

# SWAHILI ECHO-SYSTEM: A PATTERN FOR THE SYMBIOTIC MEGAREGION

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## Abstract

*The paper lays the foundation for territorial structural symbiosis based on an “echo-systemic” organisation, a principle drawn from studies of ancient Swahili territories. This singularity constitutes a systemic model for mega-region eco-design; impacting societal, architectural, urban and governance aspects; transcending local and global scales; and shifting the rhetoric on globalisation, world-system, climate change, architectural and urban epistemology.*

## Keywords

*Mega-regions; Symbiosis; Echo-system*

## Introduction

### *Lack of knowledge diffusion resulting into errors of appreciation*

The scientific method of compartmentalising objects through chronology deceives the data by shadowing a fact: the notion of evolutivity, which is necessary to the assimilation of structures as evolutive and perishable organizations. The research specialization implies a silo work inducing a lack of porosity between disciplines; resulting in the attribution of new emergence property to economic structures, urban typologies known in other discipline and named differently; causing knowledge inconsistencies.

The analogy between the global city and the city-state – *two figures belonging to different temporalities* – makes sense: they are both agglomerations politically and economically independent of the territorial entities that surround them and play a role of importance in an economic, political and cultural network spread over several distinct remote geographical units. This milieu of connectivity, exchange and influence is the concept of world-system [Wallerstein 2004]. Globalization is a phase of saturation of this flows space, which is characterized by a hegemony often announcing a new conformation of roles, specializations and the importance of cities and flows that pass through them. They are produced by human activities and policies constituting an *aroused milieu* which in turn influences the profiling of urban and territorial figures.

For three decades, scientific findings state that modern capitalism is neither the source of this structure of exchange nor the cause of this state of phase, both have manifested since the Bronze Age [Gunder, Gill 1992]. This imposes systemic and complexity thought, considering city-state and global city as the same object observed through time and different international relation regime (states systems vs society of states) [Holsti 2009].

### *Knowledge porosity, shift of regard and the rising of a new paradigm*

Patrick Geddes, a biologist and sociologist by training, then urbanist by practice, spread the idea that urban figures are living organisms. He defined the «conurbation» [Geddes 1915], that we contemporaries reduce to urban sprawl, eclipsing the fact that it prefigures the thought of regional planning [Welter 2002] and the megalopolis figure. In his vista, urban and territorial figures are objectified states of evolution; sustaining the idea of a genealogical growth process; extending biological studies to the physical structures and artefacts built by humans.

Gregory Bateson, an anthropologist, psychiatrist, biologist, and epistemologist, asserts that the taught knowledge tends to be theoretical, partial and unrelated to a “wider knowing” that connects natural and human phenomena, through patterns found in nature [Bateson 1979].

Geddes and Bateson had in common an inter-trans-poly-disciplinarity [Morin 1990] ability to seize complexity. This shift of regard allows another reading of historical and scientific facts; re-engaging past and present events, problematics and their interpretations; and opening the perspective to new future potentialities. In this reinterpretation process, three conceptual cleavages and one relationship are to be deconstructed: ecology/economy; nature/artefact; urban/rural; and, the causality between capitalism and world-system. The first world-system was triggered by a major climate change drying up the lands around 3000 BC. The areas unfavourable to agriculture forced human groups to migrate; while in fertile areas, the game of demand and supply instigated the marketing of agricultural products, leading to surplus production that required urban infrastructure for storage and sale [Gunder, Gill 1992]; this situation has driven an eruption of cities; therefore, displacing the causality relation on land usage, exploitation of natural resources in response to environmental conditions; implicating first social, cultural and ethical values rather than solely economic policies.

Part of this first Afro-Eurasian world-system, the Swahili territory – *a mega-region prefiguration* – and the Swahili community – *a paradigmatic societal model* – are studied to propose a reflection on contemporary dilemmas such as the articulation of local and global circular economy, joining ecological to economical thought; setting a symbiotic relationship between natural and artificial ecosystems; questioning what was lost in terms of collective intelligence, large-scale systemic self-organization and ability to live as symbiotic with natural environment.

