

# Developing Participatory 'Spatial' Knowledge Models in Metropolitan Governance Networks for Sustainable Development

## Literature Review

By Isa Baud, Karin Pfeffer, John Sydenstricker, Dianne Scott



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### 1

## Introduction

In this chapter we want to examine how governments and citizens in cities with differing patterns of economic growth make use of participatory spatialised knowledge to direct urban governance towards more sustainable development (SD). Participatory spatialised knowledge is the main concept we use to study the issue of how urban development processes can be made more sustainable, resilient and inclusive, as participatory spatialised knowledge reflects a strategic resource, to which all stakeholders in urban governance processes can contribute. The question is whether demands for, and contributions to, such knowledge can become more embedded and participatory in urban decision-making processes, and what the implications are for more sustainable/resilient urban development outcomes.

This question fits into a broader debate on how urban policy-making processes are changing from processes in which governments are the dominant locus of power to those in which networks of different actors participate in governance networks, i.e. the shift to a network society (Barnett and Scott, 2007a, Baud and De Wit, 2008, Castells, 2000, Coaffee and Healey, 2003, Hager and Wagenaar, 2003, Innes and Booher, 2003). It also fits into the broader debate

on how new forms of locally constructed knowledge can provide strategic inputs into the socio-political processes embedded in urban governance networks. Therefore, we will deal with the questions posed in our main questions against the background of these two broad debates, drawing on them as they contribute to answering our main research question.

The main issues in this chapter concern how different types of knowledge are constructed, how they are negotiated to settle controversies and make decisions within governance processes, and the implications of such outcomes for the growth patterns, inclusiveness (and inequalities) and environmental sustainability and resilience of urban development.

The paper first discusses the contemporary context of the network society and the shift to participatory governance in Section 2. Section 3 reviews literature related to knowledge construction and recognition in urban development processes; while section 4 provides a critical discussion of the concept of participatory spatialised knowledge as the primary concept framing the Chance to Sustain research project and the focus of WP5.

## 2

## Network Society, Spaces and Participatory Governance

Today it is a truism to state that the state no longer represents the sole ‘locus of power and authority’ in contemporary global neoliberal society and power is shared more widely with a range of civil society actors (Hajer, 2003, Hajer, 2005, Parnell et al., 2002). Policy making is now increasingly seen to be taking place through networks of actors who are “relatively stable sets of independent, but operationally autonomous and negotiating actors, focused on joint problem solving” (Hajer, 2005: 241). These actors include the state, NGOs, business, consultants, scientists and civil society. Beck (1992) describes the decision-making in the risk society as a form of decentralized ‘sub-politics’ with the gradual ‘de-monopolization of politics’ by the central state (cited in: Jänicke, 2009). However, authors differ in their interpretations on the extent to which such shifts are taking place particularly, the extent to which increased participation (inclusion of more actors) or more deliberative processes (direct engagement with citizens rather than their representatives) occurs in decision-making (Barnett and Scott, 2007a, Innes and Booher, 2004, Young, 2001). There is also debate around which types of spaces are being created (invited, claimed or negotiated), and what knowledge and information is constructed to inform decision-making processes (from expert to community-based) (Bruckmeijer and Tovey, 2008, Miftirab, 2004, Whatmore, 2009).

The main characteristics of ‘governance’ models are that they:

- a. provide for a changing role for government itself,
- b. recognize other actors beside government (private sector and civil society organizations),
- c. include more space for ideas and participation from other actors (to a variable degree, not necessarily equally for all participants)
- d. have more strategic and flexible processes of planning and management, which can take changes into account, and
- e. can lead to more synergy in developing new approaches (Baud and Hordijk, in press).

It has been suggested that the role of government has changed in that a ‘political reorientation’ is taking place from:

- “bureaucratic detailed rule-making to an emphasis on steering the framework conditions and action context;

- a state mode of dealing with problems to a societal mode of handling them, with the inclusion of the state;
- centralist to decentralized problem-solving;
- exclusive to ever more inclusive and participatory decision-making structures;
- an imperative policy style to negotiated solutions;
- from a reactive to a more strongly anticipative policy pattern; and
- steering based on public expenses to strengthened steering based on public revenues (taxes, levies, tariffs, fees)” (Jänicke, 2009: 35).

These changes imply that governments are moving from bureaucratic, administrative decision-making to more knowledge-based, strategic decision-making processes. Although this change may be occurring in high-income countries, the extent to which it is taking place in emerging economies is an issue which needs to be explored (see Kennedy et al., 2011).

The recognition of other actors beside government is a hotly debated topic at various levels. One strand of thinking has examined the extent to which civil society is ‘included’ or ‘excluded’ from the state in the process of policy-making (Bulkeley, 2000, Dryzek, 1996, Gurza-Lavalle and Isunza-Vera, 2010, Hordijk, 2000, Yanow, 2003, Young, 2001). This literature brings out the unevenness of representation of social groups in the networked process of policy making and operationalisation, in which middle class groups can make use of the new networks to a larger extent than more marginalized or vulnerable social groups, unless great care is taken to include them explicitly ((Baud and Nainan, 2008, Gurza-Lavalle et al., 2005)). This has stimulated debate around concepts of democracy and citizenship, as the contemporary policy making arena and consequent public participation approaches are critiqued for a lack of representation in decision-making (Innes and Booher, 2004, McEwan, 2005).

A second topic in this discussion pertains to the extent to which governments have preferred to engage with ‘networks’ of economic actors in policy-making in the context of neo-liberalism. This strand of research focuses on the relations between government and the private sector under the framework of ‘urban regime’ theory. In the North American context, there has been much critical analysis of the implications of such public-private coalitions,



which are seen to prioritize the agendas of economic growth over those relating to quality of life issues and promoting equality among citizens in urban areas (e.g. Brenner, 2004, Lauria, 1997, Robinson, 2008). Research on such coalitions in the global South is scattered; in India studies of Mumbai's regime shift from a no-growth to a growth coalition have been recently carried out (e.g. Banerjee-Guha, 2002, also Nainan, 2011), and in Delhi (Dupont, 2011) have traced the effects of such coalitions). Robinson (2008) has commented on this prioritisation of economic goals in the South African context.

