Successful Activism Strategies: Five New Extensions to Ashby

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Abstract

This paper reports on a fifth extension to Ashby's Law of Requisite Variety. It describes how the authors' five extensions to Ashby's Law give revealing insights into developing successful activism strategies.

These new extensions reposition Ashby's Law of Requisite Variety as a tool of politics and power.

Keywords: *Ashby's Law of Requisite Variety, complex socio-technical organisations, activism, strategic planning*

Introduction

Activists persuade institutions to act in particular ways, in spite of the fact that activists do not have the formal power and more frequently belong to constituencies not part of the formal decision-making stakeholder groups. Sometimes activists win and sometimes the institutions win. Why?

This paper describes new systems developments with examples of their use in activism. The use of activism as a case provides many integrative insights. .These effortlessly connect the subject matter of the paper to the conference themes. Activism by its nature exposes the details of the socio-technical nature of systems in the world. A simple exercise that demonstrates this is to ask oneself about the relationships between activism and the themes of the conference:

- A globally-connected virtual world.

- Applications of creativity to systemic problem-solving.
- Conceptual modelling.
- Critical systems.
- Information systems.
- Managing systemic development.
- Organisational systems.
- Regional and environmental systems.
- Social systems.
- System dynamics.
- Systems theory/systems thinking.

Conventionally, successes and failures of activism are analysed using critical analytical tools of the power situation and the negotiation processes. Geopolitical analysts such as Stratfor (Friedman, 2007) have professionalised these skills and techniques into tools for planning strategies to achieve preferred outcomes.

At heart, the traditional approaches to developing activism strategies have five components:

- Environmental scanning
- Advice of 'experts'
- Simulation and modelling
- Critical analysis (includes thinking situations through in terms of all the dimensions of power, resources, and timing)
- Scenario-building

These are supported by a raft of systems tools such as VSM, System Dynamics, Critical Systems Heuristics and second order Cybernetics.

This paper focuses on exploring the role of Ashby's Law of Variety, often claimed to be the only law that is adopted unquestioningly across all systems domains, in terms of the dynamics of power relations in complex socio-technical systems. These involve:

- Multiple constituencies – changing over time
- Multiple sub-systems
- Mixed ownership of sub-systems
- Varying purposes and roles of system and sub-systems
- Complex and dynamic distribution of formal and informal power and control

Examples of complex socio-technical systems include: media, transport systems, retail, manufacturing, construction, religion, political systems, education, computerised information systems, design activities, and legal systems.

So far we have derived five extensions to Ashby's Law of Requisite Variety that extend its role in terms of power and control in complex socio-technical environments.

These five extensions provide a simple way of understanding of the structural dynamics by which power operates in very complex scenarios. From an activism perspective, the use of these extensions to Ashby's Law of Requisite Variety offer the basis for strategies in which apparently obscure or innocuous actions undertaken at one time can create changes in power relationships later, regardless of whether the initiators are in formal power positions or not.

Application of the five extensions requires thinking several levels of abstraction above the usual approach to analysing power and political situations. Conceptualisation can be viewed as 8 levels.

1. Level at which things happen
2. Level at which people ordinarily plan what happens
3. Level at which people analyse about how people ordinarily plan what happens
4. Level of systems models and systems thinking (situations are seen as systems and systems thinking and analysis tools are applied)
5. Level of thinking about the variety in systems and the balance between control variety, system variety and environment variety
6. Level of thinking about the distribution of control, system and environment variety across sub-systems and their conceptual representations (especially important in terms of thinking about information systems)
7. Level of thinking about the time and location distributions of control, system and environment varieties
8. Level of thinking about the dynamic shifts in power and control that result from the dynamics of change in time and location of control, system and environment varieties.

Level 8 is the focus of the authors' research in which the five extensions to Ashby's Law of Requisite Variety are derived and applied. The effects, however, drive down through the levels to changing practical outcomes. At other levels, the five extensions offer insights into strategies to reduce de-facto power and to modify system characteristics in ways that will modify power relations over time.

