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Back around the Vision. Strengthening the Local Dimension

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Urban form, structure of public space and the city's role in the global economy carries to the corrosion of relationships which are essential for the restoration of environmental sustainability and social equity, based on sharing of territory, conviviality and accessibility of the opportunities. The dissolution of these relationships brings to the progressive dismantling of the local economies and to low attention for the consequences of deleterious anthropogenic activities occurring inside the urban and environmental system. This process bring to a low life quality. Through systems thinking and choosing the neighbourhood as preferred scale of action and observation, you can reverse the vision bringing to the fore the local dimension and the needs and possibilities of people groped for a rebalancing of the local dimension with global dimension that now is predominant.

Introduction

Urban growth

The city has become the place where a large part of the world's population is concentrated. In 2010 rose to about 50% and it is expected that by 2050, the proportion of population urbanized will become the 70% (UN Population Division,2007). This increase in urbanized population, however, explains only a small part of the growth process carrying to an enhancement of the urban areas, and reducing the natural and semi-natural landscapes. This enhancement depend also which urban growth model chosen. The extensive use of the urbanized areas can be distinguished into two phases: firstly, compact urban growth and secondly, urban sprawl.

The second phase began in the mid-50s. It was characterized by low density areas and by edge areas separated from existing core by agricultural enclaves (Insolera,1993; Antrop,2004; EEA,2009). During this second phase, the population of metropolitan areas continued to grow until the '70s, then decreases (EEA,2011) and from the '90s to 2011, began to grow again (EU Regional Policy,2007). This growth, however, has concerned the areas of external belt more than the central cores. This is due (in all developed countries) to economic changes which had an impact on the organizational and territorial characteristics of the cities (European Institute of Urban Affairs,1992; Eurocities,1989; Sassen,1997).

Economic processes, organizational and spatial changes

Since the early 80s, the interests and needs of companies of various productive sectors affected the urban growth. Great amounts of the production, capitals and consumption goods moved into regions providing cheap labour due to globalization, technological changes and European integration (Eurostat,2007; EEA,2009). As a consequence, many urban economies have been oriented to respond to increasing demand and production of services by enterprises (Sassen,1997; EEA,2009). A new economic core of banking and services becomes important to the overall economy of the city (Sassen,1997). The new economic urban core, aims to high profits and it may make difficult to the other sectors a genuine competition till recession or extinction of these. This is the case, for example, of neighborhood shops.

Private car dependence. Environmental and social consequences.

The urban model resulting therefrom is characterized by sprawl and low density of inhabitants and it is linked to the private car dependence for movements (EEA,2009). This dependence leads to an increase in car ownership in the world especially in urban areas: in 1990 vehicles produced were between 34 and 40 million and in 2006 have exceeded 50 million (Rodrigue et al.,2009; EEA,2009) .

The three sectors that use as much fossil fuels are, in order, the transport sector, the industrial and utility sectors. The 99% of the energy used for transport comes from the use of fossil fuels (U.S.EPA,2010). Most of the travels causing these levels of fossil fuel consumption and greenhouse gas emissions are related to the urban areas. the choice of the car as main vehicle of shift seems to depend by inadequate structure of public space and by the distribution of functions related to the daily life, which do not provide satisfying levels of safety, comfort and pleasure for moving without motorized vehicles. In this way, the needs of the car have assumed great importance and the vehicle space is increased at the expense of the spaces dedicated at the persons. Few space remains for encounters, free time and free play for children. The increase of the degree of mobility (EEA,2009) reduces accessibility. The consequence is the reduced quality of life, social segregation and the reduced sense of community by the residents (UN-HABITAT,2009; Appleyard,1981).

Aim of the paper

We witness to the break-up of important relationships among the people and among these and the places. This process is part of a series of actions reinforcing each other and it has its initial cause in the current economic and energy model that lead to organizational and territorial changes. Under these conditions, the resilience of a city or of its parts is no longer guaranteed and no change can obtain positive results without

there being a change in the shape, structure and processes of the current development system in general, and of the city in particular. This paper aims to bring to light the linkage among the actual structure of cities and its scarce ability to district as preferential scale of action and observation to balance among the weight of local and global relations. The first are resilient relations, linked to the needs and capabilities of people. The latters are relations of dependence, linked to the needs of the market, causing system vulnerability but, actually, these are dominant.

