Shift towards networks: integrating social and physical subsystems of the city through stratified models

ABSTRACT

The urban system consists of subsystems that cannot be meaningfully separated; though rigid layered approaches in Dutch Urban design and planning treat the social and the physical subsystem as autonomous in urban designs and plans. This paper develops a critique on these approaches through a comparison of socio-spatial models by Lefebvre (Social Space), Castells (Space of flows), Dupuy (Network City) and Heeling (Urban Ground Plan as mediator).

As to stratified models in general it can be concluded that relations – as between levels (in stead of layers) of socio-spatial systems – should become a central issue in specific designs when this type of model is used. Urban designers and planners though have to acknowledge the importance of coexisting varied perspectives on the same subject to be able to deal with the complexity of urban issues and other models, not using layers at all, but relational approaches, might provide a better grip.

ir. Jeroen van Schaick

Delft University of Technology / Faculty of Architecture / Department Urbanism
j.vanschaick@bk.tudelft.nl /
www.networkcity.bk.tudelft.nl

INTRODUCTION

In recent years Dutch urban planning practice spatial questions are being approached through a layers approach. The layers approach was firmly grounded in the Fifth White Paper on Spatial Planning in the Netherlands [13] in which the following layers are distinguished: 'substratum', 'networks' en 'occupation'. Research and design education at the Faculty of Architecture at the Technical University Delft follows in this trend. In the series "De kern van de stedenbouw in het perspectief van de 21^e eeuw" by Heeling et al. [10] a layers approach is put forth in which the "urban ground plan" – in general terms the 'urban work' – has a prominent role as mediator between "substratum/territory" and "use/occupation". This model in layers can be viewed as the 'socio-spatial model' of urban design. The problem is that the urban system in reality consists of subsystems that cannot be meaningfully separated. The assumption made is that Heelings layers approach cannot deal with the complex relation between the social subsystem and the physical subsystem of the city in the light of the ICT-age[i]. If this is so how can we better relate these subsystems in urban design and planning?

This article develops a critique of this type of layers approach by comparing it to three other socio-spatial models – one also from the spatial design science (Network City [7]) and two from social science (Space of flows [4]; Social Space [12]). The choice of models is based on the comparability as to content - an explicit formulation of both physical and social aspects, representation(al possibilities) - a stratified approach, and most importantly the level of relevance and use of the model in contemporary urban studies and/or practice - with regard to the Dutch perspective of the author. This selection of course does not exclude other models from the discussion, but limits the analysis to a controllable field. The models[ii] are compared in three different ways. Firstly the scene is set by analysing the relations between representation and idea of the models, including notions of the processes, the dynamics and the scales represented. Secondly the degree of overlap between the models is analysed by looking at parallels between specific elements of the models. Lastly two sets of thoughts are extracted from the comparison of the models: actual themes for the profession and the basis of integral socio-spatial models.

REPRESENTATION AND IDEA

Although all four models can be regarded as socio-spatial models, different attitudes regarding the relation between the social and the spatial are distinguished, being either more spatially/designerly oriented or socially/analytically oriented. The four models have been made comparable through new visualisations, since Lefebvre and Castells have never visualised their models. The representations of the models of Heeling and Dupuy are new interpretations by the author of their original drawings (see figure 1).

Social and spatial approach to design

Representing concepts in visualisations is an important part of designing. The difference in degree of abstraction and thus the difficulty in representation is apparent between the spatially-oriented models (Dupuy and Heeling) and the socially-oriented models (Castells and Lefebvre). This is strongly linked to the difference in direct applicability in urban and regional design. Castells and Lefebvre do not however ignore the issue of manipulation of spatial organizations. They use a wider interpretation of the person of the designer. Castells explicitly states that the [space of] flows is "*the expression of processes* dominating [orig. emph.] *our economic, political, and symbolic life. If such is the case* [flows being dominating, JvS]*, the material support of the dominant processes in our societies will be the ensemble of elements supporting such flows, and making materially possible their articulation in simultaneous time* "[4: 442]. This means he does imply some form of designing of space, albeit not by designers as we know them, but rather by crucial players in the space of flows. Social space - Lefebvre - implies through the concept of lived space even every person/body as designer of her/his own space. The level of abstraction however remains a major problem for the socially-oriented models.

Seeing these four models in one frame makes it clear that they all try to find their content in integrating social and spatial aspects. Dupuy and Castells both do this through network-thinking. In this type of thinking the different layers do not represent super imposable territories, but should be seen as a related set of viewpoints or perspectives representing different dimensions of the same socio-spatial system regarding relations as the central issue in stead of the city as a (composition of) object(s). These two models make it clear that social structures and spatial structures cannot be separated as being two autonomous systems in the way Heeling does separate them as conditional strata. Thus network-thinking might offer a more coherent framework for the interrelated co-existence of the social and the physical subsystem.

