ISSS Incoming Presidential Address Allenna Leonard July 17, 2009

ADVANCING VIABLE GOVERNANCE

I am more than honored to assume the responsibility of president of the International Society for Systems Sciences – a post that has been held by so many pioneers and practitioners in our field.

And I am happy to announce that the 2010 Conference will be held from July 18 to 23 at Wilfred Laurier University in Waterloo Ontario, about 70 miles from Toronto. The conference theme will be *Governance for a Resilient Planet.*

Let me start by saying that it would be great if we can survive the next hundred years without massive damage to our planet or ourselves.

If we are going to be able to act effectively, we'll need to pull all the information we have together. I propose that one step in this direction could be a global viability index.

Why?

Because there is a big gap between our knowledge our ability to make use of it within our present organizational and governance structures … in traditional science, in the systems fields, and in participatory decision-making.

In the rest of this talk I'm going to give you three views on this problem:

First, I'll discuss the prevailing views on regulation and multi-system governance.

Then we'll look how governance was handled in one very special situation – the Chile of thirty-five years ago.

And finally, we'll talk about how we can begin to create a global viability index to support the changes that are necessary for sustainability.

Let's begin with a look at the prevailing views of regulation and multi-system governance.

Specifically, I'd like to ask: what attitudes are hindering us here?

Although there has been more progress in some geographic areas than others (and I salute especially those here in Australia and New Zealand), globally there are many lost opportunities.

As Systems Scientists, we are often up against a structure that values power for its own sake and regards information as a good to be hoarded. The prevailing reward system reinforces this.

Some decision-makers do not see the level of interconnectedness and complexity in the world.

Others may perceive the situation but not know how to convince others to act outside traditional frameworks.

But the bigger question is: Why DO people have such negative attitudes about regulation and the need for governance?

Regulation, communication and control are central to the area where I've been most active – organizational cybernetics.

Unfortunately, people often associate control with oppression and micro-management rather than with the steering actions that get us where we want to go.

It's associated with the dour picture of a 'nanny state'.

Grown-up free people feel that they don't need nannies to make decisions for them.

But let's think about what a nanny does.

To use the term favored by Ross Ashby, a nanny has higher 'variety' than the child and keeps risks within the child's capacity to make distinctions and understand the consequences of their choices.

‘Variety’ refers to what we take to be the number of states a system or its subsystems can assume.

Depending on the purpose and characteristics of the observer, a system’s variety can be high or low.

So, a nanny knows that the swings are ok but running into traffic is not.

In the adult world we don’t have nannies. Adult protections are often based on the concept of ‘the prudent man’.

But, in the face of complexity, the prudent man is out of his depth.

Moreover, many threats to our safety and well-being remain out of sight until a rapid onset or slow onset disaster occurs.

In the wake of such disasters, there are often calls for more regulation.

Let me give you an obvious example.

The recent financial crisis blindsided economies around the world.

Fund manager George Soros, who does understand systems, has called for regulators to limit bank proprietary trading to their own assets, dampen bubbles and market mood swings, and outlaw the credit default swaps that result in some investors profiting more from bankruptcy than from success.

He isn’t calling for a Nanny State, but Soros would definitely like to see more governance.

Financial crises like this one are global, but we can also look to other examples that have local or specialized impacts.

Contaminants in infant formula and pet food… toxic drywall… and hormonally active chemicals in our food containers… all raise serious questions about the health effect of the chemicals in our environment.

When these problems are revealed, someone always calls for more regulation.

But not everyone is convinced that the solution is better than the problem.

That's because regulation is often mis-characterized as the opposite of innovation, and therefore detrimental to economic growth.

But that isn't necessarily so.

To see the beneficial effects of constraint, just think of the beautiful Haiku poems created within a very restrictive 17 syllable format.

This is one example of how constraint (or regulation, if you will) can provide a spur to creativity… and a space for innovation to flourish.

Another argument in favor of regulation is that unregulated innovation in our society's essential variables can lead to trouble.

A better service or product for the consumer may not be the objective or the result.

Sometimes, to return to the examples of finance, insurance and real estate services, the innovations mainly benefit the middlemen, to the detriment of almost everyone else.

Ultimately, the world's population was landed with a global recession as a result of unregulated and deregulated financial activities.

This isn't to say every regulation is good a good one. We all have horror stories.

Even well intended regulations can be badly designed.

But, there *is* a remedy to bad regulation. It's regulation designed with the Conant-Ashby theorem in mind.

The Conant-Ashby theorem says that "Every good regulator of a system must be a model of that system"

In other words, in order to be a *good* regulator, a regulator must have requisite variety.

