National Network
for Critical
Technology Assessment

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The success of U.S. technologies and policies depends on public acceptance. Systematic analysis, informed by social, behavioral, and decision science, can identify opportunities and vulnerabilities.

Research Issue

Promising technologies often languish, and sometimes die, because important sectors of the public do not see their value – as seen in resistance to nuclear power, mRNA vaccines, autonomous vehicles, genetically modified crops, renewable energy facility siting, and algorithmic evaluations. That opposition can slow development and deployment, erode needed political support, increase the cost of capital, and discourage talented people from entering an industry. Securing public acceptance requires two-way communications between experts and public stakeholders. Only by listening to the public can leaders design technologies and policies that are responsive to its needs. Only by speaking with the public can leaders explain their work and demonstrate their respect – creating trusted relationships and framing the issues before their opponents do. The Public Acceptance component of the NNCTA is creating and applying the science needed to support that two-way communication.

To develop our methods, the Public Acceptance Initiative has collaborated with the Biotech Initiative to address the issues specific to those technologies in ways that support two-way dialogues with affected stakeholders (e.g., communities, industries, suppliers, employees). Our team has produced a shared model that serves as a bridge between the technical complexities recognized by experts and the complex public acceptance issues identified by social, behavioral, and decision science research.

Methods and Data

We adapted the mental models approach, a flexible risk communication method that has been applied to a variety of technologies and policies. In the present context, the approach can reveal opportunities for technology policy leaders in (a) policy formation and technology creation; (b) policy implementation, through the intermediary organizational processes; and (c) priority setting, among the outcomes. It recognizes that the public includes diverse groups, with differing backgrounds, preferences, and information needs.

The approach has four interdependent steps. The first step asks what factors are most important to address the problem at hand, based on the research literature and expert elicitation. In this case, two expert models were created. One addresses the impacts of the technology and potential supporting policies, the other addresses interactions with the public that affect its trust and acceptance of the technologies and policies. These models were refined based on the findings from seven open-ended interviews with experts from industry, academia, and government (recruited at NNCTA's March workshop on technology solutions for generic pharmaceutical shortages).

The second next step involves semi-structured interviews with members of the general public, paralleling those with the experts, so that their mental models can be compared to the expert model.The second step may be skipped in situations, like the present one, where there has been little public discussion of an issue. In that case, the structured survey offers background information. The developed survey explains several potential policy options, identified as having particular potential in the expert interviews. This survey was administered to a diverse but not representative sample of 100 US participants 18 or

older, recruited through the Prolific platform. For more detailed information about the present study, please see the supporting documentation.

Insights

- Biopharma leaders feel that public acceptance is critical for the success of policies aimed at increasing supply chain resiliency for generic pharmaceuticals. They perceive that the public is unlikely to care about the specific technologies involved, but will care deeply about how the policies affect their health and economics. For example, one expert noted that “I'm not sure people want to know, oh, this drug was made with artificial intelligence or this drug was made with continuous manufacturing. …. I think they want confidence that when they go to the pharmacy, what they need is going to be there and then that it's going to be safe and effective.”The one exception was AI, which the expert felt the public could care about depending on how its use was communicated to the public.
- Biopharma leaders recognize the need for communication regarding the drug shortage problem and potential policies. Yet it is unclear who will lead this communication. For example, one expert felt that “... physicians, pharmacists, hospitals, government, educators, the whole, the whole shabang” should be responsible for communication. While this recognizes that communication is important, it leaves a gap in leadership for this effort.
- Most interviewed experts did not consider important steps of the policy communication process including engaging the public regarding policies, incorporating their concerns into decision making, communicating about decision making, and monitoring public opinion. They did bring up the need for public acceptance, the importance of identifying issues to address, communicating about those issues, estimating policy risks, communicating those estimates, and monitoring outcomes. Both members of the general public and healthcare professionals strongly advocated full transparency for policies and outcomes. A strategic communication initiative will be needed to create the level of communication that the public expects in this area.
- 42% of respondents to the general public survey had experienced a shortage problem for a drug on FDA or ASHP’s shortage list, or knew someone who had; another 10% reported shortages for other drugs. Most shortages were for ambulatory medications such as Adderall (17/42) and insulin (5/42). Many gave detailed, and painful, descriptions of their struggles to find drugs, the health problems they experienced when they failed or used inferior substitutes, and the stress even when they were successful. For example, one participant struggled with their symptoms as a result of a recent shortage saying “For me, one of my most prominent issues is lack of emotional stability. I am also Bipolar II and I was going through a manic episode at that time. Without my Adderall, I was even more unstable than usual.”
- The imperfect match between the reference categories for experts and non-experts regarding “generic drug shortages,” could lead to miscommunication regarding problems and policies (e.g., unrealistic expectations, going beyond the scope of policies). Communication regarding the background of generic drug shortages and the health impacts of common shortages could create a shared understanding of policy objectives between experts and the public.
- Respondents to the general public survey had many, and often strong, feelings about policies’ impact on drug costs and manufacturers’ potential abuse of policies. Common policy recommendations were price caps on drug prices or government incentives and subsidies to offset the increased price.

- Respondents to the general public survey wanted to share their experiences and concerns. They were not always optimistic that policymakers were interested in hearing them (e.g., “ultimately I don't think it changes the minds of policymakers as they are often in a more advantaged place, and can be out of touch”) physicians and pharmacists expressed similar sentiments (e.g., “The voice of the healthcare professional has been severely muted not to mention the relationship between those in the corporate world and our politicians.”) Both members of the general public and healthcare professionals strongly advocated full transparency for policies and outcomes.
- All respondents to the physician and pharmacy surveys have dealt with shortages. Many note that shortages will often have no consequences for patients, while others lead to rationing or use of imperfect substitutes “Many times, it doesn't matter. Other times, it can have important adverse consequences, including increasing the risk of death.”
- Similarly to the general public, pharmacists and physicians felt that manufacturers and the government were responsible for preventing the shortages they had experienced, “Ideally it would be the pharmaceutical companies themselves based on internal code of ethics. However, that seems largely unlikely in a pure capitalist society that we live in, so it is then left to the federal government to ensure that the health of the populace can be maintained…”.

Options and Trade-offs

Policy makers need better understanding of public stakeholders’ concerns, beliefs, and trust. Policies addressing generic drug shortages need to address the mismatch between expert and public’s understanding of generic drug shortages, the public’s distrust of the pharmaceutical industry, and concerns about drug pricing. Stakeholders also need authoritative information about implemented policies. For policies addressing generic drug shortages, the public expects communication about why policies are proposed, what are their expected health and economic impacts (especially on prices and jobs), and who will implement and monitor them. The developed communications must be empirically tested, in order to ensure appropriate content and understanding.

Next Steps

The next steps in the mental models research process are (a) create communications that enable non-experts to create informed judgments about technologies and policies, based on results of the research to date; (b) create structured surveys to assess the views of critical stakeholders and track their responses to events, policies, and communications; and (c) share the research with technology and policy leaders, so that they can secure warranted public acceptance. Our methodology is designed to achieve economies of scope, by addressing different technologies and policies in common, comparable terms. Biopharma supply chain resilience is our initial focal area. We plan to follow with energy storage and, later, other NNCTA topics.