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The Profession of IT Emergent Innovation

Fernando Flores, former president of Chile's National Innovation Council for Competitiveness, discusses a new common sense about innovation.

IN MY MARCH 2014 column, I commented on *Surfing Towards the Future*, a report from Chile that offers a new interpretation of how innovations arise.¹ The new story opens new possibilities for innovation in many areas including public policy, education, and world affairs. I recently discussed this with its main author, Fernando Flores.

Peter Denning: In *Surfing Towards the Future* you offered a new account of innovation. What drew you into that project?

Fernando Flores: Chile is a small country with the ambition to join the “Developed Countries Club.” To realize its ambition, Chile needs before anything else its own understanding of innovation. Our report sought that understanding with a philosophical reflection on innovation. We wanted our pragmatic recommendations for public policy to be based on sound philosophy. We had intuitions that the current common sense about innovation is flawed. I think we did a good job telling a new story of how innovations emerge at particular moments in history when the conditions are ready. This story opens new actions for innovators and policy makers. We have been receiving very positive responses from around the world.

What do you mean by the flawed common sense?

The common sense is the shared pre-



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suppositions and sensibilities among people about what makes sense in their world. We call it a *sense* because it manifests as feelings and dispositions more than words.

The common sense about innovation is revealed in the popular stories that say that innovation is the product of creative people constantly inventing new technologies based in science. Yet innovations arise without creativity,

new technology, or new science, and some creative technologies produce no innovation. Having a clear plan and strategy is also overrated. Some innovations come without these, and many plans and strategies do not produce innovation. *Innovation is a change of practice that displaces other practices already in place.* Inventing creative technology does nothing; people must take up new practice.

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A better story can be seen in Silicon Valley's practices dealing with global waves of change, which they detect, shape, and ride. We advocated that Chilean entrepreneurs visit Silicon Valley to transform themselves by immersing in its practices and thinking. They will surely make inroads when they return to Chile.

At the ACM 97 conference, you gave a speech about the impact of the Internet on business communications.² You predicted the importance of individual identities in the network of social connections that would emerge in the Internet. How is this connected with innovation?

The ACM 97 conference had a big challenge: to examine possibilities of the world in 50 years. I could not answer such a question by extrapolating trends visible in 1997. I noticed that computers had become significant in the world because of their powers of communication, not calculation. Since communication is a fundamental human concern, I speculated what might happen in a world where technology greatly enhanced communication.

I speculated that the network would be the primary medium for conversations and that people would develop network identities. Your identity would be the stories about how people perceive you and your ability to project into the world. I speculated that we would see an "age of identities" in the Internet, where our networked identities become of central importance to who we are. Amazon, eBay, Facebook, Twitter, and other social media services have realized this speculation. Identities are connected to innovation because they are sources of trust and social power.

I was not predicting the emergence of social media technology. I anticipated the emergence of a new space of possibilities. Social media have emerged in this space.

Why is the notion of historical emergence of a new space so important in your new story?

This is a very important question. The current common sense is blind to emergence. Emergence seems to be the essence of innovation. Our Western

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tradition interprets the world as a set of many objects. We innovate by making new objects from other objects. We are always using objects and moving among objects.

But this story misses something very important. The world is constituted not of objects but of practices. The practices are our automatic, embodied ways of thinking, feeling, and acting with each other. Objects are instruments that facilitate and enable our practices. We have individual, group, and community practices. We are not consciously aware of most of our practices.

Practices are deeply historical. The way the world works was not invented yesterday. It is a constant drift in our practices as we adapt to changes, circumstances, threats, and opportunities. Our current practices are the product of many years of historical evolution. Since innovation is change of practices, innovation is deeply connected to our histories. Our histories influence whether we are open or closed to various innovation possibilities.

Practices also confer power. People shape and effect change through the practices they already have in their networks and occasionally with new practices they invent. People who hold power will resist innovations if they are threatened by the loss of power from the new practices. The popular Uber ride-sharing company, for example, is meeting stiff resistance from taxi drivers and public officials in many cities. Because our common stories about innovation hardly mention power, many innovators are surprised when their proposals are met by indifference or outright resistance.