It follows from that premise that, if your goal is to design good regulation, you must know something about systems science.

You must start with a principles-based rather than a rule based system for your regulatory framework to be coherent and consistent.

But, what are the proper boundaries for a regulatory structure?

US Supreme Court Justice Oliver Wendell Holmes said "your freedom to swing your fist ends where my nose begins". But we don't know how long our arms are any more. We need to know all of the effects of our actions – the unintended as well as the intended.

The plain fact is, more people and more interdependence requires more constraint whether for simple systems such as traffic, or global systems like the environment and the world economy.

Our variety will either be constrained by better information and regulation or by breakdowns and the consequences of reverberating damage.

One of the greatest challenges we face as systems scientists is explaining that fact to the world at large!

It isn't just that our concepts and tools are unfamiliar to decision-makers and the public.

It's that the very idea that we live in a 'whole system' where everything is connected has yet to be fully absorbed.

This is why people so often discover during disaster debriefings that the relevant information was at hand all along.

We had the facts.

We just didn't have a mechanism for connecting the dots.

Worse yet, if someone *does* make a connection and persists in bringing it to light, that person is likely to be dismissed as a crank, or ignored.

That's because acknowledging the potential for disaster that he or she has revealed involves rocking the boat or spending more money.

For this reason, whistle blowers are the unsung heroes of our civilization.

So, let's look at what we've established.

#1. Regulation has a 'bad reputation' because so much of it is done badly, either through incompetence or caving in to special interests.

#2. Without good regulation, systems will continue to stabilize themselves through periodic disasters.

And #3. When someone occasionally sees a disaster coming, people don't want to listen.

It's no wonder that so many feel hopeless about the possibility of creating global regulation that works!

Fortunately, we can draw inspiration from a real-world counter example.

Stafford Beer's work in Chile gives us an historical example of how a multi-system governance structure was attempted with considerable early success.

Not that there weren't plenty of critics.

Some spoke from ignorance, and others criticized the work as part of an organized effort to discredit anything having to do with the Allende administration that was elected to govern Chile in 1970.

The whole project is described in the 2nd edition of Stafford Beer's book Brain of the Firm.

So, let's quickly review this extraordinary accomplishment.

Salvador Allende was a leader who *did* want to connect the dots. That's why he invited Stafford Beer, whom Norbert Wiener called the father of management cybernetics, to become technical director of a system for organizing the entire country's social economy.

This is probably the most ambitious social project attempted in our field.

Chile was typical of countries in Latin America in that it had many state run industries.

At the time Stafford was invited to start this project in Chile, Allende was in the process of completing the nationalization of the copper industry, as well as nationalizing other industries considered necessary to the public good.

Project Cybersyn – the name is an amalgam of cybernetics and synergy - began in late 1971.

It had two basic purposes – both addressing problems in requisite variety.

One was to manage Chile's many state-run industries.

The other, and more important purpose for this discussion was to maximize the people's participation in public affairs and decisions.

Stafford was concerned that the normal mechanisms of democracy everywhere in the world lacked requisite variety.

Two hundred years have passed since political parties, periodic elections and bureaucracy were set up to handle political variety.

These mechanisms seem outdated, in the face of real-time continuous news cycles with their sound bites and spin, and twenty-four/seven activity in the global economy.

Dealing with incoming information flow is like drinking from a fire hose, but the capacity of our democratic institutions to reflect and respond is on the scale of a pipette.

If we look at that problem through the lens that Stafford employed, the variety disbalance that plagues all democracies in the information age must either spill over or build up as pressure.

One of these possibilities results in an alienation contrary to the exercise of good citizenship.

The other results in unrest, perhaps violent; and stability is under threat.

This is the problem that Stafford confronted almost forty years ago in Chile.

Stafford thought one way to rebalance the civic variety equation was to provide a summative communication channel to provide a real-time general measure of people's general level of happiness – or unhappiness – with their current situation. He called it an algedonic meter from the Greek words for pain and pleasure.

A number of particular applications were envisioned.

One was to televise the General Assembly to allow the public to register their satisfaction, or lack of it, and for the legislators to see – in real time – what people thought of their deliberations.

Many of us saw a one-way version of this during the US presidential debates.

Let me give you an example:

Allende wanted to hear from "the people" but needed a means of determining how different issues were viewed by different segments of society. He did not want to limit public input on specifics to polling or to the views of lobbyists. He asked Stafford to think about this.

