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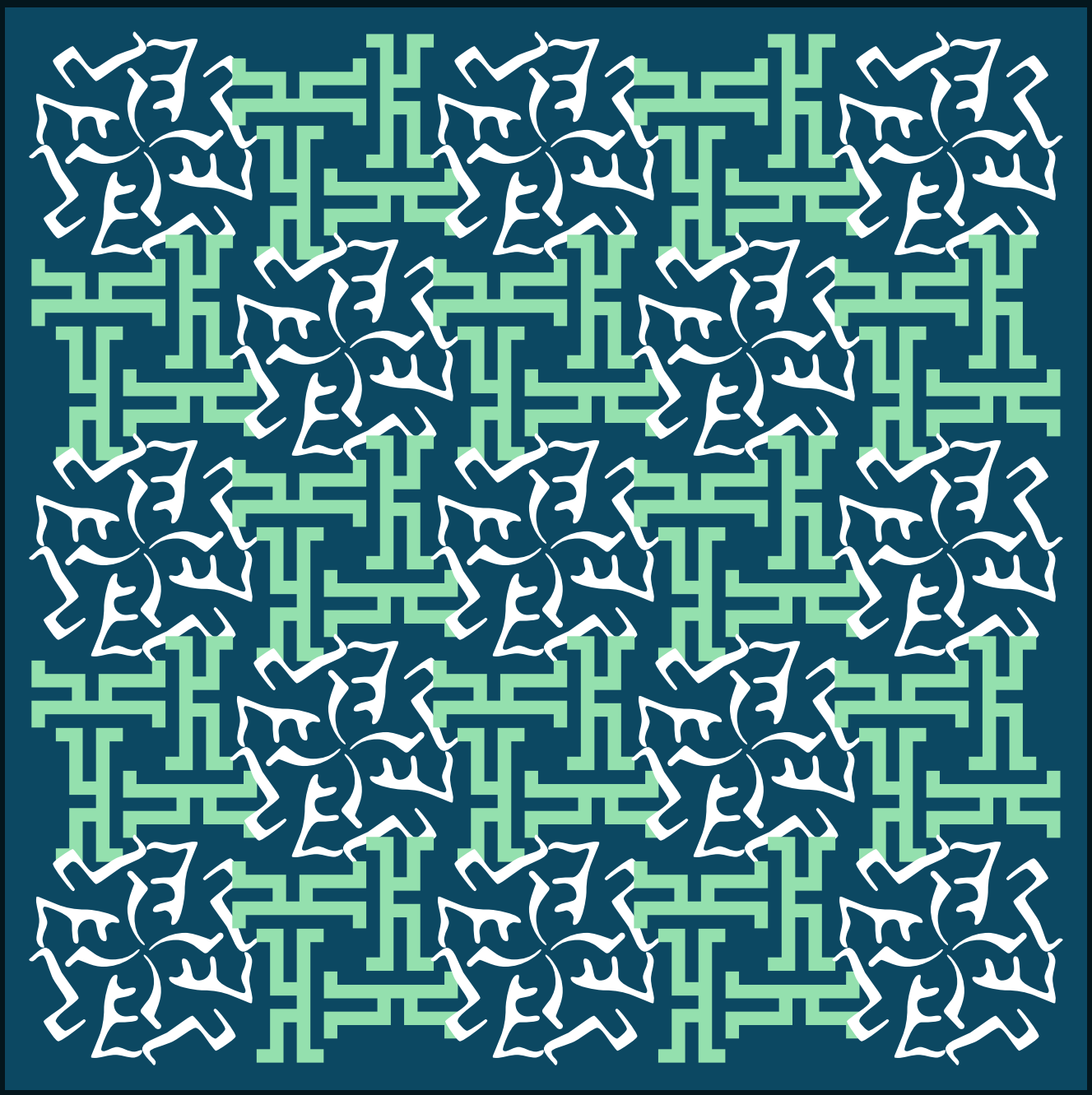

Leading in Complexity

Grow your capacity to lead in complex systems

November, 2012

Cultivating Leadership

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Leading in Complexity

What makes complexity different and how can leaders respond effectively?

