid life-work balance. It is this that we will now explore in some detail as a possible solution to new architecture which can thereby avoid using the more detrimental high-rise solution.

Figure 14: Market in Arada

Acknowledging the growing densification in Addis Ababa, it will help to explore historical live-work arrangements in different parts of the world, the separate elements of low cost housing and market conditions. From this we will begin to address issues of affordability and ownership in *Arada*, and the market as the intermediary element between the private residences (living) and the city (work).

Key words: High-rise

High-rise: of a building; very tall; having many floors or stories.

Part 1

1.1

Densification in Rapidly Urbanizing Addis Ababa and its Effects

Rapid and significant increase in population and migration to cities is one of the features of economic growth. According to Michael Spence, Patricia Clarke Annez and Robert M. Buckley (2009) in the study *Urbanization and Growth*, no country has ever achieved meaningful economic growth without noteworthy migration of population to urban cities. Supporting this they give the examples of China, Brazil and Kenya, three countries that have witnessed significant economic prosperity in the last few decades and that have seen a noticeable increase in urban population (as shown in the graphs below). These cities have relevance for this project as these are cities that have socio-economic resemblance to Ethiopia, having been in the low-income country category and having experienced rapid growth and development in the last few decades.

World Bank World Development Indicators 2005

The effects of rapid urbanization and migration is particularly noticeable when a country is achieving middle income status. Spence, Annez and Buckley make the case that urbanization is essential for sustaining if not driving growth in developing countries. They explain that this rapid growth brings with it challenges that must be addressed. Accordingly, they argue that there are two steps countries can take to make urbanization work well:

- Foster the growth of high-productivity activities, and
- Manage likely side effects of economic success of cities, which include congestion, regional inequality and high prices of land and housing.¹⁹

Spence, Annez and Buckley advise that managing growth implies managing infrastructure which must include the provision of affordable houses, expanding infrastructure and other services essential in nurturing growth.

Looking into ways that countries can manage effects of economic success Jifu Guo, Mingzheng Sun, Ting Wang and Lu Lu in *Transportation Development and Congestion Mitigation Measures of Beijing* (2015), China contend that to effectively resolve infrastructure problems, investment in and expansion of various infrastructure must be combined with other management strategies. Taking on the issue of traffic congestions, they argue that mere expansion of infrastructure has to be combined with other comprehensive efforts such as Travel Demand Management (TDM) to effectively resolve specific issues like traffic congestion in cities.

Clearly then increase in migration to cities brings with it issues of population density, housing shortage and pressure on infrastructure. In the context of an underdeveloped country like Ethiopia this could mean the expansion of slums. Commenting on the inevitable crisis in developing countries former Secretary-General of the United Nations Kofi Annan wrote:

“Almost 1 billion, or 32 percent of the world’s urban population, live in slums, the majority of them in the developing world. Moreover, the locus of global poverty is moving to the cities, a process now recognized as the ‘urbanization of poverty.’ Without concerted action on the part of municipal authorities, national governments, civil society actors and the international community, the number of slum dwellers is likely to increase in most developing countries. And if no serious action is taken, the number of slum dwellers worldwide is projected to rise over the next 30 years to 2 billion.” (UNHSP, 2003)

Many cities are thus attempting to address the shortage of housing and the resulting proliferation of slum dwellings in cities. Sanjo Faniran and Kayode Oaniyan in the study *From Slums to Smart Cities: Addressing Slum-Dwelling in Nigeria through e-Land Administration* point to lessons Nigeria has taken to address housing crisis in its capital Abuja. They call for the use of electronic governance tools such as Geographic Information Systems (GIS) to effectively manage issues of land administration and housing allocations to effectively address housing shortages in Abuja, Nigeria’s capital. The study takes on lessons from Ghana and Bangladesh, two countries that have successfully implemented GIS – based Land Administration Project in several of their cities and implemented networks that used computerized land information system to carve policies with the intention of creating frameworks that can be followed for new affordable housing to replace slum dwellings. Addis Ababa can also benefit from a similar approach to addressing the current housing shortages.²⁰

Addis Ababa's administration has more recently outlined programs to mitigate housing shortages in the city. In *Condominium Housing in Ethiopia: The Integrated Housing Development Program* (2011) the city administration led by the Ministry of Works and Urban Development (MWUD) has put forth solutions to address housing shortages in Addis Ababa, particularly the challenges of low-income housing. The program aims to:²¹

- a) increase the supply of housing to low-income population,
- b) recognize existing urban slum areas and mitigate future expansion of slums
- c) seeks to increase job opportunities for micro and small enterprises and unskilled laborers, which in turn will provide income for families to afford housing and
- d) improve wealth creation and wealth distribution for the nation

The city administration thus recognizes that future developments in Addis- to alleviate housing shortages- must integrate these four elements wherever possible. The live-work project at *Arada* will attempt to incorporate all four of the above with the aim of providing housing for low income craft workers on a site they already occupy. As the project includes a market area and work space, it allows for the continuation of existing jobs with the possibility of growth, making it an up and coming hub of crafts for city dwellers. The resulting ownership of their living and working spaces will also boost the economic standing of craft workers.

According to M.P. van Dijk and J. Fransen (2008) in *Managing Ethiopian Cities in an Era of Rapid Urbanisation*, sub-standard housing including slums make up 53 percent of overall housing in Addis Ababa.²² This includes houses that are built without legal land ownership, houses that have outlived their life-span and those built with below standard materials. The city's administration is taking steps to replace sub-standard housing (*Kebele* rental housing, Illegal housing and Slums) with Formal housing built to standard on legally registered land.

Figure 15: Condominium House Sites

Figure 16: Condominium site of Jemo I, II, and III

The location of the *Arada* project is an area where there are large numbers of substandard houses. It is an area marked for redevelopment by the city administration. The *Arada* project is built to comply with guidelines for Formal housing and will have legal standing with the government. It will be made of sustainable materials and thus will be categorized under the Formal Housing category.

