

DAR SMART THE CITY TERRITORY.TOWARDS A NEW DIMENSION

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Abstract

Our research focuses on how cities balance both macro/micro-economic factors and their spatial structure according to cultural factors: the underlying form of residential/public areas and landscapes. It discusses the relation between new settlement, activity and space and it takes into account the way different cultures are and how their activities require diverse demands on movement, new settlement of formality, gradients and co-presence. Finally we have to determine both the way how patterns of infrastructure/space integration influence the location of different settlements, classes and social groups in the city and how is possible to solve the pathology of housing and public realm estates. The spatial form needs to be understood as a contributing factor in forming the patterns of sustainable urban metabolism, integration or segregation in the city. The starting point of this work comes out from the necessity of defining the contemporary city within its territory, through a clarification of a new scale of intervention. The framework of our research coincides with the formal and structural dimensioning of the city territory. The need for a cultural "jump" is necessary in order to identify a range of elements and relations in the urban context, rather than simply upgrade the instruments of intervention and investigation. This means a better definition of the structural pattern and spine of this reality, so as to show the discontinuity occurring in the urban development and in the cultural awareness of such phenomena.

Our incoming research on Dar es Salaam follows the strategic modeling document by World Bank Senior Urbanist Pedro Ortiz, document that is used as a methodological indication in the development of a settlement. Its design in the urban context of Dar es Salaam will follow the idea of a variable formality gradient, conveniently located as proposed by the metropolitan spatial strategy suggested by Ortiz. Such a scheme guarantees the connection of every settlement to the bus rapid transit system (BRT) and the integration with the surrounding peri-urban agriculture through local form-typology specificity. Such an approach may envisage a sustainable relation between grey and green infrastructure, the latter intended as the hydro-geological system of the territory. A strong economic attractor related to the infrastructure system should foster the reversal of spontaneous settlements back into legality, providing them with services aiming at improving the sustainable level of

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the entire city. In order to cope with the historical structural transformation of the type of settlements, some guidelines on methodology and scale will be suggested, so as to structure the basis for an intervention and, as a consequence, of a specific form of the city-territory.

We promote the appearance of a new scale of settlement typologies and their consequent interrelations, and a change in the urban/rural relation. A formality-gradient type, which capitalizes on its city-center proximity its advanced services, will be determined in relation to mobility structures. Such device should also be able to communicate with the agricultural landscape, which doesn't just have the potential to provide products for consumption and sale for local communities (urban agriculture), but becomes, on the other hand, an element of urban regeneration, as it has always been i.e. in the tradition of the Italian landscape.

1. Introduction

The metropolitan Form comes from the location and integration of large-scale structural elements that coalesce the metropolitan size and extend urban-style living standards to larger populations located in sub-urban areas. Economic structures, including office buildings, factories, enterprise zones, corporate campuses, etc., along with Civic structures, such as full-service hospitals, universities, stadiums, etc., are designed to accommodate ex-urban residents. Transport structures include commuter trains, high-speed trains, airports, freeways, etc. structures that support larger, remote populations and the systems to enter them are the essential elements of the metropolitan Form. Metropolitan territory is “controlled” by a handful specific of local infrastructural nodes These nodal points shape the structure that articulates the metropolis. If these strategic points are located where the Green Environmental and Grey Transport infrastructures are most compatible, then the Metropolitan territory can be controlled. It can be a fatal mistake to impose a strategy upon a Metropolis; rather it must be formulated in conformance with the territory, and structured to take advantage, in the most efficient manner, of the available assets. In the case of the Metropolis, those assets will be the transport infrastructures and the regional size economic or social projects.

1.1 At the new scale of the city growth it cannot react with maintenance or with a partial renovation. Must transform it radically.

Incorporating discontinuous infrastructure (Housing, Productivity, Social) around the strategic nodes increases and expands their strategic importance and, as a consequence, their influence on the surrounding territory. At last, the Metropolis becomes a patchwork of dynamic urban or semi-urban patches and interchange points, where people gather because of their natural attractiveness (Green

infrastructure) and, being crossroads (Grey infrastructure), their convenience. Sent out from the points of interchange place themselves living, working, and social assets, whose borders comprise a “district” of interchange neighbours. Each district owns its distinctive character and it's similar, considering its structure and balance, to the infrastructure assets. These controlled territories form the basic structural form of the Metropolis.

The design of the Metropolis Form has to arise from a spatial concept that synthesizes the strategic assets of the districts in an overall form. Once that strategic form is recognized, then the tactical location of specific projects can be effected. Each project must reflect the strategic concept as tactically applied to that district – the Concept takes Form through the projects. This is "the art of shaping the Metropolis", that proceeds by the Ortiz's methodology of development. Therefore we could say that this is a discontinuous reform: the birth of interferences inside the new urban roads: a development method. In fact, rather than a formal model we can better talk about a development model, which consists both of a series of patterns that indicate a direction of the settlements growth and a series of maps which suggest a possibility of configuration/form that constitutes a characterization of the individual qualities with gradient of formality.

1.2 Compatibility between economics and planning // efficiency and equity

The realm of economy is often considered as an exclusive realm, connected mainly to a regional scale and planning. The concept of time (seen as the metabolic product of society) within the city is not totally understood, therefore is important to think about it as a witness endowed with signs that express the presence of a culture in a specific time, as a particular life-style presence. Transport planning, particularly suffered from a conflict between efficiency and equity. Often, large political powers found more convenient upgrading already existing facilities in the central areas rather than designing new infrastructures, but still we need to consider the important possibility of creating a democratic balance, which means going towards an equivalence between the times-regions. The conflict, then, appears between convenience and compatibility of certain works and plays through a profound social sensibility in order to limit the impact of economic activities and large infrastructures, that undeniably could transform the area, on the environment. We call this "new territorialisation of the region". This aspect is in contrast to the relative immobility of the traditional cities order, based on a horizontal system of traffic -in some cases now even out dated-, and leads us to suggest an integrated model, based both on a capillary action and on the rapidity and the multiplicity of communications, which are spread throughout any direction reclaiming the land to the nature.

