

**Workshop on
“The Cynefin Framework and its Applications for Singapore Public Officers”**

**by Mr Dave Snowden
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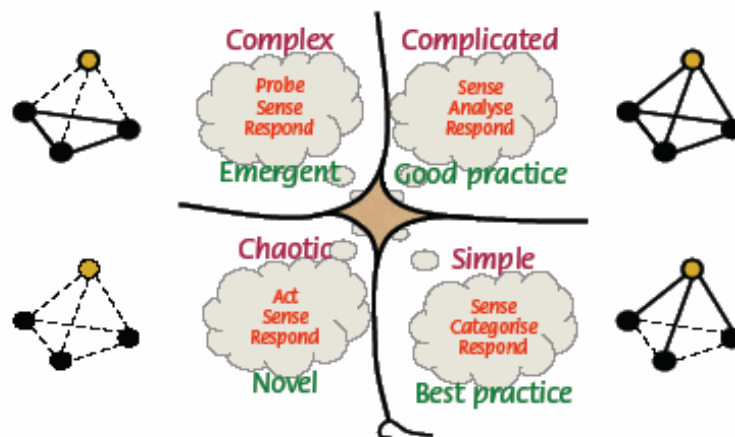
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Mr Dave Snowden began by commenting that Singapore’s success in the past was closely linked to its agility vis-à-vis large countries, and the challenge going forward was how Singapore could remain agile for the next 40 years. Traditional governance tools and management approaches might not help policymakers anticipate emergent issues. Anticipatory governance—the ability to anticipate issues, handle uncertainty and deliver services to the populace in an increasingly complex future—is critical. The objective of the workshop was to help participants discard irrelevant mental models and think in new ways.

Naturalising Sense-making

Mr Snowden defined naturalising as the return to the basis of natural sciences. In his view, organisations should stop using traditional social and management sciences, and build new theories of social systems based on new discoveries in the natural sciences. He listed three such fields in natural sciences: complex adaptive systems theory (also known as the science of uncertainty), cognitive science and evolutionary psychology. Sense-making is the way people made sense of the world so that they can act in it.

The Cynefin framework



The Cynefin Framework

The Cynefin Framework was designed to help policymakers make sense of our complex environment and to provide a guide on appropriate approaches and structures for different types of challenges.

Ordered Systems

There are two types of ordered systems: simple and complicated. Cause-effect relationships in a simple system are self-evident, repeatable and can be enforced by processes. Agents’ behaviour is constrained by the rules of the system and happens within

narrow pathways. With sufficient data, it is possible to predict the future once relevant relationships are established. The appropriate structures for simple systems are hierarchical in nature where centralised authority is imposed. A simple system is the only legitimate domain for best practices and appropriate business tools include that of process reengineering.

In a complicated system, cause-effect relationships are repeatable but only self-evident to experts, or after analysis. There are usually a few right ways to do things and experts can help to validate the different approaches. Complicated systems are therefore the domain of good practices. Structures for complicated systems are based on consensus among the experts, are almost oligarchic in nature and have little freedom.

However, there are limitations to expert judgement. When a complicated system becomes a complex system, there is a need to increase the diversity of opinions to prevent constraints of expertise by existing experts.

Chaotic Systems

There are no structured cause-effect relationships in chaotic systems—agents are unconstrained, and everything is turbulent and does not make sense at the system level. People can predict reasonably what could happen by using tools such as statistics, probability and large number mathematics. There are no connections for structures in chaotic systems.

Complex Systems

Complex systems do not have simple cause-effect relationships. The very actions of agents also modify the system, leading both agents and the system to co-evolve over time. This constrains any analysis of inter-relationships within the system. Complex systems can evolve into something more structured/ordered, or even more unstructured/chaotic. If a complex system becomes overly constrained, informal networks may evolve, or may worsen into a chaotic system.