Housing Stock in Addis Ababa

Typology	No. of Units	Percentage
(a) Formal sector housing (built to standard units on legal land)	298,000	47
(i) Housing cooperatives	156,450	25
(ii) Individuals	35,760	6
(iii) Private real estate developers	3,874	0.6
(iv) Govt. housing for civil housing and others	101,216	16
(v) Govt.'s new "low-cost" condominiums	7,000	0.1
(b) Kebele rental housing (govt. owned below standard units on legal land)	150,000	24
(c) Illegal housing (organized, built to standard units and plots on illegal land) includes cooperatives and privates	130,000	20
(d) Slums (disorganised, below standard units on illegal land)	60,000	9
Total	638,000	100

Figure 17

Housing typologies against legality and conformity with building standards

Typology	Legality (Land Tenure)	Conformity with Building Standards
Formal Sector Housing	Yes	Yes
Kebele Rental Housing	Yes	No
Illegal Housing (organised)	No	Yes
Slums	No	No

Figure 18

Housing typology and population size

Typology	No. of Units	Average Household Sized	Population
Kebele rental housing	150,000	5.5	825,000
Illegal (organised)	130,000	5.5	715,000
Slums (disorganised)	60,000	5.5	330,000
Total	340,000	5.5	1,870,000

Figure 19

Existing Housing Typologies

Addis Ababa

Housing typologies in Addis Ababa are categorized based on type and quality of material, quality of construction and tenure. Accordingly, Dijk and Frasen provide four housing typologies in Addis Ababa. Of the four typologies only Formal housing meets the legal and standard requirements as outlined by Addis Ababa's City Administration.²³

Formal housing:

Formal housing is built on legally registered land, made with robust materials and conforming to established building guidelines. They are mostly private and government owned units, with cooperatives claiming about 25% of the total stock.²⁴

Figure 20: Typical formal housing - Villa (freestanding)

Figure 21: Typical formal housing - Apartment

Keywords: Typology

Typology: a system used for putting things into groups according to how they are similar: the study of how things can be divided into different types. (merriam-webster dictionary)
Distinct spatial arrangement common for a certain time or social group.

***Kebele* rental housing:**

Legally owned by the City's Administration, 80% of these houses are constructed with mud and straw (usually not up to standard) and most are older than their estimated life of 30 years.²⁵

Figure 22: Typical *kebele* housing

The quality of *Kebele* housing is generally poor mainly because residents are not allowed to make changes, add floors or rooms without permission from the *Kebele* administration (part of city administration). Residents do not have property rights and they do not have access to basic public services.²⁶ More recently *Kebele* houses are being replaced by condominium houses that are made of more durable materials but with similar restrictions, that is, the inability to enlarge living spaces or make adjustments to fit living conditions. Because government subsidized houses aim to fit as many people on a small area as possible, most new government subsidized condominiums tend to be high-rise residential condominiums.

According to Solomon, Mathewos and Tesfaye (2004)

“The majority of the *Kebele* houses were developed through ad-hoc and piecemeal land development mechanisms in which holders of land use rights subdivided their plots and sold access to other parties. This process has produced a development pattern characterised by irregularly shaped plots, uneven access to vehicular circulation and low infrastructure and service coverage.”²⁷

Building height regulation for Arada requires 5 to 10 floors

Figure 23: Building Height Regulation Map

Lack of property ownership restrict the ability of residents to adapt to their changing circumstances and to expand residential areas to accommodate extended families. The aim of future developments should thus be to allow for future developments and possible changes and should include the possibility of obtaining property rights and the ability to make changes to rented houses to fit the needs of the residents.

Recent developments including the 10/90, 20/80 and 40/60 housing schemes (10 percent of cost covered by resident, 90 percent by government; 20 percent by resident, 80 percent by government and 40 percent by resident and 60 percent by government) funded by the city do meet the requirements of the legal ownership and standard that was lacking in previous subsidised houses.²⁸

Figure 24: New Kebele housing
Condominium Housing Programme

Slums and illegal settlements are of course an issue in Addis. The United Nations defines slums in terms of deprivations in order to have standard indicators and track progress for programs like the Millennium Development Goals (UN-Habitat 2009).²⁹

Accordingly, slums are thus areas of older housing that are deteriorating in the sense of their being underserved, overcrowded and dilapidated.³⁰ Slum dwellers are a group of individuals living under the same roof in an urban area who lack one or more of the following:

1. Durable housing of a permanent nature that protects against extreme climate conditions.
2. Sufficient living space which means not more than three people sharing the same room.
3. Easy access to safe water in sufficient amounts at an affordable price.
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
5. Security of tenure that prevents forced evictions.

In Addis, whether **illegal housing** (which can be organised by the Addis Ababa Administration) or **slums**, the growth is the direct result of the lack of legal alternatives due to government controls and poor supply.³¹ **Organized Illegal housing** occur where units and plots follow formal housing standards but land is not legally registered for housing, accounting for 20% of housing stock in Addis Ababa. **Slums** are below standard housing units built on illegal land and represent 9% of total stock. These are illegal subdivisions of land found mixed with *Kebele* and illegal housing.³²

Figure 25: Typical New *Kebele* housing
Condominium Housing Programme

In Addis Ababa substandard and informal housing far exceeds existing formal housing. As per Dijk and Frasen, they make up 53 percent of housing in the city. This includes slums, illegal housing and *Kebele* housing. The main reason for the proliferation of illegal settlements (including slums and illegal housing) is lack of access to land and administrative restrictions on changing what is once built.³³

Figure 26: Illegal settlements and slums

Dijk and Fransen offer three recommendations to resolve housing shortage and the proliferation of substandard housing in Addis Ababa:³⁴

- 1 – Increase housing supply in the formal sector by easing access to land through appropriate legal and institutional measures.
- 2 – Redevelopment of existing run-down *Kebele* housing by taking appropriate measures. This includes allowing residents to invest in home improvements by strengthening their property rights, by providing the opportunity to buy/own their units, and enhancing community level or neighborhood infrastructure through participatory approaches.
- 3 – allowing legalization of organized illegal housing that are built to standard and providing opportunities for informal settlements to be formalized through incremental upgrading to meet building standards.

Taking on these recommendations it will be possible to propose a housing type that conforms to legal and standard requirements, a type that can easily be adapted to fit the needs of individual residents and – over time can be altered incrementally to meet the changing needs of occupants and their live-work requirements.

