

## Plot systems and property rights: morphological, juridical and economic aspects

**Evgeniya Bobkova, Lars Marcus, Meta Berghauser Pont**

Department of Architecture, Chalmers University of Technology, Gothenburg, Sweden  
E-mail: evgeniya.bobkova@chalmers.se, lars.marcus@chalmers.se, meta.berghauserpont@chalmers.se

**Abstract.** *The importance of the plot (also referred to as ‘parcel’, ‘lot’ or ‘property’) as one of the fundamental elements of urban form is well recognized within the field of urban morphology. It has been described as a basic element in the pattern of land divisions that works as an organizational grid for urban form. A distinctive feature of the plot is its ambiguous character: it is at the same time a legal unit defining property rights, a spatially defined physical entity and an institutional tool designating land use in urban planning. In urban space, these dimensions act together to drive the evolution of built form. In this paper, we will investigate the entanglements of the morphological, juridical and economic definitions of the term. By resolving these we may better address and compare the vital layer of plot systems in different urban contexts and identify common fundamental aspects of the notion of plot systems and private properties. What we more specifically aim to capture with this comprehensive concept is the relation between urban form and legal and socio-economic space, where the plot can be identified as an element that creates a generic affordance for occupancy, in contrast to mobility, in cities of most kinds. The intended outcome of the paper is to contribute to unveiling the complex nature of the plot systems, bridging between spatial and non-spatial dimensions of cities, that is, more precisely, a potential to establish, not least, a stronger interface between the urban design and urban planning practices.*

*Keywords: Plot systems, exclusive property rights, land ownership, spatial capacity, real estate development, urban design.*

### **Introduction: the ambiguous character of the plot**

The importance of the plot (also referred to as ‘parcel’, ‘property’ or ‘lot’) has been widely recognized within the different schools of urban morphology as one of the basic organizing elements of urban form along with buildings and streets (Moudon, 1994; 1997; Whitehead, 2001). What makes the notion of ‘plot’ so distinctive, is its fundamentally ambiguous character: it is at the same time a legal unit defining property rights, a spatially defined physical entity and an institutional tool designating land use in urban planning

(Kropf, 1997). The multi-layered character of the plot enables it to serve as a complex interface between architectural, economic and legal dimensions of urban space; an inherent complexity that calls for a multi-disciplinary approach that links urban design to many other aspects of urban planning. In this paper, we will discuss the concept of ‘plot systems’ in the fields of urban morphology, property law, regional economics and real estate development in order to bring together key aspects of plot systems, well formulated within each field but seldom referenced between each other. It is not the intention to give a detailed review of the concept within each field, but rather to identify

key factors as a first step towards a more comprehensive conception of plot systems that may serve as a basis for a more informed urban design practice.

Within the community of urban designers there is an underestimation of the importance of the legal framework for urban design projects (Porta & Romice, 2010): rather than investigating the processes that produced certain kinds of traditional urban environments, today often highly valued, where the plot system often is instrumental, the attention is usually drawn to the physical products of such processes, that is, their built form (e.g. Akbar, 1988), which has led to misconceptions and planning failures (e.g. Marcus 2000). Scholars studying the legal dimensions of cities, on the other hand, tend to forget that 'properties' have essential spatial boundaries (Babie, 2013), most often designed by architects or planners.

When it comes to regional economics, where the strong link between the differentiation of property structures and the process of economic specialisation often is emphasised (Webster & Wai-Chung Lai, 2003), the problem of the materialisation of these mechanisms, that is, the translation of urban planning to urban design, is most often not addressed. Related to this are similar implementation deficits in the practice of real estate development, which involves issues of scale, flexibility and economic resilience, often based on subdivision strategies at different scales (Love & Crawford, 2011). It is important therefore to reflect on the possible consequences of each approach and stress the fact that the configuration of plot systems plays a critical role in the evolution of the built fabric as well as its flexibility over time.