Such studies suggest strongly that the degree of 'inclusion' in deliberative forums and governance structures is not the only measure of democratization and more inclusive processes of policy-making. Recent work over the last decade has focused on the dynamic between 'inclusion' in decision-making processes and oppositional activism, which shapes the form of democratic opposition (Barnett and Scott, 2007b). Young's (2001) seminal paper in democratic theory examines the relationship between deliberation and activism, concluding that both have the potential to deepen democracy. Some civil society actors use these strategies simultaneously and opportunistically (Scott and Barnett, 2009).

An interesting recent addition to this work is the focus on multi-scalar networks (e.g. relations between different scale levels within government, or social networks working at local, national and international levels) (Barnett and Scott, 2007a) or cross-boundary networks (city-to-city cooperation by local governments, slum dweller networks; regional cooperation in economic development- e.g. Santo Andre and Sao Paolo in Brazil).

## Spaces

Governance networks and the processes by which urban space is constructed, require a further reflection on what is meant by space and spaces. Space is a complex concept that includes ideas about physical (absolute) space and socially constructed space, and the powers and politics that help shape spaces (Jessop et al., 2008, Sutherland, 2010). It is therefore useful to apply theories of relational space to understand urban spatialities, or urban geographies, being produced in fast growing cities through planning interventions, private sector initiatives, collective and strategic civic organization, social network activities, and household urban survival strategies. The main theoretical ideas on space that can be applied are drawn from Lefebvre's (1974) work on the production of space and Massey's (2005) ideas on the construction of space. Lefebvre's (1974) triad of space contains three concepts of

space: material space (spatial practices), representative space (conceived space) and representational space (the space of the everyday lived world). Material space or spatial practice is reflected in the patterns of daily life and it provides a structure for everyday life. Spatial practices include networks and routes, institutions and patterns of interaction that link the places that embrace working life, home life and the life of leisure (Lefebvre, 1974). These practices hold "production and reproduction, conception and execution, the conceived and the lived, and somehow ensure societal cohesion, continuity and what Lefebvre (1974 p. 33) calls a 'spatial competence' (cited in: Merrifield, 2000 p. 175). Spatial practices are revealed by deciphering space and have a close relationship with representative (perceived) space (Merrifield, 2000). They include the tools used to order and construct space, to keep people in or out, such as property ownership, routes and networks.

Representative space is the space of planners, engineers and cartographers. It is a constructed, abstract space and often presents an absolute space that represents and produces a conceived reality, e.g. a town planning scheme or a spatial development framework. Private sector actors have a strong say in constructing these spaces. These spaces have great power in structuring and producing urban geographies. The everyday lived spaces of ordinary citizens intersect and collide with these representative spaces. As a result, both these spaces shift and change, with the dominant form of space in each particular context being asserted, thereby remaking or reconstructing space. Lived space often forms the space of resistance against the modernist, elitist and top-down form of representative space (Dierwechter, 2001). This body of theory links to the clash between lay and expert (abstract) knowledge, which is often evident in participatory spatial planning processes.

Representational space is symbolized space and everyday lived space. It is about vibrant and surprising spaces created by a multitude of complex inter-relations. Representational spaces are material spaces infused with particular spatial imaginations. They resist the dominant ordering of space and society by creating 'spatial alterity', which allows for alternatives that challenge economic and bureaucratic abstraction, enabling symbolic spaces to emerge (Dierwechter, 2001). Soja (1996) refers to representational space as 'third space', as it contains alternative possibilities to those presented by the dominant spatial system of spatial practice and abstract space (Dierwechter, 2001, Harrison, 2006, Pieterse, 2006, Robinson, 2006).

Massey (2005), reflects on the concept of space through three main propositions. She states that space is a product of interrelations, as constituted by interactions at all scales; that space is about multiplicity and the interaction of multiple

trajectories; and that space is always under construction. It is always “in the process of being made. It is never finished, it is never closed” (Massey, 2005, p. 9). She too acknowledges physical, conceived and lived space and explores these concepts through her ideas of the ‘stories-so-far of space’ that are made up of multiple interactions and relations of the material, abstract and imagined world.

The concept of spaces has also been used from a more political perspective (although it can pertain to particular geographic locations). Cornwall and Gaventa (2001) distinguish ‘invited’ and ‘claimed’ spaces; the former being those arenas in which the state invites citizens to present their ideas on decision-making concerning those areas, and wishes to take them into account. Claimed spaces are those areas in which groups of citizens themselves construct ideas about particular areas of concern, and put these forward to authorities outside the consent of the

government. A third type of space has been put forward by Nainan and Baud (2008) – ‘negotiated space’, which suggests that (re)negotiation of construction of spaces takes place regularly between government and certain groups of citizens. In such spaces, the extent of stakeholder participation is the crucial issue. A great deal of research has been done describing and critiquing public participation, with the general conclusion that public participation generally fails to democratically include all stakeholders equitably in decision-making processes (Arnstein, 1969, Innes and Booher, 2004, Scott and Oelofse, 2005). Equally large is the body of normative literature proposing tools and techniques to increase the democratic quality of participation (see Mitlin and Thompson, 1995, Innes and Booher, 2004, Oelofse et al., 2009, Whatmore, 2009). An example is the need to explicitly include ‘invisible stakeholders’ into decision-making processes (Oelofse et al., 2009, Scott and Oelofse, 2005, van Teffelen, 2010).

### 3

## Knowledge Construction and Recognition in Urban Development Processes

In network arrangements for governing urban development, the construction of information and the translation of information into meaningful knowledge is an important but unruly process. There is a multi-vocality of views expressed by a range of stakeholders participating in the decision-making, each ‘voice’ providing a different perspective and meaning attached to the issue (Hajer and Wagenaar, 2003). Because of the newness of governance networks as the conduit for policymaking, actors are often not sure of their positions and roles, the procedural rules and the language in which engagement will take place. Turner (1982, cited in Hajer, 2005) calls this a ‘social drama’, which as it plays out and common understandings and rules are forged, decreases the ‘institutional ambiguity’ or lack of rules, inherent in the network.

