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NEW GENERATION NEW NEEDS – THE RESILIENT CITY *VERSUS* THE SUSTAINABLE CITY

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Resilience, in urban planning, is the capacity of units, communities, firms and systems in a city to persist, adapt and develop irrespective of chronic stresses and sharp shocks experienced.

The city developing sustainably is one in which a balance is promoted between increased standard of living arising out of new investment, production and services on the one hand, and preservation of natural resources, pollution abatement and a positive energy balance on the other.

ABSTRACT: This article takes up the matter of contemporary threats to cities and urbanity, setting the problems cities face today against the background of the two categories of the resilient city and the city developing sustainably. The author describes and presents the evolution of the sustainable development concept as such, as well as the generational change in priorities that has taken place where the development of urbanised areas is concerned, given the way the concept has undergone a certain devaluation, in the light of its failure to achieve fulfilment. The challenges cities face today require multi-faceted activity, in respect of increased inclusivity, robustness and resilience, and flexibility.

This leaves today's idea of the resilient city embracing old elements of the sustainable city, but also augmenting them in various ways.

KEY WORDS: resilient city, sustainable development, urban sprawl, robust city, redundant city, liveable city, flexible city, smart grid.

INTRODUCTION

As is well-known, a city is not merely areal functions; not merely infrastructure, or climate or natural environment. First and foremost it is the inhabitants and the activity they generate and engage in. And in fact the city is one of the most complicated organisms ever shaped and built by the human hand. Paradoxically therefore, the same human species rightly regarded as the creator of the urban space is often unable to exercise – or even to take – proper control over that creation. We thus seem to remain stuck steadfastly at the point where forecasts regarding urban areas (be they about growth or stagnation) come as a surprise or even a shock to us, most especially when these are proven correct as the reality takes shape.

50 years ago, it was not widely appreciate that the European continent could muster just 3 permanently-constituted megalopolises of close-on 10 million inhabitants (excluding Istanbul), while at that same time the Far East already had almost 23 urban areas in this category. Likewise today, when problems facing Europeans that S. Huntington foresaw quite precisely are materialising almost exactly 20 years on from his writing his book *Clash of Civilizations* (Huntington 1996), we still fail to see the truth of that rule-governed situation, instead seeking out some chance explanations.

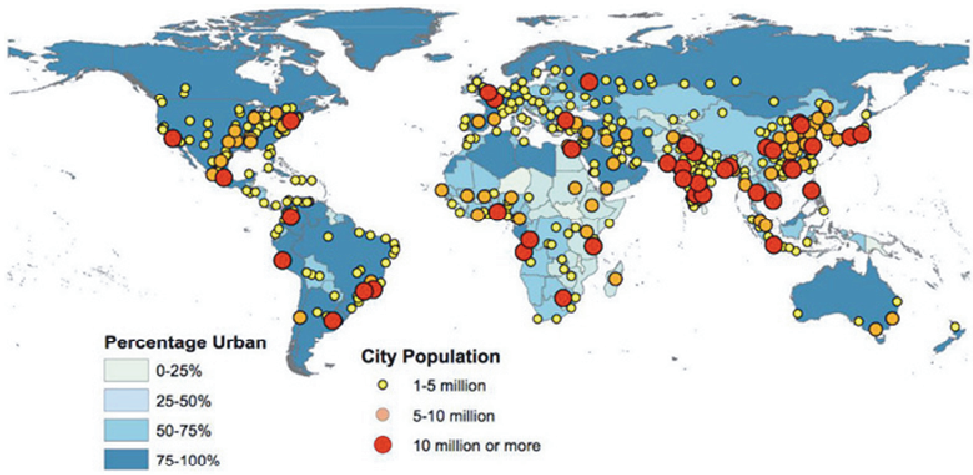


Figure 1. The world's town- and city-dwellers presented in percentage terms, with megametropolises according to 2014 UN data also depicted

Source: http://index.hu/tudomany/2014/07/15/azsia_es_afrika_varosai_2030-ra_lehagyjak_a_vilagot/

