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THE THEORETICAL UNDERPINNINGS OF A THEORY OF SPATIAL CAPITAL

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ABSTRACT

The world is witnesses unprecedented urbanization bringing extreme challenges to contemporary practices in urban planning and design. Global knowledge production has in response 'turned urban' leading to a tremendous out-put of new knowledge about cities world-wide from a broad range of fields. At the same time, it is increasingly recognised that what is lacking for a change of our cities into greater sustainability is not so much more knowledge about different urban systems as knowledge about how to change the trajectories of these systems – there typically is an implementation deficit in current research and knowledge on cities.

A typical character of contemporary research on cities, apart from the tremendous quantitative increase, is also its diversification into an extraordinary range of fields. Today Urban Geography, Urban Sociology, Urban Economics and Urban Ecology, which used to represent the periphery of their respective disciplines, are increasingly coming to constitute their core. Naturally this also builds barriers between disciplines, not so much due to disciplinary chauvinism as the simple fact that expertise in this academic range is near impossible to achieve. However, an alternative approach may be to look for what is common for all these fields rather than what is particular and when speaking of cities there is one such entity necessary for any discipline that want to call itself urban to address and that is space.

It has in space syntax research earlier been argued that space may constitute a "common language", whereby we may jointly understand social, economic and environmental systems in cities (Hillier 1999). This paper presents an extension of that ambition by presenting the outline of a theory of spatial form where it is argued how spatial form can be directly related to social, economic and ecological urban systems. To accomplish this, it also briefly refers to a model of urban spatial form that extends established space syntax models (Marcus et al. 2017), which primarily deals with distance variables, to also include variables of density and differentiation. The paper ends by arguing that due to the fact that spatial form to a large degree conditions the performance of more or less any urban system, it constitutes a form of capital that represents a tremendous value.

KEYWORDS

Sustainability, Urban systems, Urban models, Spatial capital

1. INTRODUCTION: A THEORY ABOUT SPATIAL CAPITAL

Current global urbanization processes, where two thirds of the world's population are expected to live in cities by the year 2050, put acute stress on urban and ecological systems to support environmental sustainability, social cohesion and human wellbeing. This brings unprecedented

knowledge demands on the governance, planning and design of cities of a kind these practices not necessarily are prepared for. In response to these challenges we here present a theoretical framework for a *theory about spatial capital* (Marcus 2010). Spatial capital is here understood as an extension of the fundamental value represented by *land*, but adds the argument that this value, is not only enhanced by investments in fixed capital, such as infrastructure, buildings and roads, but also by how the spatial form of land is structured and shaped through urban design, creating locations with specific socio-economic and ecological potentials. This value concerns both use values related to the everyday life of people as well as market values. The theory is underpinned by an analytical model of spatial urban form (Marcus et al. 2017), comprising the variables *distance, density* and *diversity*, whereby the entity of spatial capital may be measured and analysed.

The paper draws on a broad set of theories to demonstrate how spatial capital in this sense has a fundamental impact, not only on economic capital, but also on social and ecological capital. It is argued that the most fundamental asset in cities is people; however, the accessibility to people, the mobility of people and the distribution of the co-presences of people, are all phenomena structured and shaped by the spatial form of cities and it can be shown how such spatial relations have a decisive and long term effect on fundamental societal functions, such as social cohesion and economic markets, which in any society represents tremendous values in any respect of the word. Importantly, the same is argued for ecological capital, where the distribution of parks and green areas is essential for the functioning of urban ecosystems, which in turn are central for ecosystem services of many kinds that support health and well-being in cities of exceptional value. Together, we may see the contours of a broad theory of urban capital.

We will begin by interpreting current challenges in urban development, followed by a theoretical discussion about how spatial form in turn structures and supports the development of social, economic and ecological capital in cities. The paper ends with a brief discussion.