Hence, the aim of the paper is, first, to contrast the conceptions and uses of the idea of plot systems in different fields and to outline a broader conception that would take into account various aspects of this notion. Secondly, to in particular discuss the importance of such a conception in the practices of urban design and real estate development.

The paper begins with an overview of the morphological aspects of plot systems, followed by the notion of the spatial dimension of private property rights in legal literature, the evolution of private property rights in relation

to economic processes and the concept of the plot-based approach in real estate development. The paper ends with a discussion on the potential for a more substantial definition of plot systems after which its' potential power to inform more adaptive and performative urban design approaches will be outlined.

### **Morphological aspects of plot systems.**

Within the different schools of urban morphology (Moudon, 1994; 1997; Whitehead, 2001; Porta & Romice, 2010) plots are recognized as basic elements of urban space, along with buildings and streets. Conzen (1960) discussed the fundamental ambiguity of the plot, being at the same time a physical and a legal entity as well as a demarcation for land use planning (Kropf, 1997). He further described the plot as the basic organisational element of urban form through its pattern of land division (Moudon, 1994). This relates to what Marcus (2000; 2010) described as the concept of 'spatial capacity', where the scale, size and configuration of plots within a plot system constitute particular affordances for diverse owner strategies that in turn may influence socio-economic diversity in cities.

Conzen further introduced the concept of 'burgage cycle': the evolution of built space over time, bound by the spatial and legal framework of the plot. This concept relates directly to the idea of adaptivity of built form over time (Moudon, 1994).

Siksna (1998) and Vialard (2012) in their studies of the modification process of plot and block patterns, discovered that there are certain block sizes that are more resilient to land use modifications over time than others. Smaller blocks within regular grids absorb changes better, but at the same time, there are still certain types of buildings and land uses they do not allow due to their particular shape and size. Large blocks are more flexible in this sense, but their fragmentation or amalgamation can have a negative effect on the street network, because the transformation of their complex shapes often results into the formation of dead-end streets, incisions and blocks within the block (Vialard, 2012). Siksna and Vialard

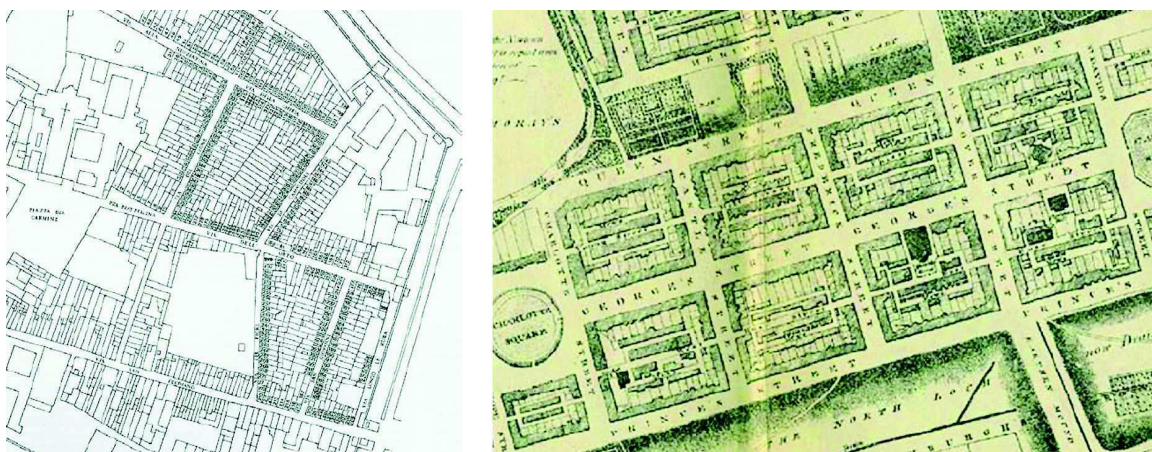
mainly study block patterns, however, these observations may also be applied on the scale of plots. Vialard and Carpenter (2015) further studied the relation between plot morphology and building densities and pointed out, that larger plots of a more complex shape cause lower building densities (Vialard & Carpenter, 2015).