## **Materials: objects studied and corpus**

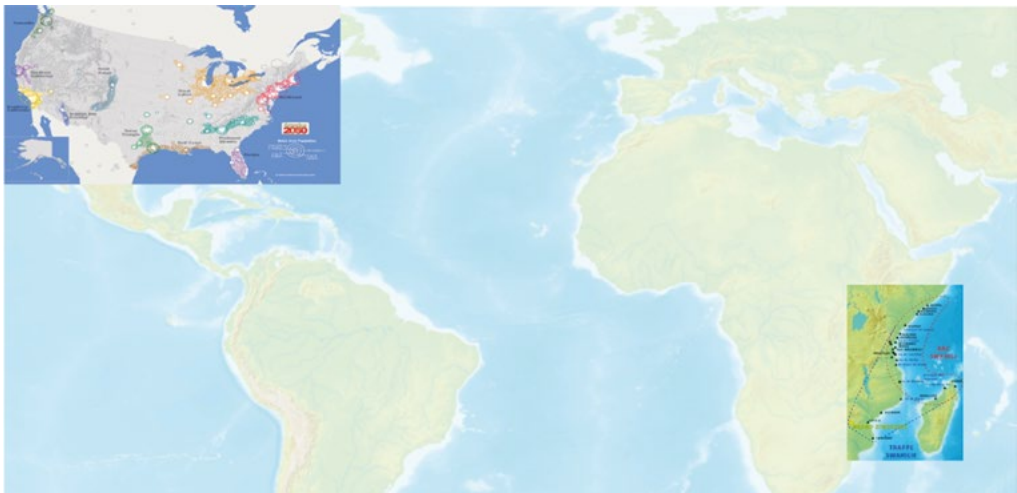
### *Subject in question: the contemporary mega-region*

The mega-region is a territorial figure, its study includes the global city urban figure. They are both related to the phenomenon of globalization and the world-system; although they are intertwined, they express in opposed form: the global city is dense and centralized urbanism; the mega-region is a diffuse and polycentric territory, encompassing one or more global cities of different categories.

Swahili words	
<i>Duka</i>	word of Arabic origin, means shop in several locations around the Indian Ocean basin.
<i>Majengo</i>	literally buildings by extension hamlet, village, settlement, colony and city.
<i>Shungwaya</i>	territory of origin where the Bantus and Austronesians met, located in Kenya.
<i>Wa-ungwana</i>	<i>Those of Ungwana</i> refers to the Swahilis around the geographical area including the Lamu coast and archipelago, it is a community self-proclaimed as the Swahili patricians, due to their prominence in the global trade between the 9th and the 16th century.
<i>Kaya</i>	the <i>kayas</i> are forest enclosures, the Mijikendas places of settlement, today considered as primary forest sacred sites.
<i>Mijikenda</i>	<i>the nine cities</i> by extension <i>the nine tribes</i> refer to a group consisting of nine tribes living on the coast of Somalia, Kenya and Tanzania, often opposed to the Swahili groups that represent the urban group while the Mijikendas are the rural group of the hinterland.

Before being a territorial planning strategy, it is an observed phenomenon; the first known is the Northeast, called *megalopolis* by Jean Gottmann [1961]. Often referred as corridor, chain, arch, archipelago and continuum; they are linear reticulated figures that follow the relief, geographical identities, navigable axes and coastlines. When instrumentalised, it is an apparatus used to sustain global cities, by the constitution of a local supportive structure, via federating regions sharing and developing of mobility infrastructures, economic competitiveness and social solidarity; revalorizing and redeveloping the local scale [Sassen 2012].

There are forty formed and under formation on all the continents. They are autonomous from state structures and tend to be transnational; its mode of governance is at question since it challenges state sovereignty. The largest is in China, it's the Pearl River Delta, surfacing 39.380 km<sup>2</sup>.



