

Universities as Systems: A Sketch for Strategic Reform

Max Borders

Executive Director, Political Economy Research Institute

Author, *Superwealth*

Universities are systems. In order to reform them, we must take a systems view.

In this brief overview, I'd like to sketch a path to strategic reform – one that relies less on policy proposals in inhospitable political environments and more on forces that can be catalyzed by *strategic research*. I make my sketch in three parts. First, I discuss a theory of systems offered by Adrian Bejan, which he calls “the constructal law.” Then, I turn the constructal lens onto the systems universities comprise. Finally, I suggest some strategic categories for university reform in light of our systems view.

This short paper is not meant to be exhaustive. It is rather a sketch to set us thinking about how we might make our centers of higher learning less expensive, less corrupt, more productive and more beneficial to society as a whole.

Before getting into our exposition, we should ask the basic question: What kinds of systems do universities comprise?

- Systems of Information and Knowledge
- Systems of Reputation Capital
- Systems of Credentialing
- Systems of People
- Systems of Resources

Of course, there are interesting overlaps among these areas. But as far as I can tell, these are the fundamental system types. Now that we have these in mind, let's go a little deeper into the idea of a system.

Systems According to the Constructal Law

Adrian Bejan raised eyebrows when he proposed his constructal law in 1996. For a professor of engineering, it was audacious to put forward an entirely new law of nature – one that would simultaneously challenge other disciplines and unify them. But here is what he wrote:

For a finite-size (flow) system to persist in time (to live), its configuration must evolve such that it provides easier and easier access to its currents.

As of this writing, Adrian Bejan has predicted and explained a staggering array of phenomena. As we will see, he has turned the constructal lens on higher education itself.

In the interests of brevity, I would like to take the constructal law as given – a kind of starting point. Therefore, I will assume it is not just that universities comprise systems, but that they

comprise what Bejan terms *flow systems*. By doing so, we can assume that, like vascular hierarchies, universities display the characteristic branching and interconnection of other types of constructal configurations, like river basins, branching trees and circulatory systems. Such an assumption will allow us to take a functional view of universities that tracks very closely with our intuitions about flow systems in the world.

“Constructal theory” says Bejan, “is the view that the generation of design in nature is a phenomenon of all physics.” And all physics includes “everything, animate or inanimate, geophysical and societal.” That’s a powerful, sweeping claim. But Bejan’s law has been so fruitful in its ability to explain so much. Can it explain the persistent dinosaur structures of higher education?

Bejan’s collaborator Sylvie Lorente argues that constructal designs exhibit the property “few large and many small.” That is, flow systems normally organize like vascular systems in which larger currents are connected to ever-smaller streams. If the law stands up across multiple domains, distributions within these domains will exhibit a similar pattern. Whether in college rankings, well-paid jobs, reputation or wealth: we’ll always see *a few large players and many smaller ones*. Constructal law predicts that universities will shift around only a little in rankings, but the basic hierarchies will persist in time.

The university is the professors, their disciples, and the disciples’ disciples. It is the ideas that flow through these human links and into the books of our evolving (morphing) science and culture. In time, this global vasculature evolves like a river basin during the rainy season: all the streams swell, but their hierarchy remains the same.

If universities are examples of successful flow systems, how have they evolved? How exactly have they been successful in Bejan’s sense? And more disconcertingly, perhaps, how can they be reformed if their flow configurations are naturally entrenched?¹

Phenomena Explained or Predicted by the Constructal Law

1. The shape and distribution of trees in forests.
2. The form and function of river basins
3. The form and function of circulatory systems
4. The physics of flight in animals
5. The physics of running animals
6. The physics of swimming animals
7. The size, shape and race of Olympic runners
8. The size, shape and race of Olympic swimmers.
9. University rankings
10. College Basketball rankings

¹ A. Bejan, "Why University Rankings Do Not Change," Int. Journal of Design & Nature. Vol. 2, No. 4 (2007) 1–9

Constructal logic and reform

In turning the constructal lens onto university systems, it makes sense to return to the constituent flow systems we listed above, i.e.: Information/Knowledge; Reputation Capital; Systems of Credentialing; People; and Resources.

