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COMPOUND CITY:

SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACT IN THE PRODUCTION OF GENERATIVE URBAN SPACE

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Bachelor of Architecture Thesis

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"Compound City" will focus on the implementation of an open source, social infrastructure, as a methodology in addressing the on-going urban crisis in Lagos. Dealing primarily with urban informality, Lagos will serve as a theoretical testbed, providing a natural precedent in which to test these ideas. How can open source technologies - softwares & hardwares - subvert or embrace existing infrastructures/processes as a means of alleviating inadequate living conditions? Identifying the coincidental pressures in Lagos will help establish project parameters, driving the development of design criteria to be addressed by the new, open source, platform.
OPEN SOURCE

a digital phenomenon describing the processes in which software (and source code) is made freely available, and may be modified and redistributed under a common "license".

INFORMAL SETTLEMENT

is the spontaneous settlement or occupation of abandoned or otherwise unoccupied areas of land or existing structures; these communities typically found at the periphery of major cities.

FORMAL INSTITUTION

a structure or mechanism of social order which governs and guides the behavior, organization, and production of a given community and/or population; i.e. regulative forces often of a legal definition.

CUSTOMARY LAND OWNERSHIP

refers to the customs or typical land use practices associated with a particular culture or society; in this case, referring to traditional practices of land ownership in Nigeria.

STATUTORY PLANNING

refers to the formal regulation and management of changes to land use and development; such regulation is overseen by various government bodies - typically local councils - who assess the general compliance of changes proposed.

TOP DOWN

referring to a hierarchical structure or process where the establishment of control, direction, and organization are subject to a singular, central, authoritative power; progressing from the large, basic authoritative unit, to smaller and increasingly detailed subunits.

ORGANIZATION SPACE

a framework of architecture focusing on the temporal, relational, and generally dynamic conditions defining a complex spatial system; allowing such a framework to respond to complex crises that prototypical modes of urban development cannot.

SOCIAL INFRASTRUCTURE

typically refers generally to a class of internet services which allow the integration of social functionality for web sites and devices (mobile or otherwise). In service of the thesis, the concept of social integration remains intact, but now refers to the integration of social processes and organizations into a regulated open source framework.

INFORMAL ORGANIZATION

the interlocking social structure that governs the means by which people work together; the aggregate of social and economic relationships, both personal and professional, built upon common organizational affiliation. "Organization" consists of dynamic personal relationships, social networks, and groups of common interest; as a result the informal organization is capable of evolving, shifting to serve the complex dynamics of its constituents.
“Scholars often think about similarity and difference when studying wealthier and poorer countries, such comparisons tend to remain within a narrow comparative geographic scope between contexts in the USA and Europe as the centre of discussions.” (Ikioda, 2013)
How will architects establish the tools, infrastructures, and institutions for new global ecologies?
"The major factor that has attracted population to the city has been the greatly enhanced socio-economic and political status of the city within the Nigerian Federation... Important state ministries had their headquarters in Lagos and in turn both business and commercial enterprises tended to locate their headquarters in the city." (Abiodun, 1974)
The major factor that has attracted population to the city has been the greatly enhanced socio-economic and political status of the city within the Nigerian Federation...

Important state ministries had their headquarters in Lagos and in turn both business and commercial enterprises tended to locate their headquarters in the city. (Abiodun, 1974)

There exists an intense migration into Lagos – the greatest number of these migrants belonging to the Yorubas of the Western State.
"The temporary housing provided in Surulere became permanent as it became impossible for many of the displaced population to reacquire and redevelop their plots in the central city..." (Abiodun, 1974)
The layering of population displacement, low wages, and increasing migration, coincidently generated informal settlement and expansion.

“NIGERIAN CITIES ARE BECOMING MORE AND MORE CHARACTERIZED BY URBAN SPRAWL TO THE EXTENT THAT DISTANCES BETWEEN PLACES OF RESIDENCE AND OTHER LIFE-SUPPORTING ACTIVITIES SUCH AS WORK, SCHOOL AND SHOPPING CENTRES ARE INCREASINGLY OUT OF WALKING DISTANCE. THIS THEREFORE ENTAILS MOTORIZATION” (AKINBAMI AND FADARE, 1997)

As the urban areas sprawl at their peripheries and the core areas break down with the burden from increasing demand for social services by the population, they consequently become homes of the poor, and the sites and sources of environmental pollution. (Braimoh and Onishi).