1.3 A paradigmatic model to order the real city growth A vision and an idea for the regional city development

Our research starts from the regional scale: the Geography space is the common ground of the physical and social cities. We have to determine a paradigmatic model that is a vision, an idea of city able to order the real city-growth. All social activities leave spatial and symbolical traces in the form of recursive patterns: how can these relate to a geographical, historical context or to a physical and spatial context, whose patterns were certainly laid down long ago, influenced by quite different social circumstances? Even more, how can they relate to some new city paradigm (megalopolis, megacity, metacity) and to the new idea of global cosmopolitanism?

2. Analysis

2.1 The role of the City: a cultural leap. A methodological indication for the development of a fast growing city

The starting point of the present work is a provocation coming from the necessity to define the contemporary city within its territory through a clarification of a new scale of intervention. The framework of the proposed methodology therefore with the formal and structural dimensioning of the city territory. The need for a cultural "leap" should identify a range of new dimensions, functions and relations among the elements of the new urban context; this means, therefore, a better definition of the structural patterns and spine of this new reality, in order to show the discontinuity occurred in the urban development and in the cultural awareness of such phenomena. Starting from Lynch's definition of the model as the representation of how the space could be structured and the representation of the shape and process description, we get to the prototype to follow: model, in this case, should be read as a way "to take care of the process through which is possible to think about that shape". We considered also Choay's definition of the model as an exemplary value characterized by reproducibility. We analysed, then, the role of the model for the definition of the Großstad as it happened in Wien with Wagner and in Chicago with Hilberseimer, we will discuss the role of the theorist plans with a demonstrative character to face the nowadays city's chaos: an implementation devise that would make it physical.

2.2 The Madrid 2016 Plan: the model

Finally we want to demonstrate that the Madrid 2016 plan is the model of a development method for the fast regional growing city. We consider the Plan Madrid 2016, made on 1996 by the Comunidad de Madrid directed by Pedro

Ortiz, the model of a discontinuous reform: the born of the interferences into the new urban roads.

In fact, rather than about a formal model we can better talk about a development model consisting of a series of patterns which indicate a direction of the settlement-growth and a series of maps which indicate a possibility of configuration/form characterization of the individual qualities with gradient of formality. This aspect is in contrast to the relative immobility of the traditional cities order, based on a horizontal system of traffic -in some cases now even out dated-, and leads us to suggest an integrated model, based both on a capillary action and on the rapidity and the multiplicity of communications, which are spread throughout any direction reclaiming the land to the nature.

That Plan connects the geography of the region and the structure of the ancient towns through a simple square geometry. That grid is shaped taming the existing infrastructures, which turn from circular to linear. The new infrastructure model is conceived as an interrelated system between commuter trains and highways.



Figure 1. The Madrid 1985 Plan & The Madrid 2016 Plan

The digit of the Plan is a Figural Landscape Unit (named UDE: equilibrate developing unit): every 4.5kmx4.5km square is the lattice topology, as a sign of human presence to move inside the territory. If we intend map not only as a tool that mimics reality, basically because it represents it, we could think about mapping also as an operational tool, that allows an experience of cognitive mapping. Geography, seen as the original archetypal form of Western knowledge (Febvre, 1922) should thus be redesigned to meet the challenges of the globalized society. The interpretation of the new region dimensions, therefore, is done by geometric linear lines of grey infrastructures. The interpretation of the new local

dimensions is a topological net that determines a new portion of body space (Shane, 2005).

UDE is the physical representation of the abstract idea of time (How many time it takes to cover 4.5 km?). We consider that the UDE is the measure of time: a new UDE or Patch Dynamic measures a new time. So, time is the abstract representation of the shape of the city, today. Time measures the form, i.e. as you distribute the elements of a city over time. Today in the megalopolis we are in a crisis of time: or the time is measured through the number, integral serialism, or the element itself (the Mega block or the Patch) is the measure. It the new measure of a Patch that determines its new nature.

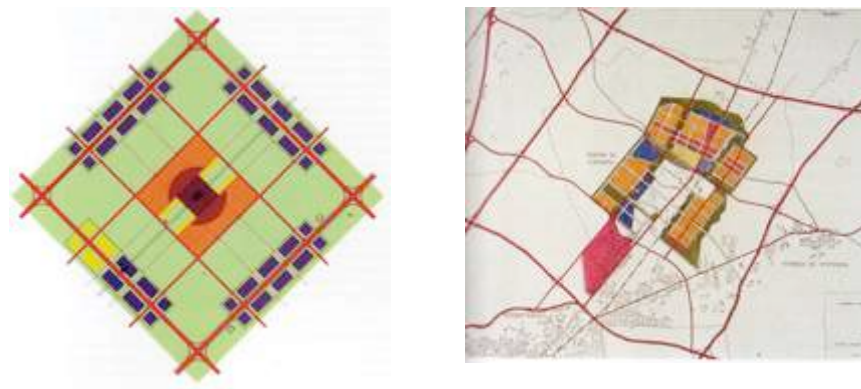


Figure 2. The Madrid 2016 Plan. The UDE model

The world is governed by a mathematical/geometrical conception, and formulas are the shadows it casts. The global order is too complicated to comprehend entirely, as already are multidimensional objects: in both cases, we can only guess through projections. For that reason we have to use models (Hilberseimer, 1927): we understand the models better, reality escapes from us. Of course we know that the lie is behind the mathematical geometric reductionism, basically because it is so powerful that we believe that coincides with the truth (Idealism v. Materialism. Neoplatonicism v. Empiricism). But the problem is that the demonstration of the model must better transfer mechanism and path of thought which made it possible to get to the UDE and understand how nowadays it works at the mega scale.

