

Workshop on Emerging Technologies and Regulatory Cultures

**Program on Science, Technology and Society
Harvard Kennedy School**

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Harvard University Center for Environment
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Background

The aim of the workshop on **Emerging Technologies and Regulatory Cultures** was to consider theoretical and empirical contributions to regulatory studies of science and technology from several fields, as well as to lay the basis for interdisciplinary conversations among researchers in the Boston area. Workshop contributions came from varied disciplines, including science and technology studies (STS), history, anthropology, political science, public policy, law, and sociology. The meeting aimed to review new strategies of regulation, as well as to highlight second and third generation work on law, regulation, science and technology by several leading practitioners.

Regulation and regulatory studies have not been central to the social sciences in recent years. Up to the 1980s such studies were somewhat more common. They revealed that there are cross-national differences in the regulation of technological risks, but they did not question the categories of political structure or the epistemic assumptions that produce “national styles” of regulation. In the context of neoliberalism and deregulation, which became dominant governmental paradigms in the 1980s and 1990s, particularly in the United States, research interests shifted away from regulation (Jasanoff, 2005). However, interest in regulatory studies has climbed again in the last few years, particularly in cross-national comparisons of the politics and regulation of science and technology within political science, sociology, and most especially science and technology studies. STS particularly attempts to open up traditional black boxes, both epistemic and political, showing their internal histories and dynamics. In analyzing regulation, STS scholars tend to focus on micro-practices and discourses at local sites of technoscientific activity, including the production of regulatory science. One goal of the workshop was to bring such analyses into interaction with perspectives from other disciplines on macro-political issues and regulatory frameworks for particular technologies.

Comparative analysis from an STS perspective also argues that a renewed focus on regulatory analysis is justified by recent profound shifts involving science, technology, politics, and citizenship (Jasanoff 2005): the rise of the constructivist view of science and technology (Jasanoff et al., 1995; Hackett et al., 2008), the growing recognition of society as shaped by the limits and hazards of technological development (Beck, 1986; Perrow, 1984), the effects of globalization, and increased engagement of broader publics in developments affecting science and technology. These have contributed to the emergence of competent and knowledgeable citizens, who critically assess science, technology, and politics and claim

involvement in related decision-making processes (see, for example Irwin and Wynne, 1996; Nowotny et al., 2001).

Workshop Summary

The discussion centered on five main themes: bringing states back in; regulatory cultures; regulatory failure; uncertainty; and comparison.

With regard to the first theme, *bringing states back in*, there was a strong sense in the group that government's role needs to be reconceptualized and sharpened—rather than sidelined or ignored—even in the current era of partnerships and governance. This was observed especially in cases dealing with (1) trade between industrialized countries and developing nations, (2) the regulation of emerging technologies and the environment in national and supranational bodies, and (3) cross-national comparison of S&T policy. Some presentations identified specific regulatory gaps and proposed solutions, while others emphasized the institutional and contextual factors driving particular regulatory approaches.

Addressing the rapid introduction of hazardous technological activities into less-developed nations by multinational corporations, Michael Baram discussed the consequent threats to worker health and safety in such nations where regulatory protections and infrastructure are inadequate or compromised by prospects of economic development. Because international “soft law” and corporate self-regulation have proven inadequate to stem this global “race to the bottom”, Baram suggests (1) that a universal principle for assuring equivalent treatment of workplace safety and health in all nations is needed, (2) that it be defined as the workplace standard of care that applies to MNC's in their highly developed home countries, and (3) that it be implemented by contractual arrangements between MNC's and the less-developed nations in which they intend to operate.

Drawing on his in-depth historical study of FDA drug approval practices, *Dan Carpenter* displayed regulation as occurring in a complex field of actors, interests and power. He showed that organizational self-image and power structures within a regulatory agency could lead to the creation of more uncertainty than they resolve. At the same time wielding gate-keeping authority translates into an increase in and broadening of power in concerned agencies.

Bringing in the notion of *regulatory cultures* and also *comparison*, *Sheila Jasanoff* and *Sang-Hyun Kim* looked at the cross-national regulation of nuclear power. By identifying key moments in the development and regulation of this technology in the United States and South Korea, they showed that the sociotechnical imaginaries governing this sector were very different between the two countries. South Korea imagined nuclear power through the lens of economic and technological self-reliance and energy independence. In the United States, however, the dominant imaginary was that of containment—that is, containing radioactive risks, runaway accidents, and unilateral military development.

