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Turbulent Times for Information Technology

For the past five years, I have been employed by companies, both corporate and nonprofit, to resolve information technology problems as they moved their information from the hardcopy model to the electronic model. Each of the database, semiconductor, publishing, educational, museum, and service institutions believed their problems were unique.

In fact, their difficulties were quite similar:

- The move to CD-ROM or networked delivery was urgently initiated by management to reduce publishing budgets.
- To reap those savings quickly, little time was provided for research, planning, or usability testing.

- Graphic clarity—the pictures on the screen—were less exact when digitized, often causing intense (emotional) reaction to the new delivery vehicles.
- The information itself was stored in rigid proprietary forms, with no attention paid to architecture or portability.
- Problem resolution became difficult because decision-making processes (about standards, directions, goals) were inadequate.
- Simple and inexpensive solutions were tried; all failed.

In each case, the efforts put in place to solve information technology problems became costly and complicated. This happened, in part, because the single project of

moving products and services online created, in its wake, a series of institutional stresses. Old principles were challenged. Traditional systems were undone. New ways of writing, presenting, teaching, and storing information are needed.

As we change our methods of delivering information, the change creates "turbulence" reflected in the mirror of information technology. I have found that the turbulence can be understood from four perspectives.

Technological. One kind of turbulence can be traced to the nature of the technology itself, which is dynamic and evolutionary. Online information software and processes are in flux, and will continue to change—even radically—for the next few years. Subsequently,

institutions should no longer be comfortable picking one kind of service, or one kind of software, with the expectation that it will be adequate for years to come. (Mosaic, on the Internet, is in vogue now, but was not even on the corporate horizon two years ago.) Information strategies in any business, corporate or nonprofit, must therefore remain flexible and adaptive.

Historical. A second cause of the turbulence is the paradigm shift promised by the new technologies and by the Internet. As with previous technological leaps—canals, railroads, telephones—the economic fabric of our culture is being massively transformed. History indicates that we will be far different 10 years from now, in ways directly related to the development and proliferation of network services. (For example, something we now take for granted—daylight savings time—was actually a reaction to the new railway systems and the ability to deliver goods faster and farther.)

But it is human nature to resist change, particularly in difficult economic times. Our resistance is a cause of distress, and that resistance creates, in turn, more turbulence.

Socio-political. The politics of information and its management in a democratic, post-industrialized society provides additional understanding of the turbulence. Those who manage information in an information-based society are the brokers of its value; as such, the management (control) of information and related technologies becomes an issue of political power. The move from paper to networks implies a shift in the loci of power and value, causing turbulence in our companies, our economies, and our governing bodies. Infrastructures are mirrors of their larger systems; to address the turbulence at this level, governance itself must be examined.

Systemic. The fourth and most provocative understanding of turbulence, as seen in the field of information technology, is suggested by systems theory. Systems theorists argue that turbulence occurs naturally in complex human systems. Chaos theory, or second-level cybernetics, identifies and defines the turbulence, accounts for it, and incorporates (rather than attempts to avoid) the natural elements of change that complex systems require. Families are systems. Companies are systems. Legislatures are systems. How information is communicated and managed, at every level, is a direct reflection of the system itself. This, in turn, suggests that the nature of human (information) systems requires a degree of self-reference, pluralism, and participatory democracy.

In other words, to correct the problems in our information systems, we need to address the flaws in the system of relationships that created them. Whether on the Internet, in the arts, or in Congress, the challenges of information technology force us to face some difficult parts of ourselves:

- We continue to resist new thinking, and we criticize what we do not understand.
- We insist upon standards, in our products and our behavior, yet we refuse to comply with any standards other than our own.
- We demand sophisticated government and management, but we manage our own teams and programs like fiefdoms.
- We pretend to listen to our customers (our audiences, our constituencies) but we ignore their basic needs unless it suits our personal agendas.
- We look into the mirror that is information technology, and we claim that the mirror is broken.

Blaming new technology for problems in our companies and our community organizations is neither accurate nor productive. The solution, instead, might be found by studying the underlying dynamic of the problems and, in response, incorporating new behaviors into our daily business, emphasizing flexibility, cooperation, and shared responsibility.

These new behaviors—critical thinking, self-reference, a pluralistic approach to decisions—are crucial to the success of businesses large and small, corporate and nonprofit, as our interactions shift from product-based to information-based economic models. In lieu of rigid, hierarchical structures, our institutions need creative teams of multidisciplinary individuals allowed to make and implement decisions. In lieu of closed, secure networks with proprietary methods of access and retrieval, our information systems must be built with a respect for the diversity of models, cultures, and uses that our new social economy requires.

Our stockholders, our grant recipients, our patrons, and our children deserve a smoother ride than what we have given them, so far. ◘

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