THE 21ST CENTURY – DIAGNOSING THE IMPASSE

With the arrival of the 21st century, planning, and especially contemporary urban planning, found itself in an impasse. The fall of Modernism more than 40 years before had left behind a strong imperative in the form of an availability of space vis-à-vis creativity that practically continues to operate through to the present day. New systemic solutions have unfortunately not arisen at all. There is no recollection of the values of neighbourliness and proximity as key to the creation and proper functioning of space (Jacobs 2011). Rather, this has been becoming – more and more clearly, in fact – a field for free auctorial interpretation and the work of "star architects". That means ever-more-spectacular complexes of buildings, each seeking to occupy their own special place in the city structure and thus providing for the more and more aggressive rejection of the principle that space (and public space in particular) should be organised hierarchically (Koolhaas 2006).

As in the 1960s and 1970s, the above trend has been associated with a tendency for the real problems of the city to be ignored, or indeed run away from (Gehl 1977). Once again, we have utopian concepts kicking off attempts to rethink the idea of the city from the very beginning – as if almost 5000 years of urbanisation had not taken place at all. Yet the problems of urbanisation today cannot be resolved as if the world was some TV cooking programme, on which a bit of everything is tasted before everyone has no choice but to home in on what is tastiest. Yet New Urbanism, for example, seems to look just like that (*Urban Spaces*... 2007).

In this negative selection, this escape from the city as the spatial organisation of multifaceted activity, we witness the extinction of all of the anyway-few theories for the contemporary city that have reached into the essence of urbanity. One of the latter, involving the notion of the mosaic of subcultures, was the brainchild of Christopher Alexander, and it appeared shortly after Modernism, in 1977 (Alexander 2008). Sustainable development appeared 10 years later – initially as a strictly humanist value arising out of care for humankind, and effectively reemphasising the old Ebenezer Howard idea of the healthy city (Howard 1970). However, with time, this came to be identified solely with the dictate that energy be saved and that there be a kind of "green sterility", through concepts such as zero-emissions and the bio-city.

A further strand to thinking had the matter of access as its battleground, and related to systems of rapid transit (as with the Chinese Great City, the Masder City or the Free City designed by Bernardo Romero). Weak-points of these solutions lie *inter alia* in the fact that they mostly embody a radical reduction in the role of the private car as a means of transport in cities, as well as a unification of human need and behaviour where the shaping of space is concerned. Meanwhile, the functions served by the car must be acknowledged as going far beyond getting quickly from A to B. Here it is worth recalling that Sir Ebenezer Howards's garden city – as a nostalgic dream of perfect urban space that nevertheless influenced the whole of 20th-century urban planning – did entail rapid transport both within and around the "wheel" (Fishman 1977; Ostrowski 1973).

And those looking to the future from the perspective of the early 20th century certainly saw the car as personifying individual liberty, imbuing a feeling of security, and often representing a means by which individual personality could be shaped. Yet in an era in which ensuring public safety becomes an ever-greater problem, the shaping of city space will lead to more and more individualistic solutions, such that – were the car ever actually to be substituted – this would solely be by some other individualised, rapid form of movement. And that is a fact that today's theories fail to take account of (despite it being seen by representatives of the second phase of the *avant-garde* like Georgy Krutikov among others) – Kwiatkowski 2013. The car will not disappear thanks to the cultivation of full "correctness" in city policy via some vision of space, and that was even acknowledged by Jan Gehl himself, as propagator of the idea of the city for cyclists. He wrote that: "we must have understanding and acceptance for the human desire to possess the motorcycle or the car" (Gehl 2014).

THE CONTEMPORARY CITY – DYNAMICS OF CHANGE AND DYNAMICS OF THREAT

In recent decades, the dynamics to change (including climate change) in urbanised areas have surpassed our capacity to make forecasts (Höjer, Gullberg, Pettersson 2007). Such is the rate of change, including as regards awareness, that we are today heading clearly for a clash between concepts that have in fact courted the world's attention quite recently only. For there is a difference between the right to the city as constituted at the *Habitat II* Conference convened in Istanbul in 1996, and the ostensibly similar description used in the critical concept of urbanisation theory from David Harvey (Harvey 2012).