Five new extensions to Ashby's Law of Requisite Variety

The five new extensions to Ashby's law of requisite variety derived by the authors are:

1. *For complex, layered and hierarchical systems involving multiple constituencies in which the distribution of variety generation and control is uneven across the system THEN the differing distributions of generated and*

controlling variety result in a structural basis for differing amounts of power and hegemonic control over the structure, evolution and distribution of benefits and costs of the system by particular constituencies.

2. *For complex, layered and hierarchical systems that have a variety of typical stable states of system structure, THEN the structural system state that the system will evolve into will depend on the relative locations of subsystems generating variety and the control subsystems able to use variety to control overall system variety.*
3. *Where differing sub-systems of control are involved in the management of a system and some sources of control are able to increase their variety to accommodate a shortfall of requisite variety in other control systems THEN the overall distribution of control between sub-systems and constituencies will be shaped by the amount and distribution of transfer of control to the accommodating control system and its owners.*
4. *In complex systems in which multiple sources of variety generation and variety control interact THEN the relative effect of different forms of system variety and control variety on system behaviour and system control are typically dependent on their relative transaction costs.*
5. *In complex systems in which multiple variable sources of variety generation and variety control interact and in which control varieties are generated dynamically to respond to changes in system varieties THEN relative control of the feedback loops driving control varieties shapes the future distribution of power and hegemonic control between sub-systems and constituencies over the structure, evolution and distribution of benefits and costs of the system.*

Review of previously successful activist situations suggest that success in activism requires acting in alignment with the insights provided by the above extensions. We suggest that activists fail when they undertake activities and strategies that go against the above extensions. Success, however, requires persistence through the time for the changes in system external behaviours and shifts in power and control to occur, AND for the shifts in power and control to be sufficient.

Example of a complex socio-technical system – airports

The case below (see, also Love & Cooper, 2007a) illustrates the application of the five extensions in a mixed hierarchical and non-hierarchical complex socio-technical system – an airport. The study demonstrates insights gained about the flow of power and control between the many constituencies involved.

Airports are a typical example of a complex socio-technical system. They involve people and technology. They have multiple subsystems, many of which overlap and are capable of fulfilling similar roles. For example, passengers and guests can be directed round the buildings and environs by ticket staff, security, signage, and by the structure of the buildings. Airports have multiple constituencies with differing amounts of power distributed over a large number of interdependent subsystems. Distributions of power and constituencies change over time.

Airport systems involve a combination of intelligent, active and passive electronic, physical, human and animal (quarantine and security checking) systems with many processes crossing system and subsystem boundaries. Sub-systems can be outsourced so that control of some sub-systems (and intention to locally sub-optimise) potentially lies outside the system in focus. System characteristics, functions and loci of control are both changing and emergent. This latter can perhaps best be seen in times of civil unrest in which external agencies such as the army, police, medical experts, engineering systems designers, information systems designers, and security experts can intervene and strongly shape internal system functioning and structures in ways that can shift the locus and balance of power and the ways benefits are distributed to constituencies.

Extension 1 to Ashby's Law: *The distribution of variety and controlling variety across constituencies shapes power relationships and distribution of benefits.*

Airports are organisationally complex with a wide range of services being voluntarily and involuntarily available and used on the site. These are usually associated with specific constituencies each with their own internal management including: ticketing; passenger, luggage and freight logistics; general security; plane-related (anti-terrorism) security; quarantine services; retail and food services; parking services; customs services; immigration management; building services; engineering services relating to airport and environs; health and safety; medical services provision; religious services; engineering services relating to aircraft; engineering services relating to flying infrastructure; coordinating management groups and air traffic control. As the system evolves or is subject to internal or external changes, the amount and distribution of generated variety changes. Planned or unplanned, controlling variety dynamically changes to match the amount and distribution of generated variety. System regulation always occurs, regardless of the provision of explicit control variety and its locations. The system functions in whatever way it functions unless failure is catastrophic. The necessary implicit unintentional controlling variety results from multiple sources which include the relative transaction costs, system constraints, timing and sequencing issues, and unplanned aspects of system structure. Thus, the provision of control variety does not necessarily occur in a rational way in which there is a matching between new generated variety in an area for which a sub-system is responsible and the provision of new control variety in that subsystem . For example, if there is a security problem and internal security cannot respond sufficiently, then it becomes a matter for other security systems such as police or the military. Other changes in the distribution of variety may be more prosaic. For example, if retail processes began to dominate an airport's commercial activity then the constituencies associated with retail activity would likely increase their controlling variety and in parallel, there would be a shift in the power balances. If, however, the additional controlling variety were to be supplied by another constituency or group of constituencies such as those charged with expediting passenger movement to planes or those responsible for minimising carry on luggage (both of which impact on retail activity), the outcomes and balance of power relations are likely to be different. In both cases, the benefits to passengers and other constituencies are likely to change.