Also in the French school of typomorphology we find the plot recognized as a primary element of urban form, together with buildings and streets (Moudon, 1994). Importantly, Panerai et al. (2004) defined the urban block not as a separate architectural element, but as a group of interdependent building plots bounded by a street network and mentioned the importance of a dialectical relationship between the plot and the street network and the role that plot systems play in providing spatial and legal conditions for the evolution of built space over time. The definition of the urban block is thus not as a unit designed as such, but is merely something that emerged through the long process of densification of interrelated plots bounded by the street network.

Porta & Romice (2010) built on the concepts introduced by British and French typomorphologists, but extending it into a discussion about the pitfalls of contemporary urban design practice based on the New Urbanism movement, pointing out that plot-based urban design is a key tool contributing to the flexibility of the urban fabric over time.

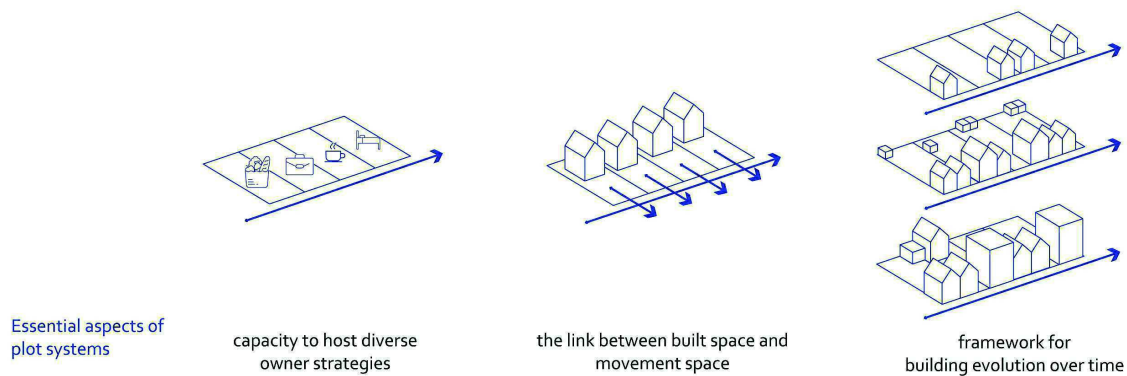
There is one important addition to the aspects discussed above. We have referred to the plot as a unit of control, corresponding to the common division of urban space into public and private, where plots generally are spaces controlled by private interests, while surrounding spaces, constituting the street network, generally speaking, is a public interest. Instead of the legal division of urban space into public-private, Marcus (2000) proposes to use the concept of generic function as introduced by Hillier (1996) which divides urban space into, on the one hand, a continuous and publicly accessible space of streets and squares, on the urban scale mainly used for the generic function of movement of different kinds, and on the other hand, a discontinuous space constituted of blocks divided into plots that generally, but not always, are inaccessible to the public and primarily used for the generic function of long term occupation. The first duality, public-private, can then be explained by the latter, movement-occupation, due to the fact that all long-term occupation, such as housing and work places, need to be accessible, why the street system, almost by necessity, becomes a public interest (Marcus 2000).

