Chapter 7
A Social Work Perspective on Socio-technological Innovations in Urban Planning and Development

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Abstract In the field of sustainable urban development ModularCity as a socio-technological innovation, which combines methods and approaches from computer-assisted planning, geography and social work. It allows planning representatives to analyse the socio-spatial context of future development projects by editing, collecting and visualizing geo-referenced, objective as well as subjective, data in one planning tool. This article explores ModularCity's impact for participative and socially sensitive urban planning and reflects the options and limits of data-driven analysis and socio-spatial visualization. The focus is on the translation between stakeholder's different planning concepts, goals and languages and it will be discussed how ModularCity's strategies of integration, visualisation and responsiveness serve to the translational demand in sustainable urban planning.

7.1 Introduction

In the last few decades, the planning and management of cities has increasingly become a field for inter- and multidisciplinary cooperation (Evans 2012). The participation of stakeholders from different professional and scientific backgrounds has been brought forward by the communicative turn taking place in planning theory since the seventies (Healey 1992). While this so-called horizontal participation calls for a collaboration between experts of different fields (e.g. planners

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and social workers), a vertically oriented participation targets to involve citizens in planning processes by means of informal processes (e.g. agenda setting, planning workshops, etc.). Today, collaborative planning "starts with the question: "How can we 'make sense' of what is happening and plan for the future within a dynamic and increasingly complex society?" (Allmendinger 2009: 127). To analyse urban processes an integral and holistic perspective on physical and social structures as well as human actions in social spaces is required in particular a specific focus on people and their daily living conditions. Therefore, the expertise of social work is becoming increasingly integrated in urban planning practices due to the growing awareness of the role of social factors in urban transformation processes (see Drilling 2013).

7.2 Social Work in Urban Planning

7.2.1 The Concept of Planning-Oriented Social Work in Urban Planning

Social work originates back to the 19th century and has from its outset been strongly dedicated to supporting an urban development which fosters liveable and inclusive urban environments for all citizens. In Chicago Jane Addams, one of social work's pioneers, supported social reforms for the poor by conducting urban research and proposing community oriented services in city districts (Kolko Phillips and Straussner 2002). In its ensuing history the field of urban social work followed different conceptual strands and practices, aiming for more participation of citizens in urban development processes. While the tradition of community organizing demanded for more civic power in political processes of urban planning (during the 1920s–1960s), newer approaches such as neighbourhood development or neighbourhood management focus on activating local communities to engage in their daily communal life (Oehler and Drilling 2013, pp. 17–28).

Planning-oriented social work is characterized by a stronger but still critical collaboration of social workers with planning authorities, either to represent the residents' interests in planning processes or to create possibilities for direct participation of citizens. One of its main tasks is to mediate between different planning actors and their relative concepts, goals, and professional languages. It aims for having a real impact on planning practices by integrating social work standards in urban planning processes on different spatial levels. This may concern the design and use of public spaces, the development of neighbourhoods, the planning of a whole new settlement area or infrastructural development in a city as well. Among others social work professionals need to develop so-called *urban planning capabilities* to effectively collaborate in processes of urban planning and development to convincingly represent the professional principles of *social justice*, *democracy* and *the right for supportive living environments for all urbanites* (Oehler and Drilling 2013, p. 33). The concept of planning-oriented social work is therefore

strongly committed to the idea of sustainable urban development which in the area of urban planning functions as a bridging concept between social work standards and urban planning tasks.

7.2.2 Social Sustainability in Urban Planning

Applying a social work perspective and its professional standards to urban planning processes puts the focus on *urban social problems*. These problems are treated as structural conditions as well as output of urban planning practices in an ongoing process of urban transformation on the global, national and local levels (e.g. global and regional economic crises, international and internal migration, social polarisation between regions, cities and neighbourhoods, etc.). Transformations are shaped by negotiation processes between various interests (politics, business, civil society, planning and administration, associations, etc.) producing unequal access to urban goods as housing, infrastructure or social support. To handle these problems the concept of planning-oriented social work aims to influence urban planning processes to enhance a more inclusive and socially just urban environment, which may be also called a socially sustainable urban development (Drilling 2013).

