Editorial Statement

Coping with Social Complexity

The problems or task-situations that most of us are facing are becoming increasingly complex. One aspect of this complexity is the set of possible solutions that problemsolvers are expected to consider. More variables, each of which has a richer range of values, are emerging. For example, car design in the 1950's required attention to relatively few major variables, which characterized the first order effects. Pollution was a second order effect that could be neglected in the first approximation. When the number of cars grew very large, pollution and many similar variables became first order effects and that vastly increased the set of possible solutions and constraints.

When a problem or task-situation involves several people, the set of possible solutions needs to be shared by all of them. When several people try to agree on the set of options or even the agenda for the discussion, they need at least to converge on some shared world-views, some common ways of representing the issues and conditions before them. The larger and the more diverse the group, the greater the complexity due to the difficulty of reaching a consensus about the set of possible solutions. Increasingly, more people participate in problem-solving and this also contributes to the complexity of their task.

A second aspect of complexity is the set of properties a solution *should* satisfy. This may include criteria for optimization – possibly even conflicting ones – and constraints. The number of such requirements increases both in number and in the number of operations it takes to satisfy them. For example, planning of transportation systems requires the consideration of variables not only relating to transportation but also relating to communications. Many couplings and additional conditions must thus be considered.

As more people participate in such decisions, it becomes increasingly difficult to achieve agreement

Manfred Kochen was educated as MIT with a B.S. in science (1950) and at Columbia University in New York, where he received an MA in 1951 and a PhD in 1955 in Applied Mathematics. He joined the Electronic Computer Project under von Neumann at the Institute for Advanced Study from 1953 till 1955. In 1955 and 1956 he was the recipient of a Ford Foundation postdoctoral fellowship to study mathematical models in the behavioral sciences at Harvard University. He subsequently joined the IBM Research Center at Yorktown Heights as a research scientist. where he later joined the director's technical staff to assist in planning and management. In 1960, he was named manager of the information science project and in 1974, he spent a year in ISPRA, Italy as a visiting expert on an exchange with Euratom.

In 1965, he joined the faculty of the University of Michigan as Associate Professor. Since 1972 he has been Professor of Information Science, with a joint appointment as Professor of Urban/Regional Planning and as Research Mathematician at the Mental Health Reserach Institute. His major research interests are in problems of representation of knowledge that could help people cope with a greater variety of tasks in more effective ways as well as in the organization of knowledge. He is the author or editor of six books, including *Information for Action*, with a book manuscript on decentralization, with Karl Deutsch under consideration by a publisher. He has over 150 scientific papers in technical journals or books, including three on the process of referee-selection and peer review.

In 1974 he was awarded the Award of Merit by the American Society for Information Science, which also named him First Distinguishing Lecturer in 1968. He was also named National Lecturer by the Association for Computing Machinery. He has been an editor of the *Journal of the ACM*, of *Behavioral Science* and is on the editorial boards of several international journals. He has been very active in the American Society for Information Science, having been elected chairman of a special interest group, a chapter, and to Council, and he served on its publication committee as well as its Committee for the Future of Information Science.

He is increasingly interested in all aspects of "Coping with Social Complexity", which is the title of the *section* of Human Systems Management that he is responsible for as managing editor. He also has a long-term interest in the process of doing science, of which journal publication comprises the later stages. He is therefore receptive to and interested in good new ideas for innovations in the publication process leading toward improved papers and particularly toward helping authors to improve the quality of manuscripts they produce in the first place.

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on desiderata for a solution, even if all agree on the set of possible solutions. This is due to the *value differences.* This diversity is a second major contributor to social complexity. A third aspect of complexity is the knowledge necessary and sufficient to search for or construct a solution with the desired properties. Knowledge continues to grow and an individual with a limited capacity for comprehension finds it increasingly difficult to maintain his perspective and to match what is known with what is needed for problem-solving. As more people participate in bringing their knowledge to bear on the tasks facing them, it is increasingly difficult to combine what various people know and to represent it at appropriate levels of specificity and integration so that the interrelationships among various specialized areas are not lost.

A fourth aspect of complexity is introduced by the information technologies that can amplify and extend an individual's ability to apply knowledge to problem-solving, to enrich problem-representations and to solve a greater variety of more complex problems. Such technologies are becoming ever more accessible, powerful and fast. Hence, they will play an increasingly important role.

The use of time, including time freed by the use of technology, is a fifth dimension of complexity likely to become more important. Decisions must be made at strategic moments. Decisions made past their natural deadlines are no longer useful. Temporal coordination or synchronization of several persons becomes more complex as the number of persons increases.

Psychological and organizational aspects of a task situation add a sixth dimension of task complexity. Solutions that are feasible in one culture or for certain kinds of people are not feasible for others. For example, a supermarket shopper may resort:

(1) to a basket of commodities as a possible solution to his or her problem of acquiring food;

(2) to minimizing cost subject to constraints of meeting nutritional requirements, avoiding health hazards, and satisfying gustatory criteria;

(3) to use of knowledge available from food producers about nutritional content, from regulatory agencies about health hazards, from their own experience about matters of taste;

(4) to meeting the time constraints on such a 'rational' approach during the time usually allotted to shopping;

(5) to the use of a programmed pocket calculator (or a home computer or terminal to calculate the basket prior to arrival in the supermarket) to amplify the shopper's limited computational capacity;

(6) It may not, however, be socially acceptable or a shopper may feel embarassed to be seen in a supermarket with a pocket calculator or a printout computing what to buy. Were this to be a norm rather than an exception, this social constraint would be less potent.

This section of *Human Systems Management* welcomes contributions to the arts and sciences of how persons or groups do or should solve or cope with complex problems or task-situations.

Insights and presentations likely to help practicing managers to manage more effectively and efficiently are particularly welcome. Management applies to all human affairs that persons would like to plan and control toward humanistic ends by human means. This includes the management of business, government, science, information, as well as the day to day affairs of ordinary people. It includes management by high-level executives as well as self-management by individuals. We welcome analytic studies as well as reports of exemplary practices. We particularly seek contributions likely to have a positive effect on the practice of human management toward a deeper understanding of what makes it human.

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