Extension 2 to Ashby's Law: *In a system that can have multiple stable configurations/structures, the relative location in the system of variety generators and suppliers of control variety will influence the choice of system structure.*

In airports, management of access is a key issue for many constituencies. Access control crucially depends on accurate identification and information. The physical control of access after the usual processes of personal identification and information gathering is most easily done with physical restraints such as walls and doors. Choice of information gathering technology dominates access design. For some of the constituencies involved in access management, their primary controlling variety is related to direct inspection of an individual for identification and for gathering information about them. For other constituencies, control variety can be exerted via surrogates such as identity cards, radio frequency identification devices, luggage smell (via dogs) and uniforms. Airports can manage access in several ways. The choice of configuration is dependent on the relational positioning and ability of constituencies controlling variety to use their control variety to influence overall system variety. An example of this is the way that airlines are now managing passenger variety associated with check in processes by moving these processes earlier in the system timeline. In some cases, it is possible to 'check in' for the flight before leaving a hotel or 'check in' 'online' at home or at the airport. This is possible because airlines' contact with the variety-generating passenger is closer to the start of processes. In turn, these control variety interventions shape overall system configuration in terms of managing luggage and security and the distribution of space and logistics round the site. Contrast, for example, some small European provincial airports in the 1980s with all luggage handling, customs, and security management happening on the tarmac next to the plane. Another contrasting example is the now defunct People's Express airline, which managed ticketing variety issues by selling tickets in flight and dealing with payment defaults using the police and conventional legal processes on landing, rather than controlling access to passengers before take off.

Extension 3 to Ashby's Law: *Where shortfall in controlling variety by one constituency group or sub-system is accommodated by increase in controlling variety by another constituency/sub-system then power and control tends to be redistributed to the constituency(ies)/sub-systems(s) providing the necessary additional controlling variety*.

An example already mentioned is when one security constituency is limited in the control variety it can provide to respond to a security problem and the additional generated variety is 'mopped up' by increase in control variety of other security constituencies. Alternatively, the mopping up of excess variety can occur through actions of other constituencies. For example, the additional variety from techniques of plane hijacking was matched by engineering services' increasing their controlling variety through their design of secure cockpit doors. In these cases, there is an increased access to power and control of the distribution of benefits and to shaping the system structure by the constituencies providing the additional controlling variety.

Another example is airport design processes. The more variety is controlled in the earlier stages of airport system design, the more the outcome is likely to be similar to what was conceived and intended. Typical variety-controlling activities used by design teams include using well-tested design processes, applying design checking and validation, utilising construction and engineering research and experience, market research, prototyping and user testing. Any outstanding variety, however, will be accommodated through alternative variety control mechanisms such as repairs, building and infrastructure design modifications (often incorporated into a later 'refurbishment'

schedule), and litigation leading to compensation. These latter methods 'mop up' excess variety to result in the intended output of an airport system that functions as expected by all constituencies, particularly stakeholders. Each time variety is 'mopped up' in an unplanned way through sub-systems outside the design process, the balance between constituencies in control of the system is changed. Power becomes transferred to constituencies in different ways from those planned during the design process.

Extension 4 to Ashby's Law: *Relative effects of elements of controlling variety are dependent in a Coasian sense on their relative transaction cost.*

This extension builds on the Coase Theorem, derived in 1937 by English economist Ronald Coase and the primary reason for his 1991 Nobel prize , which points to the dominance of transaction cost in determining the final distribution of value that result from initial allocation of property rights.