Hajer (2005) therefore argues that in order to analyze a political process of decision-making, a range of theoretical frameworks can be applied to examine the three dimensions of this process, namely, the discourse, dramaturgy and deliberation taking place in the process. Discourse, according to Hajer (2005, p. 447) is defined as “an ensemble of ideas, concepts and categorizations through which meaning is allocated to social and physical phenomena, and which is produced and reproduces in an identifiable set of

practices”. Each actor engaging in a decision-making process deliberatively, or standing outside the process as an activist, conceptualizes the planning/environmental issue in the form of a discourse that gives meaning to that issue. Laws and Rein (2003) use the concept of ‘framing’ to conceptualize how stakeholders create a framing discourse that gives meaning to their experience of policy issues.

Further, Hajer argues that concepts related to the ‘performative’ elements of the policy-making process allow for an understanding of another dimension of policy-making not discernable through discourse analysis alone (Hajer, 2005b). Language is enacted in particular ‘settings’. In addition, it is proposed that the ‘scripting’ of the performance or interaction involves creating a setting that will determine which actors are included and how they should behave. Policy processes are therefore ‘staged’ differently in various contexts with particular actors using the process and their discourse to gain control of the process and influence the outcomes (Hajer and Uitermark, 2008).

The theoretical framework described briefly above points to the emergence of ‘new spaces of politics’ (Hajer and Wagenaar, 2003: 9) where there is a “new style of



political involvement” through networks. Here people respond to issues that impinge on their lives in a discontinuous fashion as issues emerge and fade away. With the wide range of stakeholders taking part in policy making, ‘difference’ becomes very important as the myth of absolute knowledge has been exploded and a need arises to take cognizance of the variety of discourses people adopt to make sense of their experiences and of the world (Yanow, 2003).

The question of how (spatialised) knowledge is constructed and legitimized fits into this discussion at various levels. The first issue concerns the types of information that are recognized by various actors, the second the political processes to turn information into meaningful knowledge, and third the negotiations around whose ‘knowledges’ are prioritized to resolve the issues concerned (Cargo and Mercer, 2008, Schlossberg and Shuford, 2005, Whatmore, 2009).

## **Knowledge Construction: Participating and Spatialising**

The dominant paradigm of urban modernisation which frames economic, social and environmental management and planning processes adopts an “expert-led, science based policy framework” (Oelofse et al., 2009, Scott and Barnett, 2009). Scientific experts argue that such processes are highly complex and only science can provide an authoritative base for policy-making. They therefore define problems and their solutions and this provides a powerful claim that policy-making should be based on scientific knowledge only (Fischer, 2003). Power is “inherent in the knowledge claims and various practices through which specific scientific claims gain authority” (Hajer, 1995, cited in: Scott and Barnett, 2009, p. 274).

There is a large body of literature in the field of ‘science and technology’ that explores the challenges to science as the dominant approach to knowledge. There has been much criticism of the ‘science-based policy-making’ model, which assumes that there is a linear flow of information from science to society (Eden, 1998, p. 426, Gibbons et al., 1994). A range of actors, including the state and business interests, strategically use science to frame their views on environmental issues and in this way claim authority and exert power in the decision-making processes.

In the network society, with increased public participation in decision-making, the relative power of expert science and lay knowledge has shifted. In contemporary society, where ‘hard decisions’ have to be made hurriedly with only ‘soft’ evidence, the role of expert knowledge in decision-

making has been challenged. There has emerged an increasing mistrust of science and a call for local, embedded knowledge in policy making (Fischer, 2003, Hajer, 2009, Ravetz, 2004, Scott and Barnett, 2009, Yanow, 2003). Citizens are becoming increasingly aware of the failure of science and expert knowledge applied by the state to address contemporary environmental and social problems. There is increasing unease and anxiety in society which has been brought about by the ‘democratisation of knowledge’ (Hajer and Wagenaar, 2003). Decision-making now takes places in a context of ‘radical uncertainty’ (Ravetz, 2004), and it is proposed that the least that can be done to mitigate this is to operate under the ‘precautionary principle’ (Hajer and Wagenaar, 2003).

From the discussions above, there is an implicit preference for the actors government (local or national) and citizen groups. However, we also have to recognize that in urban development processes, the relation between government (local or national) and the private sector is equally if not more important in defining knowledge framing, and in setting priorities in urban planning and management. Therefore, the way in which spatial knowledge is constructed in this type of relation needs to be contrasted with that between government and civil organizations/citizens.

When we look at the issue of knowledge-building processes, two basic analytical approaches are found. The first concerns the Mode I knowledge-building process, related to classic notions of knowledge as scientific codified knowledge, built up in linear processes of experimentation, verification and codification (Gibbons et al., 1994), or what Bruckmeijer and Tovey (2008) call the ‘elitist model’. The knowledge-building process relies heavily on expert and scientific knowledge systems, and the formulation of the main paradigm is heavily dominated by scientific and bureaucratic establishments. This is the dominant model found in government- private sector relations.

The second model, Mode II (Gibbons et al., 1994, Rip, 2001), distinguishes different types of knowledge (tacit, practice-based, scientific) and recognizes knowledge-building as a social process, in which various paradigms compete with each other through institutions. The sources of knowledge are scientists, working experiences and community-based knowledge of various groups (Baud, 2002, van Ewijk and Baud, 2009). Bruckmeijer and Tovey distinguish two variants within this mode – the ‘incorporation of knowledge’ model and the ‘knowledge embedding’ model. In the first model, practice-based knowledge is also included in knowledge building. The second is based on the idea that knowledge processes are built up through social institutions, power struggles

between groups for recognition of their definitions of problems and is a conflict-prone process<sup>1</sup>, more in line with Hager's (Hager, 1995, Hager, 2005) model. The second model, which is our starting point, suggests that various sources and types of knowledge can be recognized, and that knowledge building is a result of the social construction of knowledge. Van Ewijk and Baud (2009) have identified different types of knowledge utilized in city-to-city cooperation programmes, which can be linked to the issues discussed in this paper (see Table 5.1)<sup>2</sup>. The first type of knowledge is tacit and related to knowledge built up through practice and experience, which often remains non-codified in any way. It can only be taught from person to person. The next three types of knowledge are characterized by their contextual-embedded character, which can vary from more technical-economic sectoral embedding to being embedded in social and political networks (Evers, 2008, Patel et al., 2001). Again, it is knowledge that is built up in practice, but more widely spread and shared between people than is the case with tacit knowledge. Finally, codified knowledge is that which is laid down in some form of documentation that can be accessed by others (not necessarily universally open), and learned through such documentation.