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Wise executives tailor their approach to fit the complexity of the circumstances they face.
-Dave Snowden and Mary Boone, HBR 2007[1]

Organizations are generally quite good at solving complicated problems---either they develop the requisite skill sets internally by hiring and training smart people, or they turn it over to consultants whose value propositions are built on the promise of making unmanageable problems manageable. They "cut through complexity" or simplify in order to avoid "boiling the ocean." They chunk things down and take them a step at a time. They identify (and/or create) best practices, decide which things are likely to drive outcomes, and then focus on those. They are data driven and fact based. And this is often incredibly helpful. Except when it isn't….

As Snowden and Boone point out all problems are not created equal, and not only is it important for leaders to know the nature of the problem they are facing, but also how to adjust their approach accordingly. It turns out that most people like certainty more than they like uncertainty, which is why we love to treat all problems as if they can be "solved." And practically from the day we're born, we get rewarded for solving problems, so why not?

In this paper, we

- Offer a framework for understanding the difference between the predictable and the unpredictable world
- Make the case that problems in the world of the unpredictable are fundamentally different to those in the world of the predictable
- Offer some approaches leaders can take when things are unpredictable

Because we find it helpful to have a common language with which to talk about complexity, we have included Appendix A, where we introduce and define some of this language more specifically.

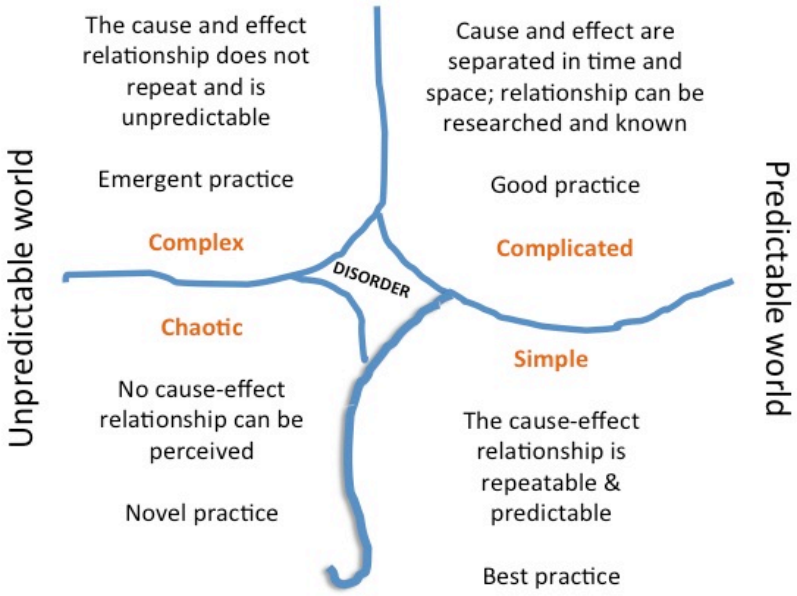
[1] Snowden D.J. and M. E. Boone. A Leader's Framework for Decision Making. *Harvard Business Review*. November 2007.

Predictable or unpredictable?

We find the Cynefin framework (pronounced Ka-ne-vin, developed by Dave Snowden, Cynthia Kurtz, Mary Boone and others—see Figure 1) extremely useful in helping us think about the world of problems. It begins by making a simple but very important distinction—that between the known (or predictable) and the unknown (or unpredictable) realms. The known world is comprised of two sub-domains:

> ***Simple:*** this is the domain of known knowns. Cause and effect are generally clear and well established, patterns tend to repeat, events are consistent, and so best practices are very helpful here. The metaphor here is one of baking a cake---follow the recipe and there is every likelihood it will come out the same today as it did yesterday and also will tomorrow. Routine mechanical or process issues also tend to fall into this domain.
>
> ***Complicated:*** this is the domain of unknown knowns. Cause and effect relationships are knowable, although it may take experts and a fair amount of analysis to sort it out. There is often more than one right solution, but in either case, the story people were telling in advance about how things would play out is likely to be similar to the stories they're telling about how it actually did turn out after the fact. The metaphor here is that of sending a rocket into space----there is a lot to figure out, but (except for human error), most of it is reasonably solvable and predictable. Most organizations act as though the vast majority of their problems fall into this domain and so approach them accordingly—think gap analysis (where do we want to be, where are we now, how do we get from here to there) and measurement systems like KPI's.