At last, in that Plan, the design of the metropolis form has to be originated from a spatial concept that synthesizes the strategic assets of the districts in an overall form. Once that strategic form is recognized, then the tactical location of specific projects can be effected. Each project must reflect the strategic concept as tactically applied to that district – the **Concept takes Form through the projects**. We consider that today this is the art of shaping the Metropolis.

2.3 The Plan Madrid 2016: the analysis

The premise

1946, in the plan Bidagor for Madrid, appeared for the first the strong directionality of the character of the entire region morphology. That was possible both thanks to geographical and topographical aspects, which were deeply relevant, and the well identified geographical, topological and ecological lines, which eventually determined the land use.

The model

Requirement of the Plan was to integrate Madrid in the competitive system of world cities, and for this purpose became necessary to rethink the urban structure, giving a correct interpretation of the leap in scale that was running.

In order to reconsider the expertise of modellers urbanism utopia, thought as hypothesis for a redefinition of the urban paradigm, the Plan of Madrid 2016 came to life in a period characterized by the paradigm of a great urban research, as well as by a technical and pragmatic one, which eventually shaped its quite innovative approach.

In this perspective the Plan, in the first instance, must refer to an urban model that is temporally and economically undetermined: urban planning and architecture become contingent transactions that must adapt to changeable political and economic aspects.

Therefore we can talk about an expression of an "idea of the city", i.e., a manifestation of an intention that turns to a condition for action, not to a mere methodology of form. That is the way to design the new regional city scale and its measure, a new spatial semantic, and to shape the figure of the contemporary time (UDE). In order to get to it, we insert the balanced formal structure, memory of its territory (the *cuadrícula*), which can distribute and determine the position of the key elements able to structure and transform it.

The reform of the city paradigm starts from the interpretation of the urban geography of the area set in 1946 by the Madrid Regional Plan of Bidagor, who defined the character of the region, which essentially followed a natural structure similar to the one of its territory and developed itself along the lines. The Regional Plan of 1996 (Madrid 2016, Plan Ortiz) reinforces this character, so as to both counteract a kind of centripetal and centrifugal urban structure and rethink the urban area, in the perspective of another system of connections.

To switch from one old concentric urban form to a metropolitan linear form, JMT Thompson urban studies and the Milton Keynes project, British New Town (1970), are used as archetypal references for the new Plan.

As a consequence, the highway M-45 can be considered as the strength-line that structures the entire Plan. This is the historical trace (Canada Real) of the geographical-region orientation (Plan Bidagor), which rotated the axis of Madrid and eventually released the planning of the city from the city reasons only: in fact it is a no more radial, but tangential line and represents the axis of development of the city along its territory.

Innovation characters of the model

The first topic addressed in the Plan of 1996 pays attention to the status of the city-region, taking care to the relationship between paths and Regional Authorities, between geographical morphology and urban morphology. The purpose of the Plan is to unhook the areas that carry forms and textures of historical city fabrics, generating then environmental areas equivalent and connected by new joints that act as aggregators of new nodes of the structural centrality.

The Plan Madrid 2016 of 1996 was dealing with the instruments firstly of the plan-form and secondly of the movement-form (new linear infrastructural system: commuter trains and highways) as a meaningful element of the Plan, assuming that a new concept of territoriality, at the geographical scale, is based on the organizing principle of land as a meeting place and mobility (Lynch, 1980). Therefore it identifies in a 4.5x4.5km simple geometric square (cuadrícula, or UDE: Equilibrated Development Unit), a grid, which permits to enter the territories, characterized by a new territorial dimension. In the Plan Madrid 2016 that simple square-shape is considered the highest guarantee for establishing new centralities, and at the same time it's able to treat and consider the network of mobility as an important and characteristic feature, which doesn't follow the historical city ground mainly because of its lack in interpreting the new scale of infrastructure. But, as Gustavo Giovannoni argued (Giovannoni, 1931), it's possible to conserve and to develop the ancient cities only if we are able to connect them to a new net. That is an important factor, because old structures are well rooted into the territory and behave, at a regional scale, as important elements that permit to be connected with the geography of the considered territory as a fundamental resource (Geddes, 1909).

The Madrid developing model superimposes a metropolitan scale on the existing system, in order to determine a different relationship between the changed constituent parts of the Great Madrid. As a consequence, it faces the model of the radial forces. The new scale determines, therefore, another form of settlement, in which the scale logic starts from engineering soils, passing to artificial and getting to natural ones: each UDE is not identified by function, but through its geographical meaning.

The Plan sets a system of axis, a governing axis and a penetrative one, which firstly determine the development of the centre along the lines and secondly act as polar systems. The City Council of Madrid is bypassed. Thus, interfering with the

old system of "M" roads in order to define a new relationship, the morphological system is not univocally determined.

We are not speaking about an addition, but about a true reform coming out from a matter of discontinuity: this operation is not meant to save the old structure of the city as if it faced an expansion, but it determines the birth of the interferences of new urban highways.

Four are the defining elements of the Plan: Geography, Geometry, Memory and Denial of the historic city (to change and reactivate it). The Plan assumes its value through the definition of the logic of settlement-distribution, which permits the localization of interchange nodes in peripheral areas. It considers not only the inhabitants but the city-users too, according to the concept that what matters is the existence of an exchangeable organization along the space-time networks of the commuter trains (Cercanias), highways and airports.

