Citizen Participation Using a Soft Systems Perspective

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Rational intervention in human activity systems such as transportation planning can be achieved through effective citizens' participation. Soft systems methodology provides one such framework and is an inquiring system used to tackle ill-structured problem situations in planning. It enables its users to learn their way to taking action and to improve a problem-ridden situation. This methodology marks a paradigm shift in dealing with complex planning problems. A soft system methodology, formulated by researchers at the University of Lancaster, United Kingdom, is described and this methodology is applied in a case study to demonstrate how it can be used in citizens' participation as applied to transportation planning. This methodology has proved to be effective and easy to use.

Recent years have witnessed an increase in citizen participation (CP) programs, although the overall record of success has been lumpy. Knowledge of CP has also increased over time, and the Advisory Commission on Intergovernmental Relations has identified over 30 different forms of CP used in the United States (*1*).

Trends indicate that the time has arrived for planners to take a good look at all the available methods to match planning styles of transportation agencies to conditions of uncertainty and the status of technology (*2*).

Rational intervention in human affairs in the form of CP needs a well-defined methodological framework. Soft systems methodology (SSM) provides one such framework. SSM is an inquiring system used to tackle ill-structured problem situations in planning. It enables its users to learn their way to taking action and to improve a problem-ridden situation. Checkland and his colleagues at Lancaster University, United Kingdom, have applied SSM in scores of planning applications in recent years and have convinced their clients that it marks a paradigm shift in dealing with complex planning problems (*3*). The purpose of this paper is twofold: first, it sets forth the basic ideas of SSM formulated by Checkland, and second, it applies this methodology to demonstrate how a transportation problem situation in a small city was tackled using SSM.

SOFT SYSTEMS METHODOLOGY

Checkland describes a "system topology" consisting of three basic systems: natural, physical, and human activity. The first two are distinctly defined and can be characterized as "hard" systems, in which the well-established methodologies of systems engineering have been, and continue to be, successfully applied. Essentially, the hard system approach defines the objectives to be achieved and then "engineers" the system to achieve these objectives. The human activity system, however, is usually ill defined and cannot be adequately described by its state, in which case the analyst must concede to its purposeful activity, human values, and nonphysical relationships. This is so because human activity systems can be expressed only as perceptions of people who attribute meaning to what they perceive. There is therefore no single "testable" account of a human activity system—only possible accounts, all of which are valid according to a particular "world view" (or *Weltanschauung*). In contrast to hard systems engineering, soft systems methodology does not seek to mechanically design a "solution" as much as it orchestrates a process of learning (*3*).

The logic behind Checkland's frustration with hard systems methodology can best be described in his own words:

> The real-world client (person, group or society as a whole) is taken to be the owner of the problem; his needs are taken as given and expressed as the objectives to be achieved by a system; there follows a systematic search for an efficient system to achieve the known-to-be-desirable end.

In other words, this hard system methodology tackles the question *how*. By definition, if objectives are themselves problematical, if the questions to be answered are *what* as well as *how* questions, then the system cannot be taken as given, and the approach must be modified (*3*). And this is precisely what Checkland strived to do.

SSM has been developed to aid the understanding of human action by systemic intervention in the situation and is being used extensively in the investigation of problematic organizational and planning contexts through communication processes. Because it is a learning methodology, it has the ability to transform "wicked" problems into tame ones.

Over the last decade, Checkland has crystallized SSM, and his general framework is illustrated in Figure 1. Regarded as a whole, Checkland's SSM is a learning tool that uses the system's ideas to organize four basic mental processes in the analysis: perceiving (Stages 1 and 2), predicting (Stages 3 and 4), comparing (Stage 5), and determining the needed changes and actions (Stages 6 and 7). The output and utility of SSM consist essentially of recognition, learning, and insight. Note the six elements—customers, actors, transformation, *weltanschauung*, owner, and environmental constraints (CATWOE)—that help to structure SSM; the CATWOE mnemonic and the questions raised through the six elements are as follows:

