

Information, Rationality, and Free Choice in a Future Democratic Society Author(s): Martin Shubik

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**MARTIN SHUBIK**

## **Information, Rationality, and Free Choice in a Future Democratic Society**

**UNDERLYING THE** concepts of the free market and the democratic voting process are some implicit models of man both as a rational, informed individual and as a decision-maker with an important freedom of choice. The rational utilitarian man, the Invisible Hand, and the democratic vote may be regarded as forming a trinity for an economic and political faith in a free-enterprise democracy.

Changes in society and in knowledge have caused us to question all of these concepts. The behavioral sciences, especially psychology and economics, and to some extent political science, sociology, and anthropology, have provided new tools with which one may examine them.

What are the economic and political values that a democratic society wishes to foster and preserve? What conditions must be imposed on institutions designed to obtain and maintain these values? What assumptions have been made implicitly or explicitly in current doctrines concerning the role and the nature of the individual?

Numbers, communication, the growing importance of joint property and services, as well as the speed of change in knowledge and information, force a reconsideration of our concepts. In terms of the democratic state and its citizens, we must re-examine power, equality, freedom of choice, ownership, centralization, "fair shares for all," "to each according to his needs, from each according to his ability," and many other appealing yet ill-defined words and slogans.

Both implicitly and explicitly much of our economic and political thought draws upon the peculiarly rationalistic basis of utilitarianism. Rational economic man in the economists' model is some-

one who knows what he wants, what his choices are, what his resources are. His value system is assumed to be well defined; his cool, consistent mind quickly and costlessly scans the myriads of alternatives facing him. His flawless discernment enables him to spy subtle differences in quality. He even calculates the value differences between the "giant economy size" and the regular pack. Many an economist realizes, however, that this is not so; that gaps in information exist; that *homo economicus* is not always certain of his desires. Yet it has been felt that the utilitarian model of the maximizing man with complete information is a good approximation. How good an approximation and of what are questions that remain to be answered. As technology grows, markets expand, and societies grow in size, the individual's share of the knowable decreases drastically. More and more the question becomes: How much should one pay for information the worth of which cannot be evaluated until it has been obtained?

Given clear preferences and complete knowledge, rational behavior amounts to following a consistent plan of action toward one's goals. The optimal program may be very complex, but it is well defined. Modern decision theory, economics, psychology, and game theory recognize, as a basic case, clearly motivated individual choice under conditions of complete information. It is also recognized that two unfortunate facts of life remove us from the relative simplicity of this basic case. The first concerns man as an information processor and the second the conflict of individual with group preferences.

Man lives in an environment about which his information is highly incomplete. Not only does he not know how to evaluate many of the alternatives facing him, he is not even aware of a considerable percentage of them. His perceptions are relatively limited; his powers of calculation and accuracy are less than those of a computer in many situations; his searching, data processing, and memory capacities are erratic. As the speed of transmission of stimuli and the volume of new stimuli increase, the limitations of the individual become more marked relative to society as a whole. *Per se* there is no indication that individual genius or perceptions have changed in an important manner for better or worse in the last few centuries, but the numbers of humans, the size of the body of knowledge, and the complexity of society have grown larger by orders of magnitude.

Perhaps the eighteenth and nineteenth centuries will go down as

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the brief interlude in which the growth of communications and knowledge relative to the size of population, speed of social and political change, and size of the total body of knowledge encouraged individualism and independence. By its very success, this brought about the tremendous need for and growth of knowledge reflected in the research monasteries, colleges of specialists, and cloisters of experts of the twentieth century's corporate society.

Dr. Johnson observed that there were two types of knowledge: knowing something oneself or knowing who knows it. In bureaucracies it is often said pejoratively that "it is not what you know but whom you know." Both of these observations are reasonable in terms of a world in which the gathering and evaluation of information is costly. As the number of individuals, things, and concepts grows, it becomes more and more difficult to maintain a constant relative level of information. The languages of signs, sounds, and motions provide us with methods of coding vast amounts of information in a compact manner. An experience shared can often be called to view at a glance by those who shared it. Yet even with our ingenuity for coding, the overload grows, especially if we wish to maintain values that stress individual men not as small component parts of the social intelligence, but as individuals.

If we believe that our political and economic values are based on the individual who understands principles, knows what the issues are, and has an important level of knowledge and understanding of his fellow citizens, then the twentieth and twenty-first centuries pose problems never posed before. Quantitative change has brought important qualitative distinctions. Specifically, how viable is the jury system for cases with technical evidence? How close must we move to formalizing concepts of statistical justice where the costs and time in the process, together with impersonal probabilities of being caught, become more important considerations than the case itself?