Having distinguished types of knowledge and actors mainly producing them (see Table 5.1), the discussion now turns to existing models dealing with processes of

knowledge construction. There is a well-developed literature on knowledge construction, production and exchange at the level of economic clusters (cf Evers, 2008). However, there are less-developed ideas concerning knowledge production in the setting of urban local governments addressing urban habitat inequalities (particularly slum rehabilitation) and urban growth.

Three main approaches to knowledge construction, production and exchange in cities can be distinguished. First, the urban planning and management approach, in which formal technical knowledge production is linked to various (local) government departments with their own sectoral perspectives (property, infrastructure, basic services, housing, water, energy, etc.), and increasingly also their own economic development policies, with provincial and national governments setting policies and standards for some areas. In this approach, the main actors are urban planners (and architects) and their research institutions and professional organisations. A certain 'linearity' is inherent in this type of knowledge production, in which Development Plans provide the context, fixed standards are set for implementation and expert knowledge provided by planner and other experts are the dominant paradigm within which actors work. The type of knowledge constructed and produced is largely technical, regulatory and codified. In this perspective, there are two explanations given regarding the contribution of residents/citizens to decision-making: the

**Table 5.1:** Types of Knowledge (Source: Adapted from van Ewijk and Baud, 2009).

	Tacit	Contextual-embedded knowledge:			Codified knowledge (analytical, regulatory, standards, etc.)
		technical, economic	community-based, social	political and network levels	
<b>Main actors</b>	Individuals with experience	Professional knowledge belonging to sector professionals	Community knowledge spread by social networks	Political knowledge within political and social networks	Academically and professionally taught and diffused

<sup>1</sup> Bruckmeijer and Tovey have gone further than these two basic models, when they first elicited different views of SD (in the context of sustainable rural management or SRM in Europe), and then drew out from those paradigms the context in which they developed – i.e. where the knowledge for a particular view of SD was generated, codified, disseminations, applied and its level of success evaluated. This way of linking a combination of knowledge types (i.e. knowledge generation and recognition) to the main processes of knowledge management (linked to urban governance processes) is the essence of what we want to do

in this research project. The other variants of knowledge dynamics that Bruckmeijer and Tovey distinguish include the 'political governance' model, in which the main assumption is that ideas for strategic changes for the future are basically 'political', and knowledge management is a derivative of the political discussions, which inform the ideas of social change needed.

<sup>2</sup> We do not pretend to be exhaustive; in this research programme other knowledge categories may be more relevant to distinguish.



conventional ‘public deficit model’ which defines public as needing to be supplied with information (Wynne, 2005, p. 70) and the ‘dialogue model’ which assumes that the public have their own knowledge and can contribute to decision-making processes (Irwin, 2001). The former model ascribes no value to lay knowledge (Yanow, 2003)<sup>3</sup>.

A second approach in which the construction and production of knowledge is important concerns the sociological analysis of city life and the knowledge of ‘lifestyles’ of particular groups of residents (households and social networks). This approach recognizes the ‘narratives’ produced by residents from all walks of life, and the extent to which social codes become mandatory in particular areas of the city. It relates also to the livelihood strategies and well-being priorities residents in each area set and their need to know the social codes to operate safely and maintain their own habitat and livelihoods in the areas where they live. An important issue in this respect is the ways in which such narratives can be exchanged across social classes, areas of the city and between different actors in order to build trust in alternative ‘narratives’ and lifestyles. It includes the ways in which collective action, social organisations and movements can contribute to increasing community-based knowledge across social and political boundaries, especially of less powerful groups (Hordijk, 2000, Miranda and Hordijk, 2001, Scott and Barnett, 2009, Patel et al., 2009). It relates to what Massey (2005) calls the knowledge of everyday space. Such spaces and the knowledge of them are ‘constituted through interactions, from the immensity of the global to the intimately tiny’(Massey, 2005, p. 9). Because urban space is the’ sphere therefore of coexisting heterogeneity’ there are a multiplicity of knowledges of this space’ (Massey, 2005, p. 9). Space, and the knowledges of it are therefore always under construction, ‘never finished; never closed’ (Massey, 2005, p. 9). It is a necessary complement to produce more inclusive approaches to urban development.

Specifically for this research programme, the interesting question is how spatialised knowledge can be constructed and produced by residents, which reflects inequalities in economic opportunities, the living habitat and livelihoods of vulnerable groups in the cities concerned, and environmental hazards they face, as well as their priorities in collectively organizing to counteract such vulnerabilities. Brooks et al (2010) in their paper on urban ‘riskscapes’ show that knowledge of risk is constructed in specific contexts through the experiences of people, but may not always lead to mobilisation.

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<sup>3</sup> Wynne defines lay knowledge as falling within “an adaptive, informal cultural idiom” pointing to the experiential and cultural base of local knowledge (Wynne, 1992, p. 287, cited in Scott and Barnett, 2009).

The further approach, which is more recent and which is a hybrid approach of the first and the second approaches outlined above, is one that focuses on the ‘spatialisation’ of knowledge construction. It concerns the discussion of various types of knowledge and the contribution to knowledge-building that spatialisation supports. This has implied that the discussion on knowledge spatialising is taking place at two levels; that of the contributions that ‘mapping’ can make to a better understanding of particular situations, and more specifically the methodologies of producing spatial information and knowledge, which can contribute to our understanding of ‘uneven’ urban development. We will briefly discuss both levels here, as they relate to our subject.

Producing spatialised knowledge is an important advance in the discussion of urban inequalities and measures to produce more sustainable/resilient development in cities, because it makes it possible to indicate local variations in inequalities, so that citizens can indicate priorities at the neighbourhood level, rather than city level. In principle, tackling particular issues could then be done through joint prioritisation processes, in a focused manner. This would make it possible to recognize local variations, and potentially reduces the costs of addressing such issues. Potentially, it could also lead to more transparent decision-making, if such spatialised knowledge is widely available and can support (participatory) decision-making in urban areas.