1: America 2050 Plan and the ancient Swahili territory [Wikipedia map elaborated by F.L. Rasoloniaina].

### *The subject of comparison: the Swahili mega-region*

Between 1000 and 800 BC, under the equatorial latitude, the West African Bantus and the Southeast Asian Austronesians converge simultaneously on the coast of East Africa; they constitute a large group of primo-Swahilis [De Vere Allen 1993] from successive waves of migration on a territory called *Shungwaya*; which will extend over several centuries in a long ribbon on land and sea, forming the Swahili territory.

The comparison with the America 2050 Plan emphasizes its size and distribution on several countries, from south Somalia to north Mozambique, on more than 400 Swahili sites, mainly ancient city-states. The nebular pattern of settlement sites propagation [Bonnemaison 1992, 415] constitutes an Austronesian-like nodes network on land and sea [Bonnemaison 1996]; and the heterogeneity of Swahili groups origin raise the question of the generative engine of the Swahili territory, which has produced city-states and autonomous *majengos*, identical from the urbanistic and architectural points of view, at each point along the territory.

### **The method**

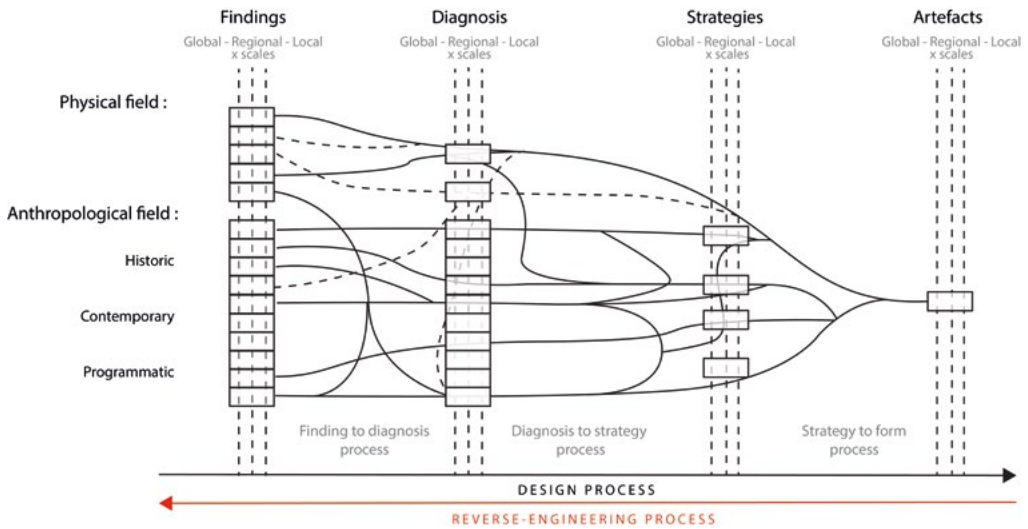
The Environmental Genetic Code (EGC) is used as a hermeneutics tool that draws up the complexity of a contextual environment, through the setting up of cartographic data visualizations on a systematic reading/writing grid. It proceeds on the embryonic development model, through a stratified physical and anthropological information column. The maps produced are placed on this matrix, from which causal, influence, impact or other links are drawn through a timeline and under different observation scale levels. The crossed maps imply the creation of new cards and intelligible threads, this deployed growth narrows and highlights significant emergences and recurrences that are the characteristics of the analysed entity; which is decrypted in its environmental and historical context, but also in its semantic and symbolic field.

In the end, they deconstruct buildings or inhabited territory, reversing the morphogenesis phases. The weaving obtained is a visual heuristic trace that constitutes intelligibility, a thread of thought. The device strength allows the bivalent usage as retro-generation or design process.

### **The results**

The reverse-engineering analysis on the EGC shows that the Swahili system is structured on the mirror conformation principle of the anthropized production with the environmental ecosystems. The major fact is that the cities, city-states and islands are systematically in the proximity of coral reef and mangrove ecosystems; this pattern is an Austronesian marker.