Likewise, when we look at the 1992 Rio ("Earth Summit") Declaration on Sustainable Development from the point of view of today, we see with some puzzlement that the idea has not met the expectations held out for it. The promise of the generation of an efficient system for the utilisation of space, with guaranteed rights thereto (for future generations as much as – or more than – our own) proved remarkably difficult to give effect to. And in the face of the threat posed to today's world by regional, or even global, conflicts, the idea of sustainable development has too often been left as nothing more than a popularising formula, as opposed to practice that is put into effect.

Today's formula of the resilient city is already therefore richer – thanks to its having encompassed the experiences of the years that have passed. The possibilities that the Internet and social portals have to offer ensure that we as humankind are in an entirely different place from 25 years ago. We are much more readily able to say what the threats today are. Growing – sprawling – cities are in search of resistance or resilience in the face of the problems afflicting local communities (also online). Indeed, some at least are threatened by nothing less than natural disasters and catastrophes. Some of the megametropolises already face problems with meeting the need for suitable resources of drinking water or food, or with achieving some kind of bioecological equilibrium.

Just as a beginning, therefore, we have the seven key features of these and other cities, which are seeking to be "Resilient" by also being *Reflective*, *Resourceful*, *Robust*, *Flexible*, *Redundant*, *Integrated* and *Inclusive*. While the defining of these features does much to help cities determine their crisis situations – and indeed respond to them (making it easier to adjust to shocks and tensions), the formula is by no means filled with content yet, but only in fact sketched out in general terms.

The cause of this state of affairs cannot be played down, as the threats facing today's cities do not reside solely in the possibility of sudden natural disasters or catastrophes that can never be properly foreseen (like earthquakes, volcanic eruptions, floods or epidemics). Indeed, we are perhaps far more shocked when we witness the depopulation of cities of centuries-old traditions going back to antiquity (like Athens), and experience their ongoing loss of identity. Then we ask ourselves: why is that so?

Causes we can obviously seek in the economic sphere, in the problems of the Eurozone, in the major overestimation of the influence the historic 2004 Olympic Games were supposed to exert. But not everything can be explained by reference to the economy. Nature did not spare Athens either, with traces of the powerful 1999 earthquake still to be made out in the city. This situation is paradoxical given the fact that, the more we seek to achieve diagnosis in the technical sphere relating to the functioning of the contemporary city, the less the influence that such diagnoses are able to have when it comes to the remedial programmes applied actually yielding a satisfactory result.

At this point, it needs to be recalled how Athens meets most of the criteria laid before the resilient city – making it clear that appearances can be deceptive. And the conclusion from that is clear: that there must be certain other – invisible or hard-to-measure – factors determining the condition of cities today. And if that is the case, these factors must be entirely located on a side that has not yet been subject to comprehensive research – relating to people's behaviour, level of activity and potential, as well as the barriers these face, and the mechanisms that help create them. And these factors in fact have a far stronger impact on the dynamics to the development of today's cities than do remaining kinds of conditioning, be this infrastructural, climatic or whatever.

RESILIENT OR SUSTAINABLE CITY?

In recent years, the search for a panacea for the problems of the contemporary city has borne fruit in the concept of the resilient city – which will differ from its sustainable counterpart in being supplied, not so much with precautionary measures and the achievements of standards, but in creativity and an adequate response to the ever-more-rapid change enveloping us all. In other words, the question regarding the resilience of the city is one on how to cope; on how the given urban organism can face up to extreme disruption to its multifaceted activity, as this result from both natural factors (like earthquakes) and those of an anthropogenic nature (like a terrorist attack or serious

international crisis). By itself, the sustainable development formula is no longer able to serve the needs that today's city will have to struggle with. One might say that economic disparities went far beyond the earlier proclamations associated with spatial planning. Indeed, this was brought into sharp relief as early as 5 years after the Earth Summit, when it was revealed that the assets of just the top 3 billionaires exceeded the GDP the 600 million poorest inhabitants of the Earth were able to generate (Harvey 2008). The sustainable development formula is too passive to match the dynamics of change, especially when we take account of the fact that, according to UN and OECD forecasts, by 2050, some 6 billion people will be living in cities. The historic moment when the numbers of urban and rural residents matched each other was reached in 2010.