Urban form and structure of public space

In Europe, the 4% of the total area consists of artificial land cover. However, due to the urban dispersion, about 1/4 of the european land is really affected by urban settlements (EEA,2011). Italy falls in the area identified as the backbone of the European Megalopolis (EEA,2011). Similarly to Europe, this artificial land cover in Italy is happening mostly at the expense of agricultural land, favouring discontinuous settlements at low density, separated among them and from the compact city through agricultural enclave of poor consistency. The not permeable area of Rome, between 1990 and 2008, is increased of the 6,8%. It is moved from 25,285 to 34,068 acres (ISPRA,2010). Great part of this urbanized area was characterised by low densities (Salvati et al.,2012). From the 1945 have been developed especially the "fine-grained reticular tissues" (low-density residential areas) and the "open forms"(Cappuccitti,2006) (Tab.1).

Tab.1 - Fabrics types and their extension

Homogeneous areas	Total surface area (ha)	% of the tissue total area
Intricate compact fabrics	386.0	3.0
Reticular fine-grain fabrics	3992.3	31.9
Organic fine-grain fabrics	146.0	1.1
Reticular medium-grain fabrics	1659.6	13.3
Organic medium-grain fabrics	529.7	4.2
Reticular coarse grain fabrics	715.7	5.7
Organic coarse grain fabrics	2174.1	17.3
Fabric fragments and composite fabrics	43.4	0.3
Open forms	2306.2	18.4
Buildings and complexes specialized for large equipment	613.4	4.9
Production and commercial buildings and complexes	928.7	7.4

We can compare this type of homogeneous areas, built at the end of XX century with one consisting of reticular tissue medium-grained and built in first half of the XX century. We analyzed the following districts: Villaggio Prenestino (Fine-Grain Fabric (FF), located 8 km away from the GRA, New Ponte di Nona (Open Form (OF), 6 km outside the GRA and Monteverde, district situated inside the GRA. The first two are from the late 20th century, while the main structure of the roads of Monteverde was planned with the Master Plan of 1909. This is characterized by a Medium Grain Fabric (MF) which is another type of fabric that, in the city of Rome, has a relevant consistency. An analysis regarding the morphology and structure was con-

ducted considering a macro-area with side of 250m (Cappuccitti,2006) in each of the three areas.

Tab.2 – Size of the spatial elements of the tissues and of the space used for the trade

	FF	OF	MF
Total area (mq)	2,291,539.68	3,195,752.57	1,342,759.71
Built core (mq)	1,200,129.72	1,521,536.05	1,342,759.71
Streets (ml)	792.81	669.48	1,709.80
Number of intersections	6	4	12
Public space (mq)	7,996.76	30,519.78	25,153.03
Vehicle space (Space dedicated to parking and movement of vehicles)(mq)	6,426.55	25,301.35	16,847.59
Commercial buildings - covered surface (mq)	0	91,506.10	0
Shops (ml)	490.23	924.28	7,172.70

Tab.3: Ratio among the spatial elements of the tissues

	FF	**OF**	**MF**
Built core /Total area (%)	52	47,6	100
Vehicles space/Public Space (%)	80,4	82,9	67

Tab.4 – Presence and educational degree of school buildings

	FF	**OF**	**MF**
Presence of kindergartens	1	2	5
Presence of elementary schools	2	1	5
Presence of middle schools	1	1	2
Presence of secondary schools	0	0	4

It is evident as in O.F. and F.F., compared to M.F., the intersections of road network are reduced (Tab.2). In O.F. the vehicle space is high (Tab.2 & 3) because the parking space and the road section is greater. In the F.F. the vehicle space is high (Tab.2 &3) because the pedestrian areas are almost absent (Tab.2&3). Shops, commercial buildings and school buildings are the functional services that most affect the daily life of the inhabitants. In O.F.the commercial fronts are reduced to benefit of shopping centres (Tab.2). In TF, the commercial buildings are absent and, at the same time, there are few neighbourhood shops (Tab.2). About the school buildings the situation is the same: in TM there are the schools of all grades and they are spread evenly over the territory, in the other two cases miss the schools of some educational degrees (Tab.4) and those present are concentrated in the space (Fig.1). The squares equipped and accessible for the people are absent in TF and OF and the surfaces destined for parking are much greater in these rather that in TM where the areas used for the parking have not been designed only for this purpose but absolve more functions. The basic tenets of TF and OF, which reduce the complexity, connectivity and interaction between elements - streets, shops, green areas, etc.-, are not able to generate comfortable, efficient and psychologically positive urban environments due to the lack of urban consistency, both formal and structural (Salingaros,2000). This deficiency is extremely evident in the road network, which also affected the morphology of the totality of public space and the built environment.