1.2

The argument for Live-Work environment

Spence, Annez and Buckley in the study *Urbanization and Growth* (2009) assert that developing countries have limited economic and strategic capacity which makes provision of infrastructure including transportation, running water and electricity more difficult. According to some estimates close to \$40 trillion is needed to meet the demands of infrastructure in developing countries and hence financing these expenditure is the biggest challenge for urbanization policy in these countries.³⁵

Like most underdeveloped countries, Ethiopia suffers from lack of adequate infrastructure and the capacity to overcome them. This means that there is a lack of resources to properly address inadequate roads, running water and utilities - all elements that must be considered in addressing housing shortages and future developments. FThis means that future proposals therefore must aim to implement a comprehensive strategy of housing that does notn't put undue pressure on the already scarce available resources.

Vivien Foster and Elvira Morella in the study *Ethiopia's Infrastructure, A Continental Perspective* (2011) conducted with the World Bank note that to adequately address these shortcomings, Ethiopia will need to invest close to 40 percent of its GDP (\$5.1 billion over the next decade) on infrastructure for the next decade, a tripling of the current spending, which is beyond the country's current economic capacity. Because this is not possible it has resulted in a funding gap of \$3.5 billion since 2006.³⁶

Getting to and from work takes up a significant amount of time in a typical week. One of the effects of increased population in a city is congestion in traffic and increased pressure on existing roads which significantly increase the commute time for workers. Added to this is unreliable transportation and poor infrastructure in the setting of a developing country like Ethiopia, especially in the capital Addis.

To understand the magnitude of the pressure on the infrastructure in Ethiopia, we will turn to China. Guo, Sun, Wang and Lu in the study *Transportation Development and Congestion Mitigation measures of Beijing, China* (2015), speak of Beijing, a city that has witnessed dramatic economic growth and with it has seen rapid urbanization and motorization in the last few decades. The automobile has brought with it significant migration to cities, pressure on infrastructure and record traffic congestion.³⁷ Rapid urbanization has caused the migration of an eighth of a billion to Beijing bringing its population to 21 million in 2014. Even though the city has adopted impressive infrastructure expansion strategies, this has not mitigated the problem. Guo et al argue that in addition to infrastructure investments, other factors such as Travel Demand Management (TDM) should be studied to ease the demand on traffic.

TDM as implemented in Beijing was developed with the intention of adjusting the city's spatial structure and distribution of urban functions, and optimizing and adjusting the city transportation structure. The issue of traffic congestion was thus effectively addressed with mitigation measures that included TDM and effective policy promotions that prioritized public transportation. These measures included:

- Increasing investment in transportation infrastructure,
- Implementation of prioritized public transportation development strategy (which was identified as social welfare) and
- Gradual implementation of TDM measures, including limiting of various vehicles from the roads.³⁸

These strategies can be adapted to suite Addis and can offer alleviating strategies for Addis too.³⁹

As is seen in China, Sub-Saharan Africa (SSA) is undergoing urbanization and rapid population growth. In *Housing Consumption and Urbanization*, a study completed with the World Bank (2014), Nancy Lozano-Gracia and Cheryl Young note that with a population of nearly a billion people and an annual urbanization rate of 1.17 percent, SSA adds over a million people to urban areas per year.⁴⁰ This puts enormous pressure on urban services to meet the needs of the growing population, and is particularly evident in the apparent shortage of housing.⁴¹

Factors such as income and housing quality are important features that determine where one lives.⁴² Lozano-Gracia and Young describe the trade-offs considered by families in allocating resources in SSA. Results show that in most SSA countries where transport services are costly, families may choose to live in slums so they can access jobs, schools or healthcare.⁴³

As the target population for this proposed development in *Arada*, craft makers are low income workers who have typically migrated from different regions of rural Ethiopia. Their economic circumstances force them to live in slum settlements. Any attempt at improving their housing circumstances would mean relocating to areas far from places of work, which in turn means they would need to commute for longer times to get to and from work.

Jennifer Roberts, Robert Hodgson and Paul Dolan in the research *It's Driving Her Mad: Gender Differences in the Effects of Commuting on Psychological Health* (2011) found that commuting for longer periods has a detrimental psychological health effect, particularly on women who are typically also tasked with household work and childcare.⁴⁴ Reducing the amount of time taken up for the daily commute to work is thus an important strategy and would contribute to the well-being of the individual and the household in general.

Craft makers in Addis Ababa live in predominantly low income households. They are among the portion of the population that would opt to trade-off quality of housing for the ability to access schools, healthcare or reduce commute time to work places. A live-work environment would thus be an ideal condition for them. We can now explore some examples of live-work solutions.

Part 2

2.1

Models of Live-Work Architecture

HISTORICAL STREET MARKET – LIVING

Existing conditions of housing and work spaces/shops in three different cities Shanghai, Beijing and Seoul show how three cities have accomplished integration of living and working conditions and how they addressed questions of maintaining privacy, preserving historical building methods/ techniques while preserving existing social dynamics.

Jieheeran Yun in *Remodelling of the Vernacular* in Bukchon Hanoks cite surveys conducted on a hundred Modern Hanok residents and two hundred apartment residents - those living in Hanoks responded as having a more “balanced and responsible” life.⁴⁵ Further research on Health-enhancing Architectural Features of Modern Hanok by Yeunsook Lee, Yeakoo Lee, Miseon Jang and Myunghee Jang support the claim that modern Hanoks in South Korea provide health and well-being to residents in a holistic way.

***Lilong* of Shanghai – Hanok of Seoul – Hutong of Beijing**

Lilong housing in Shanghai, (“*Li*” - communities, “*Long*” – lanes)⁴⁶ show a way of organizing commodity housing along private lanes that feed into active streets. This arrangement ensures privacy of residential portions while maintaining the active dynamics of the city street.