The two main *principles* of a socially sustainable urban development are (1) the consequent and ongoing participation of affected and marginalized social groups and (2) the enhancement of access to relevant social goods and equal opportunities for all citizens:

1. Participation as inherent principle of socially sustainable urban development aims to redistribute resources and influence in urban planning processes by empowering less powerful groups in the negotiation process. Meaningful instruments are the establishment of intermediate institutions as well as binding communicative processes that enable citizens to take part not only in planning projects but also in overall planning institutions and procedures. Planning-oriented social work also tries to support communities, social networks and movements to have a voice in urban planning processes.
2. Socially just urban planning focuses on the fostering of equal urban living conditions by providing resources for affected or marginalized citizens. These resources may be material like housing, access to open spaces or barrier-free mobility, as well as immaterial like social networks, social support or collective identity. Urban planning should therefore be socio-spatially sensitive which means taking into account the life worlds of current or future residents by analysing social inequalities and integrating citizens needs and resources such as for an ageing society (Drilling and Oehler 2013).

The past experiences of social workers engaged in socially sustainable urban development have shown many challenges in integrating a social perspective in urban planning processes (Klöti et al. 2014; Selle 2013). On the one hand, numerous so called participative planning processes often neglect the needs and interests

of non-affluent groups, either because they are underrepresented or not included at all. But also more inclusive settings are still restricted in their participative capacity because participation in Switzerland is mostly arranged top down and does therefore rather reproduce than transform existing political and professional hierarchies. On the other hand, the integration of informative data about socio-spatial processes is costly, needs expert knowledge and is therefore rarely conducted. In addition the consideration of qualitative data is especially complex because of their multidimensional and often subjective character (Stark et al. 2013). It is therefore not surprising that in today's conventional planning practices technical affordances and economic parameters are often of primary importance while social factors are treated as subordinated.

7.2.3 Socio-technological Innovations in Urban Planning

Related to their professionalization, social workers are interested in collecting data on socio-spatial contexts (by professionals or by the citizens themselves) as well as in activating and involving citizens in urban transformation processes. Professionals working in this field use a variety of quantitative and qualitative methods to support participative involvement of citizen's needs and interests in development projects on different spatial levels. While classical methods (e.g. citizen panels, planning for real or activating surveys) are designed in such a way that mostly people with strong intellectual, time and language capacities participate, the so-called "new procedures of cooperative planning" enable new forms of participation using internet and social medias to reach out to more and different people regardless of their location. Due to their visual vocabulary and virtual interactivity these tools may engage also lay people to participate in planning processes, especially those who are not familiar with expert knowledge and language (Neuhaus et al. 2015). In this sense socio-technological innovations have the potential to support social sustainability in urban planning as described above.

7.3 The Demand for Translation in Sustainable Urban Planning

One of the main challenges for sustainable urban planning lies in the bridging of unlike positions, values and knowledge of all involved actors: The claim for participation as well as the integration of the resident's needs and living conditions in urban planning demand for translation on different dimensions, for example:

1. between the resident's life worlds and the professional perspectives of experts;
2. between disciplines involved in the planning process (e.g. social work, urban planning, construction, regional economy, etc.);
3. between real world situations and planning instruments such as plans or models.

The disruptions between the involved actors may occur on three different levels following a deriving succession: Firstly the *mental representations* of the city may differentiate distinctively between different professions and viewpoints (e.g. city as a functional space vs. city as a social space). The way "the city" is mentally represented determines which questions and urban challenges are focused on. Therefore secondly in planning settings various *values and goals* about future urban development can come into conflict (e.g. economic growth vs. social stability), even though shared democractic values should be the touch stone for all decision making. These goals are not always explicit but structure decisively the negotiation processes between all stakeholders. Thirdly they are expressed by different *means and modes of communication* such as specific terms, participative procedures, routines or visualisation techniques. These communicative practices may vary between the involved actors and may impede or support the co-production of urban planning.

The demand for translation in sustainable urban planning goes along with the request to break with established concepts, popular goals and the conventional means to pursue and legitimate them. This reorientation may be guided by Habermas' theory of communicative rationality (Habermas 1981) which seeks to realise objective decisions not based on formal rationality but on agreement between individuals reached through free and open discourse. Planning is therefore defined as interactive and communicative process (Healey 1992) in which different stakeholders negotiate about their visions, values and goals. It must be performed through open debate achieving mutual understanding and, if possible, result in consensus (Innes 1996). Equally of importance is the requirement to give room to possible conflicts between different concepts, goals and values of planning actors. Referring to Chantal Mouffe's theory of a conflictive democracy (Mouffe 2007), conflicts in planning processes should not be obscured but carried out. The demand for translation in sustainable urban planning likewise needs the articulation of opposite positions to broach the issues about social inequalities between different social groups.

