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Stafford Beer's viable system model and team syntegrity process in requisite variety

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Stafford Beer's Viable System Model and Team Syntegrity Process
An Exercise in Requisite Variety

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Learning from nature

- Both the Viable System Model and Team Syntegrity process are designs found in nature
- The human nervous system for the VSM
- The structure of a virus, a crystal or a regular solid - the icosahedron for Team Syntegrity
- Both methods rely on design principles in nature

Beer's influences

Warren McCulloch's work on nervous nets

Ross Ashby's work on requisite variety

Beer's work in Operational Research

Alex Bavelas's work on peripherality and centrality

All address complexity by filtering variety

The VSM

Five management functions support the many homeostats that make up the system's internal relationships and those between the system and its environment

Two ever-changing environments:

The present environment

The future environment

Their relative size, division and time scale depend on the system

Uses graphic shapes for functions: amoeba for environment, circle for operation, square for management and triangle for regulatory activity

From Beer's Brain of the Firm

- System One corresponds to the muscles and organs
- System Two to the sympathetic nervous system
- System Three to the mid-brain (pons medulla)
- System Three Star to the parasympathetic nervous system
- System Four to the diencephalon and ganglia
- System Five to the cerebral cortex

Or, more familiarly

- System One produces actions that are rewarded/supported by the environment
- System Two damps oscillations among System One operations
- System Three directs the inside and now of the combined operations for synergy
- System Three Star audits/examines specific aspects of operations
- System Four explores the future environment
- System Five monitors the balance between Systems Three and Four and provides identity and coherence

VSM's Seven Communications Channels

- Resource bargaining channel (two way)
- Command Channel
- System Two's Damping channel
- System Three Star's audit channel
- Channels linking operations with one another
- Vital channels in the environment
- Algedonic (pain/pleasure) alarm channel

Key VSM Homeostats

- Three/Four Homeostat between present and future

- Homeostats between System Ones and their environments

- Homeostat between System and Metasystem

- Homeostat between vertical authority and horizontal autonomy (from Beer) "Autonomy is a function of the purpose of the system".

- The VSM describes the necessary and sufficient conditions for viability
- It is recursive (scalable) – repeating each function at every level of interest. The design of the model's graphics support the depiction of recursion
- Most VSM designs and diagnoses choose a system-in-focus and go one up and one down
- Most systems are part of multiple recursive relationships with varying levels of accountability, e.g. management, owners, regulators…

VSM Applications

- Many applications in business and industry, governments, NGO's, universities…
- Can be used to design, describe or diagnose an organizational structure with requisite variety
- Most ambitious application was Project Cybersyn for President Allende of Chile
- Beer was asked to model the organization of the state-owned sector of the economy
- Story told in Eden Median's "Cybernetic Revolutionaries"

Cybersyn Project

- VSM's were done for factories and homeostats associated with essential variables identified

- Each unit identified eight to twelve indices to be reported daily or weekly such as orders shipped, orders in process, invoices sent, invoices paid, mishaps, customer complaints, absenteeism… Workers could select additional indices that would not be reported to management.

Indices were recorded as time series and analyzed using Bayesian statistical filters

Deviations from expected ranges reported Local management given prescribed times to deal with deviations depending on the severity

Some signals (like a fire) went straight to the top

Samsung should have gotten such a signal when the second Galaxy Seven caught fire

Cybersyn's parts

- VSM Models (three of eleven levels designed)
- Operations Room to coordinate actions
- Cyberstride statistical filtration
- Planning using Systems Dynamics
- Cyberfolk – implementation of Allende's aim that science should serve the people
- A mode to provide for public participation – not completed but contributed to Team Syntegrity
- See: 99percentinvisible.org/episode/project-cybersyn/
- Beer's "Brain of the Firm" 2nd ed.

Team Syntegrity

- Influenced by:
- W. Buckminster Fuller: "All systems are polyhedra"
- Balance between tension and compression
- Alex Bavelas work on Peripherality and Centrality
- Considered basic unit to be an infoset – a collection of people sharing information and interests

Syntegration standard format

- First preliminary step – formulate opening question – can be fuzzy
- Second preliminary step – select participants to populate the infoset
- The 2 to 3 ½ day event begins with individual comments on post-it notes
- Notes are clustered and a paragraph written up for each
- Twelve chosen to be topics

- Syntegrations select twelve topics from among those that emerge from the early discussions
- Topics are mapped onto the vertices of a regular solid – icosahedron, octahedron, diagonal cube
- Participants are mapped onto the edges each connecting the two vertices of their team topics
- Non-hierarchical arrangement – each plays a unique and equivalent role
- Participants play member, critic and observer roles in each of three iterations of team meetings
- All brought together in final plenary and report
- Process is facilitated but teams responsible for all content

Typical Outcomes

- Team meeting reports and final statements documented
- Key ideas reverberate around the structure and show up in different forms
- 90% of the information is shared
- Reduces the probability of surprises or unintended consequences
- Sharing of tacit knowledge
- Bonding among participants

Criteria for Success

- Skin in the game – real interest in the question
- Having requisite variety among the participants
- Confidentiality if the topic is sensitive
- Ability to act on the results of the deliberations – even if cannot make the final decision

Examples of Syntegrations

- The Future of Retail (at OCAD)
- The Future of the city of London (UK)
- Israeli/Palestinian group on the future of West Bank Settlements
- Problem Gambling and the Elderly
- Union Bank of Switzerland
- Colombian Ministry of the Environment

References

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