## Participatory Spatial Knowledge

Spatially disaggregated knowledge in urban governance is usually information or data, delivered by expert systems. The software programmes for GIS are not generally accessible to lay people, and even urban government staff find it difficult to deal with (Pfeffer et al., in prep). This has meant that spatial knowledge is not used widely, and innovative ways of inserting different types of knowledge into GIS is still in an infant stage (cf Sliuzas, 2003, special issue Habitat International). Part of the reason for this lack of information for GIS is the requirements for putting spatial information into GIS, which requires exact geographical locations for the information provided for the mapping. This tends to favour expert scientific knowledge over local knowledge, and knowledge generated in a participatory manner, although this is intrinsically not a problem.

Currently, in urban governance processes, the use of spatially disaggregated knowledge is often used internally (within government) as a management information system, and sometimes externally for disseminating information to citizens (improving administrative efficiency), and sometimes for improving performance (effectiveness, e.g. in tax collection).

It can also be generated and used as contents for more transparent political discussions and priority setting, by including local community knowledge or other information from existing databases (Census, surveys, remote sensing – Google Earth) to give priority to specific dimensions of sustainable development, and identifying geographic areas where the needs are greatest (hotspots) (Baud and Hordijk, 2009, Baud et al., 2010, Baud et al., 2008, Joshi et al., 2002).

The first two ways of using spatially disaggregated knowledge are becoming more common among city governments in the global South; in contrast, utilizing spatially disaggregated community knowledge to address needs in a more integrated fashion is still rare and contested by governments (Joshi et al., 2002). Only a few examples exist of experiments where local or individual knowledge of localities has been mapped in GIS systems, such as in Pune, India. However, these examples usually occurred with the help of experts familiar with GIS software.

Equally important, spatialising knowledge can provide a mixture of different kinds of knowledge pertaining to the same locality, making it possible to link more qualitative, tacit kinds of knowledge (from groups in local communities), to more technical knowledge production at local levels (e.g. Clark and Dickson, 2003). In Indian cities, the idea of community ‘census’ mapping in Mumbai and Pune has provided information on slum communities which was much more valid and reliable than the assumptions made by city planners (Joshi et al., 2002, Patel et al., 2001). Scott and Barnett (2009) describe the ways in which residents living around a refinery in a South African city produce scientific information on air pollution and pollution complaints as a form of ‘lay science’, which provided an acceptable form of scientific knowledge in urban planning discussions.

### Participatory Spatialised Knowledge in Urban Governance Processes

This brings us back to a more specific discussion on how participatory spatialised knowledge can be brought into decision-making processes in urban development. How is it valued (or hidden and ignored), exchanged or contested, and whose knowledge is included or excluded? What methods exist to include participatory spatial knowledge production and utilisation in such processes, and how can they be made more inclusive?

This question is multi-dimensional. To begin with, how do different types of urban networks or regimes influence the extent to which participatory spatialised knowledge will

be accepted in urban decision-making, has to be distinguished. Basically, two major types of networks are recognized; (1) those of city governments with private sector actors (developers of various sorts) dealing with city development in economic development, housing and infrastructure (Rydin, 2007), and (2) the city government-citizen networks dealing with the quality of life issues brought forward by groups within the city, particularly inequalities and poverty experienced by large numbers of residents. A great deal of literature on this subject exists, with which we are largely familiar (e.g. Baud and Nainan, 2008, Miranda and Hordijk, 2001). An interesting recent addition in this respect is the focus on multi-scalar networks (e.g. relations between different scale levels of government; or social networks working at local, national and international levels), or cross-boundary networks (e.g. city-to-city cooperation by local governments, by slum dweller networks; regional cooperation in economic development by local governments- San Andre in Brazil) (Barnett and Scott, 2007b, special issue Habitat International 2008).

The character of such governance networks differs according to the basic organizing principle, which sets the boundary conditions for the types of knowledges produced and the ways in which such knowledges are exchanged (network, market, hierarchical). The model below sets out the types of governance in short order (Figure 1).

### Knowledge Methodologies

The methodologies by which the various types of knowledge are produced range across a set of tools. These are a combination of 1) the processes through which knowledge is generated (no participation – active participation; linear process or socially constructed), 2) the adoption of (geo) ICT tools that facilitate (spatial) data collection, management, processing, analysis and visualization (GIS, location-based mobile devices, web-mapping services or Web 2.0), and 3) the purposes for which knowledge is generated (e.g. administrative purposes, such as property tax collection or inclusion of marginalized groups). Therefore, we also have to look at the ways in which researchers from the social sciences as well as GIS/computer science backgrounds are slowly discovering each others’ work to come to a more integrated approach to how participatory spatialised knowledge can be included in urban governance networks and decision-making processes.

GIS and remote sensing programmes are the classic providers of technical knowledge about the various sectors of the urban environment, given the availability of an adequate spatial database. In this context, typical GIS data



are property tax parcels, infrastructure maps for roads, water and sewage, drainage system, land use maps, administrative boundary maps to which socio-economic data can be matched and point maps displaying geographical locations of basic facilities or other points of local interests. From this data base, spatialised sector-based knowledge can be constructed in a linear process, for example how much property tax has to be paid, depending on the size, status and location of a property or where to invest in upgrading roads or other infrastructure lines.

In many cities in the global South, these GIS databases are still under construction and the local capacity for managing and maintaining such databases or the willingness to participate in database construction is limited. Priority is given to the development of those databases that will lead to an increase in efficiency and revenues, as for example the digitization of property tax. In Latin America, as part of a trend to modernize local government agencies and increase their efficiency and revenues, the World Bank and the Interamerican Bank (IDB) have provided loans to municipal planning departments for developing those databases, while in India this was part of the JNNURM programme (Jawaharlal Nehru National Urban Renewal Mission) of the national government of India. The drawback is that, in most cases, these databases are basically used only for tax purposes not being released to other municipal departments. These departments could make good use of spatially-based information to improve policy in the area of education, health, prevention of violence and crime, just to mention a few. Furthermore, systematic acquisition and analysis of socio-economic and demographic information seems to be less relevant, although these could be used effectively

in monitoring spatial inequality (Martínez, 2009) and urban governance (Baud et al., 2008) and building information systems to inform public policy and support civil society action (Torres, 2008).