Conclusions

The Plan Madrid 2016 identifies as the critical value of the new city dimension, the introverted and a-geographic areas degraded by the effect of implosion and explosion: because that, identifying the inequalities produced in the territory, determines the need for a social and productive re-balancing of the metropolitan area. It is therefore a proposal for a new instrumental technique and structuring large-scale intervention, able to establish a hierarchy between the places, by considering their geographical importance as strategic nodes of interchanges and, as a consequence, of density.

3. Results. An Application of the methodology for a developing regional city model

3.1 Dar es Salaam. Analysis and Strategy of development through the Madrid 2016 Plan Methodology

After the analysis of the structure of the territory through the Ortiz development abstract model, our role, as architects, is to determine a spatial configuration. By learning to control the spatial variable at the level of the complex space-patterns that produce the city, we might acquire the ability to understand both the social element of spatial form, and to detect signs of the social city behind the real city. In that perspective we present DAR SMART research, which follows the strategic modelling document by Pedro Ortiz as a methodological indication for the development of a settlement.

The design of new settlements in the urban context of Dar es Salaam will follow the idea of a variable formality gradient, conveniently located as proposed by the metropolitan spatial strategy. Such an approach, may envisage a sustainable

relation between green and grey infrastructure. A strong economic attractor related to the infrastructure system should therefore foster the reversal of spontaneous settlements back into legality, providing them with services that could improve the sustainable level of the entire city.

Metropolitan scale

In ten years Dar es Salaam has collapse its urban structure. The size and speed of its metropolitan growth as well as the demand for public services and space has overcome the urban capacity, and the limited capacity to respond administratively and financially to the pressures of urbanization has probably speeded up this process and this outcome. Response have to be provided at a metropolitan scale.

Urban radial system

Dar es Salaam has an urban radial system. From this system the coastal roads coincide with a potential metropolitan reticular system.

The metropolitan transport structure

Concentration and congestion must be avoided at a metropolitan scale. Urban axes as route form the embryo of the metropolitan structure. The south 'belt' road would complete the Metropolitan centre distribution ring. The non centripetal design of these systems avoids excesses of traffic pressure on the CBD and distributes accessibility and land use provision in a decongestive system. The elongation of these roads (freeway typology) both as a coastal gradient and inland penetration provide a spread accessible land provision that offer alternative locations to congested metropolitan centre. Meanwhile roads run along administrative boundaries to provide equilibrated and shared benefits to the provinces/municipalities affected.

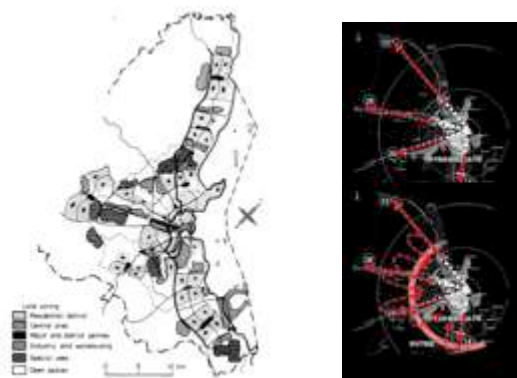


Figure 3. D4D - Dar es Salaam General Plan 1968 & Copenhagen Model Congestion

Radial growth: Finger-like Copenhagen model

The radial structure provides adequate response to the linear provision of public transport systems. It gives priority and accessibility to the centre where most of activities take place and is the destination of the majority of trips, and it is a sound urban structure. The limits of that system are on the extension of the fingers where urban trips would take too far and too long to be efficient. The orbital-radial model presents diseconomies of scale. It is efficient at small urban scales but collapses when large scales are reached.

Collapse of the urban radial Copenhagen model

1st phase: Growth takes place along the provision of transport infrastructure.

2nd phase: Cross connection takes place to avoid over dependency of the centre. This would increase non centripetal trips length and produce central congestion. Transversal connections are provided.

3rd phase: The length of the radial fingers extends to a point where infrastructures provision does not compensate. Interstitial spaces start to fill up. Land for environmental and social assets of the finger structure is taken over and the structure becomes progressively an oil stain expansive structure.

4th phase: The continuous urban pattern of homogenous settlements with multidirectional trips and insufficient traffic space provision develops into a gridlock congestion model.

Finally, the finger Copenhagen urban model has size limitations that need a different response when metropolitan scale is reached

Dar es Salaam uncontrolled infill collapse of the radial model

Dar es Salaam is experiencing the collapse of the radial finger Copenhagen model. In fact inter-finger spaces are being filled with new urban residential settlements, some controlled, some uncontrolled. Land use enforcement (discipline) could be increased but social forces, within the power of a democracy, are stronger than the capacity of the public administration to set efficient administrative controls. We can argue that traffic situation in Dar Es Salaam is the empirical consequence of this urban process. Upgrading settlements would fix the outcome. Resettlement in the right metropolitan locations could be envisaged as an alternative or complementary policy within a necessary metropolitan model.



Figure 4. D4D - Dar es Salaam Analysis and Strategy.
(*Matteo Motta Drawings*)

Metropolitan Rail network

A very important role is played by the mass transport. The Metropolis has to be built on a commuter train system. Rapid urban transport systems BRT's have scale limitations when it comes to transport large number of people for metropolitan size distances. BRT's have an urban scale that reach efficiency thresholds when confronted with larger distance scales and larger passenger numbers. We think that the metropolitan commuting system has to make best of existing infrastructure and land rights of way assets, and the inherited assets have already shaped the metropolis in one hand and have to be as well, on the other, the support for the future structure of growth.

