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The Profession of IT
Avalanches Make Us All Innovators

Avalanches generate enormous breakdowns. The practices of innovation adoption may be just what you need to resolve them.

IMAGE BY OLGA GAVRILOVA

THE WORD "AVALANCHE" brings up vivid images of destructive masses of snow suddenly sweeping down wintry mountain slopes, deadly cascades of ice and rock crushing everything beneath them. Avalanches are as unpredictable as they are destructive. No one can say with any certainty when or if an avalanche will occur or how severe it might be. The best mountain authorities can do is shut down a large area when they judge avalanche danger to be high.

Economists have adopted avalanche as a metaphor for disruptive changes that sweep through an economy. Economic avalanches can cause massive losses, wiping out professions, jobs, and wealth. Severe stock market crashes are avalanches. The housing bubble of 2007–2008 precipitated an avalanche that hurt many people badly. In the aftermath, a natural reaction is to point many fingers of blame for the calamity. This gives way to the more constructive reaction of trying to learn from what happened so as to be prepared if it happens again.

There are two kinds of avalanche: the slow-moving selective kind, and the fast-moving all-encompassing kind. The first kind is much more familiar. Take the Internet. The world of 1990, before the World Wide Web exploded the size and reach of the Internet, was quite different from today's world. Today's commonplace things—such as smartphones, instant worldwide communications, video and music streaming, online commerce, digital currency, Facebook, Amazon, Google, Microsoft—either did not exist or were too small to notice. Many ways of doing business and many professions have disappeared since those days, and many new businesses and professions have sprung up in their place. The Internet was a slow-moving avalanche. At the start of the Internet revolution, a few visionaries saw the possible changes, but few had any idea of the extent of change that was going to happen.

The Cloud has been another slow-motion avalanche that facilitated the birth of many new companies. A decade ago, most startup businesses had to include an IT department in their business plans. Big computing power was available only on supercomputers and was way too expensive for many founders to afford. Now Amazon, Microsoft, Google and others have established vast networks of processing and storage servers around the world, delivering computing power and memory cheaply like a utility. Anyone can rent the computing power they need at a price they can afford. Getting the IT needed for a startup has never been easier.

No sector is immune to possible avalanches. In 2013, Michael Barber and colleagues warned an avalanche loomed for higher education.[1] University leaders downplayed that assessment because they believed everyone wants and needs education. In 2017, Tony Seba bet on an avalanche in the energy sector from the transition from carbon-powered industry and transportation to solar and electric powered.[4] No one was prepared when the pandemic triggered an economic avalanche as bad as the Great Depression of the 1930s, which spread rapidly to into education and energy. The secondary avalanches forced many universities into bankruptcy and collapsed world oil prices.

From all these examples, we can characterize an avalanche as a disruptive change of conditions and practice that sweeps through a social community, taking with it many professions, identities, jobs, and wealth. This is not the same as the Black Swan phenomenon.[5] A Black Swan is a surprise event that no one predicted. An avalanche is a cascading, chaotic process that may be triggered by a Black Swan event. The few visionaries who see the warning signs cannot predict if or when or if an avalanche will occur. Few people are prepared when it strikes. When it does, most people get disoriented and unsettled not only because of their losses but also impenetrable uncertainty about what comes next.

Many startup companies speak of their ideas as "disruptive innovations" that they hope will trigger avalanches—often called "viral adoption." They hope their inventions will sweep them to riches and wipe out competitors. Unwilling to be disrupted, competitors take preventive countermeasures. Often the initial proposal or the countermeasure fails. Brave talk on both sides hides the underlying fact that no one can predict whether an avalanche will occur. Wishful thinking and heroic hype do not improve predictive accuracy.

Since the early 1980s with the founding of complexity theory and the Santa Fe Institute, the sharpest minds of mathematics and physics have sought to build a mathematical theory that would among other things predict the onset and extent of avalanches in chaotic processes. They developed beautiful and elegant theories. One of their surprising conclusions is that complexity theory explains past events in chaotic processes but cannot predict the timing or severity of future events. Without mathematics or science to predict avalanches, how can we be prepared?

Avalanches force innovation. When old practices have been swept away, we have no choice but to adopt new ones.

A Virus that Defied Modeling

The COVID-19 pandemic came as the greatest medical, economic, social, and political shock since 1940. It has been an all-encompassing avalanche that has left no part of the world untouched. It transformed the world in just a few months. Governments are reeling as they search for policies that will contain the virus and stanch the debt they have taken on to survive. Governments say their policies are "science based," meaning mostly computational modeling. Yet there are enough disagreements between the models and missed predictions that policymakers do not know whether they can trust the models, the data that powers them, and even the modelers themselves.