Figure 28: Jing-an Villa, Lilong Housing

Lilong housing, is a type of lane-and-community based urban dwelling form in Shanghai, China. The lilong (里弄), one of the first forms of mass commodity housings that developed in China, is a form of urban row housing that first appeared in the 1840's and has continued to evolve until the 1950's according to the needs and demands of the city and its residents. The units are organized to feed into side-lanes that feed into main lanes, and serve as circulation but also as social and economic hubs of neighborhoods. Their proximity to active street life and amenities enrich the close knit social fabric of the settlement.⁴⁷

According to Qian Guan in *Lilong Housing, a traditional Settlement Form* (1996) commercial units similar to the residential area layouts occupy all street-front lots. Privacy is maintained by differentiating accessibility. The housing units are accessible via internal circulation lanes, while the commercial units are accessible through external commercial streets.⁴⁸

Jing-an Villa, Lilong Housing, Shanghai, China

Built in 1932 and well maintained, *Jing-an Villa* is the largest new-type *Lilong* neighborhood in Shanghai. The neighborhood is organized around one main lane of 7.0m wide and eleven side lanes of 5.0m wide. The main lane connecting two major roads is usually busy with small businesses occupying the first floor. The narrower side lanes are much quieter.⁴⁹

Lilong in Beijing shows a successful integration of living and working conditions and the use of different size streets and walkways to maintain privacy in the residential sections while enhancing a dynamic flow of residents and city dwellers in the commercial portion of the area. This approach will be adapted to the live-work project in *Arada* to effectively weave the market area with the city and to sinuously invite customers to the market while maintaining resident-workers privacy in their living quarters.

Privacy from the city

Diagram showing a section of a group of Lilong houses. Narrower and more private walkways that connect to individual houses connect to a wide public city street.

Privacy within the house

Diagram showing private spaces. Privacy is accomplished by levels

Figure 29: Lilong Housing

Hutong in Beijing

China

Figure 30: Street view, Hutong Beijing

Hutong neighborhoods with *Sichuan* houses in Chinese cities have increasingly become a disappearing pattern of life. Huimin Gu and Chris Ryan in *Place Attachment, Identity and Community Impacts of Tourism* (2008) explain that *Hutongs* consists of small streets and alley ways linking homes of different sizes through intersecting lanes where family life occur in public and semi-public areas of the alleys and courtyards.⁵⁰ As seen in many other cities, modernization of Beijing has meant removal of existing settlements to make way for skyscrapers, which in this case was the demolition of *hutongs*. Because *hutongs* lacked many amenities such as hot and cold running water, inadequate sewage disposal and small living spaces, the new development was welcomed by many residents. Gu and Ryan call for the modernization of *hutongs* pointing to its cultural significance even if the cost of modernization of the *hutongs* may be higher than total reconstruction.⁵¹ They argue that *hutongs* are after all “quintessentially ‘urban Chinese’ and thus protecting the *hutong* is a way of retaining ‘difference’ that helps sustain a sense of heritage and tourist attraction.”⁵²

Hutongs in Beijing show the importance of preserving historically significant buildings and/or ways of building, even when they lack basic amenities of modern life. These amenities can be incorporated in future evolution of *Hutongs*, but losing *Hutongs* means losing an essential part of the

heritage and way of life of Beijing. As in Beijing, in Addis Ababa there are several vernacular houses that have been replaced by concrete blocks and corrugated metal roofs. This is mainly because the traditional houses in Addis Ababa are dismissed as incompatible with modern living. However, the *Arada* project will attempt to incorporate amenities that permit a modern way of life but also include features of traditional Ethiopian building, particularly in the choice of material. The aim here would be to create a design resonant of traditional Ethiopian houses, with the amenities of running water, electricity and other live-work facilities.

Figure 31: Diagram Hutong Beijing

Similar to the *Lilong* houses *Hutongs* also accomplish privacy by designating areas closer to the street as more public and allocating spaces of privacy away from the street.

Hanok in Seoul

South Korea

A traditional housing type in South Korea, the *Hanok*, once a sign of poverty, now provides a cultural identity and heritage for residents; a popular tourist attraction. *Hanoks* show how historical building techniques and the use of materials can enhance the life of residents. Jieheeran Yun in *Remodelling of the Vernacular in Bukchon Hanoks* (2012) explain that many residents in Seoul believe living in *Hanoks* helps them live a more fulfilled life. Living in *Hanoks* has increasingly become more valuable than in upscale high-rise apartments and more recently *Hanoks* are also popular attractions for tourists.

Figure 32: Street view Seoul

According to Yun, for many years modernization projects have encouraged many South Koreans to live in high-rise apartments. This has led to the rapid increase in concrete high-rises which many believe to be “aesthetically unappealing” and “ecologically unsustainable”. Yun explains that preservationists and practitioners are rightfully voicing concerns; insufficient attention is given to the preservation of vernacular architecture. There is a need to foster a new prototype that incorporates technology in vernacular house form, particularly in Third World countries where the modernization process is condensed. Yun discusses how critics have considered apartment living as a response to American lifestyle and architectural styles which may not be the best solution for South Korea. Instead remodeled *Hanoks* are suggested; traditional Korean houses with the conveniences of contemporary living. These are beginning to be considered better alternatives to the concrete boxes that have taken over Seoul, and many other cities in South Korea.⁵³

Regenerated and remodeled *Hanoks* are successful examples of hybrid dwelling developments integrating modern facilities in a traditional house form. South Korea has seen a “*Hanok* Renaissance”, a reaction to the “monotonous and dull urban landscape of Seoul or apartment forests of endless rows of rectangular concrete boxes”.⁵⁴ Regenerated *Hanoks* are perceived by Koreans as examples of a more balanced and responsible lifestyle as opposed to apartment living. Remodeling the vernacular will also be part of our strategy in *Arada*.

Yeunsook Lee, Yeakoo Lee, Miseon Jang and Myunghee Jang in *Health-enhancing Architectural Features of Modern Hanok, Experienced in and Desired by Korean Residents* (2010) refer to surveys conducted on a hundred Modern *Hanok* residents and two hundred apartment residents, argue that those living in *Hanoks* responded to having a more “balanced and responsible” life.⁵⁵ Supporting this, Yun points to interviews with residents which show the advantages of living in *Hanoks* include solving an over-reliance on technology, and promoting social interaction among residents.⁵⁶

Figure 33: Street view Buckchon Seoul

Learning from the case of *Hanoks*, the *Arada* project will attempt to put forth a prototype that incorporates local modes of building and use of material, a remodelled and regenerated contemporary vernacular. This will preserve local traditions, enhance tourism and through the incorporation of accessible technology allow for a distinctive construction that is appropriate for the local climate and makes use of locally available materials and labor.