The meaning of plot systems as the space of interaction between plots and buildings (the space for occupation) and the street network (the space of movement) is extensively addressed by Vialard (2012) in her study of plot and block frontages. She pointed out that



**Figure 1.**

**Historical examples of plot-based urban development. On the left: The San Frediano estate, Florence, an urban development between mid-13th to mid-14th century (G.L.Maffei); on the right: Ainslie's map of Edinburgh, 1804 (D. Howell, G. Black). Source: Porta & Romice, 2010.**



**Figure 2.**  
Aspects of plot systems discussed within the field of urban morphology.

the property limit of the plot is influenced both by building and the street and works as the interface that links the global structure of cities (street network) to local design decisions (buildings within a plot) (Vialard, 2012)

Distinctive features of plot systems in urban morphology can be summarised as follows (Bobkova et al., 2017). First, as a basic unit of control, the plot provides a fundamental link between spatial and non-spatial entities (Marcus, 2000; Kropf, 1997). Second, the plot serves as a connection between built space and space of movement, because it binds a building to a movement network (Panerai et al., 2004; Vialard, 2012). Finally, the plot provides the framework for the evolution of built form over time (Conzen, 1960; Panerai et al., 2004; Terlouw, 1999; De Meulder, et al., 1999).

### Other perspectives on the plot systems

#### Private property rights: the spatial dimension

In legal literature, there are two traditions existing that discuss the concept of private property. In the first, classical view, private property is defined as the bundle of rights that the owner has over the owned (Alchian & Demsetz, 1973). In the second tradition, the fundamental aspect of any private property is defined as the right to exclude. Legal geography scholars (Merill, 1998; Bromley, 1997, 2007; Babie, 2013; Braverman, et al., 2013), argue that the first definition of property leads to a 'formless' approach and becomes meaningless

when divorced from spatial practices and representations. Within this view on the property as a 'bundle of rights', it is understood mainly as an "authoritatively established collection of use rights" that includes "the list that is currently recognised by law [...] or by established practice and convention" (Merill & Smith, 2001, cited by Bromley, 2016): the concept of property becomes a label that has been granted to an owner, and ignores the aspect that the basic characteristic of property is the right to exclude others.

In the second tradition, the property right is understood as the right to exclude, it is implied that critical characteristic of property is not the relation between the owner and the owned, but the relation between the owner and other owners in reference to things owned (Bromley, 1997).

The critics of the view of property as a 'bundle of rights', are concerned that legal scholars tend to turn their attention away from the owned, away from the very materiality of property and focus instead on representation, culture and discourse (Bromley, 2007). Babie (2013) argues that rights exist, operate and are limited by physical and social space. The concept of property as the 'right of exclusion' is closely related to the concept of the boundary, where ownership is a process of dividing things and drawing borders between them in order to separate one property from the other. Hence the concept of property as the right to exclude is essentially spatial. According to Barthes (cited by Bromley, 1997) "ownership depends on a certain dividing of things: to appropriate

is to fragment the world, to divide it into finite objects subject to man in proportion to their very discontinuity; for we cannot separate without finally naming and classifying, and at that very moment, property is born". There is a range of studies based on this concept, about the geographies of property and the concept of property boundary, that focus mainly on empirical studies of particular conflicts, such as inner-city gentrification often grounded in a critique of distinctively liberal spatialities. (Braverman, et al., 2013; Bromley, 1997).

It is important to note that while legal geography scholars recognise the importance of the 'spatial turn' in legal thought and call for multi-disciplinary approaches that would engage social sciences, history or political sciences (Braverman, et al., 2013), far less attention is paid to architectural space itself, where physical boundaries of properties are drawn and materialised. There seems to be a neglect of the fact that land as property typically is subdivided into cadastral plots during urban development processes, and most often by planners or architects.

Evolution of property rights in relation to the economic process of knowledge specialisation

Webster and Lai (2003) draw further from legal geography studies and link the evolutionary process of exclusive property rights subdivision to the process of economic progress and knowledge specialisation (Webster & Wai-Chung Lai, 2003). While they do not directly discuss the spatial form and the configuration of properties, i.e. plot systems, it is implicit in their argument that changes in the pattern of economic activity and ownership also involve particular spatial changes. The subdivision process here is inextricably connected with the urbanisation process; urbanisation itself is a continuous process of property subdivision and differentiation.