If the constructal law is correct, reform is likely to complement current flow channels – not destroy or significantly re-carve them. This prompts a question, then: what kinds of marginal reforms will allow us to keep what’s great about universities while jettisoning some of the more undesirable aspects -- *even if those aspects that may be contributing to their evolution as flow systems?* (Examples of negative aspects include: spiraling tuition, grade inflation, distorted labor prices, waste, abuse, lack of innovation, campus politicization, etc.)

Higher education has the qualities of both a guild and a cartel. The system has persisted for centuries due largely to its resistance to change and to its tight control over the flow channels that compose it. And, as with guilds and cartels, benefits accrue to members. But parties outside the system can be harmed or at least don’t benefit as they ought to. Those who might compete with universities for talent or the privilege of teaching (i.e. would-be competitors) cannot. Those who transact with or subsidize universities (students, taxpayers and donors) pay too little or too much. And those in society at large receive fewer benefits than they might otherwise. To repeat, this is due to an organizational structure that functions very much like a guild or labor cartel. And these organizations fiercely protect their rents.

What is the nature of this guild system? There are differences between public and private universities. But all share the basic guild structure:

- *Accreditation Boards* – A protective oligopoly that gives members (universities) a degree of security from competition through bestowing the power to *grant degrees*.
- *Universities* – A protective oligopoly any one of which gives its members (instructors) the power to give grades (which students need in order to get degrees).
- *Students* – A protected group that spends time and money on the Guild in order to be granted degrees – that is, signaling mechanisms for professional life or graduate school.

“Rents” are economic advantages in the five system areas we listed above. These advantages could not be gained through entrepreneurial activity or market competition. Cartelization via accreditation allows universities to gain these advantages in anti-competitive ways. *Political entrepreneurship* allows them to cartelize without much fear of defection. In other words, in an entrepreneurial market, there are strong incentives for one to defect from a cartel by lowering prices and increasing quality and/or output. But if cartels are propped up by cost-shifting thanks to subsidies, student loans, accreditation, tenure, degrees and other sources of inflation, incentives to defect from the cartel evaporate. And that’s one reason why any reform that requires full privatization or de-subsidization – significant changes in policy – is a non-starter.

Because any existing organization – whether parasitic or productive – is a flow system, systemic reform requires institutional change—i.e. a change in the rules. Institutional reform is difficult, however, because reform efforts meet resistance from the current beneficiaries of the organizational status quo. Because the costs of rent-seeking behavior are borne largely by taxpayers, parents and students, they are at a disadvantage with respect to the well-paid interests that are closer to the action and stand to lose more.

The hard reality of concentrated benefits, diffuse costs comes straight from Mancur Olsen. It doesn't help that everyone – in a sort of mass hallucination -- has come to believe that a university degree is the primary key to success in life. So, despite all the tuition increases, tax increases, waste, fraud and abuse by universities – students, parents and taxpayers have less incentive and information to reform the system than professors, administrators and bureaucrats have to keep it intact.

Constructal Logic and the Adjacent Possible

Notwithstanding the serious problems touched on above, I think there are ways to make universities – public and private – more responsive to both market- and civic discipline. Because traditional policy prescriptions must run the special interest gauntlet, reform will have to come about indirectly through strategic initiatives (rather than directly through policy proposals).

Another way to put this is: all systems, virtuous and vicious, are flow systems. If correct, the constructal law, like gravity, is unforgiving. In creating new social technologies for higher education – that is, new ways of doing things – we will have to apply constructal logic to our reform efforts (consciously or not). The only way to reform an old flow system is to introduce new channels. New channels must be evolutionary extensions of existing systems – accommodating the existing systems in new ways. It is exceedingly rare to supplant an old system. Thus, we must approach our new social technologies with both creativity and humility.