Relying on GIS-based technical knowledge only for decision-making is problematic, because the data can only show what has been put in, and technical knowledge is often considered the truth as it can be quantified. Certain areas (and people) within a city are ‘switched-off’ or even rubbed out and erased by the process of digitization (e.g. in digital cadastres) or do not exist because they have never been included in the database (e.g. an illegal settlement on poramboke land that does not appear in the master plan for Chennai 2025) (see also Benjamin et al., 2007)).

In terms of physical properties, knowledge gaps in GIS databases can be addressed by the analysis of high resolution remote sensing images (Quickbird, Cartosat or Ikonos) for different moments in time. Although such images are already very interesting in themselves (with the launch of Google Earth millions of people located their own house), their strength lies in the combination with qualitative data sources. It is important to know how the displayed information can be interpreted and codified, i.e. whether it is possible to delineate and label areas on the basis of physical characteristics, and also take into account temporal references in the visual interpretation; social knowledge (tacit; community-based) is indispensable in this classification process. For instance, Sliuzas (2004) and Lemma et al. (2007) have applied a participatory approach to delineate slum settlements in African cities whereby citizens created

**Figure 1:** Types of Governance, Organizing Principles and Roles of Government

	Network governance	Market governance	Hierarchical governance	Knowledge governance
Basic principle	Reciprocity	Exchange	Power	Knowledge
Coordination principle	Collaboration	Price	Rules	?
Mode of calculation	Homo politicus	Homo economicus	Homo hierachicus	Homo sapiens
Roles of government	Govt. as partner	Govt. as service provider and contractor	Central ruler	Dominant actor
Key value	Public value	Public choice	Public goods	Optimal mixture of all forms-knowledge about available knowledge

Source: Mishra, 2011, (Water governance: an analytical framework, presented at National Seminar Utilizing spatial information infrastructures in urban governance networks to tackle deprivations in urban India, 24-25 Feb, New Delhi)

the physical criteria of what would determine a slum in the local context, and Baud et al. (2010) have used visual image interpretation to identify sub-standard housing areas in combination with semi-structured field-surveys and qualitative interviews.

Another approach for complementing gaps in technical knowledge is through participatory methods employing GIS technology (e.g. Ghose, 2003, Hoyt, 2005, Joshi et al., 2002, Cinderby, 2010), commonly referred to as PGIS, PPGIS or community mapping.

One definition of participatory spatialised information in GIS is that of Hoyt, who acknowledges that it is a combination of a ***"computer-based information system with an interactive human process which facilitates collaborative planning efforts, but its ability to effectively empower participants is largely determined by the local context—that is, the social and political relations that link or divide individuals, groups, and institutions"*** (Hoyt, 2005).

This definition recognizes the double focus needed to make a computer-based information system really participatory. It implies that equal attention needs to be given to the context within which participatory knowledge management plays a role in decision-making, as well as the structural and process limitations set by social and political structures and relations between the actors involved.

GIS started to play an increasing role in decision-making and urban management in the mid 1990s; academics, planners and community organizers have promoted the access to GIS, especially for those who were under-represented in policy-formulation and decision-making processes (Obermeyer, 1998). Participatory GIS approaches were established to complement technical knowledge, but also as a critical response towards geographical information technology as GIS was considered the domain of technical experts and requires quantification and standardization in terms of georeference, classified data and database structures, and moreover it is limited by a strict geometry of pixels, points, lines and polygons (Sieber, 2004).

Sieber (2006) identified various forms of participatory GIS in practice. A first approach consists of GIS utilization by communities and associated training to be able to apply GIS in their daily practices. An interesting example is the partnership of Lidas and Casa dos Meninos in Sao Paulo, Brazil, who have trained youth to collect data on their own neighbourhood (Sydenstricker, pers. Comm., 20/10/2010). This resulted in both a better understanding of, but also belonging to the neighbourhood.

Another common approach, especially in developing countries, is the participation in inputs and outputs, i.e. contributing to the production of spatial knowledge and verifying outcomes. Originally, this was mainly applied in natural resource management (e.g. Craig et al., 2002, Sydenstricker-Neto et al., 2004, McCall and Minang, 2005), but has also been applied in the urban context (Ghose, 2003, Elwood, 2006, Sliuzas, 2004, Pfeffer et al., 2010). Participatory methods of eliciting tacit knowledge are being experimented with and produce mixed results (Hoyt, 2005, Joshi et al., 2002, Pfeffer et al., 2010).

A further PGIS approach, often referred to community mapping, focuses on the production of knowledge to empower communities, to make their voice heard and to reach the hard-to-reach (e.g. Cinderby, 2010, Hoyt, 2005, Joshi et al., 2002, McCall, 2003, Harris and Weiner, 2003). This has been ‘successfully’ applied in the dense slum area Kibera in Nairobi, Kenya (c.f. <http://www.mapkibera.org>), where collaborative efforts of technical volunteers and community members resulted in digital databases using mainly open source software for 13 villages which would be a blank spot on the map otherwise.

With the move towards more participatory urban planning and decision-making, the term public participation GIS (PPGIS) has evolved, emphasizing the integrating of the public in planning and decision-making processes (e.g. Schlossberg and Shuford, 2005). In several cases this has been put into practice by providing an interface, often in the form of a webpage with (e.g. Kingston, 2007) or without GIS functionality, for facilitating (spatial) information exchange or one-directional provision of information. A procedural implementation of this approach are e-grievance redressal systems (Martínez et al., 2009) where citizens can enter their complaints for a particular locality and where local government could show (if technologies communicate) where and how complaints have been tackled.