A large percent – around 40% – live between 10 – 12 miles distance from the city center, forcing many to own vehicles or commute by bus.
LAGOS...HAVE BECOME VICTIMS OF TRAFFIC CONGESTIONS...TRAFFIC VOLUMES UP TO 100,000 VEHICLES/DAY ARE STILL RECORDED FOR SOME MAIN ROUTES...TRAFFIC CONGESTION HAS ASSOCIATED WITH IT SOME SOCIO-ECONOMIC CONSEQUENCES SUCH AS LOSS OF MANHOURS, AND HEALTH PROBLEMS WHICH CANNOT BE EASILY QUANTIFIED...

THERE IS A CONSIDERABLE EMISSION OF POLLUTANTS SUCH AS CARBON DIOXIDE (CO2), CARBON MONOXIDE (CO), SULPHUR DIOXIDE (SO2) AND THE NITROGEN OXIDE FAMILY (NOX) FROM VEHICLES IN MAJOR URBAN CENTRES...60% OF TOTAL GASOLINE AND DIESEL CONSUMPTION IN NIGERIA TAKES PLACE IN LAGOS..." (AKINBAMI AND FADARE, 1997)
With the drastic fall of oil prices in 1986, the macroeconomic reform program popularly known as the structural adjustment program (SAP) was introduced. Public housing that was available to workers after considerable subsidies from the government. SAP led to a sharp increase in the cost of building materials. Similarly, the cost of property maintenance skyrocketed, whilst landlords also increased house rents. (Braimoh and Onishi)

The result of high vehicle density, and severe congestion; the socio-economic impact of which cannot be easily quantified.

"INADEQUATE HOUSING LEADING TO THE EMERGENCE OF SLUMS, SPATIAL INEQUITY IN ACCESS TO LAND AND INFRASTRUCTURE, HAPHAZARD LAND DEVELOPMENT, INFRASTRUCTURE DECAY, INCESSANT FLOODING, WIDESPREAD POVERTY AND UNEMPLOYMENT ARE SOME OF THE SYMPTOMS OF UNSUSTAINABLE EXPANSION OF THE CITY REQUIRING THE INTERVENTION OF LAND USE PLANNERS AND MANAGERS." (BRAIMO H AND ONISHI)

SIMPLY PUT: OVERPOPULATION DUE TO MIGRATION, LAND USE POLICY, MOTORIZATION, AND LIMITED RESOURCES HAVE PUSHED LAGOS' INFRASTRUCTURES TO THEIR LIMITS.
“FINDINGS DURING THE STUDY SHOWED THAT FLOODING PROBLEMS IN LAGOS ARE ANTHROPOGENIC... THIS MIGHT BE COUNTERINTUITIVE, GIVEN THE GENERAL PERCEPTION THAT CLIMATE CHANGE IS BOUND TO HAVE RESULTED IN INCREASING RAINFALL...”

(ADEYOLE AND RUSTUM)
Various conditions plaguing Lagos are interconnected, acting out a continuous cycle. Which conditions can architecture explicitly address in order to remedy the deterioration of Lagos?
"...STATED BY IBRAHIM BABANGIDA: ‘WE HAVE NO FAITH IN THE STRATEGY OF CONCENTRATING MOST INVESTMENTS IN URBAN AREAS WITH THE HOPE THAT BENEFITS WOULD LATER TRickle DOWN TO RURAL AREAS, BECAUSE THEY RARELY DO. IN FACT, IN THE NIGERIAN CASE, RESOURCES TEND TO FILTER UPWARDS LEAVING THE RURAL AREAS EVEN POORER.’ (OGUNJUMO AND SALAMI, 1990)” (AKINBAMI AND FADARE, 1997)
Hence a bottom-up development strategy which involves the rural dwellers and peasants in the development planning and implementation should be adopted. (Akinbami and Fadare, 1997)

What methodology would a "bottom-up development strategy" employ? How could an infrastructure make use of "dwellers and peasants" in the development of Lagos?
"Marketplaces in Lagos may although appear disorganised and seemingly chaotic, but they still potentially reveal important interconnections that can inform and illuminate theories on retailing and consumption in new and exciting ways."
(Ikioda, 2013)
"FORMAL" VS "INFORMAL"

UNDERSTANDING LAGOS’ ORGANIZATIONS
- IN PART - AS A COMPLEX SERIES OF SOCIAL INFRASTRUCTURES.
"Can you do it on your own?"

"We can, but we also need the government. There are a lot of things we cannot do it on our own. We cannot build the roads on our own. We cannot generate electricity on our own. The telephone system and new networks are monopolized by government."

Welcome to Lagos

What is needed is a regulative foundation that provides communities with a stable platform for growth.
Still from Lagos Wide and Close: A woman waits patiently for her call to go through—telecommunication services are inconsistent, and reserved mostly for government use.

"Developing and installing modern and cheap telecommunication systems offers great potential as an alternative to physical movement."

