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Possibilities of steering the transportation planning process in the face of bounded rationality and unbounded uncertainty

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Abstract

This paper describes and discusses the possibilities of steering the transportation planning process in the face of bounded rationality and unbounded uncertainty: (a) through the introduction of the concept of 'systemicity'; (b) by expanding the spectrum of the existing planning paradigm currently in use; (c) by reducing complexity through the application of tests of adequacy, dependency, suitability, and adaptability; (d) through the introduction of soft systems thinking; and (e) by using 'abductive' in addition to deductive and inductive inferencing. It is concluded that the application of these strategies, adjustments, and tests to the existing planning procedure will hopefully enrich and strengthen our planning effort and make it more robust.

Keywords: Paradigm shift; Planning; Rationality; Systemicity; Transportation; Uncertainty

1. Introduction

Although there have been a substantial number of critical dissections in recent years on improving the transportation planning process, most of them have been based on a piece-meal basis rather than on systemic inquiry. This paper represents an exploratory formulation of an

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innovative framework to organize and steer the transportation planning process in the face of bounded rationality and unbounded uncertainty. A systemic inquiry is essential because the links connecting these problems to one another and to the planning process are currently not as clear as many imagine. Although we are strong in applying the principles of the 'scientific method' to planning in the quantitative sense, we are weak in understanding the related core social, economic, environmental, ethical, and cultural issues that affect an enlightened society. In fact, our current knowledge about the complexity of these issues and their interactions is at best tentative and incomplete.

The general prescriptive, conventional, linear, comprehensive, decision-making model used in the planning process, known as the Rational Planning Model (RPM), runs through five basic stages: (1) identify objectives; (2) identify alternative courses of action; (3) predict consequences of actions; (4) evaluate the consequences, and (5) select the alternative in accord with our criteria of efficiency (Rosenhead, 1989). Whilst the RPM emphasizes 'scientific efficiency' through rational decision-making, it has come under attack in the last three decades on the grounds that the model's basic assumptions are violated when it is applied in practice. In fact, a crisis in the methods and practice of transportation planning has been widely acknowledged, and probably the four most serious ones, amongst others, are those connected with the: rationality, uncertainty, 'wickedness', and complexity, embedded in the planning process. These four problems will be dealt with first, and will be followed by an examination of the following five strategies for steering the planning process: (1) applying the concept of systemicity. (2) expanding the planning paradigm spectrum; (3) dealing with complexity using the ADSA tests; (4) utilizing the power of soft systems methodology to complement the RPM, and (5) using 'abductive' inferencing in addition to the more common forms of deductive and inductive inferencing.

2. Bounded rationality and unbounded uncertainty

Solving purely technical (quantitative) problems is comparatively simple, compared to tackling problems encountered in transportation engineering and planning which are associated with social, economic, environmental, cultural, and ethical concerns, requiring subjective interpretations, vis-a-vis rational and objective answers (Khisty, 2001). In addition, most planning problems are poorly structured, defying straightforward analysis and are thus basically unbounded. For example, a technical problem of traffic engineering could be closely linked to a land-use problem, with social, economic, environmental, ethical, and political implications. Naturally, there is no clear-cut boundary, and the tame ''technical'' problem we thought we originally faced is now transformed into a cluster of problems, often called a ''problematique'', because it has properties that none of its parts have (Ackoff, 1999; Banathy, 1996).

Bounded rationality refers to the concept that human problem-solvers are rarely able to identify all possible solutions to a problem at hand and, therefore, settle for choices that seem to satisfy the required solution properties of a problem. Generally, they make decisions that might otherwise be considered as suboptimal, or as Simon (1957) put it, ''the behavior of human beings who 'satisfice' because they do not have the wits to maximize''. Another theme that has haunted planners in almost every sector of planning is the problem of uncertainty. Nothing is more certain than the prevalence of uncertainty about consequences of even the simplest decisions. Uncertainty arises