Recently, because of the exponential growth of free web-mapping services like Google Earth and Google Maps and the increasing awareness of geographical location promoted by the availability of GPS receivers in mobile devices and geotagging, a new strand of participation has emerged, in particular volunteered geographic information (VGI; also referred to as neo-geography, wiki-mapping, GIS 2.0) (Elwood, 2010, Georgiadou et al., 2010, Goodchild, 2007) which is basically user-generated content on a voluntary basis. Such self-organizing knowledge production, exchange and consumption opens up new opportunities for urban analysis and will change the socio-political construction of spatial knowledge (Elwood, 2010). However, VGI suffers of an uneven development in terms of data production and an



uneven access to such web-mapping services and will by itself not be inclusive. But, location-based mobile devices together with web-mapping and Web 2.0 services have the potential to complement technical knowledge and offer interesting possibilities for organising knowledge spatially. While the first mainly generates (qualitative) data referring to a geographical location, area or trajectory, providing a range of opportunities for (participatory) spatial knowledge production through a social process, the latter two are to a large extent used for the organisation of spatial information, interaction, exchange and use, and can therefore support participatory processes, given appropriate access to internet. Kwan and Ding (2008) have for instance developed a methodology for the construction of geo-narratives by combining trajectory data from a GPS with qualitative data, in her case by illustrating, in space and time, at which parts of a trip a Muslim woman does not feel safe after September 11. Location-based mobile devices could also be used to delineate areas of concerns with respect to safety, deprivation, pollution or other environmental risk. The combination of location-based services, virtual globes and Web 2.0 can create an interface between different actors (e.g. public sector and citizens or communities) for knowledge exchange (Georgiadou et al., 2010, Bugs et al., 2010, Hardey, 2008, Hall et al., 2010). Citizens can for instance use their mobile phone for taking a picture of a service which is out of order and upload that to a service through SMS including the geographical position. Virtual reality has also played a role in the empirical research. Foth et al. (2009) and Tulloch (2008) have studied evolving links between urban planning, neogeography and ICT by analysing narratives on the basis of virtual reality to understand and interpret the perceptions of proposed urban designs.

At last and the most active form of participatory knowledge generation is counter-mapping, that is, "mapping against dominant power structures, to further seemingly progressive goals" (Hodgson and Schroeder, 2002). Counter-mapping produces knowledge that has to be used to resist and develop counter arguments. The present democratization of mapping tools and spatial information is fundamental to this. An example of counter mapping would be mapping an area including existing human settlements as a tool to support land reclamation rights of a population. This map could challenge information provided by an "official" map, in which these settlements are seldom or not even present. Civic mapping (Scott and Barnett, 2009) could serve as/be counter mapping as an advocacy tool but not necessarily. It becomes counter mapping as it is used to confront or challenge another map produced by a different social group. In South America, GPS technology has for instance helped Amerindians to claim historical territories (Poole, 1995), and in South Africa GIS was proposed to re-draw the maps of apartheid (Harris et al., 1995).

Spatial technology offers thus a variety of possibilities to derive, produce, consume and share participatory spatial knowledge and combine different knowledge types produced by different methodologies referring to the same locality. However, the usefulness of spatial knowledge derived with the support of technical spatial knowledge tools strongly depends on timeliness, reliability, accessibility and the ability of the various actors to understand and use it (Kyem and Saku, 2009). Handling the tools and its outcomes may be a bottleneck for even a 'techy-savvy' user group (Rinner and Bird, 2009), despite the potential of these tools for leveraging ideas from a variety of actors. Further aspects of concern are the uncertainty and the simplification of spatial knowledge (as geometric features in space), the hidden processes of web-based services that may favour certain kinds of information (Hardey, 2008) as well as the social implications (Elwood, 2010). For example drawing a sharp boundary to define borders may generate a conflict which is not there (Dunn, 2007) or, due to the dependency on ICT and the internet, may lead to marginalization and exclusion of some groups.

It is important to highlight that mapping/spatial technology is not a pure technical exercise or activity but has an intrinsic political dimension. On the one hand, as mapping/spatial technology can be used to legitimize power relations and increase control by the state and groups of power (Harley, 1989; Kaim and Baigent, 1992, cited in (Peluso, 1995)). On the other hand, "alternative or counter mapping", produced by groups that are not part of or identified with the status quo, could serve as instruments or tools for questioning certain types of knowledge production, resisting and providing new visions or insights on contested issues. In this case would be an empowerment tool (Peluso, 1995).

Various authors have included other dimensions as well, such as Puri and Sahay, (2007) who suggest that participatory spatial knowledge production and exchange is based on social and political relations, which show large inequalities in political power, capabilities of participation and pushing agendas, and the institutional conditions, which allow for effective participation<sup>4</sup>.

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<sup>4</sup> This implies that our analysis needs to include several scale levels: (1) the extent to which computer-based information systems work as information systems, (2) who define the agenda of participation and change, (3) the capabilities of the stakeholders in the decision-making processes and their strengthening, (4) how are local participatory experiences integrated into broader networks of participation, and (5) what support or constraints do local institutional conditions set?

They attempt to synthesize the issues around participation from both the internet studies and development studies literature in order to identify four key problematic areas: viz.,” (a) who defines the participation agenda, (b) what capabilities do stakeholders have to participate and how can

this be strengthened, (c) what is the role of institutional conditions in enabling effective participation, and (d) how do local participatory processes experiences get integrated into broader networks to become sustainable” (2007, p. 142). Table 5.2. sets out some of the results of these studies.

**Table 5.2** Issues from Literature on Participation in Development (adapted from Puri and Sahay, 2007)

Theme	Emerging perspectives
Computer-based information system (CBIS) used as information system?	<ol style="list-style-type: none"> <li>1. CBIS used by urban planners mainly for planning choices and implementation</li> <li>2. Alternative community-based information produced by communities, translated by professionals for use in urban decision-making (only in experimental situations)</li> <li>3. CBIS not generally used as strategic planning tool; city government staff not equipped; private sector consultants do so according to the criteria set by institutions contracting them. To what extent are universities recognized as partners in the process? By whom?</li> </ol> <p>Critique: CBIS not generally accessible due to technical capabilities required; requires synthesizing several types of ‘questions’, types of information to produce integrated sets of knowledge for participatory decision-making</p>
Who defines the participation agenda?	<ol style="list-style-type: none"> <li>1. Largely externally driven; people (end-beneficiaries) not involved in design/implementation; not owned by people; development programmes unsuccessful.</li> <li>2. Peoples’ participation increasingly practiced; often occupies center stage in development approaches.</li> <li>3. Need to move from participation towards empowerment of people.</li> </ol> <p>Critique: Hidden agendas of governments; development agencies usurp power while appearing to promote participation to allocate resources.</p>
What is the capability of the people to participate?	<ol style="list-style-type: none"> <li>1. Shaped by sociopolitical context; constricted by limited domain knowledge; language barriers and illiteracy.</li> <li>2. Latent capabilities can find expression through facilitation by sympathetic external agency; empowerment through democratization and recognition of both instrumental and constitutive roles of participation also enhance this capacity.</li> </ol> <p>Critique: ‘community’ assumed to be a monolithic, unproblematic entity; public discussions may inhibit people from expressing opinions frankly; ‘local’ networks of relationship and power, often invisible to outsiders, deeply modulate what individuals contribute during participatory meetings; ‘time-table’ approach counter-productive; recourse to participatory action research suggested.</p>
What is the role of institutional and social structures?	<ol style="list-style-type: none"> <li>1. Change from central control to more decentralized systems of authority and governance.</li> <li>2. Human agency expressed as participation has the potential to modify present institutional/bureaucratic structures rooted in historical contexts that hinder participation or to even create new structures.</li> </ol> <p>Critique: Western “blueprint;” political technology.</p>



The summary table echoes the issues under discussion in this chapter. The discussion will now turn to the issue of the role of institutional and social structures, and our final research question: what difference does the utilization of such participatory spatialised knowledge management make to decision-making outcomes?