2.2

THE MARKET CONDITION

A market is an integral part of the social fabric of cities. It brings people together and is where relationships develop; so important in the social fabric of the city it can be designed to enhance the quality of life within the area. Kristen Seale in *Markets, Places, Cities* (2016) explains that a market place is more than just a place of trade but has a particular “cultural character and involves a multitude of social actions and relations”.⁵⁷

Arada is an important historical marketplace in Addis Ababa. The shops carry products and provide services for specific crafts. How then to design a place reflective of the culture and way of life of the residents, where craft is elevated and the creation and process of making of crafts is celebrated, where craft is seen as a state of mind and an art form?

The market space can be a social hub where craft makers can present their work and where city dwellers can shop, mingle and celebrate the craft. Any new project must address the important question of the live-work conditions. A project as network of spaces for production for the creation of crafts will also enhance collaboration and celebrate the production of craft whilst working towards the well-being of family, community and society. Taking off from existing market spaces in Barcelona’s Santa Caterina Market, Abu Dhabi’s Aldar Central Market and Rotterdam’s Markthal Market, the market place in *Arada* will be configured in the following various ways:

- To promote individual suqs (shops) that offer a variety of crafts
- Create the feel of an open market
- Create intersecting open spaces and spaces for shopping, craft making and living
- All brought together to create ‘a city within a city’

PROGRAM ELEMENTS

Residences

- Private Spaces
 - Studio/ 1 Bedroom
 - Family Size

- Common Spaces
 - Common Kitchen
 - Food Preparation
 - Food Drying

Market Spaces

- Cafe
- Exhibition space
 - Craft making
- Intermediary Space

The market place can be configured in various ways. A look into various market spaces around the world yield various configurations, of which the three presented below provide different ways numerous shops can be brought together that are places of commerce that enable individuality of shops but read as a market place as a whole.

‘City within a City’

Barcelona’s Santa Caterina Market, Barcelona, 1997-2005

Architects: Enric Miralles Benedetta Tagliabue, Miralles Tagliabue – EMBT

Client: Foment de Ciutat Vella S.A.

Figure 34: Santa Caterina Market

Barcelona’s Santa Caterina Market by Miralles/ Tagliabue is a rehabilitation project that sought to create a market space that adopts to the area’s complexity. It is a city within a city.⁵⁸

The covered market space allows for a free flow of people and activities. It holds together what is within- the market, people activities, without the physical restriction of walls. *Arada* will use a covered market typology to allow the individuality of shops and walkways and provide a wholeness to the market community; effectively picking up on Barcelona and the feeling of a ‘city within a city’.

Aldar Central Market, The Souk, Abu Dhabi Central Market

2006, Abu Dhabi, United Arab Emirates, Foster + Partners

Area: 607,000 sq. m., Height: 378 m

Figure 35: Aldar Market Abu Dhabi

Located on a historic site, Abu Dhabi's Central Market aims to reinvent the market place by giving the city a new civic heart. Instead of a one-size-fits all shopping mall, it offers a distinctive modern interpretation of the regional vernacular. Distinct experiences in the souks (small shops) are brought together in an interior architecture of dappled sunlight, bright colors and fountains with Islamic patterns.⁵⁹ The Aldar Central Market is a unique example of a market place. Individual shops have their own individuality brought together to make a whole and serve as an integral hub for the city.

The integral hub as a strategy will be used in *Arada*. In a similar way, *Arada* will have individual shops that offer distinct experiences and specific items brought together under an all-encompassing roof that allows freedom of movement and physical and visual connection between different parts.⁶⁰

Markthal Rotterdam Market, 2014, Rotterdam, The Netherlands, MVRDV

Area: 100,000 sq. m. Program: 228 Apartments, 100 fresh market produce stalls, food related retail units, preparation and cooling space, supermarket, 1,200 parking spaces.

Figure 36: Markthal Market

This project sought to evolve the market typology and densify the city centre by paying particular attention to increasing quality and density of programming in Rotterdam. It is a sustainable building offering living, leisure, food and parking, all integrated to enhance and create a synergic relationship between all parts and programs. The apartments formed into an arch create the hall, creating a large central public space- the market.⁶¹ The urban configuration of the Markthal Market creates an enclosed area that seamlessly connects living and a market space. Some element of this approach will be combined with the two previous market strategies within *Arada*, in order to improve the direct relationships between common areas and private spaces. We will now go onto the strategy called *The Elemental Solution*.

2.3
Affordable Housing
The ELEMENTAL Solution
Chile, South America

“(ELEMENTAL’s) achievements recognise the importance of ELEMENTAL’s social and humanistic approach to architecture, which shows how architecture at its best can improve people’s lives”

~ Thomas Pritzker, Chairman of The Pritzker Organization

ELEMENTAL – headed by architect Alejandro Aravena founded in 2001 in Chile is “a Do Tank”, a firm that focuses on projects of public interest and social housing, public space, infrastructure and transportation, has a unique approach to providing affordable housing to low income citizens.⁶² There are now over 7 billion people in this world of which 3 billion live in cities. This puts pressure on cities to provide sufficient housing for residents and puts provision of housing at the forefront of issues to be addressed today. ELEMENTAL is a for-profit company with a social conscience working on projects that capitalize on “the city’s capacity to create wealth and provide a short cut to equality by improving quality of life without having to wait for income redistribution.” (Aravena 2011,32)

Advocating the urgent need to focus on affordable housing, ELEMENTAL provides that by 2030 out of 5 billion people living in cities, 2 billion will be living below the poverty line, which means a demand for housing for a million people per week, costing 10,000 dollars per family.⁶³ ELEMENTAL’s solution is one that focuses on scale and speed – Scale requires the involvement of cities and governments and speed in allowing cost saving through fast completion of projects through the use of prefabricated systems.⁶⁴

