Progress

Class 9 - Organizations

Kevin A. Bryan - Toronto Rotman - Nov 12 2025

After class notes in Red

A simple question: what organizational forms are better for doing "big new things"?



SR-71, U2, and the "Hopeless Diamond"

All developed at Lockheed's Skunk Works, largely on time and on budget. The Diamond was the first stealth plane.

Skunk Works: high-skilled people, working on crazy projects, with significant autonomy.

Mary Golda Ross: Cherokee woman, studied math in grad school, worked at Lockheed in WW2, kept on as Skunk Works founded, worked on e.g., "interplanetary space travel"

So some of what was going on was "very ambitious, very smart people", like engineer Mary Golda Ross. But many places are filled with hard-working, ambitious people. If a place is well-run, what organizational structures make it well-run for "doing big new things"?

Kelly Johnson's Skunk Works (then Ben Rich's): a branch of Lockheed for R&D physically separate and organizationally isolated from much of the firm.

Upside and risk in doing this?

Upside is that you have autonomy, don't have to worry about day-to-day concerns (as Clay Christensen taught us), don't have to listen to immediate customer or voter demands. Downside is less accountability, that you are by virtue of physical separation less central in the "network" of the organization and hence generally less powerful (see Burt's "structural hole" theory), that because of this it will be harder to get buy-in when you want to reintegrate the "progress" you made in the organization more broadly.
For this reason, Skunk Works are common for things like R&D projects (where doing the thing requires separation from the org, and where we have other methods of leadership accountability, but where producing or selling the innovation once made can be easier).

Our senior shop people were tough, experienced SOBs...Our designers spent at least a third of their day right on the shop floor; at the same time, there were usually two or three shop workers up in the design room conferring on a particular problem. That was how we kept everybody involved and integrated on a project. My weights man talked to my structures man, and my structures man talked to my designer, and my designer conferred with my flight test guy, and they all sat two feet apart...We trusted our people and gave them the kind of authority that was unique in aerospace manufacturing.

Rich and Janos, Skunk Works

If you do run a skunkworks, because there are fewer "old processes and rules" to rely on, and because you are trying to do new things, you may want a very tightly linked information sharing system like described here.

Toward the end of the stealth project I had nearly forty auditors living with me inside our plant, watching every move we made on all security and contract matters. The chief auditor came to me during a plant visit and said, "Mr. Rich, let's get something straight: I don't give a damn if you turn out scrap. It's far more important that you turn out the forms we require."

Rich and Janos, Skunk Works

What are we maximizing here? Obviously security *is* important, and top secret notes on stealth in Kelly Johnson's garage *won't* work. The tricky part is knowing *what* old rules and processes to ignore! For this reason, leadership in skunk works is particularly important.

Roger Rudick: And is that just an advantage of time has passed and we have a better fix on what the trains are capable of? Or did we know that all along and just California engineers are just I don't know, too conservative? Sounds like a nice way to put it.

Ian Choudri: I don't blame anyone. These were not intentional mistakes. This was a lack of checking because we don't have another high speed rail in this country. So we were using highway bridges or freight rail design concepts, which is all we know.

And so we fixed it. It took us four months to realize that this is a big mistake and improve the cost structure. When we put our plan out, we said we saved $14 billion by optimizing cost by changing design standards and criteria, bringing them up to par with the European and the Japanese.

We are not saying that this is just made-up stuff. This is real stuff. We originally thought we had to tunnel 16 miles and now we have to tunnel only three — because of correct standards are being used. That's what we're doing now.

And just to clarify, some rules seem crazy. This is the new head of California HSR in 2025. Could this be true? Why didn't the old engineers fix this tunnel issue? Answer: they were following spec correctly - it's just that the rules and processes were a poor fit for the "new" architecture of HSR compared to freight rail construction.

[CMS] were trying to get rid of all the regulations that required faxing. This was a four-year thing...[CMS Head] Seema Verma was 100% behind this. She had a team on it. They would find the requirement and actually undo it, but then two years later, it would repopulate because they didn't get the thing that it was referring to. It just comes back like a cancer.

Statecraft Interview with Jen Pahlka

From Pahlka: Faxing this letter reminded me of Shannon Sartin's quest to eliminate requirements to transmit information by fax in CMS regulations. Largely due to a misconception that faxing was more secure than email, regulators had required various kinds of information to be shared by fax over the years. The misconception had been debunked, but the regulations remained — lots of them. On a whim, Shannon and a colleague had put a line in one of Seema's speeches calling to "axe the fax." There was a strong positive response, and Seema got behind the idea as a real initiative. They would find and repeal all the regulations that required data transmission by fax.