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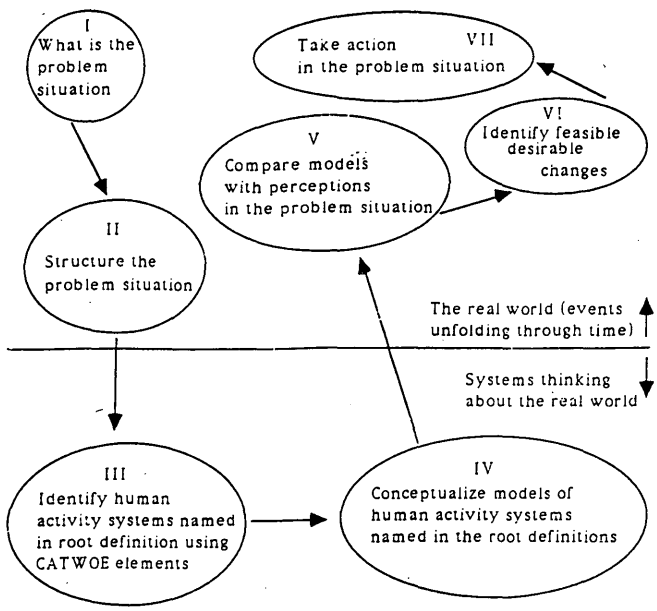

FIGURE 1 Checkland's SSM structure.

C = Customers—Who would be victims or beneficiaries of this system were it to exist (i.e., clients)?
A = Actors—Who would carry out the activities of this system (i.e., agents who carry out the transformation)?
T = Transformation—What input is transferred into what output by this system (i.e., the core of the "root definition")?
W = *Weltanschauung*—What image of this world makes this system meaningful (i.e., world view)?
O = Owner—Who could abolish this system (i.e., ownership)?
E = Environmental constraints—What external constraints does this system take as given (i.e., environmental impositions)?

In SSM, the real-world situation to be analyzed is expressed in nonsystems language using the concepts of structure and process, and the relation between the two. This constitutes a relevant system and encapsulates various specific viewpoints expressed as root definitions (RDs). An RD is a concise description of a human activity system that states what the system is. From the RD a conceptual model of the necessary activities in the system is built. The model building language consists of all verbs. This conceptual model of the human activity system may then be compared with the real world. The model is the formal vehicle for exploring dysfunctions and needed changes in the real world, involving both system analysts and clients.

The products of SSM should provide the basis for needed changes, and such changes can fall into three categories: structural, procedural, and attitudinal. The process is carried out interactively with clients and key informants. The products of SSM provide useful tools from which the clients themselves can tease out deeper insights into their situation, and thereby effect changes responsive to their needs. Four important points need noting: first, each RD makes clear its *Weltanschauung*, the world view from which the system is described; second, SSM is a cyclical process; third, SSM seeks accommodation among conflicting interests; and last, SSM is doubly systemic —it is a cyclical learning process, and it uses systems models within that process.

EXAMPLE OF SSM APPLICATION

Checkland's SSM is applied to a transportation planning problem in this example. A small city (population 30,000) served by a city municipal committee has a problem in deciding whether one of the segments of its regular street network, Jackson Street, deserves to be converted to a "shared street," so as to introduce the concepts of "traffic calming" (*4*). Accidents involving bicyclists, children, and the elderly are on the rise, primarily because of increased through traffic. Accident records maintained by the city appear to be incomplete and inaccurate and are not readily shared with individual citizens.

The shared space concept for pedestrians and motor vehicles is the most recent approach to enhance the safety and environmental qualities of local streets. The major characteristics of this concept are rearranging the street into wall-to-wall sidewalk space that is equally shared by pedestrians and motorists; planting trees, designating play areas for children, and providing benches and flowerbeds; forcing motorists to slow down to speeds of 5 to 10 mph; and providing just enough on-street parking to serve local residents. The idea is to eliminate or reduce to the very minimum conflicts between cars and pedestrians, providing street use for pedestrians, bicyclists, and children, and giving them first preference.