Stafford's work in this area eventually became the Team Syntegrity process. A Syntegration is a planning process that was designed to bring requisite variety to bear on a question. A typical Syntegration brings a diverse group of thirty people together for several days to discuss a question of common concern. It is a non-hierarchical process where every participant has a unique but equivalent role. Together they learn from and about one another at the same time as they address their topics.

The other aspect of Project Cybersyn team was to monitor and manage the state run industries comprising the social economy in real time.

Stafford's Viable System Model, with its generalized template of any viable system, was the centerpiece of this effort

The Viable System Model, or VSM, is a template for diagnosing or designing the management roles and communications channels that are necessary to support the organization's productive capacity. Its design drew from the neurocybernetic work of Ross Ashby and Warrren McCulloch.

The purpose of the VSM for an organization is the same as for an amoeba – to promote survival by facilitating its response to the variety in its environments.

There isn't time to do justice to a description of the VSM today but here is the gist of it. Multiple operations require:

- direct management of their interactions with their environment
- -coordination to keep them from oscillating and getting in each other's way
- a locus of control to mediate between competing claims for resources and choose the best alternative
- some capability to anticipate and prepare for the future and
- an identity that balances the needs of the present and the future and assures that there is a form of closure for the whole system.

These functions correspond to systems one through five in the VSM.

The strength of the model is that it can be applied to any viable system.

A system can be compared horizontally to other systems on the same level and vertically to systems of greater or lesser comprehensiveness.

This vertical characteristic is called recursion.

The same five management functions can be examined for consistency as one goes up or down a nested organization from the shop floor in a particular plant to the level of the entire industry, as a whole.

Importantly, the only test of a viable system is that it is, in principle, capable of independent existence. An example would be a division of a business that could theoretically be spun off from the parent enterprise and still flourish.

Project Cybersyn identified recursions from the individual worker to the country as a whole. This allowed for consistent messages and measures to be designed.

Although plant level pilot experiments were run, project Cybersyn concentrated on four mid-range levels of recursion where the government could make best use of the model's coordinative capacity.

They were the product line, the sector, the four branches (heavy industry, light industry, consumer products and materials and supplies), and, finally, CORFO – the umbrella agency responsible for all the state run industries.

Eventually each system from the plant upwards was to have its own VSM and its own list of essential variables to be monitored.

Each particular model was also informed by a number of standard operational research methods. They included indices of productivity, latency and performance and the design and testing of quantified flow charts.

This information, distilled into a two-digit ratio, was fed into a statistical filter based on the Bayesian statistics of Harrison and Stevens.

The programme determined whether each reading outside the normal range was likely to reflect a random or transient occurrence or a slope or step change.

All the systems at each level were responsible for reporting in bogus real time (daily or weekly) on about ten or twelve indices.

If an unexpected value came in there was a pre-established time limit on how long the reporting level had to resolve the problem.

This required that each index be tuned so its response was neither hair trigger nor fast asleep—two extremes that we would all like to see eliminated from the way our countries' respond to crisis.

A communications channel dedicated to alarm signals could override these arrangements in case of emergency.

Decisions weren't referred upstairs unless the lower level decisions would constrain those of other units.

One point to be stressed here is that the idea wasn't to control every last detail.

Most of the data on which these indices were based were standard reports such as raw materials on hand, the status of orders, cash flow and absenteeism (which is a rough indicator of morale) and cash.

The novelty came with *how* often they were recorded and their subsequent *integration and interpretation*.

When a possible slope or step change appeared, that was a signal for management to investigate while there was more possibility of bringing the straying variable back into range.

This portion of the model dealt with the present as reflected in the management functions of Systems One, Two and Three.

System Four's assessment of the future situation was addressed along two lines, rather than just one. The traditional planning processes proceeded as normal while experiments were performed using Jay Forrester's System Dynamics. The System Dynamics models showed promise but the situation in Chile was changing too fast for reliable rates and levels to be established.

System Five, according to President Allende, was "the people".

In practical terms, the present and future of the social economy was to come together in an 'operations room'. This was literally a room with seven or eight chairs connected to about the same number of display screens. The screens included the VSM for the entity, its simulations, alerting screens monitoring critical factors and basic information screens such as accounts, maps or pictures.

The best thing about this elaborate system is that *it had begun to work!*

Within two years of its implementation, two-thirds of the social economy was on line, with information coming by telex from the whole length of Chile to a computer in Santiago.

Here is one example of the system's early-stage success: With its partially developed operations room, the Allende government was able to survive a strike of small businesses and other perturbations due to its knowledge of the location of redundant supplies and materials and other integrated information.