The concept of Social Space supports this on an abstract level: "*(Social) space is not a thing amongst other things, nor a product among other products: rather, it subsumes things produced, and encompasses their interrelationships in their coexistence and simultaneity – their (relative) order and/or (relative) disorder. It is the outcome of a sequence and set of* operations, and thus cannot be reduced to the rank of a simple object. [....] Itself the outcome of past actions, social space is what permits fresh actions to occur, while suggesting others and prohibiting yet others.*"[12: 73]

Furthermore the models do not follow any specific lines of demarcation concerning scale. Where Heeling in his spatially oriented model depicts one scale level at the time with a focus on the neighbourhood and city scale, Dupuy is concerned with different scale levels in the same model. Castells on the other hand has a specifically macro perspective, which comes down in lower scales in a discontinuous field of scales. Lefebvre again explicitly uses a scale system for social space – micro, medium, macro - in connection to three 'interacting and interwoven levels of space': the public (or general), the private and the 'mediating and intermediary' level. [12: 106] creating a complex depiction (not visualized however) of the way different scales co-exist in Social Space.

Layers, levels, perspectives

A danger lurks in the temptation for clarity. Although "*at the outset [...] every scientific undertaking must proceed reductively. One of the misfortunes of the specialist is that he makes this methodological moment into a permanent niche for himself where he can curl up happily in the warm*". [12: 107] Representing a complex model through layers is problematic. Layering has showed to be treacherous in the sense of artificial, inadequate demarcation of (design)research subjects, its static character, risks and the difficulty of relating layers. As well Dupuy as Lefebvre don't use the word layer, but level. I already argued that the levels in Dupuys model could also be regarded as viewpoints or perspectives. Castells offers an even more difficult task in the sense that he uses very different levels for abstraction for his layers (a word he does use), which leads to the assumption that the layers in his model are in fact not layers at all, but again offer different perspectives to the socio-spatial system he tries to model.

Using the word perspective in stead of layer offers the possibility to position the modeller in the system from which he looks and the system in which he forms his model. This allows for a better incorporation of the inherent complexity of the socio-spatial system.

Social space
(Lefebvre)

Space of Flows
(Castells)

Network city
(Dupuy)

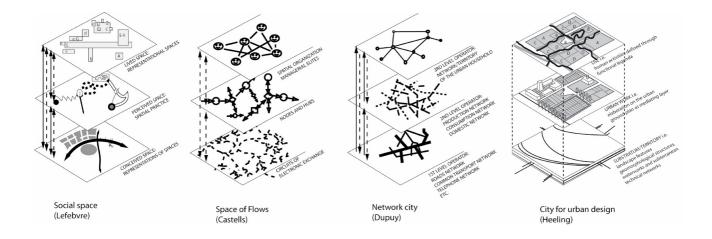City for urban design
(Heeling)

Figure 1 Setting the scene: four stratified models in one frame made comparable as stratified models in three layers: Social Space (Lefebvre), Space of flows (Castells), Network City (Dupuy) and the layers approach by Heeling derived from the urban ground plan as mediating layer between substratum/territory and use/occupation

Static and dynamic

The medium through which the models are represented here in this paper is, as most often the case with urban design and planning, the image. Besides the fact that this limits our capabilities and therefore often our analysis and design to a two-dimensional model (as proposed in Heeling 2002), which can be extended to a three dimensional model [Klaasen in 10: 181]), an even more - or at least equally - important dimension of the socio-spatial system is missing in the models presented here: time.

An important feature through which differences and similarities between the models could be seen, is the way they deal with the issue of time. An important problem is the urban planners' and designers' instrumentum lacks the means to represent time. Klaasen distinguishes in this sense a pattern oriented approach to urban design and planning opposite to a process oriented approach in which she places Heelings approach in the first and the Network City approach in the latter [11]. This representational problem has strong implications on the way the models deal with time.

The medium through which time is often represented is the sequence, but the diversity of issues of timescale (temporal grain), time typologies and time structure is too diverse to be represented in static layers. The question how to represent this dimension is however not answered by comparing the models at hand. What we can do is sketch the way time is regarded by the authors in relation to their model of the socio-spatial system:

Castells approach of time is not the strongest part of his argument on the Network Society and more suggestive then consistent. He draws heavily on abstract notions of time: the interval, the moment, timelessness; erratic, discontinuous timescale, highly dynamic systems. He constructs however a very interesting view of the shift from industrial time conception to the possibilities of a new - much more fluid -

time conception in the future.