Implementation of a shared street project for Jackson Street is a difficult problem. First, there are citizens in other neighborhoods and communities who believe that automobile mobility reduction on Jackson Street will result in a corresponding overloading of adjacent streets. Second, members of the city council are ambivalent in allowing this change to happen. And last, the city budget is burdened with implementing higher-priority projects according to city officials. Currently, the neighborhood surrounding Jackson Street does not have a citizen advisory committee. Much of the decision-making process is done directly by the city administration on an ad hoc basis. There is little citizen input at any stage. Citizens in general are frustrated with city administrators. The situation was corrected by following the stages in the SSM.

Problem Situation: Stages 1 and 2

The problem from the beginning appears to be complicated because opinions expressed by citizens living in the neighborhood appear at times to be conflicting.

RD and Conceptual Models: Stages 3 and 4

The next stage is to name relevant systems that encapsulate all of the problem themes and then to write a root definition for each one. Two particularly relevant systems emerge; both are normative in that they are expressing a version of what ought to be rather than what is. The first is the Jackson Street Community System (Figure 2). It is obvious that such a system is necessary if the community wants to get anything done. The second is the city council system (Figure 3). People need to be able to communicate with the city administration. The root definitions and the CATWOE mnemonic are used to work out the two conceptual models, as shown below.

Jackson Street Community System

Root Definition: The Jackson Street Community System is a Community Action Committee (CAC) to plan, control, and manage Jackson Street and the neighborhood by introducing improvements to the environment and safety through transformation of Jackson Street to a shared street for convenience of pedestrians, bicyclists, and residents and inhibiting through vehicular traffic.

C = Customers/clients (pedestrians, bicyclists, children, and residents);
A = Actors (elected members of CAC);
T = Transformation (transforming a regular street to a shared street);
W = *Weltanschauung* (a shared street is worth having because of safety and improvement in well-being);
O = Ownership (the elected members of CAC); and
E = Environmental constraints (budget constraints and lack of data).

City Council System

Root Definition: The City Council (including administration and elected members of the council) System develops and enhances a sense of community and uses it effectively to handle issues connected with the development of projects all across the city. This is achieved by setting up and maintaining communication arenas, both formal and informal, that facilitate the negotiation of projects and the participation of all stakeholders in tackling issues connected with prioritizing, funding, and implementing such projects.

C = Customers (the City Council members and administration);
A = Actors (the city engineer and staff);
T = Transformation (ad hoc community development is transformed to organized community development, prioritizing, and funding projects);
W = *Weltanschauung* (issue handling requires being "just and fair" with all communities);
O = Ownership (the City Council); and
E = Environmental constraints (time, staff, and expertise).

Comparison: Stage 5

At Stage 5 a comparison is made between the conceptual models and the problem situation so that one can draw up an