Because our practices in our worlds are always in flux, always drifting and changing, it is often impossible to assign any single agent to a change we see. Emergence describes our dawning awareness of the change that has already begun to gather momentum. The common notion that a creative idea triggered the change is usually wrong. The so-called creative idea is often a story we invent when we try to explain the emergence we are seeing. Historical emergence is part of a new common sense that sees the practices constituting the world. The emergence is contingent on the space of existing practices.

So, basically you are calling people to be much more sensitive to how the practices that sustain their worlds are already evolving and changing. The tension between possible future practices that are coming and our settled, habitual everyday practices is the cradle of innovation. The cradle is not in our mind or in our creativity. It is constantly emerging in our worlds. Can you say more why are you making room for contingency in your approach to innovation?

Innovations do not arise randomly, but depend on conditions and possibilities existing in the world. The World Wide Web gives a good example. Tim Berners-Lee invented a new technology in 1989 that combined technologies for markup languages, Internet naming, and hypertext. His original prototype ran only on NeXT computers. The new technology was contingent on the existence of the others. Berners-Lee was originally motivated by a concern to help the physicists in his lab (CERN) communicate better with their collaborators around the world. However, with help from his mentors at CERN, he advocated the Web as a new way for everyone to make connections and share information. That possibility intrigued a team at the University of Illinois, which built the first portable Web browser, Mosaic, an easily installed graphics interface to visualize the connection space of the Web. Entrepreneurs quickly began to experiment with businesses that would interact with their customers through a browser interface, a practice that gathered momentum and opened

the Internet to become a bustling space of commerce. Each of these elements—the original prototype browser, the combination of technologies, the development of a portable browser, and the commercial Internet—was contingent on particular policies, equipment, and practices at its time and each opened new spaces of possibilities on which subsequent innovations were contingent. Berners-Lee developed an uncanny ability to see the contingencies and mobilize people to follow them.

The important point is that innovations are contingent on the current world and the history of practices and technologies in the world. The world opens spaces of possibilities; people interplay and enrich those possibilities. The time becomes “ripe” for something new. But this dynamic process does not follow a linear causality to specific prior innovations.

Is this why many innovations seem to occur to unrelated people at about the same time?

Yes, I think so. *Innovation is always contingent on existing practices and concerns.* An innovator aims to take care of an unmet concern by proposing new practices that recombine existing practices. Often multiple members of the network will see an unmet concern and see ways to address it with existing and emerging technologies. Their proposals are often, to them, obvious responses to the unmet concern.

The ability to sense an unmet concern is very important. It is an ability to read moods and emotions by observing the conversations that people are having and the histories behind their practices. Often the first sense someone has about an unmet concern takes the form of an anomaly—the person is unsettled by something that seems out of place relative to our current practices and is not explained by our current practices. The person embarks on a quest to settle the anomaly and eventually designs proposals to help others with the same issue.

The phenomenon of multiple independent discoveries appears completely natural if you understand

contingency and emergence. It also explains why it is so hard to find agents who caused particular innovations. Often there is no single agent and when you follow the chains of contingencies it is impossible to pinpoint a “cause” for an innovation.

Now I can see in your story why you are offering the metaphor of “surfing” to better grasp the phenomenon of innovation. The potential innovators are endlessly exploring, scouting, and diagnosing historical and emerging practices responding to a particular concern. That, I think, is why you speak about “immersing in” or “appropriating” traditions and practices. Can you speak more about your notion of appropriation and why it may be different from “information” or “know-how”?

My colleagues and I are still working on this story. *Appropriation* is a process of becoming familiar enough with a new domain to observe their practices, histories, and moods, carry on conversations with their people, see how power moves among them, and contribute to them. Often the work of appropriating a domain is motivated by the unsettlement we were just discussing; it helps to seek out interactions with other, unfamiliar domains to enrich your sensibilities and orientation. Through ongoing conversations, you will find those domains increasingly familiar and may discern practices that enable a response to the anomaly. You can then speculate about how to bring that practice to the original community. This first stage of appropriation might be called “advanced beginner” in the new domain and is sufficient to nurture new innovation proposals. As an appropriator, you are not a passive observer, but bring a self, an identity, a mood, and practices to the new domain, all of which affect the appropriation.

Appropriation is not the same as acquiring information or describing the skill sets of a domain, neither of which offer involvement in the practices of the domain.