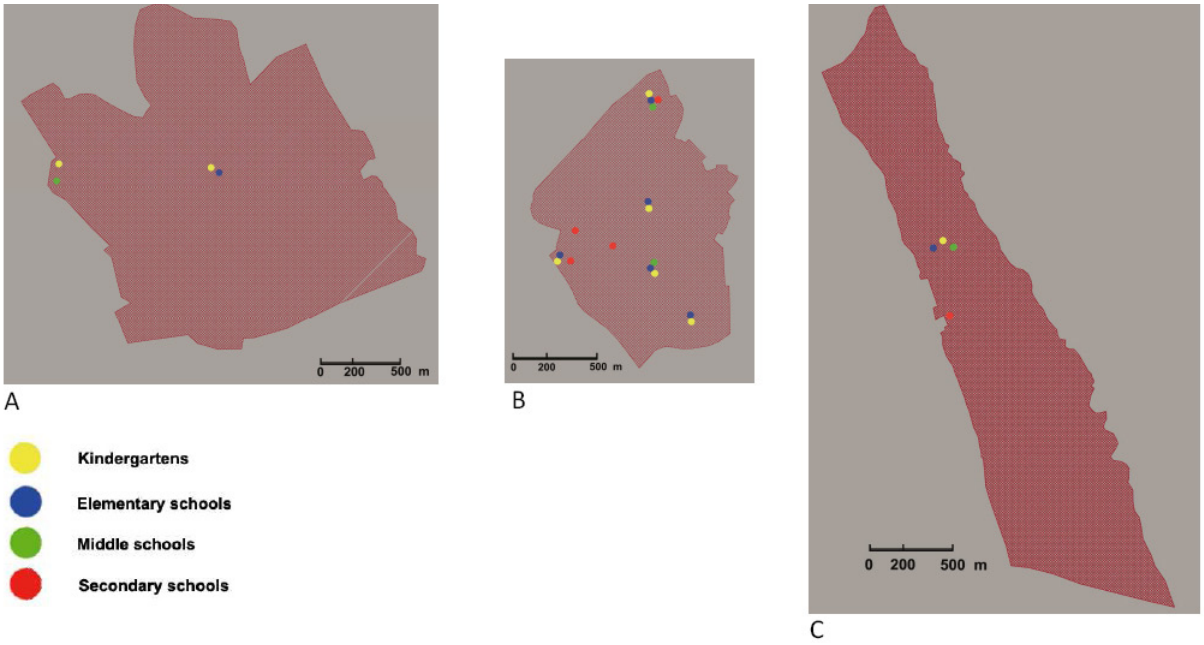

Figure 1 | Location of school buildings. A: Open Form - OF; B: Medium-Grain Fabric - MF; C: Fine-Grain Fabrics -FF

Resilient relationships and depending ones

These issues can be explored through systemic thinking that assumes the living world as a network of relationships (Capra,1996). The essential properties of the complex systems (Edmonds, 2000) derive from a configuration of ordered relationships (Capra,1996) and this implies a certain form, a well-defined structure (with its schema) and a specific process (Samaniego,2008). Fundamental property of the structure of a complex system is the connectivity that is manifested by a reticular organization (Capra,1996). The higher the capacity of interconnection between components of a system, the greater is the difficulty that can be found in the break it down. These connections give shape and structure to the system. Hence their gradual disappearance fragment the system in isolated parts determining the destruction of the systemic properties (Capra,1996).

These general concepts about the complex systems is also valid for the urban system (Samaniego,2008). In fact, as in any complex system, also in urban system the coherence between the elements, determined by certain rules of a general nature, represents a quality that allows to the city to adapt to boundary conditions differently from the present ones and, at the same time, to ensure the well-being of its inhabitants even in the presence of major changes. The scarcity of services needed to meet local daily necessities, and public spaces for meeting, playing and autonomous movement leads to a reduction of the relationships of proximity. The dissolution of these relationships is cause and consequence of the gradual dismantling of local economies, the reduction of widespread prosperity and a substantial disregard for the implications to the environmental system. Hence, the graph of the relations (Fig.2A) related to the various urban sub-system (environmental, economic, socio-cultural, etc.) loses one of its priorities (Fig.2B) in order to be a resilient system: the connectivity (Casti,1977). The relations of proximity are resilient relations (Casti,1977): allow the system to reorganize itself after destabilizing external events. Their loss leads to the loss of the systemic capabilities. Their loss leads to the loss of the systemic capabilities. Instead the relationships of dependency are strengthened. If a specific form, and related structure, derive from a specific process, we can act on they to change the process. So it is possible to change the urban structure to create conditions for a reconnection of the broken relationships. A complex system is a nested network of networks one thus we can act at various levels. Stead et al. (2001) identified three levels: strategic, local and neighbourhood level.