Complexity science tells us it is no surprise the models do not do well. It can explain the past of a chaotic process but not predict its future. The best models can do is play out "what-if" scenarios that compute a probable future state based on assumptions of how the model parameters will unfold. Policymakers are in the uncomfortable position of not knowing what forecast to trust and yet having to choose one to justify their responses.

Governments have been criticized for being unprepared, despite warnings based on previous coronavirus outbreaks that a new one could appear at any moment given the encroachments of humans into wild-animal habitats and the increasing number of genetic experiments with viruses. The preparations would include having test kit, protective gear, and confinement plans at the ready. But governments are constitutionally inclined to give priority to urgent issues and downplay warnings of unlikely events. This pandemic is likely to move many governments to prepare for future pandemics and know there is popular support for doing so.

The COVID-19 avalanche precipitated other avalanches about which we have been warned but took no preparatory action. Educators thought that education was resistant to collapse because everyone wanted it. Yet with campuses closed and foreign students locked out, university revenues have plummeted, faculty are furloughed, and programs cut, and it now seems likely that hundreds of smaller universities may disappear by the end of 2021 and many others will be severely impaired. Carbon-based energy producers were confident that coal, oil, and gas would be staples indefinitely. But the coronavirus pandemic stopped most travel and precipitated the collapse of oil prices and a surge of interest in solar, wind, and other non-carbon energy technologies. Many oil producers face bankruptcy. The suffering has exposed social inequities many people no longer wished to tolerate, precipitating further avalanches of social unrest over oppression around the world. Everyone began to realize there would be no going back—what they considered normal will never return.

What You Can Do

Avalanches force innovation. When old practices have been swept away, we have no choice but to adopt new ones. Here are a few examples of innovations people were forced to adopt after the pandemic struck. Managers of closed businesses avoided furloughs by authorizing employees to work from home. Suddenly online meeting platforms such as Zoom, Connect, WebEx, Teams and became hot for telework. Schools started using these plat-

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forms to continue classes while students were confined to home. Educators learned in a very short time how to use them as a wholly new teaching medium. Shops and restaurants learned to operate curbside service with orders taken online. Unable to visit in person, families started meeting on these platforms. Many of these new practices will persist after the pandemic is over. More businesses will telework, schools will use distance learning, shops will continue social distancing, and distributed families will continue meeting.

The avalanche has also generated some wicked problems where finding a workable innovation is not easy. One of the toughest has been the need for homeschooling when both parents are home with the children. There is no school or day-care center to tend the children while the parents work. No good solution has yet been found. Another tough problem is finding new customers. How do professionals get new customers when professional gatherings are severely restricted? What new offers would attract customers?

Over a decade ago, my colleagues and I designed an approach for intentionally generating innovations, defined as adoption of new practices in a community.[2] We found a set of eight essential practices by which innovators generate the commitments needed to adopt an innovation. They are:

- *Sensing*—giving voice to a concern over a breakdown in the community;
- *Envisioning*—design a compelling story about a future without the breakdown;
- *Offering*—committing to do the work to produce that future;
- *Adopting*—gaining commitments from early adopters to join the innovation for a trial period;
- *Sustaining*—gaining commitments from majority adopters to join the innovation for an indefinite period;
- *Embodying*—working with the community until the new practice is fully embodied, ordinary, and transparent;
- *Navigating*—moving ever closer to the goal despite surprises, contingencies, and obstacles; and
- *Mobilizing*—building a network of supporters of the innovation from within dispersed communities

We offered these as optional skills for those who wanted to increase their personal, team, or business success rates considerably higher than the prevailing industry average of 4%. But the same skills are no longer optional when you are forced into finding innovations to live in the new environment generated by an avalanche. The new environment fosters a plethora of new concerns that can be addressed with new offers. These leadership practices will open pathways to move forward, navigate among many options and obstacles, and mobilize a network to join with you in making it happen. You do not have to be stymied by massive uncertainty and overwhelm. We have taught these skills to hundreds of students and clients. Over two-thirds of our students have produced significant innovations in their communities. Compare that with the meager 4% success rate we were used to before the pandemic. The practices work!

When confronted with the need to devise new practices to live post avalanche, these skills may be exactly what you need. C

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