We are looking for ways to help people appropriate unfamiliar worlds rapidly. Every domain has certain

speakers who have an unusually good grasp and articulation of the central practices. If you can read, talk with, or watch such a person on a video, can you more quickly appropriate the domain. You do not have to agree with that person’s views to let them help you appropriate their domain.

It is important to appropriate more than one domain because that expands the space of possibilities for innovations. In my own career, I have learned the domains of entrepreneurs, political leaders, business CEO, senator in a legislature, and more. I find that I am able to see bigger possibilities for innovation in any of these domains given that I can participate in the others and find connections. I have also found that watching videos is a powerful means of appropriating. YouTube and other online video services have provided means to learn new areas that simply did not exist a decade ago. The library called Conversations with History, founded by Harry Kreisler at Berkeley, is a magnificent example of a resource for appropriators—it features over 500 recorded interviews with history-makers in many fields.

When you speak of appropriation you are also contemplating the cultivation of a new practice in a world. It is like bringing a new vaccine from the lab into the world where widespread inoculation can protect people from the disease.

Yes, I call that the process of *mobilization*. That means to move people in your network into action to get the practice adopted. This is also a large area in which we are doing a lot of thinking and research. Moving people in a network into new action requires more than a skill at reading and sensing concerns. It also requires a sensibility about their histories, concerns, moods, and practices. If you exhibit the sensibility, you will generate trusting relationships, and that will move people. If you see more than one path, choose the one that alleviates the sharpest pain being experienced by the people. Your vaccine will not be adopted if people do not trust you or the results it produces.

Your metaphors of navigating and surfing then refer to a variety of practices for appropriating and mobilizing?

Navigating has to do with a finding a sense of direction for your actions and mobilizations. Many people already understand “navigating the Web” as going from one place to another without a clear idea of exactly how. The Web skill of navigation exemplifies temporality, horizons of concerns, connections between worlds, relevance, traditions, and dynamic discovery of openings for possible actions—the same things that an innovator has to be sensitive to.

Navigating the spaces of possibilities between social worlds is very similar. The possibilities are contingent on other possibilities and they depend on the historical evolution of past possibilities. In navigating we follow connections that move toward the possibilities we want. We are influenced by our estimates of probabilities of success in following a path. Each choice affects our identity and the new possibilities we will see next.

Possibilities are not static spaces, they are dynamic waves. Waves can show up as ideas gone viral, such as rallying slogans in recent international protests about police and terrorism. They can appear as moods of agreement manifested in conversations, showing what people are inclined to follow or resist; for example, companies like Uber and Airbnb are riding waves of interest in the sharing economy and they are discovering that many existing institutions such as municipal regulators and unions are resisting their innovations. Some waves appear as technology and demographic trends that can be extrapolated reliably.


Do innovation stories help people appreciate the new story of innovation?

Yes, indeed. We like to retell some of the familiar stories to see how the new interpretation plays out. One of our old favorites is the story of Louis Pasteur, who saved France from economic ruin the 1880s by developing an anthrax vaccine. Pasteur was a chemist who believed microorganisms produced chemical reactions

that showed up as diseases. He took on the anthrax challenge because he suspected a germ was at work and that with his chemistry and microscopes he could observe it and then find a way to neutralize it. He timed his announcement for the maximum impact on a skeptical science community in France by staging a risky experiment in which unvaccinated sheep got anthrax while vaccinated sheep did not. He built a set of new practices based on his germ hypothesis and timed his introductions of innovations so that the social communities would accept and embrace them.

You can see Pasteur building on existing practices (chemistry and microscopes) and using them to propose solutions to unmet concerns (dying sheep and cows). It appears that Pasteur was able to work with the moods and emotions in the social networks of France to create convincing demonstrations of the effectiveness of his methods. He was able to tap into the currents of social power, and ride waves of change to achieve his goals. We noted earlier that Tim Berners-Lee was not simply a technology inventor, he was a great appropriator and mobilizer. The Steve Jobs story can be read the same way.

As you describe them, these new practices of recognizing contingencies, appropriating, surfing, navigating, and mobilizing seem familiar. I have experienced them all at one time or another. I just did not recognize them as essential to the innovations I was pursuing.

That is right. We are all innovators. 

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