Bridging the Divide Between Technologists and Policy-Makers

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Modern governments face an increasing number of issues that require extensive knowledge of science or technology for effective decision-making. These include issues of health care, environment, energy, agriculture, national defense, communications, and transportation, to name a few. There is no shortage of expertise to address these issues; the majority of scientists and engineers who have ever lived are alive today. Yet all too often, the policy-making process does not benefit from this technical expertise. There is a great divide between technologists—research-oriented, forward-looking engineers and scientists—and policy-makers, elected legislators and their staffs at the local, state, and Federal levels.

As a result, we have a system in which policy-makers are too often deprived of knowledge that they need to do their job well, and in which technologists with this knowledge have limited influence. Each side may blame the other for its inaccessibility. At the core of this failure to communicate are two groups with different operational systems and different cultures.

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Two worlds, two cultures

Superficially, technologists and policy-makers appear similar. Both groups work extremely hard. Both must acquire extensive expertise for success. And both are convinced that they do the important work, while the other group debates the minor details.

But fundamental differences between technologists and policy-makers should be expected, because the systems in which each group operates have evolved for entirely different purposes. The goal of the technical research community is to produce and disseminate the best ideas to advance technology and scientific understanding. If most good ideas come from a handful of renowned experts, that is not a problem.

In contrast, the goal of the policy-making community is to create a process that is immune to domination by any single group. It is therefore better, policywise, to reach a suboptimal decision, or to take an excessively long time in reaching a decision, than to allow any single group to control the system for long periods of time.

These fundamental differences in objectives have led technologists and policy-makers in opposite directions.

Process versus product

Technologists measure success exclusively by what they produce, whereas policy-makers must be concerned about the process. The first attempts to create some semblance of Internet governance underscored this dichotomy. The Internet was created in the late 1960s to allow technical researchers to share resources. Most decisions affecting the entire Internet were made through consensus of a few technologists who had earned the respect of the community. None of these researchers had a strong personal interest in the outcome. By the 1990s, the Internet had become a powerful tool for commercial endeavors. Once decisions could significantly help or hurt the finances of huge companies and entire regions, policy-makers began to pay serious attention. A clash between technologists and policy-makers on how to run the Internet was inevitable.

The first contentious process to require centralized control was the allocation of domain names. For example, who should "own" the name http://www.porsche.com? An international nonprofit organization called the Internet Corporation for Assigned Names and Numbers (Icann) was created in 1999 to address this issue. Technologists sought to create a governance system similar to the one they began with, but on a larger scale to match the growing Internet. The "best" people would be elected by the global Internet community to serve on a board, which would have vast decision-making powers. Decisions would be made by consensus of the board based on the perceived merits.

While Icann focused on trying to solve the most pressing technical and legal challenges involving domain names, members of Congress and others accustomed to divisive legislative battles asked about process. Who would be allowed to vote for Icann board members? What were the limits to Icann's power over Internet users? Who would decide which issues the Icann board would vote on? Could advocates try to persuade board members in secret meetings? To the policy-making community, these were the most critical issues, as they would determine whether Icann was susceptible to capture by a powerful minority. To technologists on Icann's board, these were mere distractions from the real issues.

The key to creating a system that cannot easily be dominated by a single group is to include all interested parties in the process, and to force them to reach some kind of compromise that shares the benefits and the pain. It can then be hoped that if everyone can advance their own selfish interest, the compromises that result will be fair—even if the chosen solution is not the best by any objective measure. When trying to argue for a given policy in such a system, one must provide evidence that the policy addresses the needs and interests of a broad spectrum of society. Relevance is exemplified through specific anecdotes and testimonials, and the value of the policy is measured in popularity polls and endorsements from representative groups.

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To a technologist, anecdotes and popularity are irrelevant, or worse; the idea that the opinions of experts and nonexperts carry equal weight is disturbing. Technologists make arguments using facts that have been repeatedly and consistently observed, precisely defined terminology, careful analysis, and references to the same. The precise language of technologists is often incomprehensible outside the field.