It's a lot of work to try to find every reference to faxing in CMS regulations, and even more work to change those rules, but Shannon was on a mission. "These policies go back decades, to before CMS was even CMS," she told me. "They've never been rescinded. Until Axe the Fax, no one had ever tried to clean this stuff up." The agency knew this was a priority – the administrator was talking about it whenever she could. Six months into her project, however, Shannon got a phone call. "Hey, listen," the caller told her, "I just wanted to let you know that you just put out a new rule that says that fax machines should be used to send information." She was playing Whack-A-Mole.

She could find and repeal as many of the old rules as she could, but as new regulations referenced old ones, and sometimes copied from them, new ones would continue to appear.

One man's bureaucracy is another man's learning-by-doing

One man's regulation is another man's internalized externalities.

There are five types of rules, processes, procedures, norms.
Rules that are just wasteful or bad in general and never should have existed. Rules that *were* a good fit for the environment but aren't anymore. Rules that are a good fit for today and encode a bunch of info we don't want to rediscover every time. Rules that are a good fit for today and align social incentives with private behavior. Rules that a good fit for today and encode rationales we can't recall anymore.

Why do we have rules, bureaucracy, etc.?

1) So we don't have to redo everything from scratch

2) To "remember" things on Burkean grounds

On (1), why do you make that first flat line when you tie your shoes? You don't know, I don't know, and you never think about it, but having to rediscover that for everyone would be pointless so we're just taught the rule. On (2), consider, e.g., halal/kosher meat with the "single clean cut": this seems arbitrary but for centuries was a useful practice that led to better food safety!
Edmund Burke, the British politician and philosopher, would say that norms and rules encode rationales from the past even if we don't recall that rationale today.

A (Partial) Nuclear Meltdown

3 Mile Island failed because a stuck pilot-operated relief valve caused water to escape the coolant loop. Folks noticed this. But a panel light said the valve was open. Turns out, that was a measure of whether the valve was *meant* to be open, not a direct measurement, hence wasn't supposed to be used for emergency diagnosis. The "wasteful" backup system for safety purposes was ignored - the rules were right!

A few hundred million down the drain

A technician at financial firm Knight Capital forgot to update some code on one of their eight servers. A feature flag was reused which accidentally triggered code called "Power Peg" on the old server which was used to do testing years before and hadn't been deleted. This code began to trade and was no longer linked to another piece of code meant to inform it that the trade had been executed. 440 million dollars were lost.
No surprise, enterprise software protocol for things like peer review, state maintenance, deleting test code before production, and so on can seem burdensome, but these rules are meant to prevent "the bad thing from happening we'd seen before".

Technical evolution is usually characterized by periods of great experimentation followed by the acceptance of a dominant design. The second concept is that organizations build knowledge and capability around the recurrent tasks that they perform...Thus one cannot understand the development of an organization's innovative capability or of its knowledge without understanding the way in which they are shaped by the organization's experience with an evolving technology.

Henderson and Clark, Architectural Innovation

As the thing we're doing gets more repeatable, it is not efficient to question every part of it each time. We encode things into rules. "The strategies designers use, their channels for communication, and their information filters emerge in an organization to help it cope with complexity. They are efficient precisely because they do not have to be actively created each time a need for them arises. Further, as they become familiar and effective, using them becomes natural. Like riding a bicycle, using a strategy, working in a channel, or employing a filter does not require detailed analysis and conscious, deliberate execution. Thus the operation of channels, filters, and strategies may become implicit in the organization."

Established firms are faced with an awkward problem...The organization may be tempted to modify the channels, filters, and strategies that already exist rather than to incur the significant fixed costs and considerable organizational friction required to build new sets from scratch. But ***it may be difficult to identify precisely which filters, channels, and problem-solving strategies need to be modified****, and the attempt to build a new product with old (albeit modified) organizational tools can create significant problems.*

Henderson and Clark, Architectural Innovation

There exists in such a case a certain institution or law; let us say, for the sake of simplicity, a fence or gate erected across a road. The more modern type of reformer goes gaily up to it and says, "I don't see the use of this; let us clear it away." To which the more intelligent type of reformer will do well to answer: "If you don't see the use of it, I certainly won't let you clear it away. Go away and think. Then, when you can come back and tell me that you do see the use of it, I may allow you to destroy it.

Chesterton, The Thing

This is called the "Chesterton's Fence" argument and it's really Burkean at heart. In some way, it is a formalization of "if it ain't broke, don't fix it".

Kelly Johnson does what he wants or anyone can pull andon?

So, what org do we want? One with a strong leader, little accountability, few rules, but able to do what they want? Or one where we have well established processes and rules, where anyone can invoke process if something goes awry? The second case is basically Toyota, and no one would say they are inefficient!

The point is, the *tradeoff* may vary depending on whether you are trying to do existing things better or trying to do big new things that "conflict" with the incumbent architecture of your organization.