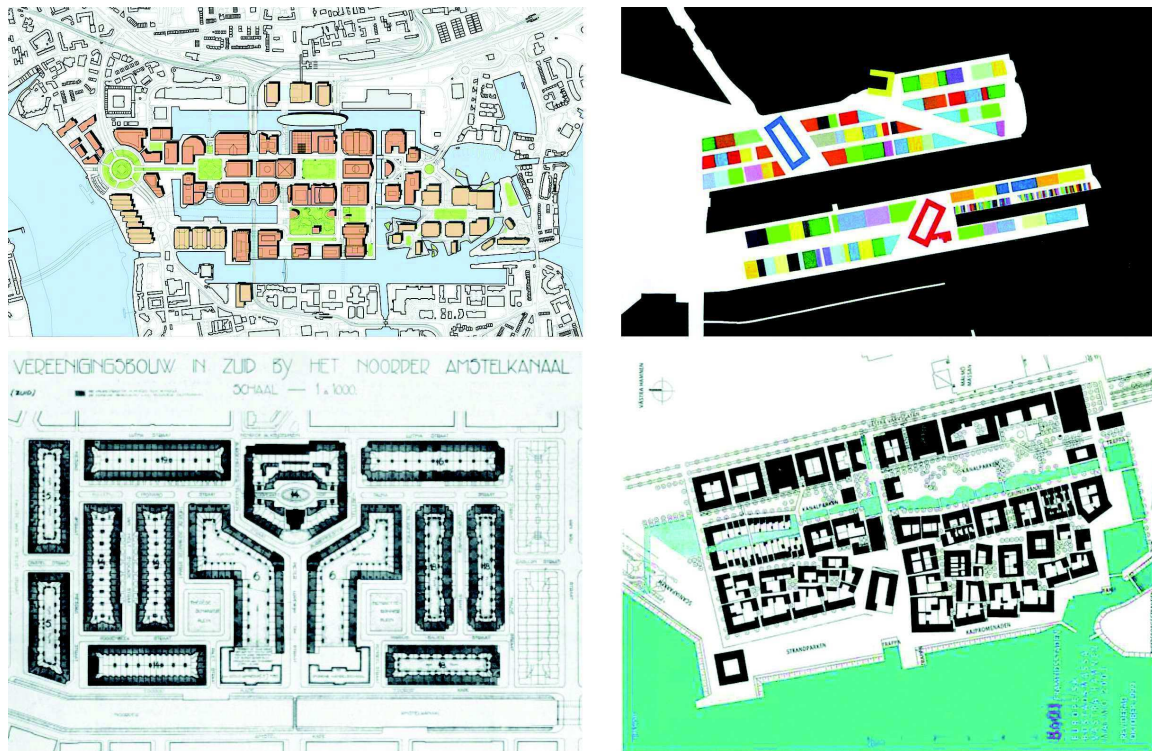
Webster (2003) describes the urbanisation process as a process of knowledge specialisation, and points out how land plots with well-defined exclusive rights first developed in towns and were generally smaller and more regular in shape than rural land parcels. He further describes how both the

size and shape of land parcels (i.e. exclusive property right) has evolved by aggregation and fragmentation both by voluntary exchange or by government design, in the effort to ease the process of buying and selling land, aiming for owners with the knowledge and inclination to use it in more productive ways (Webster & Wai-Chung Lai, 2003). He further introduces the idea of the subdivision and combination rules, where the reassignment of properties is due to a change in resource values and transaction costs, and leads in turn to either subdivision or amalgamation of properties.

Plot-based approach in real estate development: different perspectives

Even though plot-based land development is recognized by scholars as the one that can allow for flexibility in the evolution of built form over time (Porta & Romice, 2010; Terlouw, 1999; De Meulder, et al., 1999), stimulate higher user diversity (Marcus, 2000; 2010) and be a primary tool and driver in urban development (Love & Crawford, 2011), in urban practice the parcellation map is rarely seen as a vital part of master planning; rather most contemporary large-scale urban development projects typically follow the model of block-based development (Love & Crawford, 2011). Love and Crawford (2011) name several subdivision strategies for real estate development and provide arguments why plot-based development is preferable when it comes to long-term economic resilience, or generating a diversity of developers on the market.