The great complexity scientist Stuart Kauffman offers us a rule of thumb for how to create with humility: “the adjacent possible.” To explain this idea, allow me a brief diversion.

In biology there are multiple levels of description: ecosystems, organisms, cells, proteins, more complex molecules like fatty acids, less complex molecules and various cell precursors, and then atoms—the most basic of which must have been colliding in the so-called “primordial soup.” These levels of description are no accident. They are the layers of the adjacent possible having built up in step-wise fashion from simple to complex. “The phrase captures both the limits and the creative potential of change and innovation,” writes Steven Johnson in the *Wall Street Journal*.

In the case of prebiotic chemistry, the adjacent possible defines all those molecular reactions that were directly achievable in the primordial soup. Sunflowers and mosquitoes and brains

exist outside that circle of possibility. The adjacent possible is a kind of shadow future, hovering on the edges of the present state of things, a map of all the ways in which the present can reinvent itself. The strange and beautiful truth about the adjacent possible is that its boundaries grow as you explore them. Each new combination opens up the possibility of other new combinations.²

Moving to Johnson's parallel for human progress, we can also note that the "march of cultural innovation follows the same combinatorial pattern: Johannes Gutenberg, for instance, took the older technology of the screw press, designed originally for making wine, and reconfigured it with metal type to invent the printing press."

Our new social technologies for higher education will respect the path of the adjacent possible and thus also the force of existing flow channels.

Strategic Categories

How do we operate with a view to the adjacent possible? How do we reform in a fashion that does not ask us to fly to close to the sun with wax wings, or to remains stuck in 'policy' mode?

Ten major strategic categories offered by the newly-reorganized Political Economy Research Institute (PERI) provide an excellent set of starting points for a university reform agenda.

1. *Transparency Mechanisms*—Using technology and public access to information laws (FOIA) to bring light to waste, fraud and abuse in higher ed.
2. *Counter-Crowdout and Disruptive Innovation*—Exploiting entrepreneurial opportunities to compete with more flat-footed organizations along both the teaching and research dimensions.
3. *Competitive Governance*—Introducing new governance structures and institutional rules that compete with existing legal frameworks.
4. *Jurisdictional Arbitrage*—Discovering profitable opportunities in neighboring or foreign jurisdictions due to regulatory or tax burden of a jurisdiction in question. (See also 3.)
5. *Voter Education & Psychology*—Changing patterns of voter behavior by moving voter orientation away from "issues thinking" towards a "principles and public-choice" mindset, resulting in expressed skepticism of government and special interest capture.

² <http://online.wsj.com/article/SB10001424052748703989304575503730101860838.html>

6. *Counter-Coalitions*—Creating new templates for “Bootleggers & Baptists”-style coalitions to counter similar “unholy” alliances that tend to form around anti-competitive legislation, regulation, or policy.
7. *Meta-rulemaking*—Making incremental changes to the political system by changing the rules that govern the incentives of political actors within that system.
8. *Litigative Pushback*—Using lawsuits to block the most egregious policies or create a new space for legal “hacks” to undermine bad policies later.
9. *Complex Solutions*—A combination of any of the above list working to maximum effect.
10. *Seditious Questions*—Framing questions that illuminate an issue so brightly and publicly that they must be addressed.

These ten categories provide a series of starting points for a more exhaustive reform agenda. None are silver bullets. And reform efforts that emerge from these categories are more likely to succeed in combination.

Closing

I hope this sketch serves as a conversation starter about meaningful reform. Indeed, I do not intend for this paper to appear in any journal, but to be used. Perhaps germs of strategies will take root at this very FSSO colloquium. I hope you will join with other reform-minded colleagues and spend some time walking through the ten strategic categories above. Can you think of examples of projects that fit into these categories? Can you add to them? The idea is to get those interested in higher education reform to think laterally (as opposed to linearly) about reform from the bottom up. I sincerely hope this paper inspires new approaches.