There are multiple modulators influencing the agents in complex systems, and no linear cause-effect relationships between modulator activity and systems. The modulators change constantly and a change in one modulator will influence another. The more we account for the past by our understanding of modulators, the lower the risks when moving forward in future. Mr Snowden suggested the technique of modular mapping—trying to account for the past by understanding the influence of modulators. Dark matter is the gap between what can and cannot be accounted for in complex systems.

Examples

A Teenagers' Party

Mr Snowden used the metaphor of a children's party to illustrate the different approaches that might be adopted for the three types of systems (ordered, complex and chaotic).

At a teenage party, akin to a "chaotic system", teenagers may dabble with drugs and alcohol in their journey of discovery. An ordered approach could start with an adult screening a motivational video and setting the learning objectives of the party. Motivational posters will be given, reminding children of the learning objectives, and clear milestones established to measure progress towards the ideal outcome. At the end of the party, the actual outcome would be evaluated and system improvements mandated.

In a complex system, there would be boundaries on the teens' movement during the party. The boundaries should be flexible and resilient enough to take some breaches without massive failure, unlike rigid boundaries which break catastrophically when breached. Good attractors, such as a football game, video or barbecue, could be placed within the boundaries to divert attention away from bad activities. To encourage beneficial patterns to emerge, the impact of good attractors have to be amplified and that of bad attractors dampened or destroyed. Managing beneficial coherence amongst attractors is at the heart of complex system management because it expands the evolutionary potential of the system. The role of government is to manage boundaries and attractors to encourage beneficial patterns, and not to manage individual agents' behaviour in detail.

The Magic Roundabout



Mr Snowden described the Magic Roundabout in Swindon, UK, which contained a smaller roundabout at each of its five intersections. This was an example of a complex system control mechanism with boundaries, attractors, weak or strong traffic signals and distributed cognition in drivers. Traffic patterns adjust and change throughout the day, enabling the system to cope with radical permutations and shifts in the environment. The system proved to be both cost and traffic-effective. A more ordered, highly constrained, centralised cognition alternative was to introduce a single multidirectional traffic light-post to control all traffic movements. This would have to be continually reengineered or redesigned with any changes in the system, and would cause massive traffic activity if power was cut.

Ontological Diversity

Different diagnostics, intervention tools, investigation methods and governance models should be used for different systems, cultures and social environments. Attempting to replicate successes of pilot policies to different contexts where they would not work is dangerous. Instead of replicating successful outcomes, starting conditions should be replicated. Business process reengineering and other management sciences were developed for manufacturing companies operating in closed and ordered systems, and are less applicable for service organisations as they operate in complex environments.

Consensus and uniformity are inappropriate for governance in a complex system; there is a need to allow and manage diversity of perspectives and agent interaction for novel solutions to emerge. Mr Snowden introduced the method of ritualised dissent—people are placed in situations where their ideas are critiqued by others. Eventually, highly resilient policy ideas would evolve. He also encouraged a shift from fail-safe design (where the design

never fails) to safe-fail experimentation (running small experiments to find the best solution, by creating a safe environment for these experiments, even if they fail) to stabilise complex systems. Safe-fail experiments do not have to be consistent and could even be contradictory.

Weak Signals and Hindsight

It is important to scan systems for weak signals of emergent phenomena. If a system is over-structured, it would be impossible to see weak signals and the capability to anticipate the future will be eliminated. Due to uncertainty, hindsight does not necessarily lead to foresight, i.e., we cannot predict the future by learning from the past. With hindsight, a complex system may look like an ordered system and lead to retrospective coherence. There is also a danger that people would converge too quickly on a solution—premature coherence—such as rushing into policy decisions too quickly. In a complex system, it is sometimes necessary to hold back and allow the system to evolve and present more opportunities.

Conventional scenario planning based on ordered discussion may constrain views of the future. Small deviations from these scenarios based on force or factor analysis will not be noticed until it is too late. Mr Snowden advocated real-time scenario planning—gathering fragmented anecdotes, pictures from the past and getting a large and diverse group of people to assemble scenarios in real time rather than in advance of situations.

