4.5 Leveraging the iceberg

Bringing about change in a complex situation involves identifying what system scientists call “leverage points”. To understand leverage points we need to look at the law of levers in physics. A lever is a machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum. A lever amplifies an input force to provide a greater output force, which is said to provide leverage. The ratio of the output force to the input force is the mechanical advantage of the lever.

Leverage is such a great invention that the Greek mathematician and engineer, Archimedes said: "Give me a place to stand on, and I will move the Earth."

In a complex system a leverage point is a place of influence where any action is compounded to gain some kind of advantage. We can use the iceberg to help us find leverage. As a general rule, the further we move down the iceberg, the greater the leverage. Leverage thinking consists of looking for leverage points, and not quick solutions.

At the tip of the iceberg are the events that we see in everyday news. They generally monopolize our attention and provoke some kind of reaction. Below the surface are the patterns of events over time. When we recognize patterns we can adapt our behavior and actions in anticipation. “Reaction” and “adaptation” are the two action modes that we most often use. They often pay-off in the short-term, but they generally won’t make the events go away or the patterns change. Reactive actions may also have unintended consequences or be poorly thought through and taken in response to some pressure to “do something” or to relieve a painful symptom. We saw this earlier in the chapter with the “shifting the burden” and “fixes that fail” archetypes. We need to dive further down the iceberg to find more powerful leverage points.

After all, one of the main reasons we work so hard to model and understand the structure of a system of variables is to be able to influence it. An understanding of the structure and how it generates behavior can help us choose the most pertinent leverage point. Finding leverage in the structure requires a “creative” action mode.

In her work *Thinking in Systems*, Donella Meadows identified a number of such structural leverage points. Here are some examples.

The values of some parameters are relatively easy to change in a systemic structure such as subsidies, taxes and public spending. However, these remain simple numbers and as they do not affect the structure itself they won't fundamentally change the change the behavior of the system. For example, increasing the size of the police force will not make the reasons for crime disappear.

The size of stocks can sometimes be manipulated to act as buffers in a system and protect it from outside shocks or slow down change. Have you noticed how more and more start-ups provide employees with fun workplaces, free food and even nap rooms? These may increase levels of morale and help hard-worked employees recharge batteries. Not surprisingly, researchers have found that the negative impact of emotional exhaustion on job satisfaction was significantly lower for workers’ who experienced greater levels of fun at work.

Manipulating stock levels is sometimes impossible though as stocks are often physical infrastructure such as warehouses or reservoirs that cannot be quickly changed. Building new public housing for example to improve housing conditions for low-income families takes time.

More leverage can be found by looking at the rules at work in a systemic structure. The rules, incentives and constraints dictate the way a system operates by encouraging or discouraging causal relationships. For example, France gives tax incentives to investors who build social housing. This encourages a link between private investment and the availability of social housing.

By changing rules and incentives we can sometimes change the structure of a system. Researchers recently found that teams playing a competitive fishing game with a renewable resource rejected optimal**,** sustainable policies due to incentives generated by short-term accounting. They called this behavior “management myopia” and suggested “measuring a larger, balanced set of performance indicators on which managers develop their strategies.”

Leverage points with far greater mechanical advantage can be found deeper down the iceberg in our mental models. In many situations it is our understanding of cause and effect relationships that allow for structural relationships to exist in the real world. Commonly held mental models in the USA and the USSR during the Cold War were in part responsible for escalation of the arms race.

There is a one deeper level of perspective: vision. It is our world-view, paradigm or mind-set that determines how a system should work. While mental models picture how things do work, vision pictures how they should. Vision determines what variables interact and with what purpose. This is the level of greatest mechanical leverage, because any change in our vision of how things should work will mechanically change the variables and their relationships with one another. For example, computer programmer Richard Stallman’s vision that computer software should be free in the early 1980s gave birth to the free software movement and stimulated the emergence of the open source software development model. Free and open source approaches generate behaviors that are very different to those of other businesses and organizations. The hacking and maker movements are other fascinating examples of alternative visions.

These five different levels of perspective and leverage – reaction, adaptation, creation, mental models and vision - provide us with a rich palette of possible systemic actions.