Figure 1: Cynefin framework (adapted from David Snowden and colleagues)



On the unknown side, there is ***complexity*** (note, the Cynefin framework also identifies the domains of ***chaos***[2] and ***disorder***, which we do not discuss here). Complexity is the domain of unknown unknowns. It is also the domain of emergence. Cause and effect cannot be known in advance (although it is often tempting to believe in hindsight that things were predictable). Recreating the possible link between cause and effect after the event is illuminating but it does not help predict the next unpredictable event. The metaphor here is of a rainforest (or most ecosystems for that matter). In the complex domain, there are patterns in the overall system; however, individual events are not predictable. Leaders must resist the temptation to narrow or solve too soon; experimentation and monitoring are more helpful, as is diversity of perspective.

Why does it matter?

So that's the theoretical construct, now let's see if we can bring this down to earth. Spend a few minutes thinking and writing about your actual life. Make a list of the top 10 problems you're currently trying to solve. Are you trying to get your direct reports to think more for themselves? Trying to speed up cycle time on a particular process? Find the next big consumer hit? Get your boss to be more inspirational? Getting yourself to be more inspirational? Meet this month's financial targets? Figure out why the copier machine keeps breaking? Whatever is on your plate, write it down. See if you can place each of those things on your list into one of the Cynefin domains (go back and review what it means to be in each of those domains). Now, look at the items you have placed in the complex domain. Are there pieces of those problems that you could segment further because they actually fall into the complicated or simple domains? Next look at the items that you have placed in the complicated or simple domains and do the same to these. Are any pieces of those problems that you identified actually complex (hint: if you look back at the way things have gone over the past year and realize you couldn't have predicted the current state, that there were events or decisions that changed the shape of the problem or the future possibilities associated with it, it might be complex).

Once you have done all this, take a look at one or two of the items that you believe are actually complex. What has been your approach to dealing with those things? Gap analysis? Just try harder? Set targets and give orders? If so, how has it worked?

Our experience is that it mostly does not work all that well to apply approaches meant for the complicated space (the favorite for most of us) when things are actually complex. The known/predictable vs. unknown/unpredictable distinction turns out to be of great importance for leaders in terms of how they approach strategy and change and how they communicate. Most organizations approach strategy as if it were rational (i.e., assuming the future can be predicted and controlled) and so align to the complicated realm. They take what we call a "mind the gap" approach. Problems are seen as arising when there is a gap between the outcomes sought and the actual results or state of the system. The job of the leader is to focus on the gap and the steps required to close it. Visions are described, strategic leverage points are identified, critical steps are listed and milestones are drawn up.

[2] Readers with any complexity background find the way Snowden uses the term "chaos" unsettling. It is used in its commonplace understanding and not in the more scientific way Chaos is understood—which is much more like his complexity domain.

Where the issue is one that can be investigated and a right answer developed this is all good stuff.

In the unpredictable domain we can neither identify the gap nor mind it well. Instead, leaders must mind the system—meaning they must watch how it seems inclined to respond and be ready to amplify good results and dampen down bad ones. They need to focus on possibilities (what *could* happen) rather than probabilities (what we *think will likely happen*). The leader can chart a direction, but to chart a destination would imply she believes the future state is actually knowable. She can set boundaries (it's not a complete free for all) within which it is safe to try stuff out and learn as fast as possible—from *both* the successes and failures. While this approach may appear to be passive, it is actually quite active and calls on the leader to be present, alert, and agile (much like being in the centered but poised-for-quick-action "ready" stance of an athlete). Everything about this is likely to be counter-intuitive to classically trained leaders because the focus is much more on watching the inclinations of the current system and trying to nudge it to self-organize in better ways than it is on "making stuff happen." On the other hand, it might also been seen as hopeful and quite practical because it resists the urge to deploy considerable resources against predicting a fundamentally unpredictable future. It essentially encourages leaders to predict and plan where it makes sense to do so and offers an alternative approach where it doesn't.

So what can leaders do to shape strategy and nurture change in the unpredictable world?