A recent example of the application of Extension 4 is in outcomes following a proposal that security personnel who have national security clearances such as. FBI and CIA staff should have expedited passage through airport security systems because their provenance has already been checked by a higher level security agency (Schneier, 2006b). In this case, the additional generating variety individuals arriving with different security status and needing security clearance can be matched by several modes of controlling variety. There are several possibilities. For example, personnel with national security clearances could be security checked the same as anyone else. They could be given free passage. They could have a special process that took into account that their clearance must be especially well checked because it is of more value to falsify. Alternatively, they could be given additional privileges and authority over and above existing airport security staff in respect of their national security clearances. In terms of systems outcomes, all of these appear to make good sense. Viewing the choices in terms of 'transaction costs', however, factors in the 'costs' of establishing and running the alternative systems along with the potentially significant additional costs associated with failure of the security system. An example of such a failure would be if a terrorist obtained airport security privileges by obtaining or falsifying national security identification. In real life, the outcome was that all personnel have to pass through the standard system of airport security and undertake normal passenger security assessment regardless of their other security clearances. The reason is the relative transaction costs: the current system minimises transaction costs overall. This situation contrasts with an alternative in which passengers can elect to be security checked by an approved external private security organisation and given an individual security threat assessment and a 'registered traveller' ID that enables them to bypass the initial airport security assessment processes (New York Times News Service, 2006). This reduces a passenger's time spent in security assessment processes at the airport by about 90%, with a cost to the traveller of around $80 per year. The alternative security assessment processes remote and within airports are expected to be undertaken by approved external organisations. The reasons for the viability of this change also depend on changes to transaction costs. The balance of transaction costs has shifted with the changes in the variety mix. Participating passenger's shoulder some of the transaction costs. There is a redistribution of benefits via reduced costs for the existing security providers at the airport. 'Registered Travellers' benefit by jumping the security queue.

There are slightly reduced queue lines for ordinary passengers; and there is a new revenue stream for the constituencies providing the new security services. There are also likely variety changes in relation to management of airport space and passenger logistics. Again, in terms of the variety underpinning system design, all of these changes are likely to affect the relative balances of power and control in an airport ways described by the three earlier extensions to Ashby's Law.

Extension 5 to Ashby's Law: *control of the feedback loops driving control varieties shapes the future distribution of power and hegemonic control.*

Examples of feedback loops are airport management procedures, security response procedures, and airport internal and external planning such as for retail expansion, parking or new runways. Obtaining power by influencing control and ownership of feedback loops can be effective in changing the paradigms within which 'problems' are viewed. Take for example security. Passengers, airport workers and families living near an airport are concerned that security is real and effective. In contrast, for airport management, airline marketing specialists, investors and government, security considerations may be strongly influenced by concerns about maximising profits or staying in government and thus tend towards security theatre rather than real security (Schneier, 2003, 2006a). Establishing influence in the feedback loops by which control variety such as security or airport planning are actualised results in a shift of power and control over the whole system behaviours. There are three levels at which influence over feedback loops can be undertaken. The first is by direct participation in the feedback loop process. One way of doing this is by membership of appropriate committees. The second is at a higher level, by influencing the processes by which feedback processes are established. This is becoming more important as feedback loops are becoming automated via artificial intelligence or algorithms. The third approach is conventional by creating additional information paths via media and lobbying to influence the actions of feedback loops.

Implications for activist strategy-making

For activists working in complex situations, the first concern is to identify whether it is layered and hierarchical. It is not only in terms of conventional hierarchical authority involving managers, owners and sub-ordinates that is of interest, there are many systemic aspects of hierarchy. For example, in the case of learning object systems, there are hierarchies in software and hardware subsystems (this example is documented in Love & Cooper, 2007b). If a complex subsystem is hierarchical, the next step is to identify the distribution and 'ownership' of those subsystems creating system variety and the relative amount of variety they create – not only as a snapshot, also changing over time. In parallel, is to identify the distribution and 'ownership' of those subsystems creating control variety and the relative amount of variety they create, again as an understanding of the way these change over time. At that point, it is possible to infer from this structural information, what changes in the distribution of variety will result in changes in the balance of control.