2. THE ONTOLOGY OF URBAN SPACE: THE NEED FOR AN ARCHITECTURAL MODEL OF THE CITY

While Jane Jacobs' succinct statement that: "cities are problems of organised complexity" (Jacobs 1961), went over the head of most scholars at the time (Batty 2005), it has now become a truism. However, while embraced in academic circles it does not to any substantial degree influence practice in urban planning and design. For someone daily occupied with the design of the physical form of buildings and cities, it is far from apparent how one is working with complex systems, the reason is that one is not. To unpack the confusing ontology of cities, there is reason to return to Jacobs' source to her statement, the tripartite categorisation of scientific problems by American Scientist Warren Weaver (1948). *Simple problems*, are problems constituted by few and independent variables, such as dealt with in Newton's laws of motion. Complex problems, on the other hand, either concerns problems with many and independent variables, called *disorganised complexity*, such as the movement of molecules in a gas, or problems with not necessarily many but interdependent variables, called *organised complexity.* This interdependence creates feedback and multiplier effects between the constituent parts of such systems, which make them highly unpredictable, as recognised in both social and ecological systems.

Hence, cities are complex systems, but they are so by integrating many systems of which some are simple. This is important, since discussions on complex systems typically emphasise their unpredictable behaviour, which hides the critical role of simple systems in complexity. As a matter of fact, such simple systems often rule over the complex. This happens, first, since complex systems, as we have seen, are decomposable, why we can make a distinction between interactions *among* subsystems and interactions *within* subsystems, where the linkages within a subsystem generally are stronger than the linkages between subsystems (Simon 1962). Second, since sub-systems constituted by physical matter, which typically are simple, are held together by far stronger forces than many complex systems, such as living systems (Schrödinger 1947). Third, since slow variables in complex systems have a tendency to dominate over fast variables and force them to adapt to their rhythm (Weidlich 1991).

This makes it reasonable to return to the ontological distinction of cities into systems of spatial form, the built structure of cities, and systems of temporal process, social and ecological processes in cities (Harvey 1969), where the first is a simple system and the latter a complex system. This opens our eyes to the critical role of systems of spatial form and the reason to humanity's tremendous investment in such systems; it has been a way to hold together, and in extension structure and shape, the typically weaker bonds found in social and ecological systems, that is, using physical structure to sustain particular social and ecological processes.

Hence, urban space is the central object of intervention in urban planning and design, that is, it is the 'material' whereby professional practice in these disciplines influence and direct urban systems of different kinds, whether social, economic or ecological, into politically sanctioned trajectories. More specifically, urban space is structured and shaped in these practices into spatial systems by way of different media, such as built form, institutions and discourse. We will here focus on how urban space is structured and shaped by the medium of built form in the practice of urban design, leaving the media of institutions and discourse, more characteristic for planning and governance, to the side, keeping in mind, however, the many overlaps between media and practices in these fields.

The challenge then is to develop representation of spatial form that can be linked to social, economic and ecological processes in cities, thereby allowing them to be consciously directed by urban design. It is here often repeated how the language of space is geometry, but the crucial thing is how geometry is applied in descriptions of space. Today, spatial descriptions most often have their origin in *geography* and spring form rather abstract conceptions of space (Marcus et al. 2013). For instance, space can geometrically be represented as a continuous grid or as a set of census areas, where the question whether these are adequate descriptions for the question at hand not necessarily is raised. Moreover, such representations typically describe 'things distributed in space' rather than 'the things that distribute space' (cf. Koch 2007), where we by the latter mean the variable of built form, why they do not really support urban design. Hence, there is reason to go to other disciplines dealing with space, such as *architecture*, where representations of space typically have their origin in human perception, and specifically are concerned with 'things that distribute space'.