The view of Dupuy on time is less abstract – and not that explicit - and directly related to his three levels of operators, including both durability and sustainability. The conception of time in his model depends on perspective on its dynamics ranging from transformation processes, to economic (e.g. production) processes, to daily time-use

Lefebvre approaches 'time' as relational, produced concept, just as he does with space. He introduces to our discussion the issue of relative, subjective time instead of abstract, measured time, implicating socio-cultural dynamics of the heavily related notions of time and space. For further reading one should see his work on 'Rhythmanalysis'.

Heeling sees the idea of time as the rate of spatial transformations, implying a relatively static idea of the city, measuring the time grain of change in decades. The layers approach of both Heeling and the fifth white paper on Spatial Planning in the Netherlands have a very explicit understanding of time based on a hierarchical differentiation with a specific rate of change of specific layers.

To develop this broad range of interpretations of the 'fourth dimension' coherently seems to have to revolve around the idea of the temporal grain [14], the relation between objective and subjective time, the complexity of different 'times' existing in juxtaposition and the issue of sustainability as emergent out of the 'smaller' time of daily practice and lived space. This means also developing better ways to deal with this dimension in the representation of socio-spatial models. Further research by the author will be focusing on this theme.

PARALLEL THOUGHTS

After setting the scene for problems surrounding socio-spatial models in layers, we now need to see if we can discover common ground in the different models. At first sight we can

Social space
(Lefebvre)

Space of Flows
(Castells)

Network city
(Dupuy)

City for urban design
(Heeling)

X defines Y

X is one specific model type of Y

X is equivalent of Y

Y is an abstraction/generalisation of X
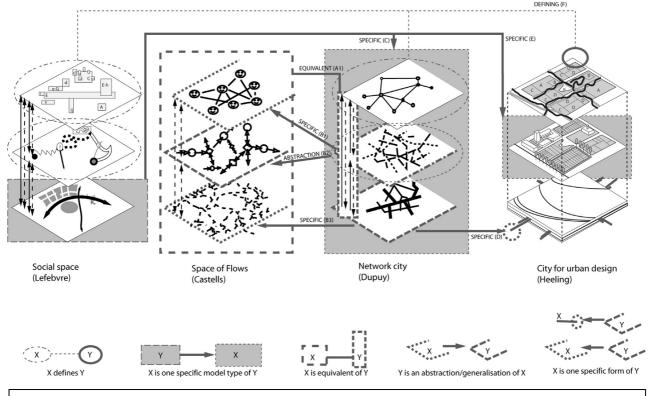
X is one specific form of Y

Figure 2 A comparison of the four models regarding parallel thoughts. Dupuys model of the Network City clearly takes a prominent role in integrating different issues from different models. The letters refer to the list in the paragraph "Parallel thoughts".

distinguish building blocks or ingredients that can somehow be regarded each other equivalent (figure 2, letters refer).

A. Castells' model is primarily a model for the power structure of how the manifestation of dependent aspects of networks are influenced, while proposing the idea that flows are the dominant factor in spatial organization/production of networks.

B. The model of the 'space of flows' however is ambiguous towards what it models. It also sets a model of the specific socio-spatial structure ('manifestation') of the space of flows itself, which can be directly related to the model of the Network City. The electronic network posed by Castells is only one of the relevant physical networks according to Dupuy, while Castells' middle layer (nodes and hubs) are a generalized form of Dupuys middle level. The 'spatial organization of managerial elites' in the Space of Flows is only one specific form - though dominant according to Castells - of a production network (2nd level Network City).

C. The idea of the network city - or in general networks - as a type of model or thinking as presented by Dupuy is a specific type of 'representation of space', which according to Lefebvre is one of the concepts that accounts for the production of Social Space.

D. Underground networks in the territory layer of Heeling are also accounted for in the level of technical networks in the model by Dupuy.

E. The urban work ('stedelijk bouwwerk') and more specific the urban groundplan is a form of representation belonging to the conceived space

F. The definition of 'use' in Heelings model is extremely general and seems to include as well individual use as collective use, ideas represented in as well Dupuy as in Lefebvre. This however poses more questions regarding the socio-spatial model than it answers.

INTEGRATING IDEAS
Besides above mentioned very direct links between the models a second glance shows a general trend of ideas. This means that the models together show a very interesting set of building blocks for the socio-spatial system (figure 3). Four types of ideas are shared by 2 or more models models, while 3 of the models offer an extra element that cannot be found in the other models. I regard the four shared elements as the core of the

socio-spatial model for the urban designer, meanwhile introducing also a number of crucial problematics in one frame.

1. Physical networks: one of the most interesting problematizations on this issue is developed in "Splintering Urbanism" [8]

2. Places (nodes and hubs): since Auges provocative "Non-place" [2] the issue of what place is, has been set firmly on the agenda for urban design.