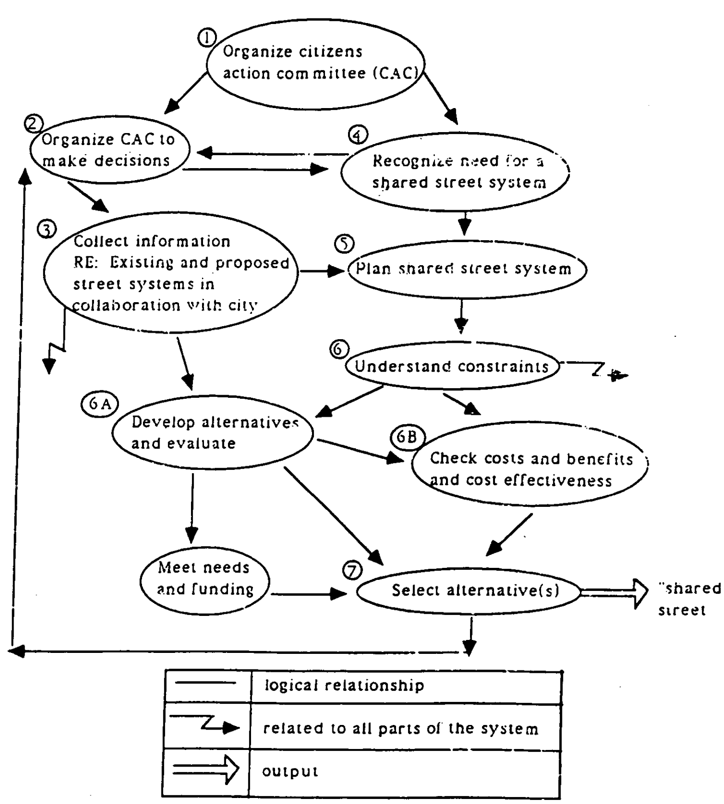

FIGURE 2 Conceptual model: Jackson Street Community System.

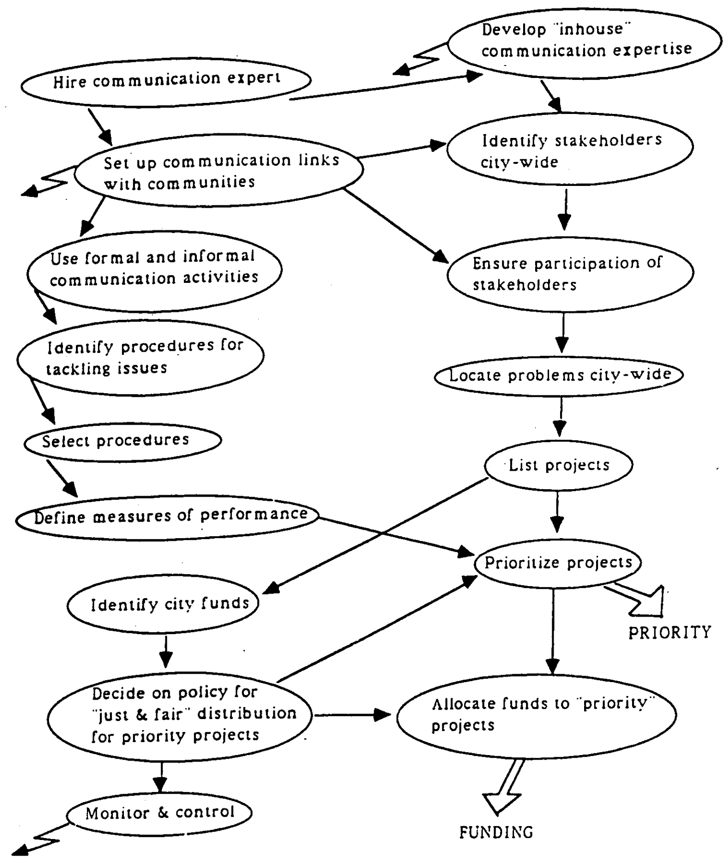

FIGURE 3 Conceptual model: City Council System.

agenda to debate the issues. Comparison of the Jackson Street Community System model with the problem situation indicates that, for example, collection of data is an important issue and should be taken up immediately with the city. Understanding the budget constraints of the city could also be considered an important issue. This interaction is shown in Figure 4.

Comparison of the City Council System model with the real world shows the vital importance of good communication between the city officials and all of the communities involved. Regular reporting procedures as a consequence of monitoring and control would resolve the issues of "secrecy" and "cover-up" leveled against city administrators. Lines of open communication between the city and Jackson Street CAC remove feelings of animosity because funding and priority issues are discussed openly.