As we alluded to above, many of the things leaders are called on to do in complex situations (lead change or shape culture, for example) require fundamentally different leadership and personal capacities than the ones they have spent a lifetime cultivating. In the complicated space, leaders have at least the *hope* of certainty, whereas in the complex space, they do not, and pretending they do will consistently lead to "solutions" that will soon become tomorrow's problems. As you read on you will notice some terms highlighted in bold italics—these are further defined in Appendix A.

First, the **mindset and practices** needed for thinking about ***complex adaptive systems***, and how to make changes in those contexts, are distinctly different from the mindset and practices needed in "complicated" situations where the relationships between cause and effect can be revealed over time through analysis and therefore determinative actions can be taken with some confidence of the outcome. Whereas the mindset one needs in order to thrive in the complicated space is one of confidence that the answer can and will and be known (and therefore certainty is of high value), in the complex space, because there is no knowable or "right" solution, uncertainty, curiosity, and openness are more useful. On the bright side, because there is no right answer, there are also fewer wrong answers. This can be very liberating for leaders and also very frightening... "If there is no right answer I need to find; there is no right answer my staff need to find. What is liberating for me is liberating for my people and I also lose one of the key means I may have been using to control my organization and my people – the search for the right answer." This can be quite an unsettling shift.

The shift is made more unsettling because the distinction between the complex and complicated mindsets is not always obvious:

- We operate with the complicated mindset being the dominant paradigm and being so prevalent in public, private, and even community sectors we are often subject to its structures without even being aware of them[3],
- Complicated and complex elements are intertwined and can be hard to untangle, therefore leaders need to be adept in both mindsets to some degree,
- Some components of complex issues can lend themselves to analysis and prediction over time, and
- Complexity might also arise in otherwise complicated contexts because there are so many different technical solutions available but only a short time in which to make decisions[4].

The practices in the complex space are intended to be enabling in the face of uncertainty. Some of these are described below, in the context of the role of the leader.

The **role of the leader** and **strategic steps** are also different in complexity. Some of these may on the surface look similar but they are often different in their execution. Leaders seeking to be strategic or lead change or shape culture in the face of uncertainty and complexity must:

- Establish a frame for the work of the organization or for the change (setting out direction and ***boundaries***)
- Encourage people to look closely at the nature (including ***inclinations, attractors, feedbacks***) of the existing system and to experiment with changing it
- Make explicit the logic that will be used for amplifying successes and shutting down failures
- Support and model open conversations and learning

We will look at each of these in turn.

<u>Set overall direction and boundaries</u>

Becoming clear about purpose, direction, and ***boundaries*** is a large part of the work of leading strategy in complexity. It provides a frame in which people can make their own decisions about how to proceed. It also enables experimentation. If the safety boundaries are clear, then anything in the safe zone is fair game for further exploration. We had one client that wanted to create a cultural shift toward more compassion and collaboration and less judgment and criticism. They decided to set pretty broad boundaries around these

[3] Ralph Stacey calls this the dominant discourse of instrumental rationality where it is assumed, often erroneously, that organizations and situations can be observed, rational interventions can be planned and implemented, and managers can have confidence in the likely outcomes. Stacey, R. (2012). *Tools and Techniques of Leadership and Management: Meeting the challenge of complexity*, Routledge, Abingdon, United Kingdom.

[4] The surgeon and writer Atul Gawande describes this as the problem of "eptitude" – making sure we apply the knowledge we have consistently and correctly, to deal with "the complexity that science has dropped upon us and the enormous strains we are encountering in making good on its promise." Gawande, A. (2009), *The Checklist Manifesto: How to get things right*, Henry Holt, New York. P.11.

experiments—as long as nothing they did caused their very public internet presence to go down, it was fair game.

Diagnose the context closely and the inclinations of the existing system

Complexity thinkers argue that all strategy work is context dependent, so context analysis is central to many of the relevant models. Understanding the ***inclinations*** of the existing system is also more useful than imagining or predicting the future, given the opportunities to evolve from the present and the difficulties in achieving a particular future state. It is especially useful to look for the patterns of ***feedback*** within the system that enable it to return to its most familiar ways of operating or might support it to behave differently. When the system (be it a corporation or government department or a key relationship) is shocked or perturbed, is the change one that is amplified, perhaps leading the system to take on a different form or move to a different ***basin of attraction***, or is the change dampened down with the system eventually settling back into a familiar pattern of behavior? What are the changes or interactions that seem to have the greatest influence on the character of the system, in whichever direction it evolves?