Such subdivision strategies for real estate development are summarized as follows: district-based, block-based, street-based, plot-based and building-based (Love & Crawford, 2011). With district-based subdivision, the land is released as a parcel (which here means the development unit) containing several blocks and usually managed by a single mega-developer. Block-based strategies are the most common pattern for contemporary large-scale development, and can be traced back to the New Urbanism tradition (Porta & Romice, 2010). In street-based strategies, a development plot consists of two half-blocks along a central



**Figure 3.**

**Different subdivision strategies for real estate development. Counter clockwise: 1. Block-based, Canary Wharf masterplan, London, SOM ([www.som.com](http://www.som.com)), 2. Street-based, Amsterdam Zuid plan, Berlage (Panerai et al., 2004); 3. Plot-based, Borneo Sporenburg, Amsterdam, West 8 ([www.archello.com](http://www.archello.com)), 4. Building-based, Malmö BO01 ([www.northernarchitecture.us](http://www.northernarchitecture.us)).**

street. In plot-based strategies, a block is divided into several parcels, each of which can be released to a different sub-developer. In building-based subdivision models, cadastral plots are usually drawn following the design of an architectural configuration of buildings.

Hausleitner and Nycolaas (2012), elaborate further on this and introduce a more complex system of units that comprise urban blocks. These are physical units, which can be divided into design, construction and distribution units, and administrative units that consist of cadastral, ownership and maintenance units (Hausleitner & Nycolaas, 2012). The physical and administrative units together form an interdependent system, and can shape complex unit organisation, where, it is proposed, the physical units are easier to change when they coincide with the administrative units. They also refer to different development models described above, and point out that the size of administrative units tended to increase over time due to the upscaling of the development

mode and demand for more space for different uses (Hausleitner & Nycolaas, 2012).

Developers often seek to maximise market flexibility by demanding large development units, few constraints on the programme mix, and loose design guidelines. Love and Crawford (2011) outline several drawbacks to this approach. The first is the scalar challenge. If an ideal large tenant (for example, biotech company or financial firm) is to be captured, then the development plan of one block will consist of one building in it. This is in turn likely to result in a monoculture of uses for each block, no matter how carefully the ground-floor mix might be designed. Also, a mix of microscale uses is difficult to design top down, because they usually emerge bottom-up in a self-organised manner when the appropriate legal and spatial framework is there. Another drawback of large-scale subdivision strategies is the lack of diversity of developers on the market. Only large-scale development company can participate in the realisation of

such large-scale plans, and market competition is therefore limited which even economically is risky, because due to the unwieldy size of this kind of development, realisation of plans often takes more time than anticipated, or may even result in abandoned projects (Love & Crawford, 2011).

Plot-based development models, on the other hand, although allowing for higher economic resilience and more actors on the market, bring certain difficulties related to governance. A fine-grained subdivision model places more stress on the management process, where hundreds of owners or developers are filing for reviews and approvals. In the end, therefore, it may be easier for local authorities to support larger subdivision strategies (Love & Crawford, 2011).