For this we need a model whereby we can describe spatial form as structured and shaped by built form. This has been a central concern for *space syntax* since its origin (Hillier & Hanson 1984), where the most original contribution is the development of representations related to both physical and cognitive human affordances (Marcus 2015). These have typically been applied in different network based analyses of *distance* (Hillier 1996), but there has also been approaches that expands such descriptions to other dimensions of spatial form (e.g. Berghauser Pont & Marcus 2015). In the model underpinning the theory of spatial capital, these have especially concerned *density and diversity, measured as attraction*s for each node in the network (Marcus et al. 2017). Density is here measured as amount of built square meters, which repeatedly has been shown to correlate with population density (e.g. Ståhle et al. 2005), and diversity as degree of land division into parcels, which has been indicated to correlate with diversity in population (Marcus 2001). Together this presents an opportunity to describe the potential created by spatial form for the size and differentiation of co-presence for each location in the urban landscape (Marcus & Legeby 2011), something we can refer to as a spatial capital (Marcus 2010).

3. TYING SPATIAL CAPITAL TO SOCIAL CAPITAL: DURKHEIMINAN MICRO-SOCIOLOGY

However, for a theory about spatial capital we do not only need a technique whereby we can analyse and measure the spatial conditions for the distribution and co-presence of people in cities, but also a convincing theory about why the co-presence of people has a central impact on social relations and society in general. Of particular importance here are the theories of Emile Durkheim on *rituals* and their role as generators of emotional effervescence that tie together social entities, whether people and people, or people and things (Durkheim 1912). Durkheim

means that what fundamentally is celebrated in the rite, is the community it creates; the coming together of people in proximity creates an emotional fervour tying people together and in the end, it is that social bond that is both celebrated and sustained in the ritual; hence his conclusion that what is cherished in all religions is society. This idea was both specified and broadened by the American sociologist Erving Goffman into a general theory of *interaction rituals* (Goffman 1959, 1963, 1967). Goffman means that the kind of emotional effervescence typical for the rite is something we experience not only in religious settings but continually throughout everyday life, albeit on a lower key, why more or less any co-presence of people, however ephemeral or mundane, is understood to be part of the continuous recreation of society. Decisive here is the emotional interlocking and attunement that typically takes place between people in close proximity; sustained by glances, rhythmic speech and body movement.

The American sociologist Randall Collins has continued this micro-sociological tradition and expanded it into a broad sociological theory (Collins 2004). His point of departure is the fact that nothing adhering to human affairs really happens outside a *situation*, that is, Collins identifies human co-presence as the critical building block by which sociological theory can be built. Collins makes two essential additions to Goffman; first, he expands the central role of co-presence into a theory about how such situations of co-presence over time concatenates into a series, which he calls interaction *ritual chains*. Hence, he acknowledges the fact that we carry into every situation the experience of a series of former situations, which naturally conditions our experience of the new situation. Second, he unpacks the potential, inherent in Durkheim's theory on rituals, that these not necessarily only create solidarity, but potentially also conflict. A ritual seldom includes everyone in a given society, why it not only creates solidarity among the 'insiders', but potentially also varying degrees of conflict with its 'outsiders'.

Given the ability our model above gives us to demonstrate how spatial form is essential in generating the distribution of co-presences of varying size and differentiation in cities, we here see an important step towards tying spatial capital to social capital. The idea of social capital has its roots in the study of collective action, where concepts such as trust, cooperation and institutions are essential (E.g. Ostrom 1990). Its current popularity springs from the work by political scientist Robert Putnam (1993), who defines social capital as the "Collective value of all social networks and the inclinations that arise from these networks to do things for each other". There are many takes on the idea of social capital and there has also been extensive critique (e.g. Urry 2002). Here we rather aim to address how any take of such a theory has a spatial dimension. Putnam's version was supported by an empirical investigation of such variation in Italy, where he found that Northern Italy was far more successful than Southern Italy in implementing institutional change and that the main reason was its' more developed social capital. The result that the South was proven less able in this regard was surprising, considering its' tradition of strong family ties, why Putnam expanded on the character of the ties that build social capital. He found two types, *bonding*, which constitute social networks that hold homogenous groups together, and *bridging* that hold socially heterogeneous groups together. The type of particular importance for social capital are the latter, he argued, since such ties bring together a variety of social groups and competences and create a capacity for adaption and renewal. In contrast, bonds concerns groups of similar predilections that, generally speaking, does not contribute to trust and flexibility in the greater community.

