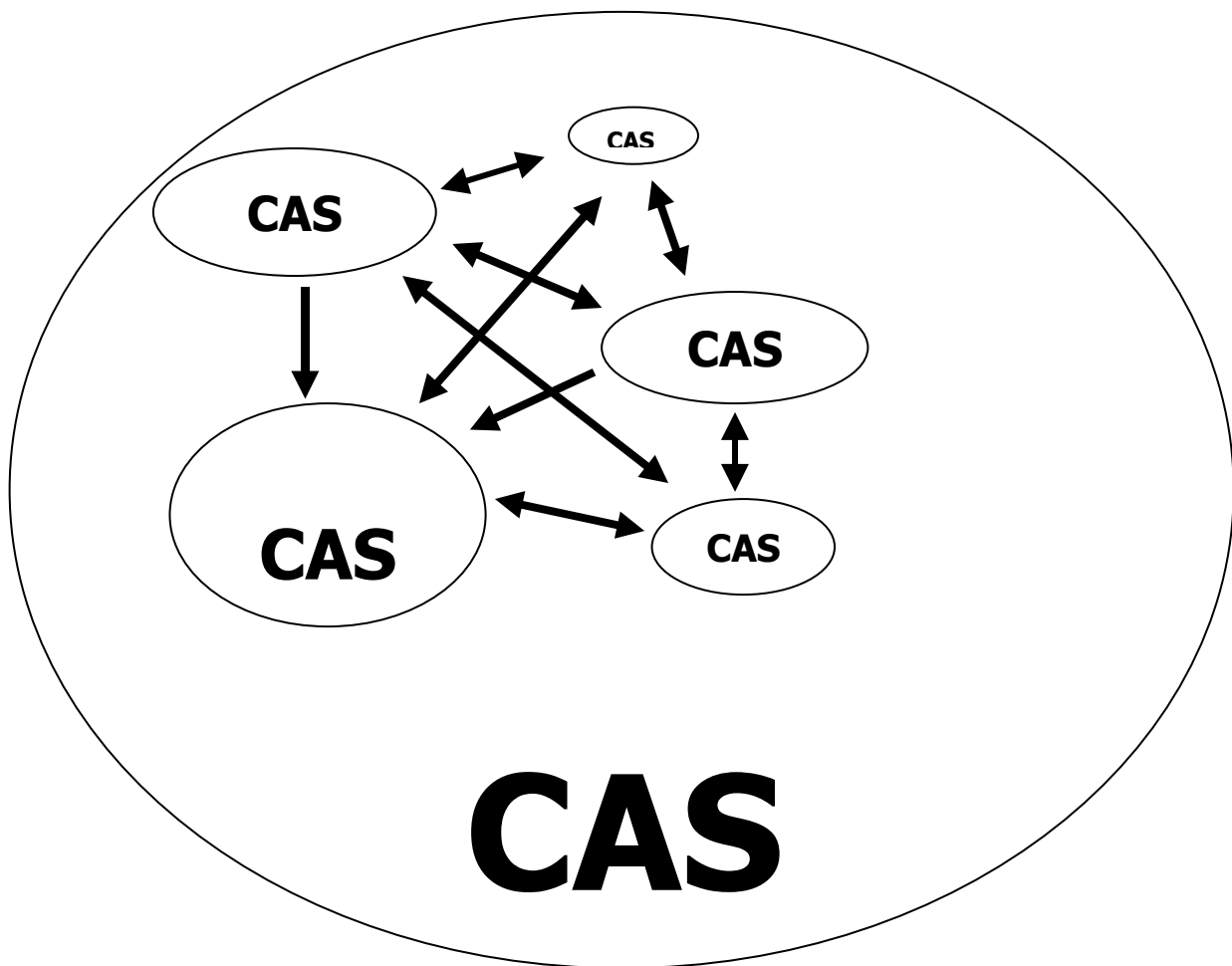


Complex Adaptive Systems (CAS)

Co-Working Solutions Pty Ltd



What's a CAS?

In systems theory a system is defined as a group of interrelated processes that function together to achieve a common purpose. Man made systems vary in complexity from the very simple (a swimming pool filtration system) to the moderately complex (a cellular phone network) to extreme complexity (a federal government bureaucracy). A bicycle is a simple system - a frog is a complex system.

A general rule of thumb is the more open the system is to its environment, the more adaptable and complex it becomes. Complex Adaptive Systems (CAS) are those highly complex systems, either man made or natural, that interact with and continually adapt to their environments. And like those wooden Russian babushka dolls, you can generally expect to find CAS within CAS within CAS

Cause & Effect

CAS have non-linear cause & effect relationships. Often impacts do not immediately follow actions - it can take months or even years for the full results of an action to surface. Also, in non-linear systems, size doesn't matter - the size of input does not indicate size of output/result. Inputs can often have impacts far out of proportion to their size. A seemingly insignificant action can sometimes have unanticipated and far reaching results. The result you get is often not the result you had expected.

Example: 100 years ago, when we started burning fossil fuels in earnest, we didn't know the result would be the massive release of greenhouse gases, destruction of the planet's ozone layer and global planet warming.

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Diversity

CAS also thrive on diversity. High levels of diversity result in increased potential for information, which in turn results in greater potential for adaptation and success in a changing environment. Diversity depends on the quality of the relationships between individuals, not just having the key individuals themselves within the CAS.

Synergy

In a CAS, the whole is always greater than the sum of its parts. The CAS has attributes that are beyond the capacities of its individual agents, some for the better and some for the worse. Also, a CAS is an integrated whole and must function as a whole if it is to achieve its common purpose. You can tear down a bicycle to its smallest component part, reassemble it and it still works. We can't do the same with a frog. At some point when disassembling a frog, the entire system will fail and you won't be able to get it going again.

Emergent properties

The outcomes of a CAS emerge over time. They emerge from a process of self organisation, not by design or control of an external body or single internal mechanism. Emergent outcomes are the result of these complex interrelationships and self organisation between agents. Emergence implies unpredictability.

What are the implications for strategic planning?

The obvious question is: "How can we plan effectively, if we can not predict how a CAS will evolve?" Instead of trying to predict and direct outcomes, why not tinker with the landscape / environment in which the organisation operates?

- ◆ Develop better strategies that concentrate on improving interrelationships, decision making, knowledge management, communication, etc... within and between agents in a CAS
- ◆ Increase the diversity of the agents within the CAS and the feedback systems that support them. The more diverse the organisation and the quicker it can learn, the greater its chances of survival
- ◆ Increase the capacity of staff to sense changes in the environment and "self organise" to adapt systems, processes and products to meet the changing needs of their clients.
- ◆ Take great care when restructuring. Streamline processes and procedures if you have to, but do so without impacting the diversity of the organisation and its ability to respond to the environment. This is a frog you're dealing with, not a bicycle.
- ◆ Find appropriate "attractors" → those strategies or new initiatives, big or small, that will help shift the strategic direction of the organisation. Try and identify those simple initiatives that can have a big positive impact.
- ◆ Alter the rules of the organisation: changing incentives, punishments and constraints is one of the best ways to quickly change the behaviour of the individuals and sub units within a CAS.
- ◆ Mind the web: Your organisation exists in a complex web of interrelationships with its environment, both man made and natural. Take care of your stakeholders (internal and external) and avoid initiatives which work against their strategic interest. Take care of your natural environment and avoid actions which will decrease its long term capacity to sustain you.