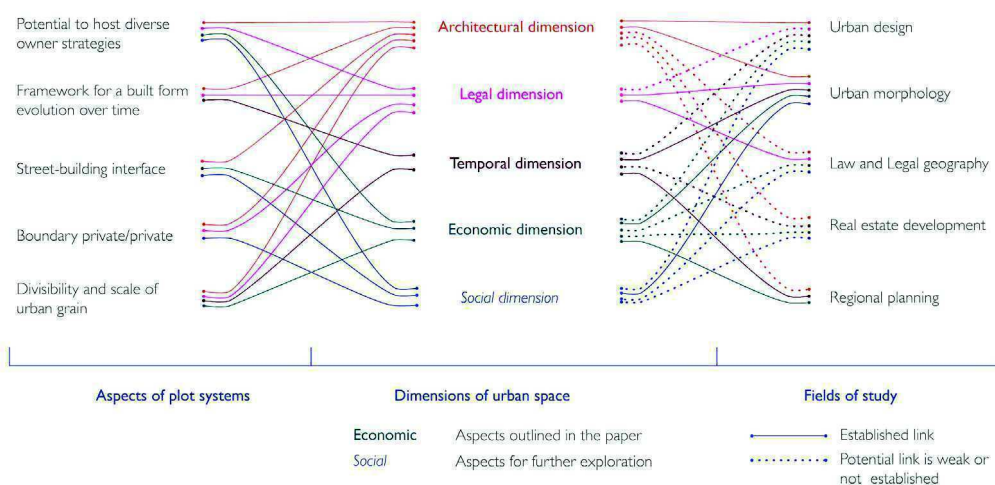
**Conclusion and discussion: forgotten aspects of plot systems.**

The importance of the plot systems and the notion of exclusive property rights, is extensively discussed in the fields of urban morphology, property law, legal geography, urban economics and real estate development. But as earlier argued, these studies appear to exist in parallel, where usually one particular aspect of plot systems is emphasised, while other dimensions remain left out.

The power of plot systems to structure urban

space and to potentially afford more agents in the process of urban development, has been recognised in urban morphology, but is still underestimated in the urban design practice that in recent times is dominated by the New Urbanism movement (Porta & Romice, 2010). However, this attitude is equally present throughout the era of modernistic planning. Legal scholars, in contrast, appear to overlook the essentially spatial character of private properties. Although it is addressed in a range of legal geography studies, the materialisation in architectural space of the notion of property boundary are not directly dealt with. When it comes to the economic dimension of urban space, a very strong link is drawn between the process of subdivision of properties and knowledge specialisation. This connects to the notion of spatial capacity where it is proposed that the configuration of plot systems affords more or less diverse owner strategies and, hence, also contributes to socio-economic diversity in cities.

Ambiguity is the very nature of the plot systems. It appears to be essential for the urban design perspective to ‘connect the dots’ from different theories in order to formulate a more comprehensive concept of ‘plot systems’, closely linked to ‘property rights’. Plot systems work as a fundamental structuring element of urban space, and serve as a critical interface between its different layers that include architectural (urban design),



**Figure 4.**  
**Relation between critical aspects of plot systems, dimensions of urban space and fields of study**

legal (property law), temporal (real estate), economic (urban economics) and social (urban sociology) dimensions (see figure 4). Its spatial configuration, as well as the complex interplay between all the above-mentioned aspects, and the many matches or mismatches between them, preconditions the emergence of particular socio-economic performances of cities.

The fact that within several schools of urban morphology the plot system, instead of blocks, are emphasised as framing the evolution of built form, is specifically important in relation to urban design. Contemporary urban design is in this sense deeply rooted in modernistic planning and furthered by the New Urbanism tradition, where the reviving of the traditional urban street in combination with the block-structure reproduce the modernistic ignorance of the plot system (Porta & Romice, 2010). This results in urban space that formally resembles traditional historical towns, but fails to perform accordingly (Marcus, 2000).

The authors of this paper believe that discussing and acknowledging the many and complex aspects of the plot system opens up for establishing better connections between spatial and non-spatial dimensions of cities. More precisely, we want to emphasize the need for architects and urban designers to acknowledge, that it is not only the built form, but the layer of land divisions that contributes to complex social-economics processes in the city and also to how built form itself performs and evolves over time. And addressing the planners, economists and developers, we want to point out, that it is important to recognise the spatial dimension of properties, that potentially allows for a more clarity in land ownership, higher economic resilience and flexibility over time. The concept framework presented here will serve as a basis for a more extensive literature review, where each above-mentioned aspect will be explored in greater detail, and also, the relation between plot systems and social dimension of space, will be added.