ELEMENTAL’s distinctive approach to address the inevitable shortage of housing in cities around the world is one that is based on a view of social housing as social investment, instead of social expense.⁶⁵ It involves the end users in the design and development of the houses. It is an OPEN

Key words: Open System, Incrementality

Open System: a system allowing change/ modification

Incrementality: Incremental: of, relating to, being, or occurring in especially small increments

MONTERREY,
Monterrey, Mexico

Initial House: 40m²
Expanded House: 59m²

Initial Apartment: 40m²
Expanded Apartment: 76.5m²

Site Area: 6591m²

Figure 37: ELEMENTAL
Monterrey, Mexico

VILLA VERDE
Constitucion, Chile

No. of Families 484

Site Area: 8,500 m²

Initial: 57 m²
Expanded: 85m²

Figure 38: ELEMENTAL
Constitucion, Chile

QUINTA MONROY
Iquique, Chile

Site Area: 5025m²

No. of Families: 93

Materials: Reinforced Concrete

Initial House: 36 m²
Expanded House: 70m²

Initial Duplex: 25 m²
Expanded: 72 m²

Figure 39: ELEMENTAL
Iquique, Chile

SYSTEM that allows for future modifications, permitting involvement of people in the building process. According to ELEMENTAL it is a solution that takes into account scarcity of resources, displacement of people, preservation of quality of life and cost of land. It provides an ABC approach of INCREMENTALITY focusing on:⁶⁶

- A. Initially building what is more difficult
- B. What cannot be done individually
- C. What will guarantee the common good in the future

Accordingly, ELEMENTAL identified five design conditions as the ABC of incremental housing which include:⁶⁷

1. **Good location:** dense enough projects able to pay for expensive well located sites.
2. **Harmonious growth in time:** strategical building of essential portions of a house (plumbing, circulation, roof and structural) that permit expansion. This allows for customization instead of decline for neighborhood.
3. **Urban layout:** introduction of private and public spaces with a manageable number of families
4. **Provide structure** for the final scenario of growth (middle class) and not just for the initial one.
5. **Middle-class DNA:** plan for a final scenario that elevates the value of individual houses to middle-class houses.

There are many lessons here to be learned from the ELEMENTAL approach. Like the few projects where this approach has been successful (Villa Verde and Quinta Monroy) *Arada* is located in an area of the city where the cost of land is significantly high. It is also in a portion of the city that requires denser settlement.

Adopting some of the strategies of the ELEMENTAL approach, the *Arada* project will investigate a similar solution to provide an incremental layout for a manageable number of families. The incremental layout will be adopted for both the residential and the market spaces. The program will be developed from these strategies in response to the current high-rise development of 11 floors on the site at present.

Quinta Monroy

Iquique, Chile

Client: Chile Barrio

Project Year: 2001

Construction Year: 2004

Site Area: 5,025m²

Figure 40: ELEMENTAL
Iquique, Chile

Quinta Monroy is a social housing project at the center of Iquique, Chile. The site where this project is built on was initially illegally occupied by 97 families since the 1960's. ELEMENTAL's project rehoused these families on the same 5,000 square meter site.⁶⁸

This project had to balance a tradeoff between limited resources, i.e. money government allocated per family, and quality of house to be built and delivered to individual families. The allocated subsidy per family for the project was US\$7,500, however because the site was located at the center of the city, the cost of land was three times more than the typical land social housing could afford. This meant there was less money available to construct decent sized houses for the families.⁶⁹

Figure 41: 'Half-a-house' Solution
Quinta Monroy

The most logical and economic response to this constraint would have been to build the houses smaller. ELEMENTAL came up with a win-win solution, one where the quality or size of the houses wouldn't need to be compromised while working with the same amount of money available for the project. This was the 'half-a-house' solution, with only the full framework and half of the house substantially completed at takeover. Over time, as families save up and can afford to build, they can do so with their own resources, within the structure provided.⁷⁰

Explaining the concept Alejandro Aravena, founder of ELEMENTAL states:

“The initial building must provide a supporting, (rather than a constraining) framework in order to avoid any negative effects of self-construction on the urban environment over time, but also to facilitate the expansion process.”⁷¹

Figure 42: ELEMENTAL

Similar to Quinta Monroy, the project at *Arada* will focus on providing a framework that residents can fill in later. Following the ABC approach as outlined by ELEMENTAL, it will focus on providing the structural, plumbing and other basic elements that cannot be done by individual families and in the end with a focus on creating a community based on a well thought out plan.

Issue of Ownership

Hernando de Soto in the book *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (2000) explains that the main element lacking in developing countries that thwarts their efforts to solve poverty is their inability to produce capital, the main engine that produces wealth.

De Soto explains that people in these nations often have properties; they have houses but no titles to the houses they live in, they have crops but lack legal titles to the land, or have businesses but without legal status of incorporation. This lack of ownership means that they cannot use these properties as collateral which prevents them from starting up businesses or gain investment from banks. He explains that this is the mystery behind solving the engrained cycles of poverty – the ability of citizens to ownership of properties to generate capital.

In the context of *Arada*, the crafts men and women who will be the new residents will need to have the ability to generate wealth from the homes and work spaces built for them. The houses and shops will thus be built in compliance with the Addis Ababa City's legal requirements. This will allow them to have legal title to their properties which they can add to through time. Simply by virtue of expanding to the allowed framework they will be able to increase the value of their houses by up to fifty percent. In addition to this legal ownership of the houses and work/ market spaces will allow them to borrow and invest which will effectively allow them to move up the socio-economic ladder.

The Bamboo Market in Adada

The case for Bamboo as a Building Material

Things came before people. People came before words. Tall, green, and nameless, bamboo walked down centuries and crossed continents in time to stand there, waiting, naked of language, when the first people came, to make the first village.