In cities, we can see how these ideas contrasts with modern urban design, where the aim to create neighbourhood community often is the paramount ideal. The neighbourhood is a distinct local entity in an urban context and given the fact that there is a well-recorded tendency in cities of socio-economic clustering and neighbourhood effects, that is, a strong influence of local conditions on individuals (Wilson 1987), the focus on the neighbourhood must be interpreted as a policy for bonding rather than bridging. We may contrast the neighbourhood unit concept with the gridiron concept, such as Manhattan, which also exhibit distinct neighbourhoods, and make use of another observation by Jane Jacobs, namely that typical for Manhattan is a spatial overlap, where both local residents and visiting strangers tend to share the same urban space, that is, that residents and visitors tend to be co-present in the same street (Jacobs 1961). Hence, we could translate bonding into streets *without* overlap, primarily used by residents, and bridging into streets *with* overlap, used by both residents and visitors.

We then see why the latter kind of spaces may prove essential if we aim to build social capital; such spaces constitute spaces of higher 'information content' – the possibility that we get to see something that we did not expect. At the same time, however, we may also acknowledge a societal need of streets without overlap, where difference and even idiosyncrasy is allowed to develop, exactly to produce informational difference meaningful to exchange in the streets of overlap – without difference, there simply is no need for exchange. The point in the current context, is that we then see how spatial form works as a 'material substratum', in Durkheim's terms, conditioning the development of social capital, why it can be seen as a spatial capital, vital both in building social capital and sustaining it over time. Essential here is to understand how spatial form creates the conditions for a continuous landscape of differently sized and differentiated co-presences of people, something that has been demonstrated using variables in the model referred to above (Legeby 2013).

4. TYING SPATIAL CAPITAL TO ECONOMICAL CAPITAL: THE NEW ECONOMIC GEOGRAPHY

It is easy to see how the notion of cities as a landscape of co-presences of varying size and differentiation, in economic terms can be translated into a landscape of markets; what are economic markets but co-presences of people and things. This is reflected in the established explanation of cities in economics, which goes back to Alfred Marshall, who observed how certain industries clustered in particular locations (Marshall 1890). His explanation was that proximity offer firms externalities of which he identified three of particular importance. First, cities offer *knowledge spill-overs* in that proximity between firms in the same industry facilitates the learning from each other; second, cities offer *thick markets* where employers can find qualified labour and employees new work if laid off; third, cities offer both *backward and forward linkages*, where backward linkages concern producers' need to access input goods and forward linkages their need to access markets for their products.

While this argument has been embraced as foundational for urban economics, it has proven difficult to model and therefore remained an unverified assumption. The central contribution of the New Urban Geography (NEG) (Fujita et al. 1999) has been models that can test these assumptions. Modelling of space has a long history in economics and the scholars behind NEG identifies two strands. First, *urban economics* originating in the work of von Thünen (von Thünen 1826), which primarily concerns land use distributions in individual mono-centric cities, where they remark that models of this kind explain the land use distributions around existing cities but not the location of the city in itself. Second, *regional science* (Isard 1956), that spring from Christaller's analysis of the size and location of a set of cities within an area (Christaller 1933), which concerns the interaction between centres in regions and cities, that is, explaining also the location of cities in themselves. NEG continues the latter in the aim to model this tug-of-war between centripetal and centrifugal forces that decides the spatial distribution of economic activity and is the central object of study in urban economics.

When it comes to centripetal forces, that is, the attraction of cities on economic activity, NEG has for methodological reasons, focused on the externality of forward and backward linkages. Importantly, such linkages only make sense if it implies increasing returns for the individual firm so that it can impact firms' choice of location. Increasing returns, however, implies imperfect competition, which is demanding to model. Centrifugal forces; forces that discourage concentration, such as transport costs, may be equally difficult to model. It is overcoming these obstacles that have brought NEG attention. Sticking here to simpler variants of their models, it can still illustrate their arguments.

