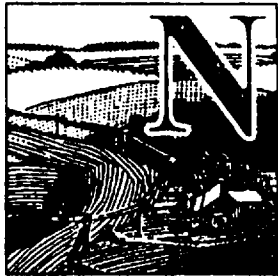


Assessing the Impacts of Technology

BY D. LINDA GARCIA



NEW TECHNOLOGIES are rarely viewed from a position of neutrality. Instead, they are seen as being either the means of mankind's salvation or the cause of its demise. Consider the telegraph. With its power to overcome distance, and hence time, some saw the telegraph as a form of universal communication that would "bind together all the nations of the Earth, link men by a single mind, and give preponderance of power to the nations representing the highest elements of humanity." In contrast, others predicted that the telegraph would lead to cultural decline. As one social observer of the time noted, with news traveling so rapidly via telegraph and being so readily available, the individual would be "entertained with the swindler, the vices and the crimes of the Earth; his paper [would immerse] him in all sorts of things and can only cease to pain him by hardening his heart and taking off the edge of his conscience." *

Linda Garcia is a project director and senior analyst at the Office of Technology Assessment, a research arm of the US Congress. In her fifteen years at OTA, she has worked on assessments having to do with transportation, radioactive waste, and acid rain. As a member of the Telecommunications and Computer Technologies Program, she has worked in the areas of information technology and education, human resources for information-technology R&D, and information policy. She served as project director for the OTA assessments Intellectual Property Rights in an Age of Electronics and Information; Critical Connections: Communication for the Future; and the recently released Rural America at the Crossroads: Networking for the Future.

—Howard Rheingold

With the debate thus cast between technophiles and Luddites, there is little room for a middle ground. Both sides are heavily armed. Each can draw on any number of examples to substantiate its position. But the problem of understanding technology remains unresolved in the heat of the argument; few stop to sort out, or even to consider, the circumstances under which technology can work for or against society. It is this kind of assessment that policymakers must have if they are to make sound decisions about technology development and deployment.

The Office of Technology Assessment undertakes such assessments. OTA is a research arm of the Congress, much like the Congressional Research Service, the General Accounting Office, and the Congressional Budget Office. To distinguish OTA from its sister agencies, and to understand its mission, one needs to look at its history, and the circumstances under which it came to life.

OTA was created in 1972, with the passage of the Technology Assessment Act. This was a time of considerable domestic turmoil; there was growing disillusionment with many es-

tablished institutions, public and private. Part of this disillusionment grew from our problems in Vietnam; but it also reflected our growing awareness of some negative aspects of technology. During the early sixties, Rachel Carson had published *Silent Spring*, describing the harmful effects of DDT. And in the mid-sixties, Ralph Nader had first told Americans that their cars were unsafe.

We also discovered that technological impacts might be extended and experienced over time and space. We learned, for example, that to understand the consequences of using DDT, we would have to trace its effects through more than one generation of the plants and animals with which it had come into contact. And we found that sulfur dioxide, even if it were generated by coal-fired utility plants in our Midwest, could travel as far as Canada, and, in the process, be transformed into acid rain.

Given this growing number of technological issues, and an increased awareness of their complexity, Congress decided that it needed more and better information about how new technologies might affect society. Rather than relying on other institutions to provide this information, Congress wanted its own source of information, independent of the executive and judicial branches of government.

* Daniel Czitrom, *Media and the American Mind* (Chapel Hill, NC: The University of North Carolina Press, 1989).



OTA was created to look at the long-term impact of technology on society. This does not mean that we were to take a position on technology. Rather, we were to try to anticipate technological consequences, so that we might avoid or ameliorate the negative impacts while still enjoying the benefits.

OTA's success has been in its ability to balance the political and the analytical. OTA has carried out objective research and analysis of a number of controversial subjects while operating in the highly politicized congressional arena. Being able to operate simultaneously in both the political and research arenas means that our studies are generally relevant to the issues at hand, and that they are likely to have an important policy impact.