## References

Akbar, J. (1988) *Crisis in the Built Environment. The case of the Muslim City*. Singapore:

- Concept Media Pte Ltd.
- Alchian, A. A. & Demsetz, H. (1973) The Property Right Paradigm. *The Journal of Economic History*, March, 33(1), pp. 16-27.
- Babie, P. (2013) The Spatial: A Forgotten dimension of Property. *San Diego Law Review*, 17 November. 50(323).
- Bromley, N. (1997) Property, Pluralism and the Gentrification Frontier. *CJLS/RCDS*, Fall, 12(2), pp. 187-218.
- Bromley, N. (2007) Making Private Property: Enclosure, Common Right and the Work of Hedges. *Rural History*, 18(1), pp. 1-21.
- Conzen, M. (1960) *Alnwick, Northumberland: a study in town-plan analysis*. London: Institute of British Geographers.
- Hausleitner, B. & Nycolaas, F. (2012) *Physical and administrative units in the urban block in Amsterdam*. Delft, s.n.
- Hillier, B. (1996) "Space is the machine. A configurational theory of architecture". Cambridge: Cambridge University Press.
- Kropf, K. (1997) *When is a plot not a plot: problems in representation and interpretation*. Birmingham, University of Birmingham.
- Love, T. & Crawford, C. (2011) Plot logic: character-building through creative parcelisation. In: S. Tiesdall & D. Adams, eds. *Urban design in the real estate developments process*. West Sussex: Wiley-Blackwell, pp. 92-113.
- Marcus, L. (2000) *Architectural knowledge and urban form. The functional performance of architectural urbanity*. Stockholm: s.n.
- Marcus, L., (2010), *Spatial Capital. 'A proposal for an Extension of Space Syntax into a More General Urban Morphology'*. In *The Journal of Space Syntax*, pp. 30-40.
- Merill, T. W. (1998) Property and the Right to Exclude. *Nebraska Law review*, 77(4).
- Merill, T. W. & Smith, H. E. (2007) *The Morality of Property*. *William and Mary Law Review*, Volume 48, pp. 1849-95.
- Moudon, A. (1994) 'Getting to know the built landscape'. In: *Getting to know the built landscape: typomorphology*. In *Ordering space: types in architecture and design* (pp. 289-311). New York: Van Nostrand Reinhold. p. 289.
- Moudon, A. V. (1997) 'Urban morphology



- as an emerging interdisciplinary field'. In: Urban morphology, Volume 1, pp. 3-10.
- Panerai, P., Castex, J., Depaule, J.-C. & Samuels, I. (2004) Urban forms. The death and life of urban block. Oxford: Architectural press.
- Siksna, A., (1998), City centre blocks and their evolution: a comparative study of eight American and Australian CBDs. In: Journal of Urban Design, October, 3(3), pp. 253-283.
- Terlouw, E. (1999) A House of one's own. A 'new' Dutch city?. OASE Consumption and Territory, Volume 52, pp. 65-77.
- Vialard, A., (2012), Measures of the fit between street network, urban blocks and building footprints. In: Proceedings of the 8th International Space Syntax Symposium, Santiago de Chile: PUC, 2012., 2012, pp. 8101:1-8101:17.
- Vialard, A. and Carpenter, A.,(2015), Building density of parcels and block-faces from a syntactical, morphological and planning perspective' In: Proceedings of the 10th International Space Syntax Symposium, London: UCL Bartlett, 2015, pp. 100:1 - 100:17.
- Webster, C. & Wai-Chung Lai, L. (2003) Property Rights, Planning and Markets. Managing Spontaneous Cities. Cheltenham(UK): Edward Edgar Publishing Limited.
- Whitehead, J. (2001) British urban morphology: the Conzenian tradition. In: Urban Morphology, 5(2), pp. 103-109.