Debate: Stage 6

Because the city officials have to decide whether or not to implement this shared street, the questions asked are, "Given the budget constraints, is it possible to provide a shared street, as requested by CAC? How does this project stack up with other priority activities needed to be implemented?" Armed with appropriate data and a cost-effective working plan, CAC

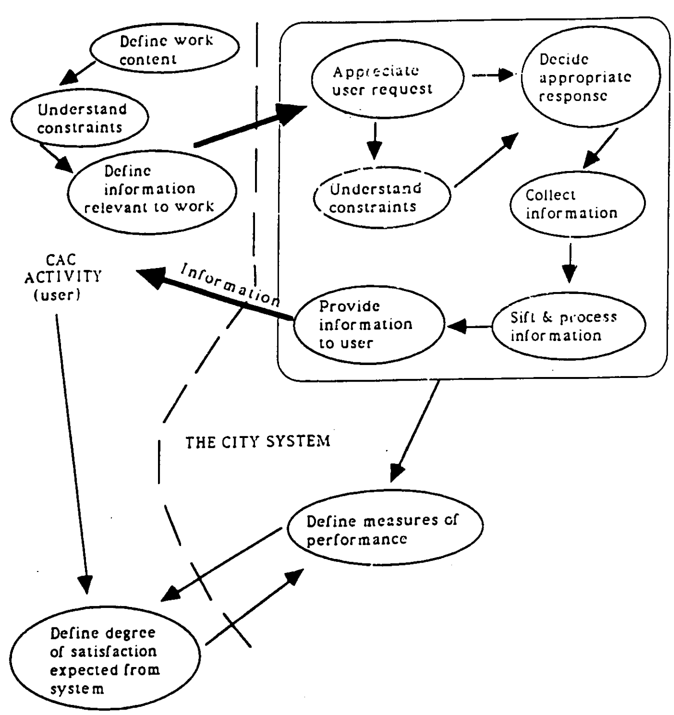

FIGURE 4 Interaction between Jackson Street CAC and city administration regarding the supply of information.

makes a pitch for effecting change. The debate can be widened if necessary.

Implementation: Stage 7

The Jackson Street community is now taking on a new shape and a confidence it can be proud of. The strategies for action developed in the debate with respect to cost effectiveness and priority help CAC in convincing the City Council to include this shared street project for implementation. A decision-making hierarchy is put in place and the process iterated that allows for communication structuring and community development by participative problem solving.

CONCLUSIONS

SSM essentially records the elements of the structure of the situation, the elements of the process, and the relationship between the two or the climate of the situation. It also examines the crucial roles of actors in the situation, the behavior expected in the roles (the norms), and the values by which performance is judged. More importantly, an understanding emerges of how power is acquired, exercised, retained, and passed on. Note that there are no right and wrong descriptions of human activity systems—only multiple possible descriptions based on different images of the world. Also noteworthy is that, in general, conceptual models of human activity systems describe what goes on in the system of concern, whereas at the comparison stage how these "whats" can be achieved becomes a subject for discussion. If necessary, these models are expanded at levels of higher resolution. The process can go through several cycles for further refinement.

It has been recognized that well-structured problems are extremely rare among human activity systems. This experience has brought about emergence of the soft systems approach, developed by Checkland (*3*) in SSM.

The need for SSM in citizen participation for transportation planning has been amply demonstrated by Wachs (*5*) in a paper concerned with a research agenda for transportation. He writes:

> The state-of-the art in transportation research is somewhat unbalanced. In the technical areas of data collection, analysis and forecasting, our field has advanced far beyond the capabilities which exist for the planning of housing, health care and other social services. With respect to the understanding of the political and social costs of transportation planning, and the nature of its institutions, our understanding is no deeper than that gained through research in other sectors. . . . I do not suggest that we should give little attention to the technical side. . .but it is also important, however, to give increased attention to the social and political dimension of transportation planning. . . . Only by improving our understanding of transportation institutions and decision-making processes, as messy and ill-defined as they may be, can we focus the work of the research community on improving the quality of public policy-making and decision-making. (*5*,pp. 521–531)

An example drawn from transportation planning and involving citizen participation demonstrates how SSM can be applied to resolve such problems and how to carry out systemic investigations in complex situations.

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