However, no system remains viable against overwhelming odds. The elected government of Chile was, in the end, no match for the external forces that determined its overthrow, and Allende died in a CIA inspired coup in 1973 – a story documented in the hearings chaired by US Senator Frank Church.

So, why is this relevant today? It is relevant because the disbalance of variety has only increased since Stafford's groundbreaking work in Chile almost forty years ago.

While cell phones and social and professional networking sites have enhanced the public's capacity to communicate with their governments and with each other, there has been less advance in consolidating the information and making it more coherent.

It is within the realm of the possible to design a recursive global information system focused on our essential variables that would distill the voices of the people and provide early warning of vulnerabilities in our social and environmental fabric.

We could begin by considering a viability index that monitored the essential variables for human life and their measures.

These essential variables are greater in number and more complex in degree for people but they are not necessarily different in kind from those of other animals. They would be:

Air
Water
Food
Shelter
Protection

Social engagement
Communication
Capacity to reproduce

For human societies, these needs are met or supported by our infrastructure.

Could such an index realistically be created?

I believe the answer is yes.

Advances in computer power mean that far more is possible now than in the '70's in Chile when some information traveled by donkey to the nearest telex machine.

And I don't think we should wait around hoping for another Allende to implement this possibility.

The people – that's us, and especially us in the systems community – could start the ball rolling.

We could look at our essential variables and how we might identify what drives them.

The potential for self-organization in the information age is nearly limitless.

There are other models of providing information that can lead to governance, beyond those of governments, bureaucracies and institutions.

Transparency International, founded in 1993, provides one model.

It works globally against corruption by assembling information and ranking countries on their Transparency Index.

Its work led, in 2003, to the United Nations Convention Against Corruption.

Much of Transparency International's information is collected and coordinated by country chapters in the form of sub-indices that are readily available.

These indices address how much official business is conducted in the sunshine; and conversely, how much cover exists for corruption to flourish.

As US Supreme Court Justice Louis Brandeis said, “Sunlight is the best disinfectant”.

Wikipedia provides another model for how exhaustive information can be created and disseminated without the help of a central agency or sponsor.

Individuals with knowledge and interest in the topic upload information onto a set of templates. They don’t have to be experts.

People with additional knowledge could add to, correct or dispute the information.

Links are provided to other sites and resources.

Wikipedia is thus a prime example of the redundancy of potential command.

So, let’s assume for a minute that it’s truly possible to assemble a global viability index.

How would we begin to launch such a global undertaking?

We could begin by asking ourselves what concepts and tools we use to import requisite variety to our efforts and how they might be applied on a larger scale.

I would suggest that the Viable System Model could again be applied to monitor and report on the management of critical variables in the social economy and the natural environment.

We might ask what measures would be analogous to temperature and blood pressure in the human body that would provide requisite variety?

Such a VSM would not arrive full-blown, but it could be outlined and made widely available even at an early stage of development. A Syntegration— or other group process - could set the stage.

It might well be possible to put up qualitative if not quantitative flow charts to identify indices to populate a basic Viable System Model for each community at several levels of recursion.

People or groups could be invited to fill in the blanks describing the current state of affairs as they knew them.

Members of the public could contribute their local knowledge, ask questions, identify anomalies – or simply add their perspectives.

Since the VSM typically identifies around ten indices per recursion, the design requires hard thinking but running it is easier.

A key would be to think in real time. The response of the World Health Organization and the centres for disease control to the swine flu is an example of rapid response and coordination.

The bureaucracy that took more than a month to get sanitary supplies to the swine flu outbreak on Native Reserves in Manitoba because of fears of providing alcohol in any form on the Reserve is its opposite.

And the VSM is by no means the only approach that could be useful.

There have been many new programmes and applications in System Dynamics.

The complexity theory approach to tracking emergence is another.

There are a number of group processes, in addition to Syntegration that facilitate participatory decision-making.

I'd like to mention one tool that combines modeling and participatory features and can be used with groups that are not familiar with systems processes.

It is the Professor Vester Sensitivity Analysis.

Although it has been widely used in German-speaking countries, the main book describing it "The Art of Interconnected Thinking" has only been available in English since 2007.

This tool applies eight biocybernetic rules in a computer assisted, facilitated exercise.

For example, the first of these rules is negative feedback loops must dominate positive ones to have a stable system.

A causal loop diagram of most of the recent regulatory failures would show that the reverse was true.

No wonder they were runaway failures.

Students in German speaking countries have been learning about systemic relationships and competing in Vester's game "Ecopolitics" over the past few years, and a comparable game could be designed to teach about a viability index.

We might look at indices for physical, environmental, social, financial, public health and security infrastructures.