Activists can then attempt to shift the distribution of control and system variety with subsequent shifts in the balance of control.

Note: this is a much easier job than fighting for control or increasing power to the level that dominance over the other parties is possible

Learning object systems (LOS) provide a good example. The original military drivers of LOS based them directly on XML (extensible markup language) as if they were business systems. This made good sense in the highly controlled military environment. Extended into general education it became problematic – in ways that offered large commercial companies the opportunities to control the e-learning economy through proprietary middleware. In effect, control variety was being exerted at the bottom of the hierarchy and could not address variety emerging higher in the system. Its failure offered opportunity for a shift in power to those who could provide control variety (Extension 3). This reduced the power and influence of the free-thinking activists and those teaching and producing educational material relative to the commercial concerns. A successful activist strategy, currently being followed, is to participate in the ownership of control variety further up the hierarchy. In this case, it involves a drive for the adoption of RDF ('resource definition framework' that is a core aspect of the Semantic Web framework (Manola & Miller, 2004)) as the standardisation mechanism, rather than XML. RDF provides an internationally defined top down framework. Its effect is to minimise the need for proprietary intermediate systems. Thus reduces the power and control of commercial and government institutions and redistributes some power and control of benefits to teachers, the creators of the value of the educational material.

Where complex layered hierarchical systems can have different discrete states (such as learning object systems) then activism efforts can be efficiently directed into adjusting the relative distributions and amounts of system and control varieties to trigger a change in system state (Extension 2).

An alternative activist approach is to a) identify weaknesses in control variety in situations in which activist 'owned' sub-systems can expand to fulfil any shortfalls in controlling variety, b) undertake acts that will overload existing control variety, and c) use 'owned' sub-system control variety to stabilise the system. This results in a shift of power towards the activist position (Extension 3).

An example is unions offering to undertake some of the management in complex organisations. Organisations providing outsourcing services have similar potential in arranging a shift in power and control. This latter is recognised by Japanese car companies who in response bring first tier suppliers 'into the family'.

A second order effect is when there are multiple ways of creating system variety and control variety and thus multiple ways that the system can behave and evolve. Extension 4 predicts that the system response and evolution will depend on the relative costs between alternatives of small step changes (i.e. their transaction costs). This is relatively easy to see in the intense competitive activity in the dot-com boom involving different approaches to providing banking and eCommerce services. The advantages of differing approaches depended directly on their ability to minimise transaction costs for each of the constituencies (constituencies include: banks, tellers, administrators, service providers, customers, system designers). The shakeout was to minimise overall transaction costs to create maximum sum of benefits available to constituencies. In practical terms, the

relative power and control distributions meant that the banks were able to allocate most of the benefits to themselves and even increase real transaction costs to customers!

Extension 5 points to a wide variety of potential activism strategies. It describes one of the most common activist approaches. Extension 5 proposes that change in the relative balance of control of system behaviour can be influenced by affecting the feedback loops by which control variety is modulated to respond to changes in system variety. Activists can influence many of these loops through approaches such as lobbying, increasing public awareness, consciousness raising, deliberately increasing system variety, and by increasing the need for high level control variety (laws and standards).

An example of this approach is the recent activist activities in the US relating to vehicle carbon emissions by which activists acting to secure differing standards at State level resulted in requests by vehicle manufacturers to the Federal government to set national standards. The pressure was done in effect via extension 4 modality – increasing the transaction costs. Transactions costs would be increased for vehicle manufacturers if they had to satisfy different standards in different states. The upshot of the increase in system variety at state level (from the point of view of the vehicle manufacturing sub systems) was an effect on the feedback loop to increase control variety higher in the system.

Conclusion

This paper described an approach based on five extensions to Ashby's Law of Requisite Variety for gaining additional insights into the redirection of power and control in complex socio-technical systems. This fifth extension is described for the first time in this paper.

The paper illustrates the more general application of each of the five extensions to Ashby's Law of Requisite Variety via a case study of airports. It then points to how similar techniques can be used in developing successful activist strategies.

The richness of the applications described in the paper span the full breadth of the conference themes.

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