Vertebral system

We may try to build a vertebral system for the new dimension of the metropolis. Metropolitan models are shaped in the coordination of rail and road accessibility infrastructures: both vertebrate the metropolis. The versatility and capillarity of the rail network within the urban fabric is not reflected in the metropolitan territory. The preferential growth potential is defined prior by possible rail network extensions, and the roads network will have to be diversified to avoid

collapse of excess of growth concentration along this vertebral spine: diversified locations in advance of rail expansion will avoid as well an excess of dependency of a linear structure.

Urban rail service

The rail system has to be reinforced: rail layout is peripheral to the urban fabric and has to be completed with complementary urban transport, BRT and buses, feeding routes. Urban rail accessibility can be quite capillaries with a 3 km. maximum distance: with an increase number of stations this distance could be reduced to 1.5 km that is a 20 minutes pedestrian walk, or a 6 m. urban transport ride. For all this a specific and detailed plan needs to be initiated.

Growth potential with existing network

The provision of commuter rail services within the existing infrastructure right of way might be a short investment policy with important decentralization results. Along the 2 existing rail lines a service could be provided with metropolitan rail stations distant of an average of 5 or 6 km, so dense urban settlements can be develop around the intermodal stations which will become new urban centralities (see appendix). Interstitial spaces will be protected to allow for infrastructures, institutional facilities and commercial facilities.

The commuter train would be fed within the urban development unit by complementary urban transport with a maximum distance of 3 km, so population will reach Dar es Salaam centre by train and will bypass and deflate actual traffic problems.

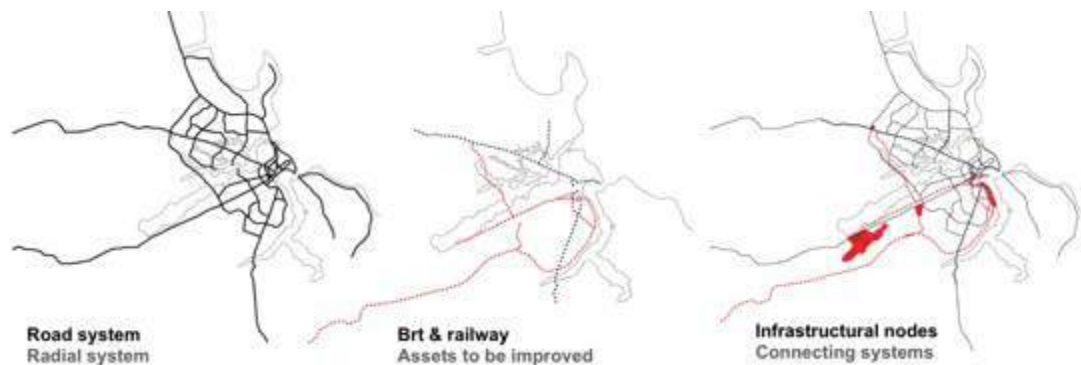


Figure 5. D4D - Dar es Salaam Analysys and Strategy. Grey Infrastructure Proposal
(*Matteo Motta Drawings*)

Future infrastructure rights of way provision

If the Rail provision will be radial to maximize train accessibility to central Dar Es Salaam as an alternative to the use of private road transport, Road pattern

accessibility would be reticular to disperse accessibility along a larger well provided territory that would invite decentralization of economic activities and residential provision. The metropolitan grid will provide possibilities for further, equal access, decongestive development.

Rail metropolitan expansion

The rail network expansion would be the guideline for metropolitan settlements expansion. The metropolitan transport will shift from road to rail passenger mass transit. The 'evolving' metropolitan diagonals could be the support for rail lines if land provision protection is made early or if finance can confront the underground investment. Urban intermodal centrality will coincide with the reticular pattern. Future rail layout will serve consecutively the areas needed for expansion within the reticular pattern.

Regional scale facilities

Regional scale institutional and social facilities are of the type of large hospitals, universities, sports grounds, and national and regional government institutions. The accessibility to institutional and social regional scale facilities must be both public and private transport. Potential site for those facilities is in the intersection of the metropolitan rail system and the primary road system. The selection of the sites should be made by a precise urban plan for the provision of such facilities.

Regional commercial facilities

Large regional commercial facilities require retail transport, which is made essentially by private transport. Potential location of those facilities is at the crossing of the primary and secondary road network. Final decisions, in response to private initiatives, should be made with a land use pattern of criteria developed in a specific policy plan.

Regional facilities land use coordination

Both socio-institutional and commercial facilities can be coexisting or independent provided they comply each of them with their location rules pattern. Conflict does not necessarily occur as rules are differentiated, but if it does, planning should provide for resolution. Locations are potential and should be decided along the capacity and the necessity to provide a land response for their need to be built.

Environmental protection and provision

Environment capital should integrate the metropolitan fabric. Definition of environmental values must be determined before planning and incorporated as a pre established policy. Flexibility of the model allows for compatibility between environment and urban development. Environment, when overlapping, prevails.

The environmental spaces must have continuity for biodiversity networking and must filter through the metropolitan fabric to reach the core of the urban system. Environmental infrastructure can be enhanced when environmental natural values are insufficient

Priorities

To respond to the challenge of growth within a metropolitan context and with the expansion model priorities of investment would be:

- 1) The backbone distributor-decongesting freeway:
 - a. Upgrade infrastructure and
 - b. Protect rights of way – free access
- 2) The first metropolitan railway line:
 - a. Upgrade fix infrastructure
 - b. Set up mobile material for mass transit passenger service
- 3) Urban development
 - a. Design and management
 - b. Urban intermodal centrality

4. The Dar Smart Project: Sustainability of identity. The local scale project methodology

In the global competition among cities and their territories value and growth can only be fostered through the qualities of identity. The last decade has made clear how sustainability is a key issue in setting long-term visions for our cities and it's important to promote an idea of sustainability which is economical, social and energetically and that, for this reason, is strictly linked with urban as a way to settle in a territory. Density, agglomeration, proximity produce the rich interaction networks which contributes to economic growth, poverty reduction and cultural improvement. Driving the urban metabolism towards a densification that is controlled in a sustainable way can enforce a vision able to root the global role of a city in its local characters, demonstrating the sustainability of identity, setting a smart growth.