We may assume an economy of two regions and one manufacturing sector and then vary transport costs. In a situation of high transport cost we find an equilibrium when manufacturers are equally distributed between the two regions, since at a certain level of transport costs, prices and commuting costs will make it profitable for manufacturers to move to the smaller region; a process that will continue until they are equally distributed between the two. With low transport costs, in contrast, an equilibrium is found when manufacturers are concentrated in one region,

creating a core-periphery pattern, since low transport costs opens for a larger market leading to both higher wages (due to backward linkages) and lower prices (due to forward linkages).

We see the importance of transport costs in these models, something that may vary for many reasons, energy costs, degree of congestion and infrastructural standard. However, underpinning any such cost is physical distance, which is what routinely is structured and shaped by way of spatial form in urban design. Hence, we may say that urban design creates landscapes of locations with different and characteristic transport costs. The implications are two. First, that a model of spatial form of the kind referred to above may add exceptional resolution to NEG models, not limiting them to the idea of cities as having one or a few centres, but being constituted by continuous landscapes of centralities. Second, that urban design shapes and reshapes the distribution of centripetal and centrifugal forces in cities, thereby changing the spatial conditions for economic activity both locally and in aggregated form for the whole city. Hence, we see how spatial form is a critical means of production – a necessary capital – its' value typically reflected in the rent of urban land. Again, it is essential to understand how spatial form creates the conditions of a continuous landscape of differently sized and differentiated co-presences of firms, something that has been strongly indicated, using variables in the model above (Sayyar & Marcus 2013).

5. TYING SPATIAL CAPITAL TO ECOLOGICAL CAPITAL: ECOSYSTEM SERVICES

We now turn to urban ecosystems, which in cities are deeply intertwined with both social and economic systems. We will therefore refer to this conflation as social-ecological systems (Berkes et al. 1998), reflecting an understanding rapidly developing in ecology of humans as *humans-in-nature* rather than *humans-and-nature*. From having been something that ecologist turned away from – in the aim to study nature in its true state – urban ecology has in recent decades grown rapidly (McDonnell 2011). This is not least due to a new understanding of ecosystems as open, process-driven and regulated by external forces, where such forces can have their origin both in human activities, such as agriculture and urbanisation, and natural phenomena, such a fires and storms. Hence, humans are here understood as an intrinsic part of nature and ecological process.

This is reflected in how urban green areas have moved to the forefront in recent urban design and now are discussed for reasons beyond the recreational uses traditionally assigned to them (e.g. Waldheim 2006). Rather such areas are emphasised as carriers of ecosystems important for urban life and human well-being. This leads to new challenges for practice: how can spatial form harbour not only social and economic systems, but also ecosystems. Important here is the notion *ecosystem services* (Daly 1997), which concerns the great number of services ecosystems perform to the benefit of humans, such as pollination, air cooling and water cleaning, calculated to represent immense values also in monetary terms (Costanza 1997).

We may illustrate the idea through the ecosystem service pollination (Marcus et al. 2014). To facilitate such services in an urban area, we need to create support for both essential agents for this service, that is, pollinators, such as bumble bees, and processes, such as their foraging, nesting and breeding. Essential for this is to create a set of biotopes suitable for these processes as well as ensuring accessibility for pollinators between these biotopes. Hence, functioning ecosystems are in spatial terms a set of locations linked together in a configuration that allow movement between them. We then realise that the spatial demands of ecosystems not are very distinct from demands of socio-economic systems and that the inclusion of ecosystems in regular urban design is tenable. As a matter of fact, many regular urban design elements can be extended to also accommodate ecosystems (Barthel et al 2011).

For instance, it is apparent that ecological processes just as socio-economic are in need of accessibility between its different nodes of activity. Hence, the notion of the 'street', and similar spaces of flow, could be augmented to also facilitate ecological connections. In a similar vein, land in cities, just as agricultural landscapes, have through history been divided into discrete parcels for diverse activities and/or ownerships. Moreover, just as buildings are expressions of the need to enhance and intensify land-use through built form, they could be extended to support

ecological needs, for example: green roofs, green walls and integrated social-ecological water systems. Finally, just as with socio-economic systems, there is a need to set these elements into a systemic whole; a particular spatial configuration. In principle, this demonstrates the prospect of integrating ecosystems in urban design projects.