It could start with examples of physical infrastructure. For each, we could complete a model that documented its physical presence, usage patterns, financial supports, vulnerabilities, feedback systems and connectivity. It would also be helpful to indicate the consequences of failure for each.

Lots of public information is already available such as GPS systems, maps of social and environmental boundaries and disaster plans.

As a systems practitioner I am mindful that categories are never objective.

There are many criteria on which distinctions could be made and the choice would need to be a product of cultural sensitivity and collective wisdom.

Nevertheless, an inventory of physical infrastructure might include:
- energy
- communications;
- roads, bridges and levees
- water, sewer and waste removal
- buildings and building codes, and
- transportation.

Even with such concrete examples, information may be missing or unconnected and that could be important.

To take one example, when the Mississippi River flooded in 2008, CNN reported that no one had the answer to the question "how many levees are there?"

The Army Corps of Engineers, the different states and the big cities knew about their own levees.

But, at the level of counties, towns and private properties, the information was incomplete.

Now understand that – in spite of the many jurisdictions involved – we're still talking about one big river full of rushing water – a force of physics.

What is especially sobering is that this is the preeminent river in the United States.

If its information was incomplete, what does that imply about information in countries with fewer resources?

Even before modeling takes place, vulnerabilities can be identified and there can be red flags that suggest all is not well.

For example, the damage and fall out from even short-term interruption of our Internet communications by hackers can be very serious.

So far, hacker disruptions seem to be caused primarily by individuals operating out of their basements.

But our vulnerability to an attack by a concentrated and professional group could have more severe consequences.

Are we comfortable with a small number of providers 'too big to fail' handling such a high proportion of our transactions?

Another example: in 2004, poor maintenance and lax regulation led to a power blackout for much of the northeastern US and parts of Canada.

What information would we want to monitor to prevent or contain future power outages?

Sometimes the threat is to the social fabric. Failed states and ethnic tensions that threaten to explode into civil war, increases in criminality and the actions of zealots are just the major factors. There are too many for any of us to comprehend but not too many for us to address collectively in an inclusive information network.

A VSM would provide a structure to map these and other factors in a consistent and coherent manner.

So far, I've spoken about the content that might make up a viability index.

Now I'd like to turn to the process of creating one.

While it is not possible to be specific about how such an index could be built, a few things can be said.

First, the index should be independent.

As an information commons, the indices would belong to everyone and no one.

A small amount of funding will be needed for design and web administration and maintenance. The information would be developed as open source.

Transition towns already have made a beginning, Pilot projects could start in university settings that would look at essential variables in their own areas. We've seen some examples at this conference.

Remember, we're talking about ten indices per entity at each recursion--and much of that information is already available, if not actually assembled.

In an open source context, these dynamic maps would begin in rough form and be improved over time with public participation.

The credibility of such an index could increase as has been the case with Wikipedia.

Also, like Wikipedia, statements could and would be challenged and in most cases further confirmation would be called for before making decisions.

To recap:

In spite of the negative attitude that many people have toward regulation and governance, we know that systems tend to stability but they may do so in ways that are counterproductive for human beings and the planet.

We also know, from Stafford Beer's work in Allende's Chile, that it is possible to create a large scale viability index that has the potential to monitor social systems on a proactive basis that employs the insights of systems science to avoid crises before they occur.

With these facts in mind. I suggest that we in the systems community begin to create a global viability index of variables in the public interest.

It could start as a grass roots phenomenon of information sharing and integration using the VSM and other tools.

People could be invited to participate from all over the world.

Once such a project got underway, I believe it would grow and self-correct along the way, much as Wikipedia has.

If the public could easily access such information, they could put pressure on governments, corporations and other institutions to act. Without public pressure, it is difficult for governments to act to change the status quo. A story is told about President Franklin Roosevelt. He met with some labor leaders and told them "I agree with you 100%. Now, make me do it."

A new view of governance is needed before a new role for government can emerge.

Continuous broadly inclusive measures are required to make connections between actions and their unintended consequences and between relationships and results.

As systems people, we deal with dynamic processes and the relationships between them. We are uniquely qualified to design a framework to integrate expert and grass-roots viewpoints in, or close to, real time.

And one more thing.

You've probably noticed that I don't consider this an academic topic!

We have knowledge of how systems work; we have methodologies and models; and we have a special responsibility to bring them to light.

If we don't promote a whole systems view of our challenges, who will?

Let's all put ourselves in the picture to create solutions. I hope you will all think about the potential for a viability index - or advance your own ideas.

The future of our planet may depend on it.

Thank you.