The key to creating a system that produces the best solutions is to debate every idea openly on its merits. Technologists carefully develop their best ideas with extensive supporting evidence, disseminate their results, and then defend the ideas to peers. (Thus, peer review brings great credibility.) Unless the fundamental facts or analysis change, a good technologist would not change his conclusions when faced with detractors.

Such an approach is doomed to failure in the policy world, where all views must be heard and accommodated, and compromise may be required at all stages. In the policy world, everything is a work-in-progress. Indeed, sometimes a bill is publicly announced primarily to signal a policy-maker's interest and to solicit informative feedback, so the next version will be better.

Information sources

Different skills are needed in a process-oriented system than in a product-oriented system. Producing new ideas often requires a vast knowledge and insight into past work, so most successful technologists have a deep understanding of their field. The success of a policy-maker depends more on his or her understanding of the process than on his or her understanding of the particular subject at hand. As a result, most good policy-makers are process experts, whose knowledge of issues is broad but not deep. After all, a policy-maker may address health care one hour, and energy the next.

Since most elected officials are required to have an opinion (and vote) on more issues than they or their staff can possibly know in detail, they must rely on trusted sources of ideas and opinions. In contrast, technologists are trained to take a position only if they have inspected the data and drawn their own conclusions, rather than relying on the opinions of others. Indeed, seeking out evidence to support one's conclusions is a significant part of the process.

The inclusive nature of the policy-making process means that all sides of an issue are expected to share their ideas and opinions with policy-makers. As a result, many policy-makers expect that stakeholders will convey any worthwhile facts or arguments. For those who accept this premise, active research is unnecessary as long as one receives input from all partisan interests. This is just one reason why policy-makers are often not inclined to seek input from nonpartisan technologists.

A side effect of getting information from partisan sources is that partisans present a simple and clear case, which makes objective technologists seem more confusing. Why can't scientists just announce the pace of global warming, or the effectiveness of antiballistic missiles? How can this year's "scientific facts" on cancer risks contradict last year's? Scientists know that objective scientific fact changes as our understanding evolves, and that uncertainty is inevitable, but policy-makers are usually advised to wait for "the definitive answer" before acting, and may even suspect self-interest when they get conflicting or uncertain answers from technologists.

Creating ideas versus creating laws

Technologists respect the originators of useful ideas that are fundamentally novel. Thus, technologists emphasize how their ideas differ from the conventional wisdom of their peers, even when the differences are small. Moreover, technologists with integrity are careful not to adopt the ideas of others; that is the sin of plagiarism. Policy-makers are more interested in turning ideas into legislation. The ideas need not be novel. Indeed, to gain enough support for passage, policy-makers emphasize how their ideas are similar to those of peers, even when similarities are small.

The concept of credit is also different, because in the policy context, success requires the support of many players. For example, who in Congress should get credit for creating a new program? The person who wrote and introduced the authorizing bill? Or, given that Congress does not have time to consider the vast majority of bills that are introduced, should

it be the person who pushed the bill onto the agenda? Or the person who brought it to a vote in the House? Or the person who cast the deciding vote in the Senate? Or those who got funding for this program after it was created, which is a totally separate process from creating the program? Proponents of a program may even offer to share credit in return for support; credit is an important form of currency.

Forest and the trees

When technologists and policy-makers address issues that require the talents of both, they both struggle, but in different ways. Because the expertise of technologists is deep and narrow, they sometimes lose sight of the big picture. When you spend your life studying a particular cause of lung cancer, it is easy to forget that there are other causes of lung cancer, and other diseases, and things that a government should do besides fight disease.