The correlation between the origin of this Southeast Asian group and these two ecosystems, in the *Coral Triangle* in the same region, indicates an installation pattern encoded in ancestral operating cosmology; this also is supported by the Swahili architectural



2: EGC phylogenetic matrix [Patrice Ceccarini and F.L. Rasoloniaina]

construction mode that uses resources from mangrove wood and coral limestone; whose structural model is a Javanese constructive grid associated with the Limasan [Idham 2014]: a spatial organization with three traverses, the median is left as free passage leading from the front to the rear of the building; formalizing two side wings where the service and sleeping spaces are distributed.

The heuristic weaving directed on the Austronesian biotope and culture resonates with the Cultural Geography and Joël Bonnemaïson's work which allowed the decoding of the Swahili system.

### *The Swahili system decoded: a production of the territory mirroring the ecosystemic zonation*

The observed milieu presents a zonation of the ecosystems from the oceanic coast to the lands, with fringe effects interposed by ecotones: the coral reef, the seagrass, the mangrove, the plain and the mountain forest.

On a 25 km wide strip, the Swahilis are settled in two types of urban figures: the *majengo*, the spread city and the coral stone fortress, the enclosed and centred city, often a city-state. In the hinterland, on the forest and mountain band, the *Mijikendas* live in two types of rural figures: the spread village and the *kaya*, a vegetal enclosure nesting a central void. This Swahili / Mijikenda ensemble produces a double string of settlement units.

The Austronesians have a binary division of settlement and territorial occupancy, "those of the coast" and "those of the forest-mountain". This Austronesian indicator made possible to affirm a sole societal affiliation between the Swahili and Mijikenda communities; fact that was forgotten.

The mangrove forest spreads from sea to land, in a succession of four species and subspecies from *Avicennia* to *Bruguiera*. This highly ordered species zoning by different

densities and heights constitutes the mangrove resistance against offshore winds. By analogy, the Swahili community is based on the diversity of origins, their distribution in space corresponds to a societal role as metier, not relative to hierarchy. It illustrates the principle that the union of differences is the strength of the group and homogenize it. Like the mangrove forest zonation, the swahili built productions are spread from the seashore to the interior plain, from small hut to complex 'stone' building. This distribution follows a zonation graded on construction mode: from the vegetal to the mineralized vegetal structure. This ultimate stage is a reminiscent process of the coral exoskeleton fabrication. The swahili stone wall is a three-layer sandwich, its core is constituted by a double-stud square grid of mangrove wood, as building skeleton, filled with an apparatus of clay and coral stone; that core is covered on interior and exterior sides by a clay and lime mortar sealing coral stones; finished by a white lime coating. This technique still used is in line with an economy of means that draws its resources locally.

### *Societal production by inclusion and vegetative expansion supported by a link policy*

James de Vere Allen argues that the Swahili community is a societal structure by inclusion of individuals from heterogeneous immigrant groups; and its integration mode is the swahilization process [De Vere Allen 1993, 246]. The candidate who wants to change his condition must accept detribalization to adopt the practice of the Swahili language and lifestyle to become a Swahili [De Vere Allen 1993, 246], without losing their original identity, used as an interfacing vector in the mercantile exchanges.

The acted adhesion allows any Swahili to become part of a societal system regardless of their location across the territory. The easy application suggest that the Swahili society implies a collective intelligence, articulated by a vegetative system with either no centralised control nor governance, but a multiplicity of simultaneous responses to contextual stimuli, which conforms itself to a reference scheme [Bronckart, Schurmans 1999] based on a simple and self-regulated behavioural register. This autonomy of the components process is found in the Austronesians but also in the development of coral colony. The social and urban fabric regularity is rendered by a political geography of relations in "nexus"; a string of connecting knots. This linear of nodes is at the origin of the reticulated mesh of a large-scale territory, weaved in a "plexus". Each node is a "complex" of human settlement unit; it is a thick wrap encircling a clearing in "living heart". This urban void is found by homothetic design of the dwelling, at a smaller scale, echoing the "living heart".

