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To: "Dr. Baruch Fischhoff - Chair, National Academy of Sciences Study on Social
& Behavioral Science and Improving Intelligence for National Security"
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From: Lloyd Etheredge <lloyd.etheredge@policyscience.net>

Subject: The Complex Adaptive Systems chapter; Failure cascades and the global financial system

Dear Dr. Fischhoff & colleagues:

A chapter on **Complex, Adaptive Systems** is urgently needed for the forthcoming National Academy <u>Report</u> to upgrade DNI data and analysis for intelligence.

This is leading-edge social science. However, everything that the DNI has published (e.g., <u>Global 2025</u>, the US national intelligence plan, and the published work by the DNI/Treasury Department's Office of Intelligence & Analysis that I have seen) suggests that the DNI still is doing older and simple "<u>x</u> causes <u>y</u>" predictive models - (also, without capacities for self-reflection, effects on interpretation and meaning, learning, complex strategies, etc.) DNI models also do not appear to have modules that introduce new, emergent properties into systems - a lively, but still emerging area of inquiry that includes unexpected and cascading system failures.

The chapter might, *inter alia*, use two examples to illustrate areas of high yield pay-offs.

1.) <u>A Key Challenge: The Global Financial System</u>

To get started, I suggest that the National Academy make an urgent recommendation that the DNI develop a model of the international financial system as a complex, adaptive system - *with capacities to predict how it will react to any attempts by the Obama Administration and other governments to regulate it!*

We are accustomed to "national governments rule" ideas, based on the simple model of individual law-abiding citizens inside national systems. The simple, last-generation, causal model would be: Governments will decide what new

laws and rules are needed for the world of international finance, they will pass them, and then everyone will obey, and the system will return to normalcy.

But an adaptive - i.e., constantly changing - complex global system could produce unexpected responses, other than compliance and a return to normalcy. There may be too much money in the system, and too many possibilities for financial benefits of key players to diverge from collective interests, for such a simple model to work, especially in most political systems of the world where the amount of money available for lobbying could be effective.

There is a lot of hard work to develop and evaluate this new class and level of modeling, but global finance is one area where I think it is needed and will give us smarter government policies. Also, we have just seen an extraordinary and unexpected global failure cascade across many institutions and national boundaries, which suggests that we (and the DNI) should be funding and developing this new class of models quickly.

2.) <u>Anti-Americanism: Intersections of Complex Adaptive Systems</u>
An interesting, second recommendation would be to develop complex, adaptive system models for understanding Islamic anti-Americanism & multiple points of intervention for new policies. My earlier message discussed the Friedman, <u>Fox News</u>, model of The Narrative that is needed to understand evolving dynamics in the Islamic world. In reality, this model itself reflects the higher-level analysis of current systems thinking - i.e., that *institutions exist at intersections of <u>different</u> complex adaptive systems.* [1] We are looking, simultaneously, at continuing changes within the global Islamic & jihadist systems; at forces impinging on youth cohorts and recruitments; at the political agenda and vulnerabilities of different national political systems that affect the content of their media; at the decisions of advertisers and economics of advertising revenues and competition for different demographic groups; at Rupert Murdoch's agendas; at the changing digital technology to record and transmit images of human suffering; at status and budgets of a US Under Secretary for Public Diplomacy and the likelihood that a high-level strategic planning group actually will meet; at the institutional failure of the Voice of America's Alhurra television channel for the Islamic world, etc. . . . Once you begin to think about the problem, the leading-edge social science ideas about intersections of complex, adaptive systems make sense - but the National Academy really needs to push the DNI system to do the thinking, get it onto paper, and then take a fresh look at how many policy options actually exist, what to

monitor, what experiments to get underway, etc.<2>

     - Melanie Mitchell's, <u>Complexity: A Guided Tour</u> (Oxford UP 2009) is a useful overview, across many kinds of systems, that attempts balanced evaluations. Part of the conceptual/speculative work on complexity and emergent properties is, almost surely, well-known at some locations in the DNI system - e.g., data mining & Watts and Strogatz, "Collective Dynamics of 'Small World Networks,'" <u>Nature</u>, 393 (1998), pp. 440-442. However all of these pioneers are pointing, mostly, to the work that needs to be done.

yours truly,
Lloyd Etheredge

<1> This also is true of the international financial system. I.e., the work ahead is probably more complex than simply developing <u>one</u> model of a single complex adaptive system. Key institutional components are likely, themselves, to be at the intersection of several complex, adaptive systems. [For example, if we are trying to understand the behavior, and potential use, of the International Monetary Fund, we may need to forecast its behavior with greater sophistication (e.g., recognizing vulnerabilities of its professional staff to political pressure from members) than simply assigning it a role and expecting the role to be implemented as designed.]

<2.> The visual analytics methods being developed by Horn [an earlier message} seem to be good at accessing and getting onto paper the actual models of these complex, adaptive systems, which people already have in their heads.

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