4.1 Dar es Salaam. The city

Dar es Salaam (Tanzania) can be identified as a urban region with 3 million inhabitants exploding with a growth rate running since more than 10 years around 4-5%/yr and the 80% of the population living in informal settlements. Its geopolitical conditions are making it one of the most important African metropolises, attracting investments from the worldwide system and attentions from the international organizations. Administrative boundaries have been overgrown producing governance conflicts that require compromise, agreements and time. Time is what growth does not respect. Growth is taking place whether the administrative framework is able to manage it adequately or not; a proper flexible strategy is needed.

This can be rooted in the urban character of the city, expressed by a threatened rich porosity based on the complex overlapping of formal and informal economical structure. The great challenge is managing the urban development linked to the ongoing infrastructural projects avoiding the overflow of the formal neo-colonialist development and balancing it to build a smart welfare city.



Figure 6. Dar Smart. Green System Strategy (*Danilo Vicente Damico Thesis. Politecnico di Milano. School of Architecture and Society 2012*)

4.2 Open themes

1. Mobility: Metropolitan spatial strategy.

Net-city and mobility: private traffic and parking, public transportation and slow mobility. The envisioning of an integrated system could configure the city as a fast net that interweaves relations in specialized nodes and defines an archipelago of local enclaves with inner slow mobility and a brand new landscape. These new hierarchic relations will set a new spatial strategy for the city.

2. Urban agriculture: feeding growth.

Poverty and urbanization rates according to well know models seem to be directly proportional. The defence and promotion of local models of urban farming could allow to controvert this relation proposing urbanity scenarios which link living and feeding in accordance to local models. New living and land-use typologies can be studied considering the local property policies to propose an original model of urban farming for the low-grain developments of the city.

3. Energy and sustainable infrastructure.

The urge of making up for the present infrastructural lacks to offer higher standards of liveability suggests the development of low-cost models of urban infrastructure based on innovative technologies able to overcome the limits imposed by the low availability of electric energy; i.e. exploitation of renewable sources, low-tech water treatments, low power consumption lighting and lighting management, liquid and solid waste treatment, etc. It's necessary to set a locally fitted ecological balance for the informal evolving settlements able to produce a specific recognizable urban landscape.

4. New building typologies: between informal and formal.

It is necessary to understand the relation between formal real estate market (and its imported models) and informal settlements dynamics. Identity/cultural aspects link with typological/climate/energetically aspects under the common framework of sustainability. A wide spectrum of issues can be combined in the definition of new morphological schemes and typological solutions thanks to parametric and associative design.

5. Climate change. Natural hazard.

The importance of agriculture and the relation with the sea are great resources for the city, but the future scenarios about the climate change and sea-level rising are uncertain. They need to be monitored and their effects have to be taken in consideration for the present planning decisions (i.e. Kigamboni) producing evolving dynamic scenarios and focusing on urgent actions about water management.

4.3 Power of place and need of a Vision. An urban model based on a formality gradient

The vision project, which is a cultural project, should be verified according to an ecological equilibrium to state its sustainability, according to an economical equilibrium, to state its feasibility and according to the equilibrium of fluxes in order to state its efficiency. Only thanks to a powerful vision of this kind it is then possible to build consensus among the actors and a virtuous dynamic of interaction between public administrations and private investors able to deal with the dichotomy local/global.

Infrastructure, Landscape and Identity

Contemporary cities can be seen as complex systems that have a network armature rooted in specialized multiscale nodes and that set an archipelago of island of urban landscape with various grains. The infrastructural operations linked to the moving issues have to deal with network dynamics and with the global scenario, setting the space/time relation of an urban system. A metropolitan spatial strategy built on a public transportation net can contribute in setting an accessibility hierarchy organized by nodes of density and intensity. These nodes, linking global and local, merging different speeds, scales, grains can behave as flexible stem cells introducing in the formal or informal urban tissues original regeneration elements able to adjust uncontrolled gentrification phenomena. Accessibility to the urban system can coincide with the availability of social and cultural services, rare urban functions, safety and health structures and unconventional interactive typologies, conveniently located according to a general sustainable vision. This means exploring different possible interactions between infrastructure and urban tissue depending on whether it comes across fine grain central areas, evolving suburban neighbourhoods, loose grain informal settlements.