### *The gain symbiosis with the surrounding ecosystems*

Nobody designed the territorial strategy in arch or trap shape, it is a collective self-organization. The ecotone situation, bordering maritime trade and hinterland resources, made the Swahilis key players in intermediate trading. With the mangrove forests and coral reefs preventing large-tonnage ship to berth, the Swahilis monopolize the supply, resources transport on land, the transshipment and cabotage along the seashore.

In an environment saturated with brackish water, sulphate and acid; little oxygenated, the *majengos* rise from the territory like pneumatophores; living hearts are like lenticels that connect the interior of the plant or the city with air. This breathing principle is declined even in the dwelling design where the living hearts are patios.

This structural symbiosis is done through:

1. an hologrammatic principle passed on through a cosmological conformation based on «ecomimicry» [Marshall 2007] of the endemic regional ecosystems, this principle is referred as echo-systemy [Rasoloniaina 2014, 141];
2. a mode of rhizomic expansion governed by a vegetative system: the principle of self-organization;
3. a standardization of the buildings to implement the categorization process and societal and cultural self-inclusion;
4. a mode of thinking and fabricating, the principle of “making system by being part of it” with the physical geography, the societal and economic geographies.

Swahili pragmatism stems from the minimal gap between the ecumene and the potential of an environment. With very strong environmental constraints, they have optimized the Austronesian heritage by constituting a structural, systemic and operative “ecological” thought.

One question remains: how to explain consistent standardization on such a large scale of territory?

### *Back to the future*

The return to the contemporary elucidates this interrogation, Saskia Sassen [1994] says about the global cities that their architectures have become infrastructures that incorporate standardized routines that impose their own systemic compliance. The characteristics of the city are no longer felt according to its urbanity *citiness* but through its circuits of specialization in the world-system. She puts on emphasis on their similarity and speaks of a standardization effect; Becherand affirms the notion of «Standard City» [Becherand 2011].

Contemporary discursive regime tends to reject global cities assimilated to globalization, but their ease of appropriation, the acquaintance feeling of their perceived urbanity rule at a glance make them to be of pragmatic usage. This equality at each point of the territory gives a conformity and belonging feeling; conferring an identical status to any user; providing a systemic equity that facilitates circulation without the right to the city ever being questioned.

### **Conclusion**

The Swahili stone fortress and *Mijikenda* vegetal *kaya* were systemic answers to the contextual stress, their abandonment to find the Swahili *majengo* and the *Mijikenda* village when the favourable conditions return suggests that the urban form is a response or adaptation to a perceived context. Like biological cells, human groups have encoded

presets aiming to cope with contextual situation, and without losing its values and systemic structure. That later stages a structural symbiosis between *Ars e Natura*.

The Swahili binary territory reminds us that conceiving the urban territory implies addressing its rural pendant. This invites us to revisit the phenomenon of *shrinking cities*, engines of western urban agriculture contemporary movement and the first major circular economy urban initiatives reinforcing construction waste management.

The mega-region must be more than a development strategy in terms of mobility infrastructure and competitiveness; it must be a societal project in which the question of democracy and the integration of immigration are considered as constitutive parameters. Saskia Sassen [1994] traces all the stratification and socio-economic, ethnic and political diversity of the actors of the global city, which together make the city and constitute its intrinsic properties.

The world-system, globalization and climate change are driving conditions for re-establishing a symbiotic thought. It is in the interweaving of systemic transcalar components that the environmental challenge will be resolved. It is the emergency parameter that will constitute the ability to turn a negative element into a positive one; not as an ideological political ecology but as a pragmatic practice of the city.

The acculturation imposed by globalization is a factual and non-dogmatic opportunity to implement systemic mode of thinking and building. Still, we must adopt appropriate governance policies, get out of the catastrophism and populism discourses to find new formats, deploy collective intelligence and join theoretical thinking with practice in order to act with pragmatism.

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