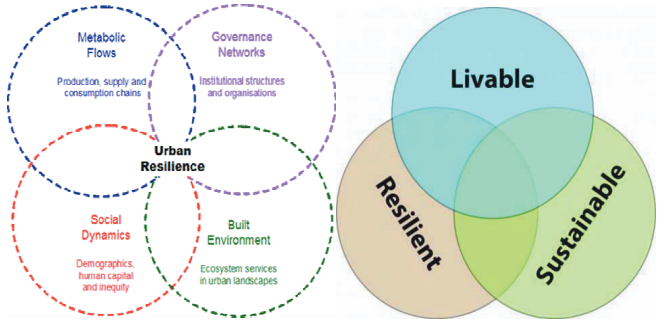


Figure 2. Resilience *versus* sustainable development

Sources: http://lulab.be.washington.edu/omeka/collections/show/8; https://www.slideshare.net/TalkingTransitionSlides/the-new-resilient-city/38-BLENDING_RESILIENCY_INTO_DESIGNAccom; https://www.thenatureofcities.com/2013/05/08/the-cities-we-want-resilient-sustainable-and-livable/

In other words, elements of the sustainable city and of the resilient city must augment each other these days, in order that new needs of – and new threats to – the liveable city (Fig. 2) can be faced up to and addressed. To put it at its most simple, the resilience formula entails a mixing of four areas, i.e. possibilities as regards the economy, mobility and local-community capabilities, with a properly-functioning governmental and local-governmental administration and full use made of natural resources. Different values of this kind are responsible respectively for:

- the economic sphere – i.e. overload-resistant production and polycentric distribution of material goods and services (with the whole gamut of the latter available everywhere across a city), and alternative sources of energy beyond those relating to oil alone;
- the social sphere – i.e. the development of potential in local communities where skill and creativity are concerned;
- the governmental and local-governmental sphere – i.e. the introduction of mechanisms optimising decisionmaking, transparency and speed of reaction at the administrative level – in the face of all the different kinds of unforeseen phenomena affecting today's city;

- the sphere of the natural environment, which, apart from having its natural resources managed appropriately, is supposed to help give the city its image, not only in relation to its green space, but also as regards the built-up area – with this in practice denoting an influence on the urban-planning environment (with, for example, consistent promotion of pedestrian activity in city centres).

By definition, the resilient city is one that is innovative. But is the application of a perfect infrastructural network enough to allow mechanisms of growth for the "active community" (Pinterest.com 2016) to be achieved? As J. Gehl writes in his book *New City Life* (Gehl 2006), the essence of the resilient city lies, not merely in coordination, band the augmentation of the four areas referred to above, but in the creation on the basis of these of a modern and efficient system, *i.a.* with the diversification of services, and – in connection with that – the allocation of jobs, better transport accessibility, a multipolar transport network, a polycentric power-supply network based on alternative, renewable sources of energy, and so on. The construction of the resilient city is not favoured by the absence of a living laboratory for such cities. Nevertheless, the set of instruments already possessed allows potential resilient cities to be pointed to, e.g. in the cases of Antalya and Bursa (in Turkey), Kobe and Kyoto (in Japan), Ottawa (in Canada), Oslo (in Norway), Lisbon (in Portugal), Tampere (in Finland), Cardiff (in Wales, UK) and Belo Horizonte (in Brazil).

Put in the most general terms, the opposite of the resilient city is the divided city, though the division lines referred to here may be of many and varied kinds, and often in fact invisible or entirely hidden, yet still very deep. Cities in which industry plays or played a dominant role, like Detroit or Liverpool are included here, but so are those that lack new land for development, and this by definition have difficulties with being resilient.