In Dar es Salaam the geographical endorsement of settlements and the infrastructure network set a multiple layered net with high urban potential; built by:

ARMATURES: an evolving grey net of technological infrastructure providing fast interconnection and a green net of topographical ecological corridors currently neglected

NODES: multiscalar entities to be developed as alternative centralities; they activate densification and formalization phenomena to be properly managed

SPONGY TISSUE: formality gradient patterns for the archipelago settlements preserving and enhancing porosity, managing informal urbanity, welfare equipment, urban farming

4.4 A new definition of mega block as an open pattern

The UDE model

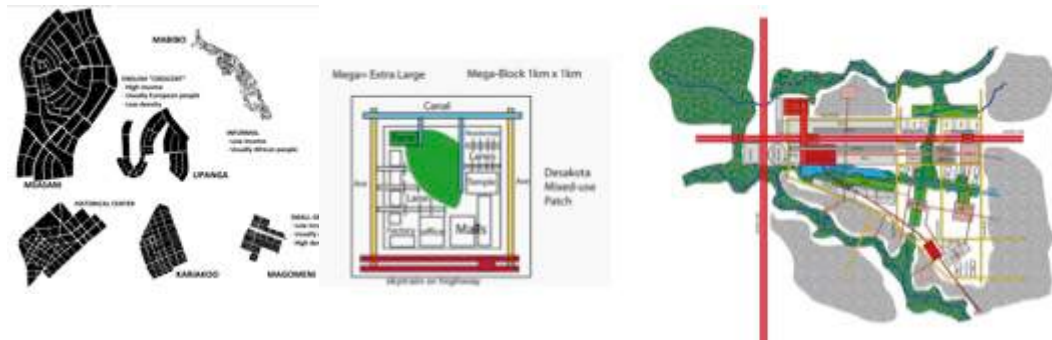


Figure 7. Dar settlements typologies. From the UDE model to the a Desakota Block (1kmx1Km) for Dar. (Matteo Motta Thesis. Politecnico di Milano. School of Architecture and Society 2012).

The explosive growth and regional scale involve the necessity of strategic models with a measure descriptive of different density weights and their distribution over the territory.

The Broadacre City of F.L. Wright, was structured on a micro module of 80 x 60m but looking at the regional scale with a macro module of 3.2 x 3.2 km The model designed by Ortiz to manage the regional dimension, predicts a large size of about 5 x 5 km supported by a infra-structural system of geographical matrix lines and public transport.

This system identifies different degrees of mobility and activity and different density weights in relation to the infrastructure. The core of the UDE is supported by the Commuter Train and secondary roads to handle a local scale, which determine the location of elements of public and residential areas. The biggest entity weights are placed near the matrix lines (the main road on a territorial-regional scale) and in particular close to the intersections of the infrastructures. This model shapes the regional system while provides flexibility, density weights and measures used to manage the system.

The critical task of breaking down the model to the local context has taken to a modification of the model towards a definition of the type of grain and porosity of the settlements, freeing them from a mere indication of functional issue and re-evaluating the environmental system that is not taken as background but as the material and substance of the project.

The Mega block Model (green and grey infrastructure)

The concept of mixed-uses and landscapes Desakota model between the urban spaces related to infrastructure, and rural space, characteristic of agriculture, is taken up by Grahame Shane (2011) and defined through a diagram of Mega block, as a large urban element at regional scale. The model of the Mega block provides a size of about 1x1 km, smaller than the UDE model. So, we consider it as a part of the UDE that organizes the UDE centralities: i.e. the mega block is the point where the model of Ortiz is hooked to a large grey infrastructure as railway stations, airports.

The model of Shane provides the presence of very heterogeneous activities that are mixed with each other in a pattern of "patches" dynamic, where the green is not just a background, but an active element with its proper infrastructure and activities.

The diagram then, shows how to structure a gradient of formalities between an infrastructural system heavy and "grey" and an infrastructural system light and "green". Each of them carries density weights and the co-related activities in a pattern of "mixed use patch". This "pattern", thought for South-East Asia, is decomposed into our action-planning to be integrated into the African context of Dar es Salaam, so that, the elements of agriculture, supported by an urban hydro-geological structure (channels), might go deeply inside the structure of mega block generating a porosity that from the informal part of the city goes into the formal settlements at the regional scale. In addition, the provision of a strategic system of elements of welfare allows to connect the large size with the small one: building the elements of an institutional reference, bringing services and infrastructure, it can give shape and legalize the informal settlement.

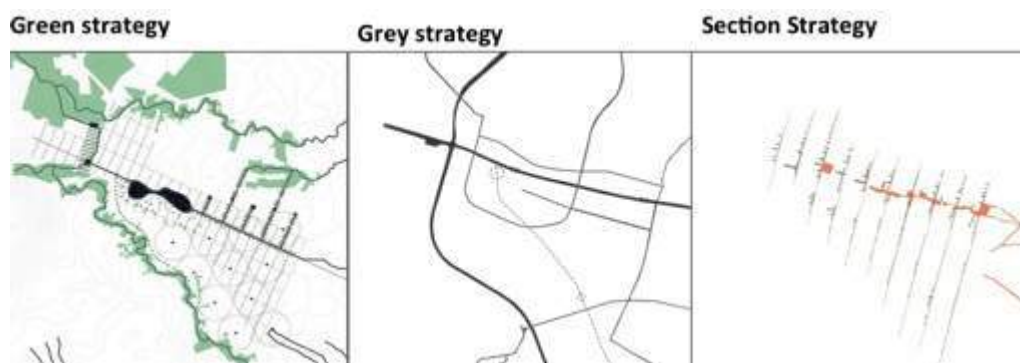


Figure 9. Dar green/grey strategy (Matteo Motta Thesis. Politecnico di Milano. School of Architecture and Society 2012).

4.5 Definition of eco-green armature within the concept of the gradient formality potential

A system of eco-armature, from an ecological point of view infrastructures the landscape. The open question is that natural resources can not be planned on the basis of a model, but through a rule: a rule of Form. This form always has 'content'. It leads citizens to recognize the city as an important place to plan their own life. Meaning is attributed. They become symbolic intermediaries.

The city has always been the place of urban metabolism and thus for transformation and evolution. Able to set up the dual urban and social structure, which should never be disarmed because it is not as much the backbone of a communication system, but rather the competence to interact with the site and the land: the inter-somaticity that bodies acquire orienting in a field.