Turning to European Union chemical regulation, *Henrik Selin* described the precaution-oriented framework of the new system for managing hazardous chemicals (REACH), which stands for “Registration, Evaluation, Authorization and Restriction of Chemicals”. He argued that by implementing a best practice-driven approach, EU policy-making shapes debates, decision-making, governmental strategies, and policy choices in other jurisdictions as well,

with regard to raising both domestic and international laws and standards. This initiates stronger national legislation and international regulations, which stands for a turn in global environmental politics away from the idea of deregulation to that of stronger national legislation. *John Wargo* pointed out core failures of U.S. chemical regulation in preventing the health impacts of toxic chemicals on the weakest members of society and argued for a renewed focus on the health of children.

Iris Eisenberger identified a regulatory gap between the supranational level of the European Union (EU) and the several nation states in the regulation of medical nano devices. The regulation of such devices at the EU level is based on the idea of product safety standards, but Europe as a whole lacks a regulatory framework for related ethical and human rights issues, which are governed mainly at the level of the nation states.

A comparable transatlantic gap can be observed in the regulation of nanomaterials. By comparing the regulation of biotechnology, chemicals and nanomaterials, *Monika Kurath* observed that the U.S. regulatory culture focuses mainly on product equivalence and risk prevention. This stands in contrast to the European precautionary orientation. In the U.S. governance of nanomaterials, not only environmental advocacy groups and technology assessment institutions but industry also advocates for stronger federal regulation—an observation shared by *Margaret Quinn*, who presented a survey of risk management practices in Massachusetts nanotechnology firms. She observed that the firms (especially small firms) lack information and guidance from suppliers, industry and the government regulatory bodies in order to manage risks.

Stressing *uncertainty* in the politics of emerging technologies, *Chris Bosso* described this concept as a driving force in nanotechnology regulation and diagnosed current approaches in the United States as being insufficient, particularly for active nanostructures. *Regula Burri* analyzed a nanotechnology citizen panel in Switzerland. She observed that uncertainty leads citizens to argue from their everyday, habitual schemes of perception and interpretation. This has implications for the current widely supported imperative for regulation to take public opinion into account.

Under the heading of responsibility in nanotechnology *Chris Kelty* presented the making of a governance network to manage uncertainties by scientists at Rice University. By addressing risks in the favorable context of new medical applications and by heading a worldwide network with corporate, public and NGO actors, nanoscientists at Rice University are trying to build up their influence and power in the arenas of politics and regulation.

A further theme centered on the diagnosis of *regulatory failure* and how to think about and compensate for it domestically and transnationally. In general, compensation for regulatory failure has taken the form of voluntary frameworks, improved technology assessment, and civil society initiatives. In the U.S. federal regulation of nanomaterials, for example, initiatives for more precaution-oriented regulatory approaches have emerged from actors external to the government. Since such actors—e.g., the Environmental Defense Fund, a national environmental advocacy group supportive of market-based solutions, and DuPont, an industrial corporation with high social responsibility commitments—act outside the traditional political arena, they can contribute to governance by introducing voluntary self-

regulatory schemes. However, whether they will be able to initiate an epistemic turn from *prevention to precaution* in the U.S. political culture of regulating emerging science and technology remains to be seen. In general, the question remains open as to which social actors can best compensate for governmental regulatory failures.

Beside the need for a more pronounced state role in regulation, the group also discussed issues around *comparison*, specifically how and what to compare. Particular challenges for comparative analysis are seen in the discrepant development status of countries, the appropriate level of comparison (global, regional, national or local) and the identification of particular national patterns or regulatory cultures. Often, comparisons lead to broad generalizations that do not do justice to the entire, complex dynamics of a national regulatory framework or political culture. By comparing the regulatory practices of two countries with blunt analytic concepts such as *precaution* and *prevention*, the analyst may lose sight of the fact that multiple approaches can be found within a single national or even local regulatory framework. New analytic concepts such as sociotechnical imaginaries, which focus on the dynamics through which dominant cultural orientations are created, may better grasp some of these complexities.

Finally, one of the most frequently raised issues in the context of risk assessment and policy responses to emerging technologies is that of increased citizen participation. However, the ways with which a more democratic engagement of citizens might be achieved remain unclear. As several participants pointed out, engaging people in discussion prior to a developed public discourse on the subject raises a paradox: at the very moment when a science or technology field is new, and decision making agendas are relatively open and could be influenced, public perception of this field is lowest. By contrast, public awareness tends to be much greater when both the development agendas of science and technology and the principles for regulating them are further developed and less malleable.

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