In spite of growth in communications, has there been any considerable change in the number of individuals that a person can get to know well? Since spatial distribution has changed, the individual may select his friends from a larger set. Yet regardless of the growth of modern science and the speeds of transportation, an evening with a friend, except for the transportation factor, will still call for the same amount of time to be expended in the twenty-first century as in the nineteenth. It has been suggested that 7! (5,040) citizens is the optimum size for the city state. Span of control literature sug-

gests 7 as the largest span. George A. Miller's "magical number  $7 \pm 2$ " discusses the data-processing implications of this number.<sup>1</sup>

Taking a few crude calculations we observe that if half a day a year is needed to maintain contact with a relatively good friend, then there is an upper bound of seven hundred people with whom we could have much personal interaction. How many cases can the judge handle? How many patients can the psychiatrist treat? Is personal interaction becoming a luxury that modern mass society cannot afford, or are there new social forms and institutions that will foster and preserve it?

In voting do we have criteria other than a blind faith in the "stolid common sense of the yeomen"? The growth in the size of the electorate and in the numbers and complexities of issues is only exceeded by the torrents of writings in which the public may be buried if it so chooses. In the jungle of municipal politics, even the well-educated and relatively more articulate part of the population is woefully under-informed. At what point does a division of labor become a division of values and of social responsibilities?

The second fact of life that limits any simple view of individual rational men with freedom of choice, who wisely select actions so that their private welfare coincides with the public welfare, is that, given the preferences of all, market mechanisms and voting procedures will only succeed if very special conditions prevail (even assuming complete information). These conditions were indicated in writings from Adam Smith onwards. They call for certain technical properties to hold for the production processes in society; it is necessary to consider that the preferences of the individual are either completely independent of the welfare of others or subject to very strict limitations (such as being identical). Furthermore, the conditions go against intensive specialization, as many individuals are needed in all walks of life in order to avoid the dangers of monopolization. It is doubtful that conditions for the smooth functioning of the price system were ever applicable to the majority of the economy of any society; in general, they do not hold. As the size of the population and cities grows and as modern communication and information technologies weld previously independent groups together, the chances for the conditions to hold become even more diminished.

The aggregation of individual wants and powers into social wants and powers is one of the central problems of political science, economics, and sociology. We are currently in the position where

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we need to, and may be able to, answer certain fundamental questions concerning the possibility of constructing institutions to satisfy desired properties for the relation between the individual and his society. In particular, we are at least able to formulate in several different ways concepts such as equality, centralization, and power, and to ask if it is at least logically possible to discover methods for making diverse aims of a society consistent. It is neither obvious nor true that there may be any institutions that enable our desires for decentralization, dispersion of power, and equality (or equity) of distribution to be simultaneously satisfied.

These casual comments should be taken merely as preliminary and somewhat disjointed notes calling for the rethinking of some of our models of political and economic man so that they fit the pattern of the uncertain decision-maker acting under severely restricted conditions of information embedded within a communication system upon which he is becoming increasingly more dependent. His freedom of scope is limited by the powers of others; as these powers become more numerous and technology permits quicker communication, his actions become more deeply intertwined with those of others. Given our view of man, and for the moment assuming no great biological changes, we need to explore the arithmetic of economics and politics for the restrictions on the societies of the future.

Where will we be in the year 2000 or 2100 is far more a problem in control and anticipation than in prediction. Man has succeeded so far because of his incredible flexibility and adaptability. Now that he has learned to control fantastic sources of energy and to create devices in the form of computers and communication equipment that promise to aid his intellectual and organizational abilities, his power to manipulate the future has grown tremendously.

Knowledge has grown, and our abilities to analyze have increased. Has there been a like increase in either individual or social wisdom? Additions to human power without like additions to wisdom could set up the conditions for the destruction of civilization. The case has not yet been proved in either direction. Whether this society will destroy itself or not cannot be answered even with the proliferation of modern weaponry.

We may not be able to specify sufficient conditions to guarantee the preservation of values and of man. It is possible, however, to consider some necessary conditions. These involve a thinking-

through of a political economy for the modern world. We need to touch upon conceptual problems dealing with measurements and the logic of society's control of itself, and to re-examine both the values to be preserved in our society and the role of modern technology in the attainment of its goals.

