Book Reviews

Trapped in the Net: The Unanticipated Consequences of Computerization

Gene I. Rochlin

Princeton NJ, Princeton University Press, 1997, xvi + 293 pp., US\$29.95, ISBN 0-691-01080-3(hbk)

This is a significant work to be read by all those involved in the interconnections between IT and social organization. For this reviewer, it should be bracketed with works like John Rawls' A Theory of Justice and Fred Hirsch's Social Limits to Growth-penetrating books that asked neglected questions and suggested disturbing answers.

Rochlin is Professor of Energy and Resources at the University of California, Berkeley. Having taught and researched in physics, he retrained in social science in order to study the nature and structure of social and political phenomena that have relatively large scientific and technical components.

His central proposition is that carefully engineered systems and organizational structures have been found to fail disastrously when placed in novel circumstances, even though the equipment worked perfectly and the people involved acted as expected. Where experts have to interact in real-time with sophisticated computers, there is, he believes, high probability of error in situations not explicitly accounted for in design. This is captured nicely in a sub-heading: *The Hegemony of Design*. I suspect the theme would have appealed to G. L. S. Shackle who throughout his career emphasized the incompleteness of knowledge and the central importance of uncertainty as the human dilemma.

The danger lies in an insidious process: a gradual loss of control over hardware, software and function through networks of interconnection and dependence. This is the computer trap and it has four parts: the lure, the snare, the costs, and the long-term consequences. The lure is familiar in the history of major technological changes; steam-engines and steam-boats were the equivalent fascination a century and a half ago. The snare comes later. Heavy investment and its linkages bring lock-in, and generate an outlook of commitment that sheds alternatives and permeates the cultural context, affecting individuals and organizations. In the case of computerization, with scope as implied in the familiar OECD ICCP (Information Computer Communications Policy) elements, the pervasiveness is probably greater than with any previous technology.

The costs of lock-in are not perceived for a long time and then only slowly. Consider, for example, the failure to modernize the concept of capital. Buildings and machines are still the core for official statistics although one might have expected that software and hardware would by now have qualified. And if we now live in a knowledge-based economy, is knowledge not capital? The distorted images prevail and yield the long-term consequences; the paths not taken, the risks run, and the failures.

Rochlin pursues his theme through networks ('Webs of Dependence'), the search for managerial control ('Taylorism Redux?'), computer trading, global finance ('Jacking into the Market'), expert operators and critical tasks, and warfare ('Techno-industrial War, The Virtual Battlefield'). An important element of his treatment is the potential loss of experiential knowledge as operations are increasingly computerized. He is critical of the enduring myth that power as well as information and technical capability will be distributed more evenly through industry, offices, bureaus, and society at large. He sees everywhere 'the substitution of data-scanning for information-gathering, of rules and procedures for learning, and of models and calculations for judgment and expertise. In short, the replacement of art with artifice' (p. xiii). This brings 'the elaborate, long-term, collective effects of the possibly irreversible and largely unexamined drive to computerize and network everything and anything whose efficiency or economic performance might thereby be improved' (p. 217). Those who do the re-designing and re-engineering 'seem to have little understanding of the potential vulnerabilities they are creating' (p. 217).

Rochlin ends with an apocryphal story about intertranslation of English and Russian. In the process the English 'Out of sight, out of mind' came back after double translation into and out of Russian as 'Invisible idiots'. The computers grow more and more invisible and they are 'idiots, having no information other than what has been supplied them and capable of doing no more than what was programmed into them. And they are no more capable of understanding or predicting indirect or long-term consequences than were their designers or programmers. They require constant, intelligent, and informed monitoring' (p. 218).

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A New Economic Paradigm? Innovation-based Evolutionary Systems

Kevin Bryant and Alison Wells (Eds)

Canberra, Australia, Department of Industry, Science and Resources, 1998, x + 104 pp., price not available, ISBN 0 642 28125 4

This booklet is edited and partly written by the Director (Bryant) and a member (Wells) of the Science and Technology Analysis section of the Australian Government's Department of Industry, Science and Resources. It is aimed at, according to an explanatory note heading a list of the department's publications at the back of the booklet, 'informing discussion on policy issues relating to matters of science, innovation, research and technology' (p. 103). The booklet has succeeded admirably in this objective, in this reviewer's opinion, and in doing so has provided readers with a useful and lucid introduction to the growing field of 'evolutionary economics', a school which now has its own journal¹ and has spawned a spate of titles in recent years.²

Yet, as the question mark in the title suggests, 'evolutionary' economics is arguably *not* all that new a discipline, at least in a number of respects. It is in any case not strictly a new economic *paradigm* but rather a collection of theoretical positions loosely pivoted around the notion that the 'economy' is a *path-dependent* entity, much influenced by historical circumstances—an idea which of course dates back at least to Marx and later to such important theorists as Joan Robinson, as in her seminal paper 'History Versus Equilibrium'.³ As Elias Khalil, himself a major contributor to the field, has written: 'The advanced alternative to the equilibrium approach—what has been dubbed recently