(Akinbami and Fadare, 1997)

Are there existing platforms or technologies capable of operating as "bottom up" social forums?
"WIKIHOUSE IS AN OPEN SOURCE CONSTRUCTION SET. THE AIM IS TO ALLOW ANYONE TO DESIGN, DOWNLOAD, AND PRINT CNC-MILLED HOUSES AND COMPONENTS, WHICH CAN BE ASSEMBLED WITH MINIMAL FORMAL SKILL OR TRAINING."
WikiHouse is capable of providing the design, distribution, and assured quality of low-cost homes. This is achieved by taking advantage of freely available softwares and technologies.

Left: Image illustrating parts layout for any given WikiHouse model - these sheets are typically come in .svg format, and are ready for immediate mill use.

DESIGN
DESIGN FOR CLIMATE, CULTURE, ECONOMY, ENVIRONMENT, AND SAFETY.

RECYCLE
DESIGN CHEAP, LOW CARBON, RECYCLABLE, BIODEGRADABLE, SOLUTIONS.

BUILD
DESIGN TO DISMANTLE, DESIGN FOR MISTAKES.

FEEDBACK
WHAT IS OPEN SOURCE? IT IS NEITHER A DIGITAL, SOCIAL, OR PHYSICAL CONCEPT—BUT A CONFLATION OF ALL THREE.
LATERAL EXPANSION ONLY INCREASES SPRAWL, EXACERBATING INFRASTRUCTURAL PRESSURES
While WikiHouse provides a flexible "all-in-one" solution, it does not address verticality.

Left: Diagram and map illustrate how WikiHouse - due to current lack of vertical construction - would only exacerbate the already growing urban informality.

Above: Diagram illustrating what WikiHouse does currently, and what it doesn't; mainly, the inability to build vertically.
“Makoko Floating School is a prototype floating structure, built for the historic water community of Makoko, located on the lagoon heart of Nigeria’s largest city, Lagos. As a pilot project, it has taken an innovative approach to address the community’s social and physical needs in view of the impact of climate change and a rapidly urbanizing African context. Its main aim is to generate a sustainable, ecological, alternative building system and urban water culture for the teeming population of Africa’s coastal regions.”

Left: Diagrams illustrate the project’s response to local constraints and technologies, harnessing both to provide a low cost and realistic solution for the community. Above: Similar to previous “feedback” diagram, this shows how the floating school project utilized local materials and technologies to produce the school locally. Missing is the open source capability to “learn” from build experience and build upon its platform.
What is fantastic about the floating school, is that it provides a blueprint for what works in Makoko; a project that addresses a multitude of constraints in a coherent solution. It suggests the possibility in how alternate building systems might also address the vast sprawl that now characterizes Lagos; maintaining quick construction, low cost, and with minimal effect on the environment.

The slight drawback is the concentrated effort needed on the part of NLE to produce just one of these structures. What would happen if these blueprints were freely accessible by the community? How might that alter the community’s ability, and need, to provide for itself?

"STRUCTURAL SOLUTIONS ARE THEREFORE UNSUSTAINABLE IN THE LONG TERM BECAUSE THEY CAN DAMAGE THE ENVIRONMENT, THEY ARE COSTLY AND, MOST IMPORTANTLY, THEY ARE TIME CONSUMING." (ADEYOLE AND RUSTUM)
While the floating school makes use of vertical construction, it still lacks the flexibility of WikiHouse.
The site for the project will be located in the suburb region of Ebute Metta, operating within existing urban blocks as a foundation for informal development. Architecturally the platform will operate as a hybrid, merging the most advantageous qualities of the Wikihouse platform, and the Makoko Floating School project while addressing four major criteria.
A NEW FRAMEWORK

CLAIM SPACE FROM SPRAWL

ADDRESS SPRAWL, REDUCE CONGESTION

LUMBER MILLS, RAW MATERIAL YARDS, WASTE SCAVENGERS, ELECTRONICS MARKET

VERTICALITY

public data feedback
reclaim space from sprawl
new generations
lumber mills
raw material yards
waste scavengers
electronics market

1.0

1.4
HYPOTHETICAL FLOW CHART HIGHLIGHTING WHERE AND HOW AN OPEN SOURCE PLATFORM COULD INFLUENCE THE EXISTING DYNAMICS OF LAGOS.


http://www.openstreetmap.org/#map=13/6.4693/3.3673
http://www.geocommons.com/
http://www.nigerianstat.gov.ng/
http://www.gapminder.org/
http://kff.org/globaldata/
http://www.who.int/research/en/
http://stats.oecd.org/Index.aspx
http://data.un.org/
**STUDIES**


**FILM**


**ONLINE**


**GIS**

http://downloads.cloudmade.com/africa/western_africa/nigeria/lagos#downloads_breadcrumbs