~ Bamboo Construction Source Book

Figure 43

Several estimates show that Ethiopia has the largest area of commercially untapped bamboo in East Africa, according to the study *Ethiopia Leads the Bamboo Revolution* reported by Ed McKenna (2016) an estimated one million hectares.⁷³ Approximately a billion people live in bamboo houses, mostly in developing countries.⁷⁴ In Ethiopia, bamboo has traditionally been an important building element used for the construction of houses. It is used as a building component for walls, floor, has become a growing and lucrative industry. As of 2014, 100,000 square metres of bamboo was exported, which is expected to grow to an estimated 500,000 square metres by 2016.⁷⁵

Figure 44

Bamboo has many attributes that would make it an ideal material for construction. It addresses the question of affordability, availability and sustainability. It is a highly versatile material that can be used both processed and unprocessed, offers high structural integrity. Various tests and researches confirm that bamboo offers high tensile strength, high strength to weight ratio and high specific load bearing capacity. It is also highly durable and has natural insulation properties. Some species of bamboo are tested to have mechanical properties that surpass timber and concrete.⁷⁶

Another important attribute of bamboo is that it gives warning before structural failures, unlike timber which breaks if bending fails. When under pressure bamboo first cracks giving ample opportunity to repair or replace failure of parts of a house. Another advantage of using bamboo is it can be used unprocessed or they can be used in panels.⁷⁷

In comparison to most softwood trees which take 30 years to mature, bamboo trees reach maturity in 3 to 4 years, which make it an environmentally and commercially sustainable material.⁷⁸ In *Arada* bamboo will be a viable material for use in small and medium scale buildings; particularly suitable in Ethiopia given its abundant availability. This will create a local market for the bamboo industry in general, including small-scale bamboo farmers and provide a viable alternative solution to sustainable building in the country.

The Ethiopian Vernacular

People living in different regions of Ethiopia build houses that are specific to the region.

Different types of weaving and material choices identify the houses made by local residents.

These ways of building can be adopted by residents to make their houses uniquely their own.

Region	North		South			Central
	<i>Afar</i>	<i>Amhara</i>	<i>Sidama</i>	<i>Chencha</i>	<i>Konso</i>	<i>Oromo</i>
Climate	Desert Hot and arid	Temperate climate	Temperate climate	Temperate climate	Temperate climate	Temperate climate
Houses	Demountable tents	Named tukul, Have circular plans with conical roofs	Onion shaped with circular plans	Oval shaped houses	Separate huts for separate purposes (guest house, cooking)	Circular planned with different angle roofs
Materials	Wooden frames and leather mats	Mud and wood	Bamboo and mud	Bamboo and mud	Wood and mud	Mud and wood houses
Construction	The construction of these tents starts with clearing of twigs, pebbles and thorn bushes or the horn of an Oryx. A hole 15 – 20cm is then dug to erect the structure. The armature has three types of arches, longitudinal side arches (arhina) are first erected, followed by the transversal arches (aboli) forming the roof of the tent. The longitudinal and transversal arches are connected by threading in a small cord of bark (maderto) A third row of arches (allawe) is put up depending on the size and rigidity of the constructed tent. ⁷⁹	The Tukul usually have circular plans with conical roof. Construction of the Amhara Tukul starts with two posts being buried opposite each other into the ground. The central post (Meseso) is then set. This is followed by the setting in of several load bearing posts following a circular path following the first two posts, usually 10 to 12 in number. These posts are tied up by a series of ring beams. ⁸⁰	Skilled weavers are tasked with the construction of houses, which as in most parts of the Sidama life is also a social endeavor. Similar to the Amhara house, the Sidama also build their house around a central pole called Helicho, which in addition to structural support has a cultural significance, in that elders will not enter a house with out it. ⁸¹	These houses rise up to six meters with varying widths depending on the owner's wealth. Unique to other areas, the Chencha build the roof separately from the rest of the house, which is made of wicker work. Unlike the Sidama house, the Chencha house doesn't have a central pole. Instead the walls serve as a shell structure for the roof. ⁸²	The Konso architecture is particularly unique in its segregation of spaces. They build separate huts for different functions, and thus usually have four different huts per large family – Community hut – for events, which also serves as a courthouse; Guest huts; Shade hut for open working and resting space and Hiding hut for women and children for emergency. ⁸³	The Oromo, found in central region of Ethiopia have similar huts to northern Ethiopia. They build the huts with a central supporting pole holding up the roof. Variations in the huts are particularly noticeable in the angle of the roof – acute angled, obtuse angled or wall and roof formed of the same material. ⁸⁴

Part 3

3.1 A Live-Work Proposal

Incremental Housing and Market
Arada, Addis Ababa

Existing Site

Arada

The site is located in Arada, a historical commercial area in Addis Ababa.

MALE TO FEMALE
RATIO

53 : 47

TOTAL DWELLINGS IN
ARADA

50,349

TOTAL POPULATION IN
ARADA

211,501

SITE BUILDING/ZONING
INFORMATION

Minimum building height	5
Maximum building height	10

Land use: Commercial and Mixed Residential

Proposed Land Use as per 1994 Structure Plan:
Sub-Centre

Non-Permitted Development:
Industries, manufacturies and storages more than 500 m2 areas
Military establishments and prison
waste treatment plant and landfill sitas
Mining and Quarry

THE SITE

The site is a central location surrounded by key government offices including the Ministry of Transportation, the Ethiopian Television Corporation, the Commercial Bank of Ethiopia, and the 'Teglachin' monument within 500 metre radius.

SITE, Zoning information

Minimum building height	5
Maximum building height	10

EXISTING HOUSES

There are several settlements surrounding the site that are either Kebele housing or slum dwellings. These are to be cleared according to the Addis Ababa city plan of 1994.

Existing Site

Current housing and shops on the site are sub-standard housings- *Kebele* houses and Illegal settlements that are earmarked for development.

Illegal settlements and Kebele houses behind shops

Existing shops facing the street

Existing Site

Existing Site

Street View

Shops

3.2 Design Proposal

Incremental Approach:

Adopting ELEMENTAL's ABC approach of INCREMENTALITY, the project's initial phase will:

A. Focus on building the more difficult parts

Provide a framework that residents can expand into through time, including a structural grid, and plumbing

B. Provide what cannot be done individually

The planned layout of units, structural grid and plumbing that units can connect to

C. What will guarantee the common good in the future

Carefully planned layouts that ensure planned expansion.

