Dupont Summit 2016

Science, Technology, and Environmental Policy

December 2, Historic Whittemore House, Washington, DC
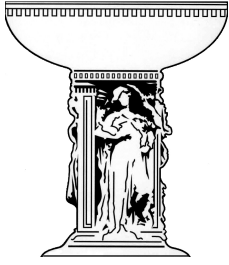
Panel
"The Law of Requisite Variety and its Role in Management"

The Law of Requisite Variety was described by Ross Ashby in 1952 in his book, Design for a Brain. The law says that the variety in a regulator must be at least as great as the variety in the system being regulated. This is a very general law. It describes regulatory activities by businesses, government agencies, machines and individuals. When combined with George A. Miller's article, "The Magical Number 7 Plus or Minus 2," it is easy to wonder how human beings manage to cope with an increasingly complex society. Although the channel capacity of a human being is quite limited, versatility in conceptualizations is impressive. When combined with organizations that use the capabilities of many people and machines, the great variety of conceptualizations that human beings are capable of have so far been adequate to cope with great complexity. This paper will describe four strategies for amplifying management capability by combining organization with several fundamental types of conceptualization. As an example the paper will discuss the regulation of a country of several hundred million people.

Panelist
Stuart Umpleby, *George Washington University*

Dupont Summit 2016

Science, Technology, and Environmental Policy Issues

December 2, Historic Whittemore House, Washington, DC

Panel
**"An Exercise in the Design of Government"**

If the Internal Revenue Service does not have enough employees to answer the phone when people are preparing their taxes, the government is not able to work as intended. If the number of meat inspectors in the Food and Drug Administration (FDA) is not sufficient to do an adequate number of inspections of meat producers, the safety of the public is endangered. These are just two recent examples of lack of requisite variety (insufficient staff to handle the task required by law) in federal regulation. Many more examples can be found at the blog location given below. This presentation will consider "the design of government" which may lead to a discussion of "designing the design of government." How SHOULD the American government go about designing our laws and regulations?

Panelist
Robert Knisely, *Senior Civil Servant, Retired*
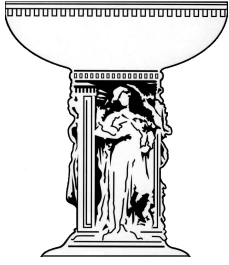
Panel
"A Framework for Designing Federal Agency Regulatory Models"

Federal agencies use different types of regulatory models * to manage complex issues they are mandated to address. The models are designed to incorporate sufficient complexity and variety to match the complexity and variety of the problems/issues they face. The models are designed differently because of the different characteristics that define their particular milieu; and hence shape the regulatory model itself.

*Regulatory is used in the broad sense of management approaches.

In designing regulatory models four framing questions can be addressed in order to determine the basic design of the model:

- **Who is the regulator?** – The continuum ranges from one centralized regulator to dispersed regulators. This is often not a settled question. Depending upon one's perspective on the problem, it may be perceived as international, national, regional or local. The question of who regulates or manages the problem, is a function of how power to address the problem is dispersed. To illustrate: In the case of determining who decides on educational standards for U.S. students, the regulatory model is negotiated through collaboration between national, state and local governance; and the pendulum tends to swing in one direction or another based on the sentiment of the populace.

- **What are the decision rules?** What are the criteria that determine how the regulator designs strategies to solve the problem at hand?

- **At what level is the problem perceived and being addressed?**
    - ✓ Technical
    - ✓ Managerial
    - ✓ Political
    - ✓ Cultural

- **What are the characteristics of the operating environment?** – Is the environment stable and predictable; discontinuous, circular and complex, but in which deep patterns can be defined; or entropic with the possibility of discerning trends toward a disaggregated end state? Each cell in the table below requires a different regulatory approach. The LRV model design should consider the complexity of the management challenge, and the level at which the model is being applied

Panelist
Morris Bosin, *Grant Thorton International Ltd.*
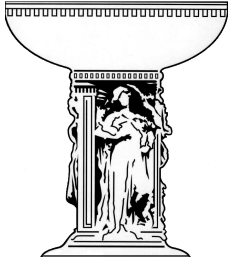
Panel

"Feasible Cost, Requisite Variety, and Preferred Taste: Three Dimensions of 'Good' Regulation and Their Hidden Laws"

What is in common for a "good" photographic image, a "good" organization, and a "good" society? Or, what is in common of a "good" camera, a "good" management team, and a "good" government? This paper identifies a three dimensional space in which we perceive what we mean by "good" in human affairs involving regulation or control. The three dimensions are Feasible Cost, Requisite Variety, and Preferred Taste. The attempt here is to construct a three dimensional measurement instrument, i.e. Organizational Efficiency Index (Cost-wise), Regulatory Capacity Index (Variety-wise), and Aesthetic Position Index (Taste-wise). The three dimensions are all about human limitations. Each describes something that we wish to do better but cannot for the time being. Together these indexes offer a 3-D perspective for us to observe and compare the development and evolution of any human organization – families, companies, governments, societies or civilizations. The progress of civilization means that over time, thanks to the accumulation of experiences and our capacity for reflection and critical thinking, we are able to raise our marks on these limitations.

Three laws related to this three dimensional perspective are discussed: (1) Law of Limited Rationality: Any human brain functions with a long list of cognitive biases that need to be eliminated before reaching pure rationality, but the process of overcoming these biases demand resources (monetary cost and bio-cost (time, attention, stress and health). Since such resources are always limited, the rationality reachable will be always limited. (2) Law of Requisite Variety: If a system is to be stable, the number of possible states in its control mechanism must be greater than or equal to the number of states in the system being controlled (Ashby 1958). (3) Law of Preferred Taste: Human beings prefer their more pleasurable (subjectively definable) option when other aspects are equal within their scope of awareness.

Panelist
Jason Jixuan Hu, PhD, *Independent Researcher*