

Whither Systems Analysis?

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Prefatory Note: September 11, 2001 should make clear beyond doubt to everyone that failure to take a total systems approach to plans and practices is to court disaster. Everyday in the press one reads of the ripple effects of that disaster. Effects only can ripple through a system.

1. My talk will be about the future of systems analysis over the next fifteen years.

2. Before getting to that let me highlight three key reasons why one should study the future:

- Specialist by virtue of being successful specialist tend to stick to their field and often are oblivious of factors they may converge on it in the future. Objective number one is widen one's horizon.
- Objective number two is to show how that widened horizon has implications for present planning.
- Objective number three is most important. It is to help people to get at their own assumptions about the future since most organizational failure results from deep seated, tacitly held powerful assumptions about the future, that are wrong.

3. Some observations on systems and systems analysis.

- The field suffers from self-imposed isolation and provincialism
- Reluctance to relate to new tangible opportunities for systems analysis.
- The common failure is not going beyond quantitative analysis to the integration of different forms of analysis, in order to create a complete policy relevant picture.

- The failure to effectively relate to closely allied fields, such as operations research and futures studies. The parallel between future research and systems analysis are worth nothing.
- Dependency on a narrow clientele, principally in the defense sector.
- Systems sciences are missing the boat of great new opportunities.
- Systems science is operating under a false thesis. That faulty thesis is that systems science offers some intellectually, exciting, ground breaking new paradigms. The reality is that systems science is abstract, theoretical, and hypothetical with few and far between reconnoiters into the world of reality. The real unmet role for system science is process improvement, where the process is that of public policy, business analysis, or the operation of any complex system or network.

4. Shortcomings

Consider the following widespread shortcomings in futures research. The parallels apply as or more strongly to systems science.

- Practitioners often lack practices with real situations and most importantly real users of their work.
- There are great difficulties in getting over negative thinking because of our widespread familiarity with pain, discomfort, setbacks, and disappointments. Yet the future depends upon positive creative and plausible reasoning about systems.
- Reductionist tendencies drive against a full systems approach.
- Too many systems people are exclusively academics who suffer the dual disabilities of intellectual timidity and of the absence of direct quality control.
- Short time horizons because of customer's wishes drive out consideration of the more natural temporal unit in the development of new things in U.S. and global society, of 15 to 40 years. That is the time it takes a new social, political, scientific, or technical development to mature and become common and significant.
- To capture complexity by mathematically oriented models is good. On the other hand it tends to drive out consideration of complex systems, which do not involve readily quantified data. Complexity has to be treated on a

spectrum of levels from the conjectural to the analytic.

- Ideology and conventional thinking often blind us to choices and the potential for change.
- Confrontation is so common in western culture that it too often leads to “I’m right your are wrong” rather than “You may be right and I may be wrong.”
- A lack of vision and unfamiliarity with visionary thinking limits the scope of possibilities to be explored.
- The desire to predict rather than to forecasts tends to drive out the concept of alternative futures and to concentrate on one or two outcomes.
- Systems sciences in principle could absorb, embrace, and do everything futurists do since any significant futures activity, which goes beyond mere trend extrapolation, is systemic. Let’s look at the total system and work with all its elements and components. If systems science does not take over futures work at least it can open up some interesting collaboration.

5. Factors widening and expanding the market for systems analysis

- The defense budget and the role of defense are both radically changing. The defense budget still reflects older categories of procurement yet it is clear that military operations in the future are either going to be incompatible with traditional logistics, or radical alterations will have to be made in the way logistics will be used. In either case it should be a field day for systems analysis.
- Business is globalizing and as it moves into new environments more often than not it fails to understand cultural, social, and customary difference between the new country and the home base. Cross-cultural systems and their analysis will boom.
- New tools are creating incredibly rich capabilities.

Computers are opening up three universal capabilities, interaction, three-dimensional imagery, and dynamic screens. These three capabilities alone will alter the ability to do and present a systems analysis and can do a great deal to move it into a domain of contingent elements and forces to expand policy choices and understanding. A fourth characteristic of computer technology combined with other capabilities is to create virtual reality, which will have effects in two broad areas.

— For the first time complete total learning of a subject will be

possible based upon what the person holds in his or her head, what needs to be learned, and what the person's best learning strategies are. The teaching will then be based on the students preferred learning mode —cognitive, tactile, auditory, visionary, etc...

— It will lead to improved simulation. Nothing will be built until it is planned, designed, tested, evaluated, executed, and modified in cyberspace.

- Chaos and complexity are two relatively new mathematically linked tools coming into their own. While still primarily at the test and evaluation stage they may open up new opportunities in systems analysis.
- More mathematization of all societal and organizational problems.
- The technology of sensing, computing, and activating are coming together to create the opportunities in many areas for practical applications, such as handling of car traffic and the evaluation of public programs, such as Workfare. Virtually any complex real time network can move from the old model of fixed rules modified slowly, to making networks and other complex problems open-ended continuous real time experiments. For example, in the case of traffic drop the terms "management" and "control" and think of it as a continuous open-ended experiment.
- Many of the most important problems that society faces are interstitial to the traditional disciplines putting a tremendous new premium on interdisciplinary work, which could hardly present a better opportunity for systems analysis in principal, if not yet in practice.
- Increasingly policy makers are asking what does science have to say about this topic, whatever "this" may be. Again systems analysis holds the promise of giving more complex, but at the same time more lucid, useful and comprehensive responses to those questions.

6. New societal problems abound for systems science to engage

- Money laundering
- Delivery of policy advice, in depth, to whom, and on what schedule
- Genetic counseling to optimize personal and social outcomes
- A systems science agenda

- An immigration policy for the U.S.
- NAFTA and jobs
- R&D teams, size, duration, makeup, etc.
- Mate selection
- Workfare
- Rationing access to fragile recreational areas
- Strategic gaming for
 - Business
 - New profits
 - Foundations
 - Government agencies
- Cross cultural training
- Foster care
- Systems vulnerability
 - Money flows
 - Deregulated electric power
 - Airports
- Memes
- Potential step functions in society
- Weather modification
- Earthquake prevention
- Making the message stick