The following paragraphs discuss the challenges of communication in sustainable urban planning by developing a tool for area development called ModularCity. It focuses on the processes of integrating different concepts of city and goals of urban development in one communicative instrument and discusses how such a socio-technological innovation answers to the demand for translation in sustainable urban planning.

7.4 Socio-spatial Analysis with ModularCity

ModularCity is a socio-technological innovation which was developed by a collaboration of research institutes, private enterprises and the city administration of Langenthal. The project aimed to develop a planning software to edit, analyse and visualise objective as well as subjective data about a specific area under

development. It was conducted from 2011 to 2014 and completed by testing a software prototype in Langenthal, Switzerland.[1]

The project aimed to develop a planning software which allows to collect, edit, visualize and analyse socio-spatial aspects of a development area. Above all the visualisation of the socio-spatial context of an area shall offer an expanded basis for discussion in interdisciplinary working groups and enhance a systematic consideration of all relevant factors.

The projects demand was primarily to combine methods from computer-assisted planning (Urban ROI[2] Designer © by TSquare) and geography (geo-information system GIS) with approaches from social work (participation and socio-spatial analysis) in one software tool aiming to integrate socially relevant factors in the planning process. To select the interesting variables the project team was assisted by the methodology of socio-spatial analysis used in professional fields such as social planning or urban and district development (Riege 2012). The basic assumption behind this approach is that urban qualities (for example of public spaces) are not only shaped by physical conditions (like the design of the place) but also constructed through processes of appropriation by the users. ModularCity therefore tried to integrate socially relevant data about a development area in one planning tool, namely the social structure of the residents surrounding the development area (objective data) as well as the urbanites' subjective perception, daily use, and personal evaluation of the area (subjective data). Table 7.1 shows the main steps of the socio-spatial analysis to develop the ModularCity planning software.

7.4.1 Subjective Analysis with an Online Survey in Langenthal

One of the software's components is a survey-tool for collecting and visualizing data about the perception, use and evaluation of a defined area by the neighbourhood residents. Referring to the concept of sustainable urban development this tool aims to take into account the subjective perceptions and needs of urban residents in planning processes in the city. The survey comprises 5 closed questions and one open one about the following topics: subjective definition of the depicted area, means and routes of transport as well as activities on the area, positively and negatively perceived places on the area, qualities and atmosphere as well as problems and potentials of the area.

To test the tool a development zone in Langenthal was selected and all in the area registered 834 households (1582 persons) as well as 524 local businesses and

[1]For more information see www.modularcity.ch.

[2]ROI stands for Return of Investment.

Table 7.1 Main steps of the socio-spatial analysis by ModularCity

Phase	Steps	Example	Techniques used
Objective socio-spatial analysis	Definition of socio-spatial dimensions with relevance to a socially sustainable urban development	Social structure in the area	
	Operationalising the dimensions into objective variables	Age distribution among the residents in the area	
	Data collection using existing communal data bases	Individual ages out of the communal population register	
	Geographic referencing of the data and integration in the planning software	Aggregation of the individual ages and allocation to apartment blocks	GIS
	Visualization of the variables in a virtual 3D-model		Visualization techniques
Subjective socio-spatial analysis	Definition of socio-spatial dimensions with relevance to a socially sustainable urban development	Quality of use of an area	
	Operationalising the dimensions into subjective variables	Resident's activities on the area	
	Data collection using an online survey	Mapping activities on a map of the area	Map-based online survey
	Geographic referencing of the data	Aggregation of the individual answers and generation of density maps	GIS

institutions have been invited to participate in the study which lasted from 18th June to 16th July 2013. The novelty about this application is its map-based concept which makes possible to geo-reference the relevant information. Designed as an online survey the tool allows the respondents to answer the questions online by drawing lines or placing icons on a map (see example in Fig. 7.1).

Therefore it is possible to analyse the data by editing it on maps showing the location and density of the resident's answers (see example in Figs. 7.2 and 7.3).

