

A WORLD THAT TURNS TOO FAST

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Financial Times, London
January 2, 2001

In the last century, our population on this planet has quadrupled, and most of us now live in cities. At the same time, new technologies – from antibiotics to jet planes to the internet – have vastly extended our power as individuals, groups, and societies. They allow us to live longer and healthier; produce more stuff; travel farther and faster; control the world around us more completely; and send more information to more people, faster, over greater distances.

Together, these changes have sharply raised the density, intensity, and pace of our interactions. Our social and economic systems now have many more entities – including people, organizations, corporations, and technologies – and these entities have more links to each other. They also pass more materials, energy, and information among themselves more quickly than ever before.

When things happen faster, in greater numbers, and with greater interactive complexity, we need more ingenuity to make the right decisions at the right time – that is, we need a greater flow of practical ideas to solve our technical and social problems. But sometimes we can't supply enough ingenuity to meet this soaring need. There is, if you like, an ingenuity gap.

Nearly every statistic that gauges the degree of connectivity among human beings or the movement of things, people, and information shows exponential growth. In the mid-1980s, the whole world contained a few thousand host computers for the Internet; by 1999, the number had soared to nearly 50 million. In 1977, about \$18 billion worth of foreign exchange was traded every day in the world's financial markets; today the figure is \$1.5 trillion a nearly one hundred-fold increase in less than twenty-five years. Between 1960 and 2000, a period during which the planet's population doubled, worldwide traffic volume – that is, the total number of kilometres travelled by people in cars, buses, trains, and planes – increased more than five times; and between 1950 and 1988, worldwide volume of air transport alone increased almost one hundred times.

This steep and seemingly endless rise in our connectivity and kinetic activity generally makes the social and economic systems we depend on more tightly coupled, synergistic, and likely to exhibit abrupt and unexpected changes in their behavior – or nonlinearities as specialists call them. We saw a good example in 1997 and 1998, when the international financial system, triggered by events in Asia, flipped back and forth between stable and chaotic modes. The system's innumerable components – including banks, trading houses, corporations, and governments – interacted intensely to produce vicious circles and sharp surprises. Lightening-fast computer and communication technologies and round-the-clock, round-the-world trading gave the system little slack to absorb errors or sudden shocks. A relatively small event – the devaluation of a minor currency or a corporate bankruptcy in Hong Kong – produced cascades of repercussions. Rapid-fire crises blind-sided financial managers and policymakers. Rumors, misinterpretations, errors, and lies tore across the planet, causing wild market swings before they were corrected.

Technology-driven changes in the complexity and speed of financial transactions have surged ahead of our capacity to manage these transactions. Yet as the people charged with overseeing the international economic system (in central banks, the IMF, and the like) try to catch up, they find themselves profoundly handicapped: current economic theories do not give them an accurate understanding of the system's nonlinear and often chaotic behavior, and key data on countries' economic performance are often poor or nonexistent. Most fundamentally, the skyrocketing complexity and speed of financial events can exceed the cognitive ability of system managers.

In the face of cognitive overload, financial managers and policymakers increasingly rely on automated procedures and on consultants with narrow technical expertise. And in the absence of strong economic theories and data, facile nostrums and fads – such as crude monetarism – become received wisdom. Confronted with rapid and confusing changes, managers and policymakers cling to this wisdom. Hardly surprisingly, it usually supports the short-term interests of powerful economic elites.

Such trends are visible not only in the world of finance and business, but also in practically every domain of human activity – be it economic, technological,

political, or ecological. From the greater speed of the international financial system, to the rapid invention of new technologies like micro-robots and genetically modified food, to our soaring emissions of carbon dioxide into Earth's atmosphere, we seem to have our collective foot slammed down on the world's accelerator pedal. It's time to think creatively about how we can slow things down, how we can ease up a bit on that accelerator pedal.

Some skeptics might respond that people have always perceived they lived on the cusp of chaos, but in the end they've usually managed well by marshaling their ingenuity and courage. But today's world is fundamentally different from the past. The complexity and speed of our social and technological systems are unlike anything we've seen before, and these factors are now pushing against the upper limits of the human brain's abilities. Ecologically, for the first time in history, we are moving materials, producing energy, and generating waste on a scale that rivals nature itself.

If we don't slow things down – if we allow the complexity and speed of the systems we've created to go on increasing unchecked, and if we continue to perturb the deepest dynamics of our planet's ecosystems – these systems will sometimes fail catastrophically. In other words, nonlinearities will simplify and slow down things for us, whether we like it or not.