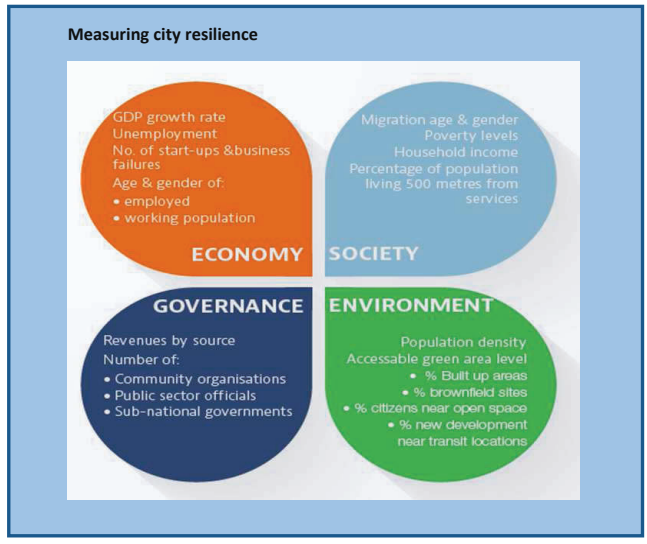
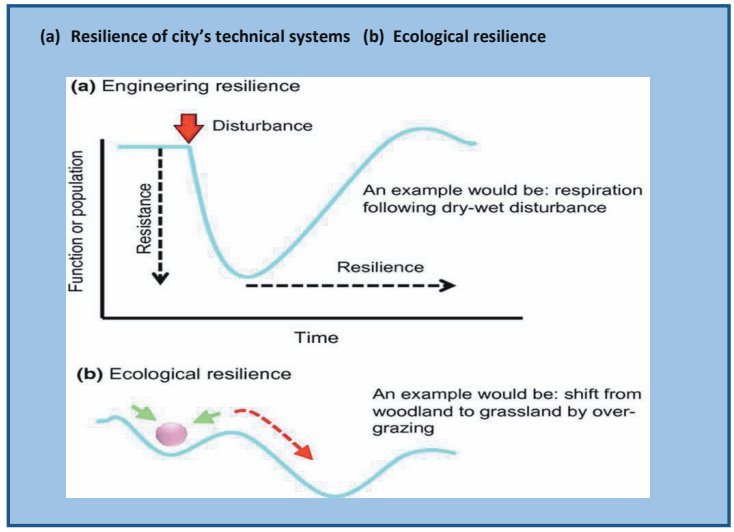


Figure 3. Measuring city resilience

Source: http://www.oecd.org/cfe/regional-policy/resilient-cities.htm

The degree of advancement of processes of urban resilience (Fig. 3) can be recognised by way of a series of detailed analyses in each of the four aforementioned areas of activity. In the social sphere this may be: degree of poverty, migration balance, age and gender, household income and the percentage of city inhabitants with access to services at a distance of 500 m or less from the dwelling. In turn, in the central and local government spheres there might be data on the number of organisations active in society in the given area, the quality of local authorities, and the level of services supplied to inhabitants by local government officials. In the economic sphere there would in turn be levels of unemployment and poverty, the age and sex of those employed and total numbers in work, the rate of growth in GDP and numbers of unsuccessful start-ups. In the sphere of the natural environment what are involved are density of habitation, the percentage of the surface area that remains biologically active, the percentages of inhabitants living adjacent to open space within the city, the percentage area accounted for by commercial and residential space in the vicinity of transit roads, and the percentage area that is post-industrial in nature.



Figures 4. The nature of urban resilience: people, the activity of technical systems and the natural environment

Scheme presenting the operation of the system (a) and ecological resilience (b). Activity in the system is defined by reference to a stability that denotes immediate reaction to a disturbance via resistance, followed by the regaining of potential over time via a form of resilience basically involving a bounce back. The diagram points to the effectiveness of action of the city (in the given environment). A system is resilient if the environment in a given niche can be maintained in the face of (ever-greater) disturbance; while a weak system (of limited resistance or resilience) is one which transfers over to another environmental niche.

Source: https://www.researchgate.net/figure/224924552_fig1_Figure-2-Schematic-representation-of-engineering-a-and-ecological-resilience-b-In

Under the formula of the resilient city, a huge role is played by the rate at which at-risk can be rebuilt or restored. The higher the rate, the more advanced the resilience process is. A major role here is played by both resistance to the destruction of resources themselves, and the time factor, which is to say the time it takes to ensure their resupply or restoration (Fig. 4).