Generate multiple options and experiment with these:

This is where this framework diverges most sharply from the traditional strategic planning process. Typical approaches involve narrowing down choices on a strategic decision tree and, where possible, chopping branches off the tree. Where are the points of greatest leverage? How do we narrow our focus to the most significant issues and choices? The strategic response to complexity and uncertainty is to create choices, generate lots of options, and keep options open to see what works. Instead of lopping off branches, you want trees with lots of branches going in as many directions as possible. You want to make lots of small bets. The bets can be extended later when you have seen what is working and want to amplify your successes. These experiments or small bets need to be safe-to-fail (rather than using fail-safe design).[5]

Dave Snowden offers a helpful set of guidelines for safe-to-fail experimentation:[6]

1. Have several of them running in parallel so that you can be gathering information about the system in several different ways simultaneously.
2. Include some that are in contradiction to one another, so that, if one succeeds another should fail.
3. Design experiments that are finely grained, pragmatic and short term in their experimental phase. Cheap is good too. These experiments should be crisp and clear so that everyone knows what's expected.

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[5] The scale at which experimenting can occur will vary from context to context. In some cases small bets may not be possible or viable, for example, when there is a great deal at stake and it is not possible to break things down to run smaller and containable experiments (when things are not safe-to-fail). This can occur in complex situations where the system is "tightly coupled" – where the elements in the system are so tightly linked together that when surprising events arise and a part of the system is threatened with collapse lots of other elements in the system are also threatened with ruin. Examples include the banking system, transportation networks, or high-hazard workplaces.
Harford, T. (2011) *Adapt: Why success always starts with failure*, Little Brown, London. pps. 207-208.

[6] Snowden's guidelines for safe-to-fail experimentation can be found at:
http://cognitive-edge.com/blog/entry/5990/complex-domain-applied-to-scrum-kanban/
Accessed on 23 April, 2013.

4. Some of the experiments should be at the edges of the problem rather than at the center.
5. Draw on "naive capability." These are people with deep expertise in a related field that might give new insight (like bringing in a script writer to help solve a community engagement issue).
6. Think what success and failure might look like. What stories will be told about successes? What ones about failures? Have plans in place in advance for amplifying successes and dampening failures (see below).

One of our favorite examples of a safe to fail experiment comes from the book *The Power of Habit* by Charles Duhigg.[7] He tells the story of a US Army major in Kufa, a small city in Iraq, in 2003. The major noticed that the number of gatherings that turned violent was increasing in this little city, and he wanted to reverse that trend. Rather than figuring out the "right" solution (which in this case would have been likely to involve guns and brute strength), the major studied videotapes of the riots and watched the way they tended to unfold: crowds would gather and over the course of a few hours, more and more people would come along. Food vendors would set up in the afternoons to feed the gathering crowd. Then, as Duhigg tells us, "someone would throw a rock or a bottle and all hell would break loose."[8] So the major met with the mayor and asked about whether the city could pass an ordinance keeping food vendors out of plazas, and the mayor agreed. The next time a crowd gathered, the pattern repeated: a few people turned into a larger group. More people came by to see what was going on. The crowd got restless and started to get angry. Then they started to get hungry and, seeing no way to get a meal nearby, they went home for dinner. Problem solved, with a solution in a neighborhood many of us wouldn't connect with riots. Duhigg concludes, "In addition to removing the food vendors, [the major] had launched dozens of different experiments in Kufa…. There hadn't been a riot since he arrived."