Problems are often complex and cannot be explained in a few sentences. The market mechanism is not sufficient to solve the problems of optimum allocation in our society. The voting mechanism in combination with the price system may provide a way, though not necessarily an optimal one, for the achievement of society's goals. Our beliefs and desires may call for a preservation of both the market and voting mechanisms at the federal, state, municipal, and corporate levels. Nevertheless, many modifications are possible. The period from 1930 to the present can be characterized by a tremendous growth in the means and measures of economic control. National income accounting, input-output tables, gross national income figures, and other monetary measures came to the fore. The next thirty years must be characterized by the development of social statistics and measures for the control of the services and joint processes of society. What are the measures by which to judge the performance of the police, education, social services, justice, and so forth? Such measures will undoubtedly be complex and subject to dangerous misinterpretation. (For example, how are the police to be credited for crime prevention?) Because of the difficulties involved in constructing suitable measures, it may easily require decades of devising and revising the appropriate indices and processes for obtaining them.

Compulsory levels of sanitation and education are not regarded by any except a small minority as limitations on freedom. Does this also hold for the draft, Medicare, taxation, or fluoridation of the water supply? In the next few years, birth control and possibly even genetic control must be considered seriously. The nature of government for a multi-billion-person world (and, eventually, planetary system) is neither quantitatively nor qualitatively the same as that required for an isolated New England village. What freedoms do we intend to preserve? Perhaps it would be more accurate to ask: What new concepts of freedom do we intend to attach the old names to?

The purely academic economic, social, or political theorist may claim that we can scarcely define values, can hardly measure them, and cannot compare them. Only the Philistine or the administrator

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faced with the problem dares to ask the question, "What price should we pay to increase the safety level for an astronaut?" In spite of themselves, the behavioral sciences have been forced to become applied sciences. Measurements have been and will be made that many claim are impossible. Even the crudest approximation provides a guide for behavior where a decision *has* to be made.

The influence of the high-speed digital computer upon society cannot be underestimated. If we wish to preserve even modified democratic values in a multi-billion-person society, then the computer, mass data processing, and communications are absolute necessities. It must be stressed again that they are necessary, but not sufficient. Using an analogy from the ballet, as the set becomes more complex and the dancers more numerous, the choreography required to maintain a given level of co-ordination becomes far more refined and difficult. The computer and modern data processing provide the refinement—the means to treat individuals as individuals rather than as parts of a large aggregate.

The treatment of an individual as an individual will not be an unmixed blessing. Problems concerning the protection of privacy will be large. Once established, the universal identification number will mean a great release from the drudgery of having to use a dozen cards to establish one's credit rating. A computer check of central files could supply the individual with an extensive dossier whenever he needed it. It could, however, also supply the dossier to others unless appropriate checks on availability are established.

Devices on automobiles or other property may be invented in order to keep track of their use. This would enable societies to enforce tax schemes for the use of joint assets that are closely related to individual use—such as parking space and roads. Computers would do the accounting, meter reading, and billing. Once more we are confronted with questions concerning privacy. At what point do we wish to stop "Big Brother" from watching our every move?

Voting patterns could change by use of the "instant referendum." With the availability of a computer console as a standard consumer good as commonly available as a television set, it would be feasible to present the electorate with the opportunity to vote directly and immediately on a variety of issues. Not only could they be asked to vote, but they could be supplied with information by direct library interrogation prior to casting their vote.

Computer and other modern information technology can make it possible to preserve or even to extend the treatment by society of

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the individual as an individual. His own memory and internal data processing may not change, but information technology will increase by several orders of magnitude his ability to obtain information and to store and retrieve it externally.

The growth of numbers of people, amounts of knowledge, and speed of change in technology work against the individual being in a position to exercise free, reasonably well-informed, rational, individual choice concerning much of his destiny. The advent of computing and communications devices to aid both in the obtaining and analysis of information has provided the possibility of preserving and possibly extending the individual's freedom. Technology is necessary, but it is not enough. Sophisticated devices and sophisticated measures and methods for the co-ordination of behavior in a complex free society may call for a sophisticated society with sophisticated individual members. If we wish to preserve and extend our freedoms, to permit the growth of world population to tens of billions, to increase the world's standard of living, to explore and possibly colonize space, then the next changes may well have to be within ourselves.

#### REFERENCES

1. George A. Miller, "The Magical Number Seven, Plus or Minus Two—Some Limits on Our Capacity for Processing Information," *Psychological Review*, Vol. 63, No. 2 (1956), pp. 81-97.