Figure 10. Dar Smart . The rule of the grey/green Interference (*Matteo Motta Thesis. Politecnico di Milano. School of Architecture and Society 2012*).

This sense of direction, which occurs only if a site of the earth, is found and made, that is constructed and marked by man, can be possible then only in a place which becomes central again to human intentions, and therefore, allows man to transform in the symbols the mental processing of the memorable events (plot of desire and memory): we call these places symbolic mediator or intermediaries

5. Conclusions. An urban model based on a formality gradient

The natural and anthropological characters of a territory determine the local value of landscape as part of the identity feeling. For this reason acting on the way of inhabiting a place requires a synthetic effort that has to be systemic and set at the right scale. The transition towards formal uses of land and the related infrastructural process has to combine innovative technical solutions, typological

experimentations, and imaginative issues setting the unique and recognizable image of that territory at the scale of the urban realm.

The new infrastructural system should determine an original urban tissue based on a double formality gradient, connecting to the mobility system of the global scale - opening to urban regeneration and liveability enhancing - but at the same time improving the relation with medium/low density territories of informal settlements and urban agriculture - preserving their rich interactive social and economical system. This strategy could determine a specific local way of settling provided by specific relational dynamics, specific regulations about the private/public partitions, land-use and property.



Figure 11. Dar Smart. The Welfare Staminial and he Green Infrastructure (*Matteo Motta Thesis. Politecnico di Milano. School of Architecture and Society 2012*).

The ongoing infrastructural projects in Dar, like the Bus Rapid Transit, are introducing a new scale in the urban structure moving towards an uncontrolled development. The vision for the city has to be rooted on an idea of urban intensity that is effectively net-connected, but also deeply place-specific. The local peculiarity of the green net given by the geography of the city could be the key issue for the urban growth; its management, driving a virtuous balance of the urban ecosystem, could be the specific know-how and branding identity issue for the African green metropolis.

The proposed spatial strategy, promoting a double formality gradient pattern, considers the existing rich interactive social and economical system as a matchless resource for the city growth. It has to do with an effective local way of settling provided by an uncommon urban porosity. According to this all the required governance tools have to be fitted, so that people can feel a correspondence between laws and behaviours of land-care, minimizing the conflicts occurring in the formalization process. Virtuous interactions between the public and private sectors have to be fostered to assure an economical balance, making densification paying for welfare. Setting an urban model on this perspective could mean opening the way to a competitive strategy for the sustainability of identity.

Long term scenarios for the urban landscape

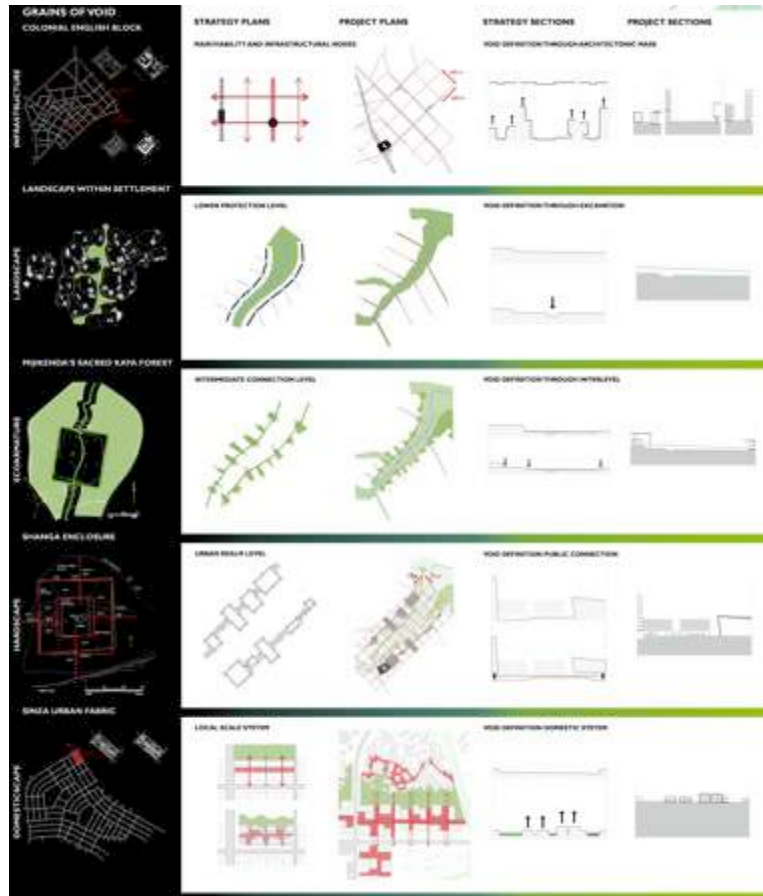


Figure 8. Dar Smart. The Formal/Informal Strategy (*Danilo Vicente Damico Thesis. Politecnico di Milano. School of Architecture and Society 2012*)

Reaching a real grade of sustainability means considering economical, environmental and social aspects in their complex relations. Space and time interlace in this issue making the decision making process even more difficult for the administrations when the spatial strategies don't include some flexibility levels and at the same time long-term wise decisions. In this perspective climate change and natural hazard are the main issues to take in consideration. Dar es Salaam will face two aspects of the climate change problem: the vulnerability of the agro-ecological system with the decline of agricultural capacity and sea-level rising with the risk of floods and the coastline alteration. Defence, attack or retreat are the three strategic options and water the element to deal with. Both the issues

must be faced in accordance with the general urban landscape strategy through a specific and conscious approach to water management, which can become the distinctive element of a conscious far-sighted vision for the city. The virtuous balance of urban ecosystem through the flexible innovative solutions which structure the urban landscape could be the specific know-how and branding identity issue for the African green metropolis.

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