Speaking about my own particular program at OTA, the Telecommunications and Computer Technology Program, I can point to a number of recent cases where our studies have significantly affected the outcome of the congressional debate. The policy conclusions from our study on electronic surveillance were used as the basis of a new privacy law. And our study concerning the impact of technology on intellectual property rights broadened and fundamentally restructured the national discussion of the issues.

Because the US political system is based on the separation of powers, there is room for OTA to play a truly independent (albeit political) role. Under this system, where there are a number of "independent commissions" staffed by the executive branch but accountable to Congress, OTA is a thoroughly legitimate and acceptable way of organizing policy research.

OTA's organizational structure helps it to maintain this delicate balance between research and politics. OTA is, first of all, a nonpartisan agency. It is governed by the Technology Assessment Board, a bipartisan, bicameral body made up of six members from both the House and the Senate, who represent both parties equally. This board rules on and approves OTA studies at their outset and at their conclusion.

Unlike the Congressional Research Service, which responds to requests from individual congressmen, OTA works only for committees, which are themselves bipartisan. Typically a requesting committee will ask us to do

a study. The appropriate program within OTA will then develop a proposal which, after internal review, will be submitted to the Technology Assessment Board for approval. The board will also review the final draft of the report; upon approval by the board, a study's findings are released to the public.

OTA's research method reflects its unique role. Many federal agencies seek information and get feedback by holding hearings, calling for comments in the *Federal Register*, and undertaking inquiries. The information thus generated is then collated and synthesized in government reports. Presumably the sum of these public comments equals the "public interest." In my view, this does not constitute research; it is, instead, a literary form of log-rolling. At OTA, we begin by conceptualizing the problem, setting up hypotheses, and developing research questions. This is a more rigorous and objective approach.

This is not to say that we try to avoid outside opinion. We make an effort to seek a representative balance of all points of view. By reaching out to all the players, and incorporating their concerns into our research design and analysis, we create a product that is valued as much for its process as for its substance.

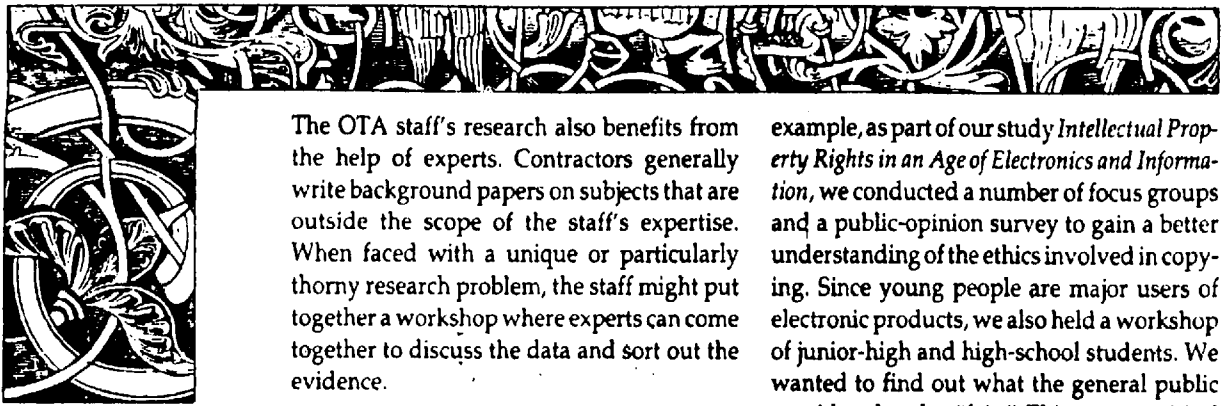
All OTA assessments are supported by an advisory panel, comprising individuals who are knowledgeable in a particular area, or who have a stake in a study's outcome. The panel's job is to provide OTA staff with advice about the scope, methodology, and substance of a study. Members come from business, academia, public-interest groups, and sometimes from the general public. Putting together a good panel, whose members will work well together, is akin to designing a work of art. A balance needs to be struck, not only among interests but also among personalities.