The comparison of the positively and negatively marked places in the online survey allows to identify those places on the area whose should either be conserved or optimized. In this way the planning authorities gain insight in the area's hotspots of conflict and potentiality; these places could be treated with high priority in the planning process.

Fig. 7.1 Question in online survey: "Mark on the map places you like with the green pin and places you don't like with the red pin."—© GoogleMaps 2014.

Fig. 7.2 Density map of positively marked places in the online survey—(Fabian et al. 2013)

Another question of the online survey treats the means and routes of transport through the area. The participants are asked to choose the relevant transport mean and draw on the map the route by which they transverse the area (see Fig. 7.4).

The generated density maps (see Fig. 7.5) show that the site is modestly accessible from the inner city in the north but lacks sufficient access routes from and to the surrounding districts.

Fig. 7.3 Density map of negatively marked places in the online survey—(Fabian et al. 2013)

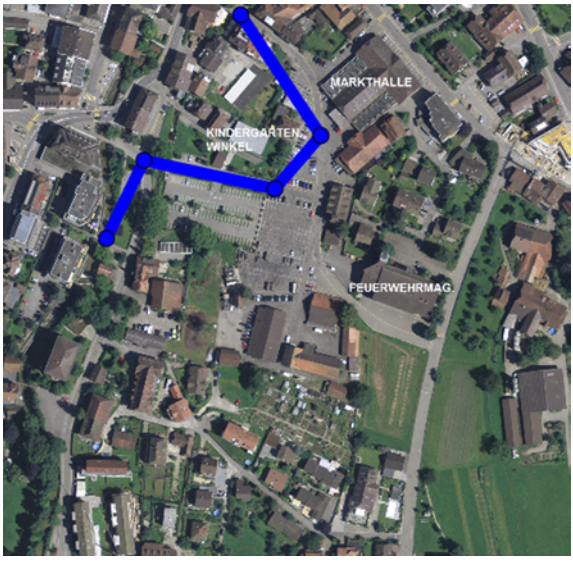

Fig. 7.4 Question in online survey: "Draw on the map by which means and on which routes you traverse the area." © Google Maps 2014

These results can be complemented by other findings of the survey concerning the subjective definition of the area borders. The respondents are asked to indicate on the map how they would personally define the respective area (see Fig. 7.6). By clicking on the map they can set the corner points that are automatically connected to one territory.

Fig. 7.5 Density map of all means and aggregated routes of transport in the online survey (Fabian et al. 2013)

Fig. 7.6 Question in the online survey: "Plot on the map the area in demand by clicking on the corner points of its territory." © Google Maps 2014

Every single area defined can be aggregated to one density map; in this case study the subjectively marked neighbourhood boundaries were differentiated for three different age groups (see Figs. 7.7, 7.8 and 7.9). The resulting maps show that the definition of the area varies according to the respondent's age, but the majority of all participants perceive the area's border in the north-eastern direction as quiet clearly defined by two main roads.

Fig. 7.7 Density map of the subjective area definition of respondents under 31 (Fabian et al. 2013)

Fig. 7.8 Density map of the subjective area definition of respondents between 31 and 50 (Fabian et al. 2013)

The findings of both questions illustrate that the main access routes to the respective area come from the inner city north-western of the area. The access from north-eastern direction is less open because of two main streets. The accessibility from the south may be judged as potential but not yet fully developed. Planning priorities may therefore lay focus on fostering the linkage between the

Fig. 7.9 Density map of the subjective area definition of respondents above 50 (Fabian et al. 2013)

area and its surrounding living districts in the south assuming that the better the respective area will be embedded in its context the more people will have access to the area and use its facilities.

By assessing socio-spatial resources and processes through ModularCity various issues concerning the urban living conditions can be raised: Although access to the area is provided sufficiently the actual usability of the space is limited. One of the main reasons for this is the lack of adequate infrastructure and spatial qualities (marked respectively mentioned by the participants of the online survey) impeding the use of the site as a place for social encounter and leisure activities. Another issue refers to the insufficient provision of green open spaces, a problem also related to the stated unpleasant atmosphere on the site. Following the approach of socio-spatial analysis this data can be compared to the structural context of the site that was provided by already existing communal databases of Langenthal. This comparison of subjective and objective information reveals gaps in the existing infrastructure as well as potentials for the future development of the area pointing for a more multifunctional use of the different places on the site.