SMART GRID AS A STRATEGY BY WHICH TO COMPENSATE FOR THREATS

The *Smart grid* system, as a smart ICT and electricity-supply network, and key element of the resilient city, has as its aim to compensate for certain threats by integrating dispersed renewable sources of energy (solar batteries, wind turbines, geothermal power, exploitation of the kinetic energy of water and so on), as well as the power-supply resources already existing in the networks and produced in large power stations based on conventional or nuclear fuels.

The *Smart grid* system can operate in both directions, which is to say that it will transfer energy to the system where this not needed by the individual generator-customer (given that even the single-family home will be outfitted with photovoltaic cells). The incorporation of renewable sources into the network, and hence also the reduction in emissions of carbon dioxide, will allow for the development of a transmission network of new parameters (in which losses are minimised). This will further allow for saturation access to energy for regions and states threatened by shortages, thereby ensuring resilience in the face of interruptions to supply. In the same way, the system might in future counteract huge losses in the world economy (extending to billions of dollars), as these result from breakdowns in the system and abrupt interruptions to the supply of power supplying whole agglomerations. In the case of the United States, for example, this happened as many as 3 times over a 10-year period. Also involved here is enforced reduction of power transmitted to customers during heatwaves, as for example in California over the last several seasons.

Ultimately, it is anticipated that the future will bring Internet control of electricity consumption, with it also becoming possible to automatically redirect supplies of energy should there ever be power cuts. Intelligent meters will be monitoring consumption, providing simultaneous information to the customer and the system. The network will operate flexibly, protecting access to power from both terrorist attack and natural disaster. The intelligent network known as the *Smart grid* will also provide new ways in which energy can be stored, as well as instant transfer to places it could not have reached in the past. Energy storage will be a key component to a process whereby a system of electrically-powered cars develops, given the way that such a system provides for access to the power grid (for the charging of cars) almost everywhere – i.e. at every car park, in front of restaurants, in shopping malls, on ferries, near railway stations and close to each home.

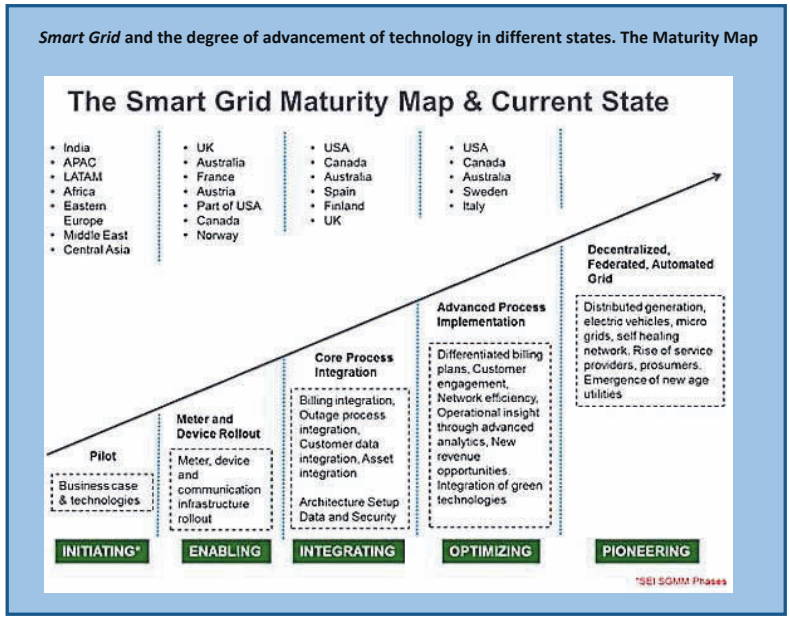


Figure 5. The maturity map for the *Smart Grid* system and degree of technological advancement achieved in different states

Source: http://www.wipro.com/industries/utilities/segments/electricity-gas/smart-metering-smart-grid/

Smart grid is not just full energy security; it is also a process for the optimal use of these resources in the name of the integrated development of energy services. In this way, *Smart grid* is associated with the need for harmonisation and unification of services in telecommunications, construction and architecture, with a view to the so-called inter-operability being achieved. This is then a harbinger of change that will affect the spatial picture of the city of the future.