OTA advisory panels take on a life of their own. Panel members rarely agree, either with OTA or among themselves. They debate and argue using OTA draft documents as the basis for discussion. In the process, panel members inform OTA as well as each other.



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The OTA staff's research also benefits from the help of experts. Contractors generally write background papers on subjects that are outside the scope of the staff's expertise. When faced with a unique or particularly thorny research problem, the staff might put together a workshop where experts can come together to discuss the data and sort out the evidence.

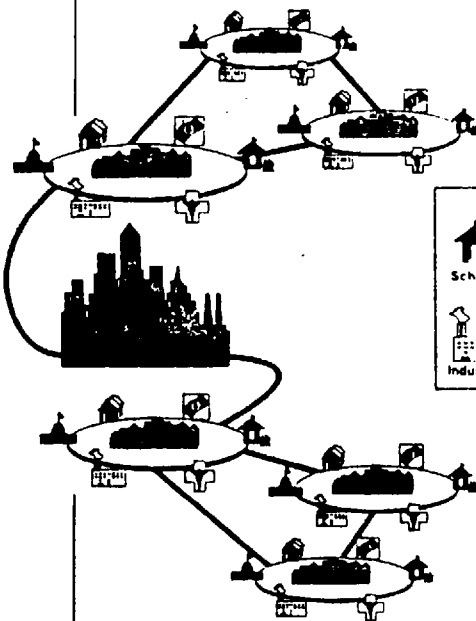
Interested parties also come to speak to us, and their input is always welcome. In fact, I often invite people to "lobby" us. A lobbyist's statement can be turned into a hypothesis: "If Government would only do . . . , then . . . would happen." This is a perfect "if/then" statement, and an excellent source of research questions.

OTA studies also reach out to the public. For

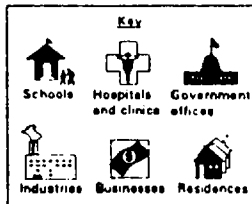
example, as part of our study *Intellectual Property Rights in an Age of Electronics and Information*, we conducted a number of focus groups and a public-opinion survey to gain a better understanding of the ethics involved in copying. Since young people are major users of electronic products, we also held a workshop of junior-high and high-school students. We wanted to find out what the general public considered to be "fair." This was a critical piece of information for us. We could not suggest changes in intellectual property laws unless we had a good idea of how enforceable they might be.

Our recent study *Rural America at the Crossroads: Networking for the Future* took us out into the field. We did not believe we could study rural development without trying to

Rural America at the Crossroads



Linda Garcia was the project director of OTA's recent assessment of the impact of communication technologies on rural America. This document lays out the options available to citizens and policymakers today, and forecasts the possible future impacts of current decisions. Ten years from now, it might be useful to look back at this. —Howard Rheingold



A Rural Area Network would be designed to foster the deployment of advanced technology to rural areas in an economically viable manner by pooling the communication needs of a community's many users — especially the businesses, educational institutions, health providers, and local government offices.

Although often isolated and remote, America's rural communities do not exist in a vacuum. They will inevitably change as the world around them changes. As communication technologies extend rural ties and expand rural markets, these communities will become increasingly vulnerable to national and global trends and events. For rural America, the most critical of these developments will be the adjustment to a highly competitive, service-based, global economy and the emergence of major, worldwide environmental concerns that will compel them to reorient their economies. Since many rural communities lack essential financial and human resources, and often depend on a single industry for the lion's share of their wealth and vitality, their ability to adapt to these changes is limited. Without some form

of intervention, these communities are headed for decline.