<u>Have a means for choosing among the options</u>

Choosing can be a challenge, as it requires the organization to both generate fast and relevant feedback and then take it on board and use it to make coherent choices. Experimentation works particularly well when things can be tried out quickly and easily and there is a close connection with the market or stakeholders and they can provide direct feedback—all of which were true in the Kufa food vendor experiment. The ideal is that organizations (or in that case, communities) can internalize as much as possible the signals from the markets they operate in or the stakeholders they serve. Internalizing is not easy; even where market feedback is available, organizational interests filter the messages.[9] Another issue is to what extent the organization takes a coherent approach to choosing what is important. Beinhocker calls this a "selection environment"[10] – a set of behaviors and

[7] Duhigg, C. 2012. *The Power of Habit: What We Do What We Do in Life and Business*, Random House, New York.

[8] Duhigg, C. 2012, p. xviii.

[9] Beinhocker says once the signals enter an organization they are "distorted like a fun-house mirror" as they are filtered through the interests and politics of the different parts of the system. To this end, Snowden, and his colleagues at CognitiveEdge.com, try to compensate for the filtering effects by creating distance between the data and the sense that is made of it. They focus on capturing a spread of anecdotes and micro-narratives and then trawling this material to create rich pictures of what is happening in the markets or other contexts the organization may be working in.
http://www.cognitive-edge.com/

[10] Beinhocker, Op cit, p.342.

signals that tell people what is to be rewarded. It is a mix of boundary-setting, policies, and culture, which creates a frame within which people across the organization at many levels can make sound case-by-case decisions attuned to the overall direction, but are free to exercise their best judgments.

Amplify and dampen:

The final step (although of course, like an Escher staircase the project is never-ending!) is to amplify successes and dampen down failures. In Snowden's view we should not start safe-to-fail experiments without first developing a strategy for how we will amplify successful experiments (or allow them to spread their success virally) or shut down ones that fail. In the Kufa experiment, the ordinance could easily have been reversed if the violence hadn't decreased, and not only would no damage have been done, but they would have learned something from the experiment.

See if you can think of safe to fail experiments that might work on your complex problems.

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Ways of leading change in the face of complexity follow the same overall pattern but they often operate at a different scale and are more tangible in their impacts. The change process may follow the strategic process, implementing elements of the strategy or, as with emergent strategy, the strategy could arise from the cumulative impact of a number of change projects or successful experiments.

Appendix A: The language of complexity

If our understanding of the difference between the known/predictable and the unknown/ unpredictable is to be of much use to us, we will have to have a common language. Here are brief descriptions of a few of the main properties of Complex Adaptive Systems (CAS):[11]

Property	Explanation and examples
Complex Adaptive System (CAS)	Consist of many diverse and independent parts, or agents, (which could be people or cells or governments, depending on the scale) that are interrelated, interdependent, and linked through many interconnections into a network. Every CAS is more than the sum of its agents, and its behavior and properties cannot be predicted from the behaviors and properties of the agents. They are characterized by diffused and not centralized control and, unlike rigid (mechanistic) systems, they change in response to the feedback received from their environment to survive and thrive in new situations. Fashion trends, stock markets, and traffic jams are just a few of the many everyday phenomena that are actually CAS.
Unpredictability	It is not possible to know in advance how the system will behave, but it is tempting, after the fact, to imagine that what happened was predictable. Elections and "the next big consumer hit" are examples.
Interconnectivity	The relationships between the agents are generally more important than the agents themselves. A great basketball team is defined not by the sum of its players but the way in which those players interact. This makes straight cause and effect problem solving limited in its effectiveness.
Feedbacks	The behavior of CAS is influenced by the various feedbacks in the system. If a leader communicates transparently with her direct reports, it is likely that they will also do so with her in return, and she will in turn communicate openly with them—a reinforcing feedback loop (you can as easily imagine a reinforcing feedback loop that would be "negative" in nature rather than positive). Sometimes, when an employee performs well technically, he gets promoted, but because of over-focus on technical skills to the detriment of management skills, the new manager becomes frustrated. He then re-commits to his technical expertise and under-invests in his management skills, leading him to focus even harder on her technical skills, where he is more comfortable—a balancing feedback loop
Non-linearity	Non-linearity is the property whereby--like a rolling snowball that, each time it does a complete turn as it rolls down a hill, gains more snow that it did with the previous roll--small changes in a CAS often produce larger changes the more times they pass through the feedback cycle.
Inclinations	The observable tendencies in a CAS. For example, some organizations are inclined toward conservatism or risk-aversion, while others are inclined toward entrepreneurialism.
Attractors	Phenomena that arise when small stimuli and probes resonate with agents in the system. In human systems, these are generally people, processes, or policies to which people tend to gravitate. Leaders can often create change (or keep change from happening) by identifying the current or creating new attractors in the system.
Boundaries	CAS are usually open systems, meaning that the boundaries of any particular CAS can be defined in any number of ways. When leading in complexity, it is useful to define and monitor the boundaries and to be prepared to play with the boundary definitions to see how the system behaves and whether it is exhibiting behaviour you desire or not. The problem definition and potential ways forward may look quite different, for example, when considered at the level of team than it does at the level of business unit.
Rules	Although a CAS may appear complicated, the rules that govern the system are often quite simple. Like the water systems of the world---though these are vast and complex, they are all basically governed by the principle that water flows downhill. Most for-profit organizations, though complex, have a rule that says something like "have maximum impact with the fewest resources." Implicit rules might be somewhat subtler—like "don't threaten a key stakeholder's ego." Identifying the explicit and implicit rules that govern activity in an organizational system (and sometimes altering them) can help leaders both understand and influence outcomes.

