Complexity Thinking

Idea In Short

Some problems yield to analysis, and others only respond to experiments. Complexity thinking helps leaders tell the difference. Dave Snowden and Mary Boone argued in the Harvard Business Review that managers apply the wrong tools when they treat every situation as a puzzle with a correct answer. In a complex setting, patterns emerge from interactions among many agents, and no expert can predict them in advance. John Holland described such systems as collections of components that adapt or learn as they interact. This article explains what changes when you accept emergence, and how to lead through probing, sensing, and responding.

A new platform launches, and the product team has a detailed plan. Within weeks, users do something nobody expected, a competitor changes direction, and an internal rule produces odd side effects. The plan was careful, yet it assumed a world that behaves predictably. Complexity thinking starts from a different premise. In many business settings, outcomes arise from interactions that cannot be foreseen, so the right response is to learn by acting.

Matching the method to the situation

Dave Snowden and Mary Boone presented a practical map in their Harvard Business Review article on a leader's framework for decision making. The framework, called Cynefin, sorts situations into contexts: simple, complicated, complex, chaotic, and disorder.1 The key message is that each context calls for a different style of leadership.

Simple contexts have stable cause and effect, and best practice works. Complicated contexts, which the authors associate with known unknowns, require sensing, analyzing, and responding, usually with the help of experts. Chaotic contexts call for fast action to stabilize. Complex contexts sit between these, and they need something else.2

Most failures come from mismatch. A leader who treats a complex problem as complicated

hires experts, commissions studies, and writes a detailed plan, while the situation keeps changing. A leader who treats a simple problem as complex wastes time experimenting with something that has a known answer.

What complex means

In a complex context, the authors explain, right answers cannot be ferreted out in advance. Instructive patterns can emerge if the leader conducts experiments that can safely fail.3 They describe these as the realm of unknown unknowns, where you do not know what questions to ask.

The recommended sequence is to probe, sense, and respond. First you set up a small experiment, then you watch what happens, and then you amplify what works and dampen what does not. This sequence differs from the analytic one, in which you gather facts first and decide afterward.

The Cynefin framework has a history worth knowing. It was created in 1999 by Dave Snowden, who was then at IBM, and it has since been applied in software, healthcare, and government. The research summary on PubMed lists the same five contexts and emphasizes the leader's task of recognizing which one applies.4

The science of adaptive agents

Behind the practice lies research on complex adaptive systems. John Holland, a pioneer in the field, described them in a 2006 paper as systems with many components that adapt or learn as they interact.5 Ant colonies, immune systems, markets, and cities share this property.

Adaptation matters because it breaks prediction. When agents change their behavior in response to others, the rules of the game shift as it is played. A competitor who copies your pricing changes the market you are measuring. Employees who learn how a metric is judged change what they do to meet it.

Emergence follows. Patterns appear at the level of the whole, such as a traffic jam, a culture, or a price, which no single agent plans. Leaders who expect emergence stop looking for a single author of every pattern, and they begin to ask which interactions

generate it.

Safe-to-fail experiments

Because the future cannot be calculated, complexity thinking relies on experiments. A safe-to-fail experiment is small enough that failure causes limited harm, and it is designed to yield information. Contrast it with a pilot meant to prove a plan. A pilot that must succeed encourages teams to hide bad news, while an experiment that may fail encourages honest reporting.

Run several experiments in parallel, and make them differ. If three approaches to a customer problem all rest on the same assumption, they teach little. Before launch, decide what signals you will watch, what would make you amplify an approach, and what would make you stop. Write these down, since memory shifts after the results arrive.

Keep experiments short. Weeks matter more than months, because the aim is to get a feel for how the system responds. When an approach gains traction, invest more in it and keep a few small bets going in other directions.

Leading with diversity and feedback

Complex settings reward diverse viewpoints. People from different functions notice different patterns, and a group of similar experts tends to see the same ones. Invite frontline staff, customers, and outsiders into the sensemaking.

Feedback should be fast and close to the work. Dashboards that update monthly suit complicated problems, while complex ones need information within days. Encourage people to report weak signals, such as an odd customer complaint or a workaround that spreads, before these become obvious.

Leaders also shape the context through constraints. Rather than dictate behavior, they set boundaries, such as budgets, ethical limits, and shared goals, and let agents find solutions within them. Boundaries focus effort without freezing adaptation.

Common traps in complex settings

The first trap is the demand for certainty. Executives ask for a forecast, a business case, and a guaranteed return, and the team supplies numbers it cannot support. Over time, the numbers lose credibility, and the organization learns to distrust its own plans. A better request asks what the team will learn, how quickly, and at what cost.

The second trap is premature scaling. A small trial shows promise, and leaders roll it out everywhere before they understand why it worked. In a complex setting, a result often depends on local conditions, such as a particular manager or a unique customer group. Scale in steps, and watch whether the pattern holds in each new setting.

The third trap is punishing failure. If people who run an experiment that fails suffer career damage, they will stop running experiments, or they will define success so loosely that everything passes. Leaders should praise the team that found a bad idea cheaply, because that saves the organization from a bad idea at full price.

Signals that a problem is complex

Several signs suggest that you face a complex situation. Experts disagree, and each gives a plausible but different account. Past solutions worked once and failed the second time. The actors in the situation change their behavior as you change yours. Small events seem to produce large and surprising results.

When you see these signs, slow your urge to analyze and increase your capacity to learn. Gather a mixed group, state the question openly, and ask what small step would teach you the most. Check back often, and be ready to change course when the system answers.

A hypothetical example

Imagine a hypothetical bank that wants to improve small business lending. Experts propose a new credit model, which is a complicated problem. Yet the bank also wants to know why small firms avoid the bank altogether, which is complex, because the reasons involve trust, habits, and local networks.

The bank runs four safe-to-fail experiments: a weekly clinic in a market district, a partnership with an accountant network, a simplified online form, and a phone line staffed by former business owners. Within two months, the clinic and the accountant network show

the strongest response, so the bank expands those and closes the others. The example is invented, yet it shows how probing replaces a plan that would have rested on guesses, and how a bank can learn from customers before it commits large sums to one approach.

Cautions

Complexity thinking can become an excuse for sloppy work. Not everything is complex, and many problems have known answers. Classify honestly, and use analysis where it fits.

Experiments also require discipline. Without clear signals and stopping rules, teams can run endless trials and learn nothing. Document each one.

Finally, accept that the framework is a sensemaking aid and not a law. Situations move between contexts, and a complex problem may become complicated once you understand it. Review the classification regularly.

- 1A leader's framework for decision making
- 2A leader's framework for decision making (Scrum.org reprint)
- 3Cynefin framework
- 4A leader's framework for decision making (PubMed record)
- 5Studying complex adaptive systems

Summary

Complexity thinking asks leaders to match the method to the situation. In simple and complicated settings, analysis and expertise work. In complex settings, Snowden and Boone advise running experiments that can safely fail, and then amplifying the patterns that appear. Holland's work explains why: adaptive agents change as they interact, so the whole behaves in ways no single part reveals. Leaders who accept this ask for small probes, fast feedback, and diverse views. Choose one uncertain initiative today, design three small experiments with limited downside, define what you will watch, and decide in advance how you will respond to each outcome.