We may next contemplate how ecosystems and the services they produce, which create the very foundations for our existence, can be regarded as capital. The concept *natural capital* has generally come to concern natural resources, while we here aim for the systems that produce such resources. This has been called *green capital* (de Perthuis & Jouvet 2015), but has then been looked upon as something given, which limits the discussion to how to protect such systems; a static conception that can be questioned by pointing out how the history of humanity has seen continuous intervention in ecosystems; think only of agriculture. Our concern is rather to develop knowledge on how to support, improve or even create such systems, that is, invest in *ecological capital*.

However, it is obvious that ecosystems also are different from social and economic systems. Most importantly, while the agents in the latter systems are humans, constituting the primary flow in them, it can in the case of ecosystems be many different types of agents, such as birds and insects. This put new demands on urban design, albeit not as dramatic as one may think. The fundamental need is to adjust our model to a series of key species, in addition to humans, and acknowledge cities as a set of biotopes. Hence, we need to, first, relate all *distance measures* to these key species; second, relate the size and type of biotopes to these species; finally, adjust the *substrate* of the ground to these species to facilitate movement. Hence, also in regard of ecosystems it is essential to understand how spatial form creates the conditions for a landscape of differently sized and differentiated co-presences, this time of bio-topes, something that tentatively has been shown using variables from the model above (Berghauser Pont et al. 2017).

6. CITIES AS COMPLEX SYSTEMS: THE ROLE OF SIMPLE SYSTEMS IN COMPLEXITY

In the previous sections, we see a division of cities into two sets of systems, systems of spatial form and systems of temporal process, such as social, economic and ecological systems. We have also shown how the two are linked and influence each other, where the influence of spatial form on the co-presence of human and non-human agents has been vital. However, this is treating the dynamics of such systems in a limited sense. In our cases, people and other agents repeatedly generate social co-presences, local markets and urban ecosystems of similar size and differentiation and in the same locations. But what if this system is disturbed through a change of some kind, that is, acknowledging the true complexity of urban systems. To address this issue, we need to lift our discussion to another level and ask ourselves not only how spatial form support certain social, economic and ecological processes in cities, but how spatial form also sustain these processes over times of change. What we paradoxically are asking is what static structure can sustain dynamic change.

From our earlier discussion, we realise that what is surprising about cities and other complex systems, perhaps not so much are their often-emphasised irregularity and unpredictability – how could we expect cities to be anything else – but rather that they over long time periods remain so stable and predictable. This typical property of complex systems is called *resilience*, a concept introduced by Canadian Ecologist C.S. Holling (1973), in the effort to describe nonlinear dynamics in natural systems. Resilience has three interrelated characteristics, first, the amount of change a system can undergo and still retain the same controls on function and structure, second, the degree to which a system is capable of self-organization and, third, the ability to build and increase the capacity for learning and adaptation.

To support resilience in urban systems by spatial form, we need to identify, not so much the spatial demands for particular social, economic or ecological systems, as we have done above, but the spatial demands for resilience in these systems. Fortunately, such critical attributes of resilient systems have been identified (Berkes et al 1998; 2003). These attributes include *change, diversity, self-organization and learning* and have also been translated to spatial variables typical for our model above (Marcus & Colding 2015). Her follows a short review.

