12th CCRTS: 2007
ADAPTING C2 TO THE 21ST CENTURY
TITLE: Organizational metrics: A progress report

Topics: Track 5; Track 6; Track 4
Authors: W.F. Lawless
POC: W.F. Lawless
Paine College
1235 15th Street
Augusta, GA 30901-3182
lawlessw@mail.paine.edu

Abstract:

The traditional model of an organization is predicated on the correspondence between reality and the aggregated observations reported by its individual members. But the evidence indicates that observational data alone cannot reconstruct an organization's actual status (Levine & Moreland, 1998). The well-known result is that traditional organizational theory has failed (Weick & Quinn, 1999), leading Pfeffer & Fong (2005) to propose that illusions are a critical missing ingredient. We agree, and have constructed an alternative to assume that social reality is predicated on a bistable interdependence between observational illusions that may not correspond to reality ("fog of war") and physical actions.

Organisms live under uncertainty partly dispelled by social interaction (Carley, 2002). To survive, they form organizations as centers of cooperation (Ambrose, 2001) that marginalize opposing beliefs among its members in exchange for a share of the resources, but the tradeoff reduces adaptation to change. We have applied our model to a web-based metric for Marine Corps weather forecasters (Lawless et al., 2006a); to an extension of the metric to a reorganization of a Management Information System at a University in the E.U. (Lawless et al., 2006b); to measure the performance of a military medical department of

clinical research (Lawless et al., 2006c); and, in the next application, to an online web system to measure the performance of a university's graduate school of business (Lawless et al., 2007). This versatile metric derives from the quantum model of interdependence for the social interaction (Wendt, 2005), one of the subjects for a AAAI symposium at Stanford in 2007 (www.aaai.org/Symposia/Spring/sss07symposia.php#ss08). It assumes that information entangled among social objects once measured collapses into one of two interdependent observables, necessarily losing all information on the non-observed variable.

The loss of information opens a new area of study as indicated by tracking the tradeoffs in two very different studies. First, in a meta-analysis of over 30 years of research, Baumeister and his colleagues (2005) found that an individual's self-esteem was strongly consistent with their other worldviews but not with their academic or work performances. Then in field studies of the Department of Energy's Citizen Advisory Board (CAB) recommendations on cleaning up nuclear wastes at DOE sites, we have found that decisions by consensus ruled CAB's were rationally consistent but not practical for their DOE sponsor, while decisions by majority ruled CAB's were inconsistent but practical (Lawless & Whitton, 2007).

Next, we exploit the theory by applying it to business mergers or military coalitions. When a market is highly fragmented, like the current U.S. airline industry, it is unable to act cohesively, characterized on average by a loss of profit or success. In late 2006, US Airways made a hostile offer for Delta Airlines that, if enacted, could consolidate the U.S. airline industry. As the average size in market share increases, a more focused business model implies an increase in execution in one tradeoff parallel with

another that increases the market's capacity to put more resources behind decisions to make its average execution of plans quicker. A more focused coalition twice the size of a fragmented coalition should execute in one-half the time (where a focused business model can reflect a reduction of organizational duplication, personnel or overhead expenses; or in parallel, an increase in operational readiness could occur with the wider deployment of new technology).

References

Ambrose, S. H. (2001). "Paleolithic technology and human evolution." Science **291**: 1748-53.

Baumeister, R. F., Campbell, J.D., Krueger, J.I., & Vohs, K.D. (2005, January). Exploding the self-esteem myth. Scientific American.

Carley, K. M. (2002). Simulating society: The tension between transparency and veridicality. Social Agents: ecology, exchange, and evolution, University of Chicago, Argonne National Laboratory.

Lawless, W. F., Bergman, M., & Feltovich, N. (2006a). A physics of organizational uncertainty. Perturbations, measurement and computational agents. Computational Economics: A Perspective from Computational Intelligence. Shu-Heng Chen, Lakhmi Jain, & Chung-Ching Tai. Hershey, PA, Idea Books, 268-289.

Lawless, W. F., Bergman, M., Louçã, J., Kriegel, Nicole N. & Feltovich, N. (2006b). "A quantum metric of organizational performance: Terrorism and counterterrorism." Computational & Mathematical Organizational Theory Springer Online: http://dx.doi.org/10.1007/s10588-006-9005-4.

Lawless, W. F., Wood, J., Everett, S., & Kennedy, W. (2006c). <u>Organizational Case Study: Theory and mathematical specifications for an Agent Based Model (ABM)</u>. Agent 2006, Chicago, IL, University of Chicago--Argonne National Laboratory.

Lawless, W. F., & Whitton, J. (2007, forthcoming January). "Consensus driven risk perceptions versus majority driven risk determinations " <u>(British) Journal of Nuclear Futures</u>.

Lawless, W. F., Howard, C.R. & Kriegel, N.N. (2007, forthcoming). <u>A quantum real-time metric for Networked and Virtual Organizations, Networked and Virtual Organizations</u>, Idea Publisher.

Pfeffer, J., & Fong, C.T. (2005). "Building organization theory from first principles: The self-enhancement motive and understanding power and influence." <u>Organization Science</u> **16**: 372-388.

Weick, K. E., & Quinn, R.E. (1999). "Organizational change and development." <u>Annual Review of Psychology</u> **50**: 361-386.

Wendt, A. (2005). Social theory as Cartesian science: An auto-critique from a quantum perspective. <u>Constructivism and International Relations</u>. S. Guzzini, & A. Leander. New York, Routledge**:** 181-219.