The construction of the network also has its weak points. Apart from the huge costs of bringing it into operation, there is also the so-called "human factor". As one element in the overall system, the smart home will be supplying information on users' behaviour. While that may indeed be useful for awareness-raising as regards energy consumption, there will on the other hand be total surveillance of residents, in some senses at least. A sensitive system will be able to say how many people are in the home at the given moment, but also what activities they are – or have been – engaged in, where the car was last charged (and the route it took after that), and so on. That raises a question as to whether the sacrificing of individual liberty and the right to a private life is not in fact too high a price to pay for the saving of energy and guaranteed continuity of supply.

A RETURN TO THE REPEATABLE CITY?

It is hard not to notice that a side-effect of the globalisation processes in the middle of which we find ourselves is a proneness on the part of local communities to behave in some kind of collective manner, en masse. This mass or collective identity makes its appearance, and is magnified thanks to the possibilities the Internet provides. We still fail to fully appreciate what this is, but nor do we ultimately know how it might be controlled. It also tends to defy the diagnosis that would allow us to devise appropriate methods of reacting to the destabilisation and stagnation that is impacting upon the development of cities. The recognition of these processes that are hidden – but at the same time most likely longlasting, as they arise over years in a given urban environment – is, or certainly should be, a main task of the urban planning of the future. Unfortunately, we do not notice often enough that the human being as city-dweller is also an element of its space – indeed a very important one, provided he or she does not remain seated in front of the TV or permanently "hidden" in his/her room (Gehl 2013). Social behaviour (also important!) can be perceived when we notice how skilfully it for example finds itself incorporated into the ways in which large shopping centres and supermarkets operate. After all, the city is a vision of social beauty, as S. Gzell seeks to remind us in his *O architekturze* sketches (Gzell 2014).

A defining of these processes, and of the new socio-spatial identity on the macroscale, can for example be sought by reference to the dispersal of collective behaviour, with atomisation of this possible in laboratory conditions. To this end, we ought to construct a lab to work on social processes ongoing in towns and cities – a kind of laboratory for the resilient city. An experiment could be run by reference to a series of virtual models of the repeatable city, as augmented by emotional maps of city space generated by way of in-depth interviewing of inhabitants. It is worth recalling that the actual idea of the repeatable city appeared rather a long time age – in *Utopia* (1516) by Sir Thomas More (Morus 1946). However, there it was only a rhetorical figure – as opposed to a spatial one, representing egalitarianism in a very particular form. On the other hand, the spatial formula for the repeatable city needs to be sought in solutions as regards linear cities arrived at during Russia's *avant-garde* period in the late 19th and early 20th centuries, as well as later in the Soviet era (Kwiatkowski 2013). However, these brought no positive result, *inter alia* because the priorities when it came to the development of these cities linked up with the need to increase industrial output and to achieve extreme rationalism in power generation, albeit with no interest whatever taken in considering and defining human behaviours (Khan-Magomedov 2009).

It needs to be made clear that the formula of the repeatable city, as a real contemporary urban area of precisely-defined location, must be rejected as irrational and perhaps even harmful to society. Rather, the idea of this kind of city as given effect to today can only exist as a modern laboratory for the resilient city (whose absence in real life has been noted above); and this should be based on a series of spatial models generated virtually

and then offered up for the perceptions of defined groups in society. The models would be identical, just as we today have identical industrial products (like cars, televisions and washing machines). Through the launching of the relevant psycho-spatial experiment there may be a revealing of mechanisms by which people's behaviour and activity is differentiated, with a restoration of the personalised nature thereof. The result of an experiment of this kind might be anticipated opportunities to define and pin down the barriers giving rise to the disappearance of social activeness in urban areas. It is also possible to foresee ways out of the impasse in which cities find themselves today being indicated, with this therefore being regarded as a measure of the experiment's success.

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