

Planning Amidst Complexity

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Complexity generally refers to a multitude of entities combining in intricate ways. Complexity science, an outgrowth of general systems and chaos theory, is the study of complex adaptive systems. They respond to their environments, adapt, change, learn and evolve. As a diversity of "agents" interact, highly complex new properties appear. Examples are rainforests, organizations, cities, the human brain, even evolution.

A central concept is emergence, described as "much coming from little." Immense possibilities are generated from a few elements governed by simple rules. A small number of notes spawn myriad musical compositions. Players devise innumerable moves in classic games such as chess and Go. From simplicity comes complexity.

Imagine a continuum of system behaviour. At one extreme is stasis and, a bit farther along, dynamic equilibrium; change is contained

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within known parameters. At the other end there's random disorder, with total instability and unpredictability. In between but far from equilibrium is "a zone of creative adaptability." Under equilibrium, order can be imposed. Amidst chaos, order is

by definition impossible to attain. At "the edge of chaos," however, self-organization can occur, controlled from within the system. "Hidden" order emerges spontaneously (recall the immediate responses in New York on 9/11). Dense nonlinear connectivity with feedback produces disparate patterns. Novel global-level properties arise unpredictably from local-level processes. The new system, adaptive and resilient, maintains a form of stability but much of what happens cannot be foreseen. The system is making it up as it goes along.

Two additional properties of complex adaptive systems are well known. First, small changes now can lead to big changes later - the "butterfly effect." That's because the system has a sensitive dependence on initial conditions, its component parts are interacting with feedback to create changes in each other, and the parts constantly self-organize. Weather provides lots of examples. Second, when major change comes, it can happen fast, as disintegration of the former Soviet Union demonstrated. Fluctuations occur until a pattern emerges, then the whole system suddenly converges on it. Stock market investors know and fear this phenomenon. We experience it in heavy traffic - sudden congestion that just as abruptly clears up, for no apparent reason.

Complexity science's implications for planning are only beginning to be grasped (the planning field itself is in the middle zone). It's advisable to treat the following suggestions as working hypotheses, for testing in practice.

- Reframe change. Despite the mantra "change is the only constant," planners typically treat change as a brief interval between longer periods of stability and steady growth. But this view may have it backwards. A time of stability may be no more than a respite within a complex dynamical process of relentless change featuring sudden, discontinuous transformations. Basic premises are no longer valid and unforeseeable states emerge.
- Bracket "planned change" and accept unpredictability: Intendedly rational and based on predict-command-control, planned change may be suited to conditions of relative stability; it becomes increasingly inappropriate as uncertainty and complexity escalate. Feedback loops, nonlinearity and self-organization combine to severely limit understanding of complex system behaviour along with the ability to foresee consequences of interventions and control over outcomes. The edge of chaos, which describes most living systems and much of what's happening in the world of planners, invites emergent, experimental, learn-adapt styles of planning (if that's the right word for it) that emphasize building in system resilience, robustness and response-ability.

- Initial conditions are critical. The key (or trick) is being able to recognize changes or developments percolating below the surface, and then finding ways to encourage, influence or exploit what's taking shape. Create "enabling conditions" that may enhance emergence of the kinds of change desired. A city, planning the future development of part of its central area but with little real control over the key forces shaping "the new economy" finding expression there, looks for ways to trigger and support innovation. Community developers pursue capacity-building so that people can be more effective in meeting needs for themselves, rather than having them met from outside. Organizations flatten hierarchies, open channels of communication, reduce barriers to novel initiatives, and otherwise seek to "excite" the system.
- Bound instability. Complexity scientists have a label, "strange attractor," for the force that holds in place a system's components under near-chaotic conditions - similar to what contains a tornado. The strange attractor "coalesces the energy and creates the system boundaries while at the same time allowing dynamic activity within those boundaries," as Irene Sanders puts it (p. 67). In planning terms this might be accomplished by a powerful vision statement or a firm declaration of "strategic intent": knowing where we're going but leaving open how we'll get there. A similar role can be played by an organization's or

community's culture - the shared set of values, relationships and ways of being that both shape and circumscribe their members' actions. Involved is ongoing management of the tension between preserving a necessary degree of stability and occupying a shifting field of action.

- Enhance connectivity. Innovation in the zone of creative adaptability seems to depend heavily on information flows through linked webs of agents (the Internet springs easily to mind). Interconnection, networking and the building of relationships, therefore, can be significant strategies in the near-chaos zone. Consciousness is reshaped and local action is stimulated, leading to large-scale change previously considered impossible.
- Enlarge your planning repertoire. Situationally appropriate planning amidst complexity demands a rich array of approaches, concepts, methods and techniques. Needed is a judicious mix of the deliberate, where intent precedes action, and the emergent, where intent is becomes revealed as we act. Planners are challenged to re-examine and constantly update their mental models, incorporate systems thinking into everyday practice, and review their work through the compelling lens of complexity.

What relevance might the foregoing (much of it admittedly speculative and drawn from outside the planning field) have for you and your planning activities? Responses are invited. They will be incorporated in future versions of this page.

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(from a long list, growing exponentially)

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