In resilience thinking *change*, is an inherent characteristic of all complex adaptive systems and therefore not seen as a threat but rather as necessary for renewal and adaption of a system. In urban systems, change can either have internal or external origins. External origins are related to the degree an urban system is connected to other cities and the following opportunity to receive new input, that is, it is related to the *variable* distance. Similarly, internal origins are due to the connectivity of different parts within the city, creating interactions and potentially innovation. *Diversity*, spreads risks by generating redundancy and creating buffers. In spatial terms, this is obviously connected to the variable *diversity*, that is, the division of land into multiple parcels, which can harbour, support and develop differences in human activity, and in extension in ecosystems. The capacity to respond to and shape change in productive ways is also a function of *self-organization*. In spatial terms this concerns the degree to which spaces that carry differences, such as different human activities, are connected to each other, so that these differences are able to reconfigure when facing change. Finally, there is the capacity in a system for *learning* in the sense of *memory*, that is, the ability of the system to retrieve lost information after disturbance. In spatial terms this concerns both distance and diversity, where more segregated spaces in cities can work as pockets of cultural memory that at a certain moment can inform, influence or inspire the city as a whole. Hence, creating spatial configurations in cities through urban design is a form of "writing" that, if correctly understood, creates memory of the social or ecological function the system is designed for.

Importantly, a typical ability of space is to carry many processes simultaneously; many trajectories parallel in time (Massey 2005). We can, therefore, create conditions for several of these attributes simultaneously, despite spatial form being such an unyielding material, simply by putting them in different locations. This is reflected in the idea in space syntax theory, that urban street grids, on a generic level, are constituted, on the one hand, by a *foreground network* that distributes high accessibility throughout the system and thereby facilitates socio-economic exchange and innovation and, on the other hand, a *background network* that throughout the system creates patches of secluded and undisturbed spaces that facilitates socio-cultural continuity and reproduction (Hillier & Vaughan 2007).

Due to its particular design, urban space can, thus, to varying degrees, simultaneously support parallel but different processes; on the one hand, allow for processes of change and, on the other hand, protect processes of continuity. In the end this needs to take the shape of particular configurations of spatial systems depending on the specificities of local contexts, however, our point here is to argue, that urban spatial form can be the object of design in the aim to not only support certain social, economic and ecological processes, such as the reproduction of social co-presences, local markets and urban ecosystems, but also in the aim to sustain and enhance the resilience of such processes.

7. CONCLUSIONS: HOW SPATIAL FORM UNDERPINS URBAN VALUES

We have here discussed how spatial form may support, structure and direct not only individual and fairly repetitive urban processes, such as social co-presence, local markets and urban ecosystems, but also how it may sustain such processes over times of upheaval and dramatic change; which we here argue is necessary if we want to transform our cities into greater sustainability. Importantly, we thereby do not say what processes are good, but rather that if we through political processes can agree on that, we here present tools whereby these processes not only can be spatially supported but also supported in a sustainable manner. Hence, it is also clear how spatial form in this sense represents a remarkable value – a value that enhance other values without self being spent – why it seems reasonable to speak of the spatial form of our cities as a *spatial capital*.

Spatial capital as we understand it here is closely related to one of the three fundamental sources of wealth in classical economic theory, that is, *land* (Brown et al. 2007) – the other two being *labour* and *capital*. While 'land' initially was understood as the prime generator of human wealth, its importance deteriorated under the neoclassical era in the first half of the 20th century; even to the point that when modern growth theory started to emerge in the immediate post-

war years, 'land' was not an integral part of the production function (England 2002). However, surfing on the tide of the growing environmental movement, 'land' has returned to the debate since the 1960:s, although, increasingly under the name 'natural capital' (Brown et al. 2007). In this context, it primarily refers to the fundamental resources provided by nature and necessary in almost any form of human production, a process we then may summarise as an interaction between natural *capital* and *human capital*, enhanced by what we today call *physical capital*, that is, different forms of machines or technological devices.

What we are looking for by the concept of spatial capital then, is an expanded understanding of 'land' as a source of wealth, which at the time of the classical economists primarily concerned the fertility of land. The point being that we may then not only envision investment in human and physical capital, that is, augment and improve these forms of capital both quantitatively and qualitatively through education and innovation respectively, but we may also envision investment in land. More precisely, our intention here is to address how the spatial form of both urban and natural landscapes, as structured and shaped by built form through urban planning and design influences the performativity of land, that is, the ability to enhance or invest in land by way of the design of its' spatial form.

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