All else equal, progress requires throwing out old rules and granting more deference to leaders.

This comes at a productivity *cost* in most cases!

It's not free. The rules are often (not always, but often) there for a reason, to save time doing new things and to prevent bad behavior. You *will* get more fraud, more unaccountable nonsense, more reinvention of the wheel, if you drop all existing rules and process.

Embedded Website:

https://kevinbryanecon.com/usgovdemo.html

Consider this demo of what US government services could be like: https://kevinbryanecon.com/usgovdemo.html. A single sign-on developed with Google, Apple, and Microsoft. All data entered only once, and pulled from a central secured database, auto-filling in, e.g., the tax example. Click on the name on the top right - all views of your private data are visible, with permission possible to revoke. The government knows who you are, your status, and so on.

As a *technical* matter, this is very easy. Estonia, with the population of Maine or Saskatchewan, highly vulnerable to Russian hacking, built exactly a system like this (heck, the frontend of this demo I made in an hour before class). So why don't we have it in all of the US or all of Canada? There may be good reasons! We keep a lot of this data unlinked currently. Sometimes law *requires* this. Good? Bad? Chesterton's Fence! We require government services to follow disability accessibility and language requirements the private sector ignores. Good? Bad? Chesterton! What we should agree on is that these rules, though they may have some positives, do *slow down big new things*.

...the right structures of governance to enable, to empower, ***to isolate them,*** *to give them the freedom of movement so that Gus Perna, Moncef Slaoui, etc. could have the power and freedom to do what they needed to do without political or bureaucratic interference. That's what Warp Speed was about. That's the core of it. Thinking how we would build the next Operation Warp Speed, what were the defining...There are other ways to fund things, other ways to create incentive structures. We can talk about those, but Warp Speed was primarily an execution focus.*

Alex Azar, Interview with Statecraft

Why does "isolating them" come up so much? Why does it matter more for big new things than day to day?

DOD brought incredible capabilities to the table: the Defense Logistics Agency, procurement, logistics, operations, go through that lengthy list. There's been a long-standing debate since Warp Speed: "Do you just build that at HHS so it's there at the ready?" Because HHS doesn't do those things well. It's not our wheelhouse. We have really smart scientific minds, but logistics, operations, and procurement are not the core. As with pharma manufacturing, it's very hard to build something and have it run without a warm base.

Alex Azar, Interview with Statecraft

So I can't really just nuke institutions. Even for OWS, you couldn't set up a new logistics platform from scratch. Institutions and their norms/rules/processes *tend* to be quite good at doing their main job.

That's part of the reason I get a bit nervous when we talk a lot about translational medicine, et cetera. I get very nervous, as you can probably guess, when I hear the government talking about trying to replicate what the private sector in biopharma does. Because they do it really well, and they aggregate huge amounts of capital and are really good at placing a diverse group of bets there. What they don't do is the commons, the basic primary research. That's the foundation that becomes generally applicable knowledge.

Alex Azar, Interview with Statecraft

You want your org to do "big, new things"

1) **Junk the existing system and start from scratch**

2) Set up a Skunk Works

3) Work through existing systems but try to understand "fences"

Essentially, first is DOGE, or Estonia after end of Soviet Union. Sometimes it is better. It will upset people. Don't do this if system in areas other than the new thing is difficult to replicate! Take Chesterton seriously! But still, we probably "nuke and start over" too infrequently.

You want your org to do "big, new things"

1) Junk the existing system and start from scratch

2) **Set up a Skunk Works**

3) Work through existing systems but try to understand "fences"

This will work well to do independent things (like R&D projects) but not if the end result needs to be reincorporated into the existing organization. E.g., consider a skunkworks for AI-based redesign of a university? There'd be no point - you've actually isolated the AI development and integration from the stakeholders you need buy-in from, and the departments you need connection to, if you are going to make this type of redesign more broadly. The *technical* problem is not the hard part.

You want your org to do "big, new things"