As indicated earlier, the ideas behind urban governance networks implicitly suggest that they provide more space for including and recognizing other types of knowledges in decision-making processes, in which the extent of participatory inputs from residents, slum residents, NGOs/CBOs has become part of *a priori* accountability in some countries/cities, depending on the political context. Brazil is an example of a country with institutionalised participatory budgeting processes. The examples from South Africa and India indicate that political strength is needed by the actors producing alternative community-based knowledge to ensure that it is recognized and utilized within the planning process (Joshi et al., 2002,

Patel et al., 2001; Scott and Barnett, 2009). The extent to which participatory planning and management is anchored in a legal framework makes a large difference in making inclusion of knowledges effective. Ackermann (2004) indicates that such frameworks are essential for the mandates of participatory processes to be given legitimacy. This is echoed by the firm embedding of similar types of participatory processes in Brazil (Gurza-Lavalle et al., 2005). Gaventa (2006) indicates the necessity of a democratic context in which such processes gain legitimacy and wider acceptance. Local government needs a mandate, provided by legal frameworks, as well as fiscal decentralization and earmarked funding, which are strategic supports. The influence of various external conditions has not yet been analysed much locally and certainly not comparatively across different socio-political contexts. It is a strategic research question, given the inherent trade-offs and potential political conflicts in combining environmental, social and economic goals within sustainable development.

## 4

# Participatory Spatialised Knowledge and Outcomes?

This brings us to the final question of how the ways that knowledge is utilized and by whom, will affect the outcomes in the urban development processes. This is a normative question, the outcomes of which aim to contribute to sustainable development in cities. The criteria for assessing the outcomes of urban planning and management processes are defined to a large extent by each WP in the programme – and include economic growth and diversity, reducing social inequalities and vulnerabilities, and increasing environmental sustainability. Since the more recent approach of resilient development is to be included in the research, criteria which reflect adaptability to changing circumstances will be added (namely, diversity and redundancy of economic activities, pre-cautionary approaches to environmental risks and hazards, and strengthening social networks and reducing inequality – see) (Puri and Sahay, 2007; Meerow, 2010).

In the approach adopted in this project, it is assumed that models of participatory learning and knowledge construction<sup>5</sup>

are conducive to economic growth and diversity, reducing social inequalities and vulnerabilities, and increasing environmental sustainability. The main idea is that knowledge should be built locally, based on local producers and users (citizens), built on joint learning and collective local formulation of principles of change, and include formal and informal groups. One of the primary themes of human geography is to understand the dialectical relationship between society and space. Space is socially produced, but space and place act back on society and influence the structuring of society in a relational manner (Peet, 1998). These dialectical relationships need to be explored in the knowledge production process and practice of planning so as to address the challenges facing cities in the South and to ensure more sustainable outcomes (Swilling, 2006).

One such way of revealing the dialectical relationships between society and space and society and the environment is through participatory planning. Participatory planning is a means of deliberating the outcomes of the intersection or collision of the different knowledges, practices and experiences of the city (Cabannes, 2006; Whatmore, 2009).

<sup>5</sup> (Bruckmeijer and Tovey call this the missing model, but in fact it has been experimented with widely outside the European context in which they are working)

The concept of ‘competency groups’ is presented by Whatmore (2009) in her study on the relationship between science and democracy in mapping knowledge controversies. She outlines how ‘competency’ groups can be used to redistribute expertise. This could be used as a ‘model’ to allow for greater deliberation on spatial planning in cities.

Therefore, we focus on ten cities with contrasting economic and political conditions, with the scientific objective of developing a qualitative explanatory framework (model) analysing the ways in which participatory spatial knowledge management is linked to and can direct urban governance to sustainable development (SD). This model will show 1) the influence of differing political and economic conditions, which can be either conducive or obstructive to more sustainable development patterns; 2) outline the ways in which different urban governance models (including participatory) address issues of spatial and social inequality, and promote/degrade environmental sustainability, and 3) show how utilizing participatory knowledge management and decentralized fiscal funding can support these initiatives.

The main question which is posed in this research programme, concerns the ways that knowledge is produced for urban development and its effects on the direction and outcomes of such urban development. Answering this question leads us to the following more specific issues:

1. Identifying the main actors involved in urban development and their relations (urban regimes and contesting groups); the actors involved in producing knowledge and the discourses produced by each of the actors; the dominant planning and development discourses; and the conflicts between expert and local knowledges of other groups (lay knowledge).
2. Determining the extent of democratic urban governance, i.e. procedural justice, necessary for sustainable decision-making, including the exchange and sharing of knowledge among stakeholders in processes and networks; the existence and democratic nature of participatory practices; and the use of knowledge to exercise power in planning decision-making.
3. Analyzing spatial knowledges and their construction and utilisation; specifically, the institutionalisation of knowledge into policies, programmes and projects at the local, provincial and national level; the contestation around and resistance of dominant knowledge by civil society and the resistance of community knowledge by elites; the extension of sustainability and democracy through the inclusion of alternative knowledges (methodological, participatory and policy making tools).
4. Evaluating the implications of more participatory spatialised knowledge building and utilization for outcomes in urban development.

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**Chance2Sustain** examines how governments and citizens in cities with differing patterns of economic growth and socio-spatial inequality make use of participatory (or integrated) spatial knowledge management to direct urban governance towards more sustainable development.

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