[11] Mitchell M., 2009, *Complexity: A guided tour*, Oxford University Press, New York
www.trojanmice.com. A brief description of complexity theory by Peter Fryer.

Appendix B: Decisions in Multiple Contexts: A Leader's Guide[12]

The Contexts Characteristics		The Leaders' Job	Danger Signals	Response to Danger Signals
Simple	• Repeating patterns and consistent events • Clear cause-and-effect relationships evident to everyone; right answer exists • Known knowns • Fact-based management	• Sense, categorize, respond • Ensure that proper processes are in place • Delegate • Use best practices • Communicate in clear, direct ways • Understand that extensive interactive communication may not be necessary	• Complacency and comfort • Desire to make complex problems simple • Entrained thinking • No challenge of received wisdom • Overreliance on best practices if contexts shifts	• Create communication channels to challenge orthodoxy • Stay connected without micromanaging • Don't assume things are simple • Recognize both the value and the limitations of best practice
Complicated	• Expert diagnosis required • Cause-and-effect relationships are discoverable but not immediately apparent to everyone; more than one right answer possible • Known unknowns • Fact-based management	• Sense-analyze-respond • Create panels of experts • Listen to conflicting advice	• Experts overconfident in their own solutions or in the efficacy of past solutions • Analysis paralysis • Expert panels • Viewpoints of nonexperts excluded	• Encourage external and internal stakeholders to challenge expert opinions to combat entrained thinking • Use experiments and games to force people to think outside the familiar
Complex	• Flux and unpredictability • No right answers; emergent instructive patterns • Unknown unknowns • Many competing ideas • A need for creative and innovative approaches • Pattern-based leadership	• Probe, sense, respond • Create environments that allow patterns to emerge • Increase levels of interaction and communication • Use methods that can help generate ideas: Open up dscussion (as through large group methods); set barriers; stimulate attractors; encourage dissent and diversity; and manage starting conditions and monitor for emergence	• Temptation to gall back into habitual, command-and-control mode • Temptation to look for facts rather than allowing patterns to emerge • Desire for accelerated resolution of problems or exploitation of opportunities	• Be patient and allow time for reflection • Use approaches that encourage interation so patterns can emerge
Chaotic	• High turbulence • No clear cause-and-effect relationships, so not point in looking for right answers • Unknowables • Many decisions to make and no time to think • High tension • Pattern-based leadership	• Act, sense, respond • Look for what works instead of seeking right answers • Take immediate action to reestablish order (command and control) • Provide clear, direct communication	• Applying a command-and-control approach no longer than needed • 'cult of the leader' • Missed opportunity for innovation • Chaos unabated	• Set up mechanisms (such as parallel teams) to take advantage of opportunities afforded by a chaotic environment • Encourage advisors to challenge your point of view once the crisis has abated • Work to shift the context from chaotic to complex

[12] Snowden D.J. and M. E. Boone. A Leader's Framework for Decision Making. *Harvard Business Review*. November 2007.