1) Junk the existing system and start from scratch

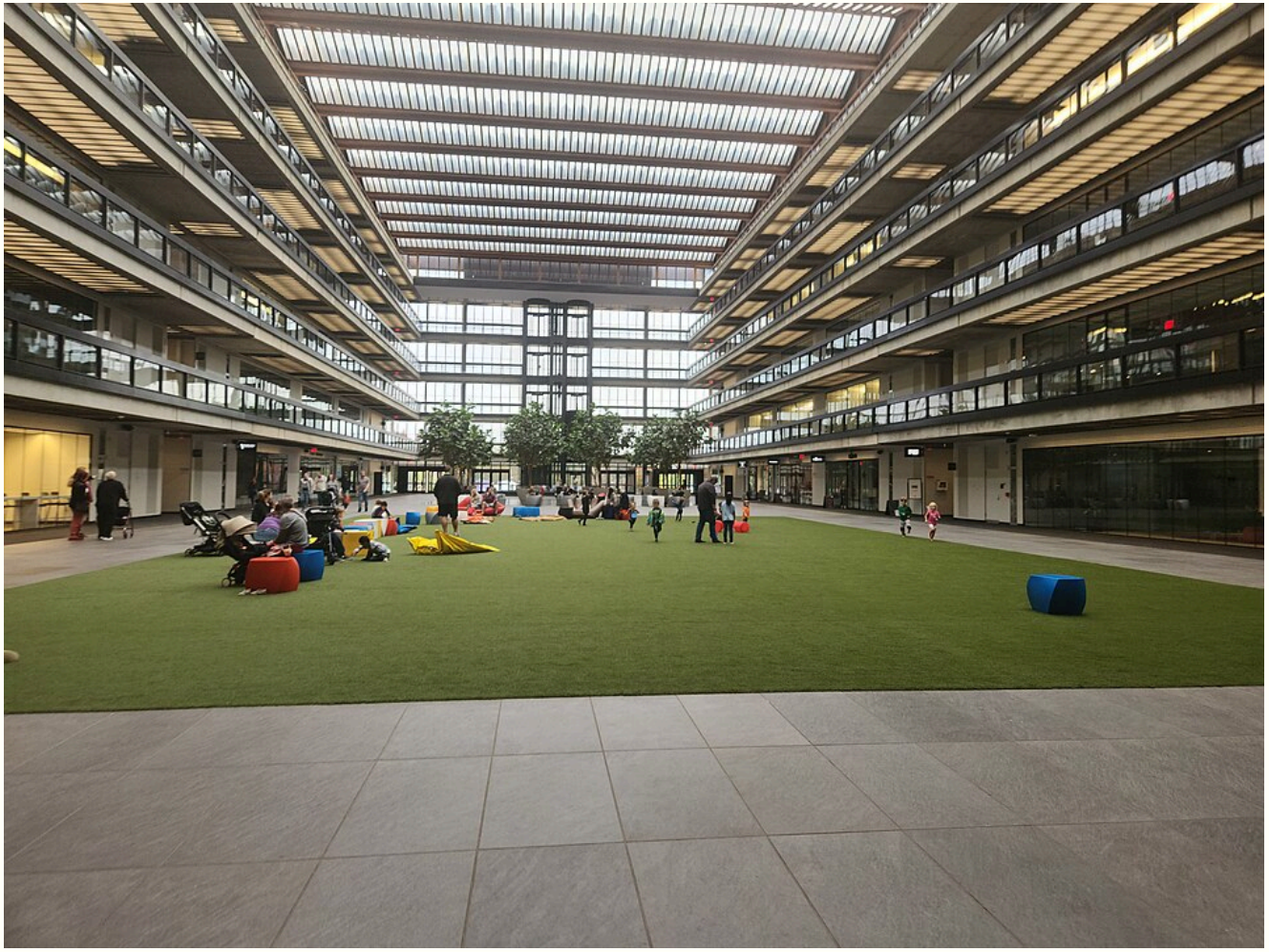
2) Set up a Skunk Works

3) **Work through existing systems but try to understand "fences"**

Not impossible to do new things in old orgs. ASML won in Immersion photolithography and then EUV, two generations of tech in exactly the industry where Henderson and Clark noted it was very difficult architecturally for incumbents to adapt to the new regime. The light source: You need to blast 50,000 tiny tin droplets per second with a laser so precisely that you hit each 30-micron droplet twice - once to flatten it, once to vaporize it into

Even trickier, the optimal organizational structure for progress depends on what *other* orgs do

For instance, corporate science is in decline (see Arora et al). Why? Partly because smaller firms specializing in research, academic institutes, NIH, etc. do the early stage research now and firms just build off that. One alternative to "restructure my org to do the progress-generating things" is "restructure my org to *incorporate the diffusion* of progress-generating things".
We sometimes call this "absorptive capacity" - I need enough progress-orientation to be able to notice useful ideas and processes from the outside that are worth adopting.



Where are today's Bell Labs?

So, a survey. You are asked by a friend (or policymaker!) "how important is organizational structure to progress?"

Let's vote: 1-5, where 1 is "not at all" and 5 is "I imagine the most important factor we'll discuss this term". We'll keep track of these votes as we go!

3.82/5. Comments: "If one organization is bad, but you still have good science and other factors we discussed, progress at a societal level still happens (3/5)", "If you are, say, a university, and you want to make major changes, the most important thing is to get the organizational factors discussed here right (5/5)"

Next Week

Speed and Risk

When can progress go wrong? How do we make sure we don't cause harms when doing new things...or at least make sure the downside is proportional to the upside?