This will ensure that overtime as residents expand, they also increase their overall wealth effectively allowing them to improve their social status.

Clusters of Units creating Courtyards:

Units arranged in clusters creating courtyards that provide a sense of privacy from the street and market areas. These courtyards can be used for various occasions as gathering areas for social activities, providing shared spaces where children can play, the elderly can gather around for daily social occasions and where various social activities can occur.

Clusters creating courtyards at various various stages:

Four incremental stages:

Lanes into Streets

The site is spatially organized into clusters of varying sizes connected by paths that lead to the city's main street, in much the same way as the city of Lilong in China. The lanes provide a semi-private area where residents and shoppers can mingle. The in-between areas are areas of activity and green space, creating a village feel, a city within a city.

Unit Design:

Structural columns are laid out and provided from the beginning providing a framework residents can add to. The structural layout is thus determined based on predetermined measurements of a unit.

Based on a one person one bedroom apartment, four different layouts were selected. Based on flexibility of configuration, two were chosen 7m by 8.6m and 5m by 12m.

Family Units:

For families, the individual units can be combined to make one large family unit.

Units and Clusters:

Clusters of units as a whole create semi-private courtyards.

Empty spaces that result from un-occupied units are spaces that can be used for various functions, such as drying of food and clothes. Thus open spaces that are not yet occupied have functions.

Three Dimensional View:

By providing a framework into which units can be filled in the integral hub in Arada provides areas of residence/work and open (not-yet occupied) spaces that can be adapted for various uses. An optimal occupancy of about 75% will allow for densification with enough open spaces for various activities.

Ground Floor Plan

- 1- Open plan market space
- 2- Green space, courtyard for social activities
- 3- Existing building, recent build (current approach to densification), 11 floors

Secon Floor Plan

Mainly for residential, but can also integrate market spaces

- 1- Open plan market space
- 2- Green space, courtyard for social activities
- 3- Existing building, recent build (current approach to densification), 11 floors
- 4- Residential units

Long Section:

Section across site shows units that have been occupied and open spaces available for future expansion.

Street front showing shop windows

Long section across site

Front elevation

Street view

Gathering areas with green space in courtyard

Interior of units - allow for ventilation, abundant natural light

View of a corner cluster of units with market spaces on ground floor, residence units on upper floors and un-occupied open spaces for various uses (food preparation, food and clothes drying,...)

Market spaces

Roof Structure:

The roof is an overarching canopy bringing together the cluster of units, the shops and living spaces. Its construction is reminiscent of vernacular Ethiopian construction. Residents can choose to fill in the frame of bamboo provided where they want shelter.

Bamboo Construction Sourcebook

Figure 45

Figure 46

Figure 47

Open Spaces:

Open spaces that are created by unbuilt spaces (to be incrementally occupied in the future) can be used for different purposes, for open cooking spaces, food preparation, clothes drying area.

Open cooking area

Food drying and preparation area

Clothes drying area

Circution:

Corridor around units serve as open circulation.

'Open Market'
Small shops that engage
shoppers walking by

Materials

Materials used on the site are chosen with affordability and availability of local materials in mind. Bamboo and concrete are both largely available locally. A concrete frame with an overarching roof made of bamboo provides a mixture of new and vernacular creating a unique experience.

Figure 48

Figure 49
Guardrail room
divider

Concrete frame

Concrete Block

Materials Alternative Construction:

Bamboo is a sustainable, relatively low cost material that is available in abundance in Ethiopia. This presents an opportunity for its use in construction, especially due to its structural qualities, including (but not limited to) the production of bamboo panel walls and bamboo reinforced columns.

Figure 48

Living - Working Relationship

First Approach

To separate living and work/market spaces a lateral arrangement was applied with the market in the front openly accessible to the public and the living spaces in the back to provide some privacy.

Living - Working Relationship

Second Approach

To create a more open market feel the whole of the ground floor was designated for market/work spaces promoting as an open market, with living spaces above. The separation in levels provided privacy.

Living - Working Relationship

Third Approach

The third approach was done with the intention of creating a continuous flow between the residential and market/work spaces. Intersecting living and work spaces can occur horizontally and vertically next to one another.

POSTSCRIPT: A Critical Reflection

A live-work environment for a low-income group can be challenging, particularly in a vibrant capital city like Addis Ababa where the cost of land is skyrocketing every year. It is considering these challenges that the Incremental housing approach by ELEMENTAL, which has been widely successful in Chile has been chosen as a possible adaptation for the residential and work/market areas for this project in Arada. This solution will resolve the question of affordability, preserve irreplaceable social and economic ties and maintain the existing city dynamics.

New Adada is meant as a viable solution to the high-rise that has taken over Addis Ababa in the last decade with the intention of housing crafts-makers that have for decades lived on the site. Serving as a hub where people can come to when seeking hand looming, and woodworking products and services provided by these craft-makers, Adada is an exploration for an alternative to the current trend of building that overemphasizes economic approaches; thereby it addresses the need for densification and underlines the need for incorporating social, historic and cultural aspects. In answer to the fundamental questions this thesis posed, architecture can offer a viable alternative to the high-rise in a city like Addis Ababa. Issues and the design can balance architecture with urban planning when building in a prime location for low-income population groups. This alternative is long overdue when considering important historic, cultural, socio-economic condition in Addis Ababa – certainly a sensitive viable option that could be adopted for other integral hubs in the city and adopted to other specialized living and/working conditions. If this mode of building can meet the densification requirements set out by the city, this alternative could prove more culturally and socially relevant than the adjacent high-rise in the way it maintains an irreplaceable social and economic fabric of the city and maintains Addis Ababa's re-identified city-scape.

In a world where local culture, history, and social norms are increasingly being superseded by economic priorities, it is increasingly important that existing societal ties are maintained as seen in the revival of Hanoks in South Korea. Rapidly urbanizing cities like Addis Ababa are in a unique position

to investigate what works in their municipalities and what to learn from other cities as they rebuild their cities for the future. I believe this is the type of intervention that can offer a cultural and spatial identity, economic relevance and is sensitively designed with the target users in mind.

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