

Title: Expert Participatory Modelling of City System to Explain Misguided Policy Decisions

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Cities are currently on the front lines of change management. It is in cities that economic, social and environmental processes converge, along with the tensions arising from uncertainty and the need to shape the future. However, cities regularly experience spectacular systemic breakdowns, that is, actions which, although intended as solutions, have had unexpected and long-lasting consequences. Among the examples most frequently discussed in the media are gentrification, suburbanisation, ‘white elephants’, etc. These stem from a lack of knowledge about the system, particularly its key feedback loops and points of interaction. They are manifestations of systemic breakdowns, i.e. non-obvious, unexpected effects of actions intended to achieve a completely different outcome. Therefore, the thesis has been put forward that these systemic breakdowns stem primarily from incomplete knowledge of the urban system's structure and insufficient consideration of interdependencies at the time of decision-making. They concern, in particular, the relationships that help shape the system's dynamics but remain beyond the scope of perception and decision-making. Such relationships within the system are referred to as ‘unattended relations’, i.e., ontologically existing structural-processual connections that remain epistemologically and decisionally absent in intervention design models.

To explore such relationships within the urban system, Expert Knowledge Elicitation (EKE) was conducted through participatory modelling, involving experts from four sectors: local government, academia, non-governmental organisations, and the business sector. Experts were selected using the snowball sampling method. All experts came from the Gdańsk-Gdynia-Sopot Metropolitan Area in Poland.

The EKE process consisted of two complementary stages: individual and collective. The first stage involved correspondence interviews, where nine people responded. The questions concerned: (1) the purpose of the city, (2) the sources of its definition, (3) key areas requiring improvement, and (4) examples of flawed urban planning decisions. The results of this stage served as the starting point for collective modelling. The second stage involved expert participatory system modelling (PSM), conducted as four-hour workshops attended by 11 experts. Participants worked in two diverse groups, creating maps of the urban system. (1) identifying the city's fundamental objectives, (2) analysing cause-and-effect relationships

(CLD), taking into account dependencies on development pathways, and (3) identifying leverage points and potential interventions.

Within the very limited time allocated to modelling, nine feedback loops and four key intervention pathways (leverage points) were identified. The most important points of intervention are: the need to reform the electoral system for local government; cooperation and interdependence; flexibility and adaptability; and education about the city, understood as the long-term building of awareness of interdependence, shared responsibility and the role of residents within the urban system. Experts pointed out that, with weakened community and co-decision-making mechanisms, decisions in the property market often shape the city's development. Conversely, cooperation and a sense of community are strengthened by the accessibility and high quality of public spaces. The two main loops were identified in the city system: loop (1), the reinforcing loop: the greater the emphasis on meeting community needs in governance → the greater the cooperation → the more sustainable the development → the more this supports the fulfilment of community needs. Causal loop (2): ineffective governance leads to the dominance of market-driven decisions → market-driven decisions exert pressure on the suburbs → sprawling suburbs require infrastructure that demands funding from outside the city budget → this causes systemic breakdowns.

To sum up, key conclusions from the modelling are: 1) the city should meet needs as collectively understood; 2) the city must be capable of adapting to respond to changing configurations of needs; 3) the conditions that mitigate the risk of systemic breakdowns are education, cooperation and the consideration of interdependencies.

Limitations of the modelling process: the duration of the process and the profile of participants. This is typical of short modelling sessions, and the outcome is also influenced by participants' and facilitators' intentions, confidentiality requirements, and the level of trust within the group. Other limitations include the geographical dimension (the selection of experts who were able to meet in one place at the same time) and the potential influence of group dynamics (e.g. communication style, tendency towards dominance), although in this study, the participants demonstrated a high level of engagement and openness to different perspectives.

This modelling showed how important it is to discuss the system among the various stakeholders. Modelling the system would greatly help reduce the scale of unattended relations, thereby avoiding inappropriate decisions regarding strategic and operational activities in the city. Next, it would be valuable to build an operational tool for such modelling to make it a regular practice in cities.