Strategy to Navigate Complexity

Mr Snowden shared a basic strategy in confronting a complex situation. Three simple questions would be posed:

- 1) What can we change?
- 2) Of the things that we can change, for which can we monitor the emergent impact of those changes?
- 3) Of the things that we can change and monitor, which should we change (probe/amplify/dampen) and in what combinations to facilitate the unknowable journey?

This was his three-point process to manage complex, emergent situations.

Wisdom of Crowds

Mr Snowden explained this concept by citing an example of a crowd at a fair was being asked to guess the number of jelly beans inside a large jar. Each individual would make a guess without knowing the other's guesses. Often, the average would be more accurate than the best individual guess. The wisdom of crowds is due partly to large number theory and partly to distributed cognition.

To find out which policies would work in a complex environment, Mr Snowden suggested distributing several different perspectives on a complex problem in the form of pictures, stories or questions to pre-prepared lists of people and/or to post on the internet for engagement. The results would be collated and summarised in a single diagram. This would apply the “wisdom of crowds” concept in a more structured, constrained way.

Language and Patterns

Mr Snowden explained that people from different language backgrounds focus differently on objects and contexts when looking at things. Those from pictorial language backgrounds tend to focus more on contexts in pictures, whereas those from linguistic

backgrounds focus more on objects. There are no deep, consistent structures in language. The brain is constantly adapting, and language and the brain co-evolve.

When the human brain first comes into contact with a new pattern, it will scan fragmented patterns stored in its long-term memory and do a first fit match with the frequently used patterns nearer the surface of the memory before making a judgment. This is because humans evolved as pattern recognition intelligences, not information processing devices which make logical, rational decisions.

There is no single mental archetype but many fragmented models which assemble and blend in different ways, which cannot be managed or determined top-down. Overemphasis on getting everyone to conform destroys collective cognitive capability. Mr Snowden warned that the weakness of an elite education was its failure to recognise many other kinds of abilities (e.g., ability to absorb and reproduce facts, ability to synthesise and think differently) and the need to balance all of them, and not filter out different ways of thinking.

Measurement Techniques

In the UK, government-funded agencies implement outcome-based measurement systems to prove that their work adds public value. These measurement systems are stressful, costly and excessively constrain the systems, leading to unintended undesirable results.

How then can impact of work be measured? Surveys and questionnaires do not work because they are hypothesis-based research methods and aim to prove or disprove hypotheses. There is also a huge delay between data capture and intervention because of the time taken to process results. Focus groups are also not effective because research has shown that facilitators may be biased.

Stories increase the depth of contextual learning and understanding. Narratives make intervention easier and access to real intelligence improves decision making. This method is a form of complex systems management and achieves the three-fold objective of research, real-time monitoring and knowledge management.

Risk in the Cynefin Framework

Risk can be easily measured in a simple space, and can be managed by compliance control and management. Managing risk in a complicated space requires balancing probability of the outcome with the cost and consequence. These techniques cannot be applied to non-ordered spaces because of the lack of predictability. Risk in complex spaces can be managed by ensuring boundaries and attractors are stable, and dark matter quotient is low. Managing risk in a chaotic space is not about advance measures but the capability of the organisation to handle crises.

Mr Snowden concluded his talk with an airline cabin crew analogy as a way to improve organisational capabilities. Crews have high collective cognitive capability as a result of well defined roles and role expectations, even when crew members have not worked together before. The cognitive capacity of a crew is deemed to be higher than the collective cognitive capacity of its component individuals. Crews allow distribution of authority outside the standard hierarchy for specific purposes. Mr Snowden advised organisations to deploy crews rather than other organisational models because they are more sustainable and have better abilities to cope with crises. Organisations should start identifying critical roles for handling crises and training people for these roles.