7.5 Discussion

The initial results obtained for ModularCity's online survey tool speak for themselves as providing a valuable contribution to urban planning processes. As such, it highlights the need for the inclusion of different perspectives and viewpoints in the planning process to result in a socially sustainable urban planning solution.

When reviewing the lessons learnt from the study exercise, one of the main characteristics of the study was its interdisciplinary approach, concerning both the involved disciplines (geo-informatics, social work, urban development and software-engineering) and the cooperation between communal administration, residents, universities and private enterprises. This consortium partially mirrors the different working arrangements taking place in actual planning and development projects and affords a constant bridging of unlike concepts, values and goals of all involved actors.

The capacity of ModularCity to accommodate conflicting perspectives as well as to enable the establishment of a mutual understanding can be grouped into three translational strategies: (1) integration, (2) responsiveness, and (3) visualisation.

7.5.1 Integration

As described in Sect. 7.4, ModularCity tries to integrate different variables in one planning tool: The combination of objective as well as subjective socio-spatial analysis allows comparing the structural components of a development area with the subjective perceptions, uses and evaluations of the residents. Furthermore ModularCity attempts to relate physical aspects of an area with questions of access to resources provided by the area. In this respect ModularCity contributes significantly to the concept of sustainable urban development by bridging between different *mental representations of the city* as follows:

1. the social work's perspective on the given area captures several social processes and characteristics by integrating data about social structure and subjective perception. As a result it was possible to sensitize the planning authorities and decision-makers for the social work profession's questions, such as the distribution of and access to relevant social goods in the city (e.g. access to public space);
2. visualising a surrounding neighbourhood through the daily living perception of residents captures important intricate knowledge about qualities of urban spaces, which can be used further in the planning process;
3. supporting the politicians' responsibility to be aware of the legitimate concerns about communal questions, ModularCity offers a more sophisticated knowledge base for political decision-making;
4. for planners the functionality of urban spaces is one criterion for quality in urban spaces. Considering that besides the physical design also social processes are of relevance for the functionality of a space ModularCity makes those "soft" factors more tangible for planning experts.

Even though ModularCity proved to be a valuable tool, it was difficult to integrate the generated density maps (see figures in Sect. 7.4) in the already existing planning software Urban ROI Designer. These problems are discussed in the next paragraph.

7.5.2 Visualisation

The ModularCity platform made visible information that is not normally so readily available and as such the software tool provides a more sophisticated understanding of the concept of socially sustainable urban development. In comparison with other available software ModularCity allows the mapping of access to and use of the area's resources (e.g. leisure facilities, places for social encounter, green spaces, etc.). Hence it enables planning experts to better understand the social consequences of future development projects. Therefore ModularCity tries to facilitate the translation between different languages of planning experts and citizens.

However, linking the real and the virtual world is challenging. As every aggregative procedure in research leads to a reduction of complexity ModularCity also standardizes those social processes that it attempts to record. While the real life experience of the city is rather subjective and very dynamic their visual representations in ModularCity appear quite static and objectified. Due to the intention to facilitate the communication between different languages these visualisations may lead to an oversimplification of rather complex processes. If not interpreted correctly and with professional caution the visualisations of ModularCity may be misunderstood or even misused as visible proofs of doubtful facts.

Additionally a combined visualisation of both data from subjective and objective socio-spatial analysis could not have been developed sufficiently because of technical hindrances in the planning software. Only the objective data about social structure as well as some of the survey results got visualised in 3D (see Fig. 7.10).

In these cases the collected data is visualised as integrated in the building landscape and therefore gives the impression that the very individual behaviour of people is rather dependent of its physical environment than vice versa. Following the approach of socio-spatial analysis the appropriative processes are hence not sufficiently depicted.

7.5.3 Responsive Planning

The case study in Langenthal was designed as online survey to reach as many residents as possible. Based on 372 participants the calculation of the response rate shows that 37 % of all addressed households and 26 % of all addressed businesses and institutions have answered at least parts of the questionnaire. However concerning the total of people addressed ($n = 2106$) the response rate decreases to 18 % suggesting that only one person per household participated the survey. A closer look at the personal data reveals that the majority of all respondents were Swiss, male and employed while foreigners, unemployed people, women, pensioners and people in education are underrepresented; children under 22 didn't

Fig. 7.10 Visualisation of subjective perception of atmospheric qualities of the area (green words represent positive qualities, red words represent negative qualities) © ModularCity 2014

participate at all (Fabian et al. 2013). This distribution corresponds with other experiences of participative processes, problematized in the literature as selective participation (see Cornwall 2008; Werner 2012).