Advanced communication and information technologies are certainly not "the" solution to the many problems confronting rural America. In fact, one needs only to look historically to see examples where the deployment of these technologies has left rural communities worse off. However, in the current economic environment, in which businesses are using these technologies strategically to gain a competitive advantage, communities and businesses that have limited access to them are unlikely to survive. While not a panacea, in a global, information-based economy, these technologies could help rural communities overcome a number of the barriers that have limited their economic well-being in the past.



Rural America at the Crossroads

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understand the people, their cultures, their environment, their problems, and their hopes and aspirations. And we knew we had to visit more than one place. Although rural communities share a number of values, the way these values enter their social and political discourse varies greatly. For this reason, we chose to visit four states: Kentucky, New Mexico, Washington, and Maine. We selected them for geographic balance, ethnic and economic diversity, and contrasting approaches to the development of the telecommunications infrastructure. In each state, we visited economic-development professionals, telephone-company representatives, politicians and activists, educators and academics, businesspeople, and "ordinary" citizens. With the four members of our project staff traveling together for a week at a time, processing our experiences as we went along, continually debating our findings, we were able to develop a new way of thinking about telecommunications and rural economic development.

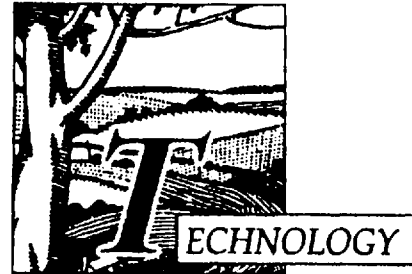
Our record of success does not assure our future. As a maturing government agency, OTA faces a number of challenges. Although we have survived for a number of years, we need to develop and maintain a broad-based national constituency that strongly supports what we do. In effect, we need to rekindle the spirit that gave us our beginning. This will be hard to do in a policy environment in which the major preoccupations are international competitiveness and a balanced budget. It is not only difficult to raise controversial issues in such an environment; it also requires being able to justify costs in terms of some demonstrable benefit. And quantifying in advance the benefits of correctly anticipating technological impacts — especially when they are negative — is a difficult task indeed.

A second problem stems from the fractionated nature of our government. Technology assessment strives to be holistic, to bring together a wide assortment of interrelated issues. Yet in a country where power is divided among a number of agencies and institutions, there is no single locus where problems can be dealt with comprehensively. Even in Congress, issues are broken up on a committee-by-committee basis. And concerns about turf, more often than not, preclude real cooperative joint action.

This problem is nowhere exhibited more clearly than in the area of communication policy. In the United States, responsibility for communication policy is highly fragmented. A number of agencies have a say in such matters, including the National Telecommunications and Information Administration (housed in the executive branch within the Department of Commerce), the FCC (an independent agency responsible to Congress), the Department of Justice, Judge Greene and the 1st Circuit Court of the District of Columbia (responsible for administering the Modified Final Judgment that broke up the Bell telephone system into the Regional Bell Operating Companies), the National Institute for Standards and Technology, the Department of State, and the House and Senate Commerce Committees together with their respective telecommunications subcommittees. In this environment, it is no wonder that we have been unable to establish any communication policy, much less a holistic one. Thus, when OTA recently completed a broad-based study on communication policy examining a wide range of interconnected communication issues, there was no place where it could be "received" in the comprehensive fashion in which it was written.

Political divisiveness, and its tendency to constrict how policy issues are conceived, can only increase in the future, as we take further steps to balance the budget. With the pie shrinking, everyone begins to clamor for his or her "fair share." And there will be more money and resources for those who succeed in defining issues narrowly.

If technology assessment is to continue to play an important policy role, it needs to develop further as a discipline. For this to happen, everyone needs to be part of the debate. And the discussion needs to be more sophisticated. We need to spend more effort trying to understand the dynamics of technology as it evolves in different social contexts, and less time promoting or denouncing technology itself. Hopefully, discussions such as the one appearing in these pages will further this effort. ☺



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