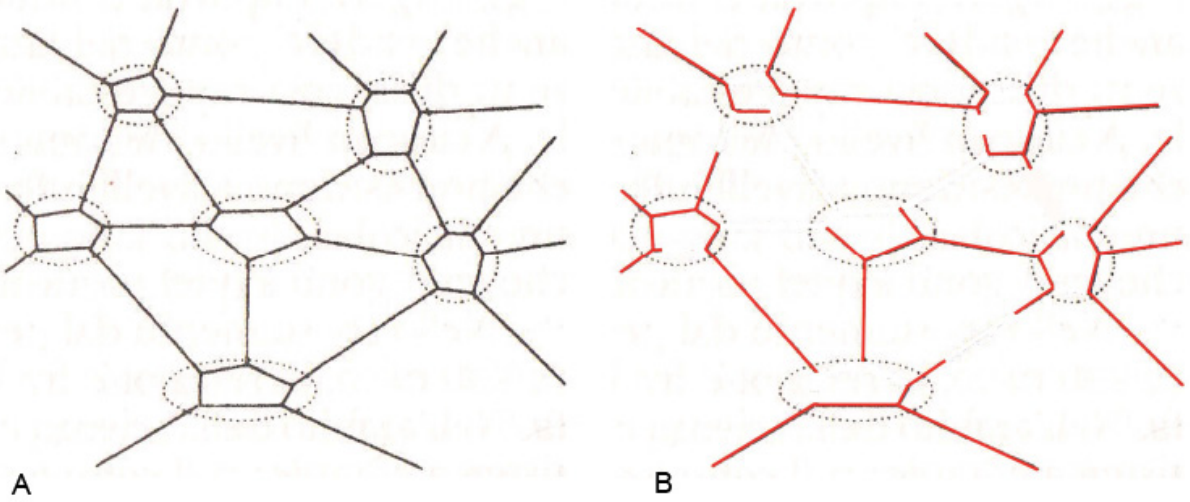

Figure2A | Relationships graph in a complex intact system. Source Capra 1996, p.50;
Figure2B | Relationships graph in a complex system with reduced systemic capacity

The neighbourhood as a key element for the reconstruction of relations resilient

Since the aim is the reconstruction of relations resilient, the scale of the neighborhood is important (Jacobs,1961; Castells,1997). At this scale the residents should meet the small daily needs (functional and socialization) without the vehicles use. Give strength to the size of the neighbourhood means revitalising the local economy, social relations of proximity and contributing to the reduction of emissions and energy consumption. Today, we can see a high degree of mobility due to the long distances among residents and opportunities. Give strength to the size of the neighbourhood means to find a relationship of greater proximity and increased efficiency. It becomes important the concept of accessibility. To achieve this it is important to consider the characteristics of the fabric, of structure of the public space and road network. In fact, as in a organism the cardiovascular system distributes energy and materials to the cells, so the road network distributes energy, people and materials in different places (Samaniego,2008). If the space needed for these transfers is not effective, the transfers and the relations are not effective (Samaniego,2008).
Effiective means a low level of entropy of the system. The entropy defines an irreversible process: the mechanical energy used is transformed mainly into heat that, once dissipated, can never become again mechanical energy. This law should also be retrieved in order to consider the urban system and its sub-systems. An organism is always looking for a lower level of entropy and we must inspire to these. According to Allometry and Metabolic Scaling Theory (MST) in biology (Banavar et al.,1999; Brown et al.,2004; West et al.,1997) the characteristics of vascular networks determine, in an organism, its volume (Banavar et al.,1999; West et al.,1997), the velocity of the flows of energy and materials, growth (Moses et at.,2008; West et al.,2001), the duration of life (West & Brown,2005) and other key features of the functioning of organisms (Brown & West,2000). Also Samaniego (2008) shows the similarities that exist among cities and organisms about the metabolism, the size of the system, network size, density and scale of prediction. The road network is equated to the vascular system of organisms. This distributes energy to the cells as well as the road network must distribute materials, people and energy in various urban places. Reconfigure the vehicle space can make a positive impact on the characteristics (social, economic and environmental) of the entire system. Samaniego (2008) points out that according to the MTS, the networks that distribute the energy are characterized by hierarchical branching. Similarly, the urban road networks should distribute cars and people in the city through a hierarchical structure (Samaniego,2008). In fact, the hierarchy of the parties is one of the characteristics that do exist a network and that make it effective. If these characteristics (continuity, capillarity, recognizable hierarchy) are not met we will obtain a low efficiency of the network, we have more energy consumption

and more harmful emissions and we cannot obtain a system of low entropy. In addition, the decline in the economy is increasingly linked to the quality and accessibility of streetscapes (Hamilton-Ballie,2008). Within the neighbourhoods the road network has lost all hierarchical rank and it is standardised towards a model that allows for a greater mobility, but at the same time, it has reduced its accessibility degree. Searching for a high level of accessibility can be a starting point for reconnecting the broken linkages increasing thus the overall connectivity of local networks. This systemic reconnection can help to ameliorate the well-being of communities and individuals.

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