Another interesting indicator for ModularCity's responsive capacity is the drop-out rate. From all 372 people who started the questionnaire 167 of them also finished the survey. Most of the participants dropped out after the entrance page (108 drop-outs) and after the first question (57 drop-outs) suggesting that the interest to participate significantly declined when seeing the first or second question. Reasons for this may originate either from the insufficient user friendliness and attractiveness of the interface or from content-related barriers. Regarding the design of the survey (see Fig.7.11) the functionality of the interface was tested repeatedly and judged as adequate but no professional efforts had been taken to enhance the visual attractiveness of the websites. This may also explain why no young people were interested to participate in the survey.

Concerning content-related barriers one must consider that the selected area can be judged as highly political: As a former marketplace the site has a historic value for the community and although currently poorly used the area is well known and contributes to the resident's identity. This may explain why all the former efforts to develop the site didn't succeed (Stadtbauamt Langenthal 2010) although especially the economic interests in establishing new housing and business spaces have always been strong. Regarding this political background it can be assumed that the most important concerns for the residents of Langenthal are related to the future development and uses rather than their actual activities on the area. One can speculate that questions about the resident's needs, visions and prerequisites for the area development may have caught much more attention than

Fig. 7.11 Example of the design of the online survey. © ModularCity 2014

the tasks set in the online survey (see Sect. 7.4). This assumption is supported by the fact that the response rate increased significantly with the last question which treated current problems and future potentials of the area.

ModularCity's efforts for responsive planning may be judged as one important step for sustainable urban development: Workshops with planning experts as well as discussions with administrative and political personal showed that the addressed decision makers got sensitized for the resident's needs and expressed their interest for more participative planning. This position can mainly be explained by the motivation to help the project's popular acceptance and the state action's legitimacy to be strengthened. In this sense ModularCity mediates between subjective living practices and the interests of planning authorities and hence fosters a better understanding of resident's needs and interests. However considering the sensitivity of the political business ModularCity rather avoids the confrontation of conflicting opinions by involving citizens only as data suppliers (online survey) and planning condition (data of social structure) but not as active negation partners. Seeking for a consequent translation between different maybe conflicting *urban development goals* more fundamental negotiations are needed. This involves not only the collection of the citizen's opinion but an interactive exchange of all stakeholders' goals, interests and values. Concerning ModularCity this would have included at least informing the participants about the survey's results, and feed backing as well as discussing the study's implications for planning with residents for example in planning workshops or in planning working groups.

7.6 Conclusion

With ModularCity some interesting insights have been obtained regarding sustainable planning in the data-rich city: Combining methods and approaches from computer-assisted planning, geography and social work subjective as well as objective data can be collected, edited, and visualized related to each other. The case study in Langenthal shows that the findings serve as more sophisticated basis for many stakeholders involved in urban planning processes. The evaluation of ModularCity's translational capacities against the standards of social sustainability in urban planning identified potentials as well as challenges of socio-technological innovations in sustainable urban planning. Above all the demand to integrate a social work perspective in urban planning has proved to be fruitful also for other involved disciplines.

However there are some open questions to be addressed: The first challenge lies in the search for a more differentiated correspondence between real and virtual worlds. The key question in this regard is how best to visualise objective and subjective information (e.g. values or subjective meanings) since it raises the question of power through specific visualisations that have the capacity to reinforce existing dominate concepts of the city. To avoid oversimplification and standardization new visualisation techniques must be developed which allow capturing socio-spatial processes in a more fluid and differentiated way. Ideas may be torn from ethnographic research (e.g. mental maps) or visual communication to create more interactive images of the city. Secondly, to allow stronger participation of residents in urban planning it is of fundamental importance to discuss how and by whom participation in socio-technological innovations is defined and in which way bottom up efforts can be integrated in the rather expert-driven tools. Active and effective involvement of citizens may be supported through strategies of community work and participatory action research (e.g. raising political awareness through civic education and capacity building) as a complementary approach to socio-technological tools.

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