3. Collectivity: in "Cities – reimagining the urban" [1] a shift in types of collectivity has been sketched, a challenge for urban design and planning

4. Directly lived space: a difficult issue that mainly gets attention in philosophical circles. Edward Soja has developed it in "Third Space" [17] with attention to the position of urban design. This issue brings new temporal dimensions – with a focus on a small temporal grain – to the field of urban design and planning [see also 6]

In addition to above generally shared principles, the different models add crucial issues to the discussion of integrating social and spatial principles.

5. The issue of 'power' or 'forces' that organize space and time, introduced through the Space of Flows

6. The importance of being conscious towards our ways of representation, introduced through the concept of Social Space. Representation through the concept of networks incorporates all shared ideas (see above).

7. For urban and regional design a profound understanding of the territory/natural system is important, specifically as a notion to position the issue of sustainability.

Through these issues the models together offer a range of themes that form some of the most challenging tasks to the urban designer and planner at this moment. The following thematic field can be distinguished in which one can recognize the growing influence of ICTs in both method of urban studies and the 'urban' itself.

Firstly I would like to develop the notion of networks further. One can distinguish three approaches to the implication of

Social space (Lefebvre) Space of Flows (Castells) Network city (Dupuy) City for urban design (Heeling)

Shared themes — Physical networks — Place — Direct space — Collectivity

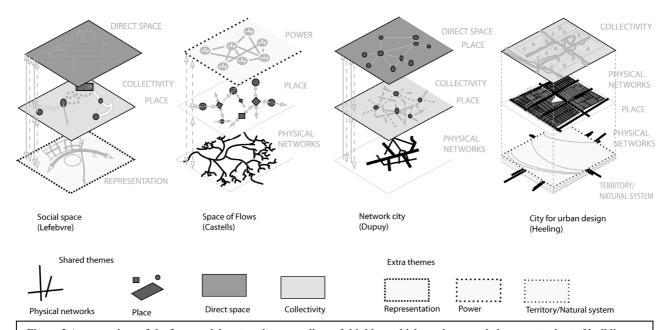Extra themes — Representation — Power — Territory/Natural system

Figure 3 A comparison of the four models extracting seven lines of thinking, which can be regarded as a central set of building blocks of the socio-spatial system.

network-thinking in urban design: the network as model, the network as metaphor and the network as thing. As the analysis of the models show, a tension exists between (new types of) collectiveness and individuality, putting forward questions of identity, freedom of choice and the relationship between order and chaos. This leads us to the complexity of scale in urban design. The implication of network thinking, the interaction of different scale systems of time, space and relations, and the disorienting processes of time-space compression due to - amongst others - new ICTs makes it necessary to rethink our straight forward use of both scaling in models of urban design as the scale of processes themselves. The scale-issue is thus a prime example of how organised complexity of multiple existing interacting systems becomes important for urban designers. The problem of static thinking in dynamic systems becomes even more apparent in this sense, because rather processes and relations – time and space - govern the organization of the 'city' and not primarily the composition of space or time. This leads us to the discontinuous character of space. Specifically the relation between the space of places and the space of flows, related to issues which Marvin and Graham call 'splintering urbanism', would govern special attention. This leads us back to the affirmation of one of the underlying themes of this paper: the existing schism between knowledge of the social and knowledge of the physical. This comes to ground in the differences between empirical research approaches and practical research approaches [11], representation and language problems, and the object of study. This paper though offers a view on the possibilities of bridging the gap between socio-spatial science and technical-spatial science.

CONCLUSIONS

In the introduction of this paper the assumption was made that the layers approach as at the moment widely used in the Netherlands cannot deal with the complex relation between the social subsystem and the physical subsystem of the city in the light of the ICT-age as to representation, scale and dynamic character of relations. From the comparison of the layers approach with other socio-spatial models can be concluded that a network-approach offers better choices to integrate social and spatial issues in the complex urban system; though the problem field has appeared to be wider than this.

As to the representation of spatial models two things can be concluded. Firstly explicit relations should be developed between levels (in stead of layers) of socio-spatial systems. Urban designers and planners have to acknowledge the importance of coexisting varied perspectives on the same subject to be able to deal with the complexity of urban issues. Secondly a further understanding should be developed of the dynamics of the socio-spatial system dealing with issues of representation and language, scale, complexity and (dis)continuity, relations and new perspectives (in stead of sectored thinking), choice and probability. It should be the goal to develop design prototypes of time-space and the language to work with it in the field of urban design and planning.

As to the content of socio-spatial models in spatial planning and urban design can be concluded that the sets of related issues raised by both Dupuy and Lefebvre form the core around which to model the social subsystem and the physical system in relation. A new research agenda for urban design and spatial planning should focus on network (or relational) thinking in which the social-cultural system and the physical-technical system are intensely related.

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[i] See for an elaboration of the role of urban planning in the ICT age amongst others Drewe [5] and www.networkcity.bk.tudelft.nl

[ii] A contextualisation of the four models used in this paper can be found in Schaick [16]