Worse, technologists often ignore real-world constraints on solutions, especially when those constraints are political. It is generally easier to reach consensus on incremental policy changes than on fundamental change. When the "best" solution cannot win enough support to pass, a smart policy-maker compromises and pushes the second-best solution. Technologists, who are trained to criticize the conventional wisdom whenever given the slightest provocation, tend to attack reasonable compromise. This can make them the unwitting accomplices of ardent defenders of the status quo.

While policy-makers may see the big picture, they sometimes miss the details. And in many policy arenas, the details are everything. Will a bill mandate the impossible? Will it be ambiguous when applied, leading to endless court battles? Will it be so tied to today's technology that it is inapplicable or counterproductive within a year? Will there be vast unintended side effects? A policy-maker who does not look beyond a superficial explanation of the underlying science and technology may never even consider these possibilities.

What technologists can do

Many technologists must first realize that they already do work that is relevant to policy-making. Effective policy-making can require detailed understanding of virtually any human endeavor or physical process. Few technical fields lack policy relevance for long.

Policy-makers are always hungry for new ideas that they can turn into popular legislation, regardless of whether the idea originated with their own staff or an engineer off the street. To get an idea considered, it is essential to approach an appropriate policy-maker, at the appropriate time. Elected officials are more likely to devote their limited resources to address an issue that is already of great interest to their own constituents. (The greater good is supposedly served when elected officials representing different groups reach agreements.) Suggestions can also be more influential when the author does not need to take credit.

Because their small staffs must address a wide range of issues, policy-makers rely on credible and dependable outside sources. Technologists can play this role. Timing is important. Passing (and opposing) legislation requires more rapid reactions than most technologists are used to, so nonpartisan technologists often respond too slowly to have impact. Information distributed too late may be irrelevant, because the matter is settled. Information distributed too early may be ignored because the focus is on other issues.

When technologists see both good and bad in a policy proposal, they tend to attack it. Since legislation is always a work-in-progress, friendly (or private) suggestions on how to improve legislation may have greater impact than pure opposition, especially in the early stages. Moreover, technologists who are not part of the continual evolution of legislation must be careful about endorsing or opposing a specific bill, which can easily change. It is safer to comment on general principles.

To be useful, suggestions must take into account political as well as technical realities. Some say that politics is the art of the possible. Talking to a policy-maker about the optimal policy is like talking to an engineer about a perpetual motion machine; it is an interesting intellectual exercise, but it has little practical value. Input must also be made in a form that can be digested by overworked generalists who do not need or want to become experts in every facet of the issue.

To get more technologists involved in policy, institutional change may ultimately be required in many industrial and academic research organizations. These organizations supposedly address long-term issues affecting technology, and policy affects technology. They must broaden their mandate. Overemphasis on peer-reviewed output encourages researchers to speak only with each other, and not with practitioners. Still, it is widely accepted that biology researchers should sometimes work with doctors, and that engineering researchers should sometimes work with commercial implementers. Yet, researchers in science and engineering who spend time doing policy-relevant research, or working directly with policy-makers, are too rarely rewarded in their own institutions.

It would also be useful for technical organizations and professional societies to establish an organized network of carefully screened experts to answer technical questions. Imagine that a policy-maker wants to know whether it is technically possible to protect users of cellular telephones from eavesdroppers. Although reasonable minds can disagree on whether government should act, the technical question itself can be answered with little controversy—if you have the expertise. Today, it is extremely difficult for policy-makers to find this expertise without turning to partisan stakeholders. Instead, the request could pass through a hierarchical network to find experts who can assist within the desired timeframe. The policy-maker would also receive biographies of these experts to assess their knowledge and objectivity.

This system would work for uncontroversial technical questions, and if you add editorial support to ensure that diverse views are considered and that the results are written in a clear and concise form, this network could also address more complex issues.

Burgeoning advances in technology will force new and difficult challenges on policy-makers every year, challenges they are unlikely to meet well without expert assistance. Technologists have a responsibility to provide advice and guidance to policy-makers in a consistent, useful, and timely manner. ●