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# E-Rulemaking: Information Technology and Regulatory Policy

New Directions in Digital Government Research



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Harvard University
John F. Kennedy School of Government
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HARVARD UNIVERSITY JOHN F. KENNEDY SCHOOL OF GOVERNMENT

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## Regulatory Policy Program

The Regulatory Policy Program at the Center for Business and Government at Harvard University's John F. Kennedy School of Government develops and tests leading ideas on regulation and regulatory institutions. The program aims, through research, teaching, and outreach, to improve regulatory decision making across a range of policy realms.

For more information about the Regulatory Policy Program at Harvard University, visit www.ksg.harvard.edu/cbg/rpp.

For our comprehensive on-line portal to research and policy information on e-rulemaking, visit www.e-rulemaking.org.

## About the Author

Cary Coglianese is Associate Professor of Public Policy at Harvard University's John F. Kennedy School of Government and Chair of the Regulatory Policy Program at the school's Center for Business and Government. His research focuses on issues of regulation and administrative law, with a particular emphasis on the empirical evaluation of alternative and innovative regulatory strategies and the role of disputing and negotiation in regulatory policy making. He has served as the Irvine Visiting Professor of Law at Stanford Law School and an affiliated scholar at the Harvard Law School, and is currently the Vice Chair of the E-Rulemaking Committee of the American Bar Association's section on Administrative Law and Regulatory Practice.

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# Contents

# Executive Summary

Government regulation plays a vital role in nearly every aspect of social and economic life. As a result, any innovation in government practice that improves the way that regulatory agencies make new rules is likely to have important public benefits. E-rulemaking, the subject of this report, is one such promising area of innovation.

Interest in information technology and government rulemaking has been growing in recent years. For example, the federal government recently launched an e-rulemaking initiative that has already led to the creation of a one-stop website through which the public can access and file electronic comments on all new regulatory proposals issued across all agencies. In addition, officials are currently at work developing a government-wide, on-line docket system that will make available all the extensive information contained in each agency's rulemaking files. Efforts such as these are likely to continue.

To maximize e-rulemaking's potential over the long term, the Regulatory Policy Program at the John F. Kennedy School of Government convened two research workshops—one in Washington, DC, and the other at Harvard University—to develop a research agenda on the technological and institutional aspects of e-rulemaking. These workshops, sponsored by the National Science Foundation's Digital Government Research Program, brought together leading academic experts from computer sciences, law, and public management, along with key public officials involved in managing federal regulation. This report summarizes the workshop discussions and outlines an agenda for future research on e-rulemaking.

The e-rulemaking workshops made clear that the government's efforts to accept electronic comments and make regulatory documents available on-line mark only the beginning of what can be accomplished. Workshop participants proposed many other possible ways that information technology can assist government regulators. For example, government analysts could use information retrieval and extraction software to isolate relevant data for rulemaking proceedings. Text categorization software could be developed to organize and summarize public comments, which could improve agencies' ability to process a large volume of public input. Further applications could include the convening of digital juries to link citizens across the country to provide feedback on new rules. Rule compliance wizards could help ensure that regulated entities follow complex systems of rules. Some of these new uses of information technology will simply require applying existing technologies to existing institutional practices. Over the long term, however, e-rulemaking will call for new technologies, new institutional practices, or both.

Whether applying existing technologies or designing new ones, decisions about e-rulemaking should be made with a clear set of goals in mind. Different applications of information technology to rulemaking promise to advance one or more of the following goals:

(1) ***Increase democratic legitimacy*** Increasing democratic legitimacy could be accomplished by using information technology to increase public understanding of rulemaking, to make the process more interactive and deliberative, and to make it

easier for more democratically accountable institutions, such as the Congress or president, to oversee the rulemaking process.

(2) ***Improve regulatory policy decisions*** E-rulemaking could improve policy decisions by making it easier for regulatory officials to analyze large volumes of data drawn from multiple sources. Simulation software could help analysts make better predictions, and other technologies could make it easier for agencies to rely on routine use of quality economic analysis.

(3) ***Decrease administrative costs*** Information technology can enable agency managers to coordinate rulemaking staff and other resources more efficiently. In fact, some cost savings from e-rulemaking have already been reported.

(4) ***Increase regulatory compliance*** Agencies can use information technology to increase compliance both by increasing public understanding of what regulations require and also, possibly, by reducing the cost of compliance through compliance assistance software.

For each of these major goals, this report provides concrete metrics that can be used in designing and evaluating different uses of information technology.

To achieve measurable improvements in rulemaking, research will be needed from across both the information sciences and the social sciences. Information science research will be crucial for technological design, such as developing text categorization and summarization tools for the rulemaking environment. Social science research will be needed to understand better the professional tasks of regulatory decision makers as well as the organizational environment within which technologies will be deployed. With coordinated input from both disciplines, however, researchers will be able to develop still more effective uses of technology and better design organizational procedures that make appropriate use of new technologies.

E-rulemaking has the potential to help government officials create higher quality rules, induce higher compliance rates, and foster greater and deeper public participation. But the effective implementation of e-rulemaking over the long term will depend on continued research on both information technology and the institutional and legal environment of rulemaking. This report develops an e-rulemaking agenda by proposing twenty-five major research questions that span four main areas: (1) information technology, (2) agency management of rulemaking, (3) public involvement in the rulemaking process, and (4) regulatory compliance. Pursuing these research questions through interdisciplinary teams or networks will help ensure that regulatory agencies can improve their use of e-rulemaking in the decades to come.

The federal government's recent efforts at e-rulemaking represent important first steps toward better utilization of information technology, but they are just first steps. This report articulates a longer range vision for e-rulemaking and maps out an interdisciplinary research agenda to help deliver on e-rulemaking's full promise. Through interdisciplinary collaboration, and with the cooperation and support of government agencies, researchers will be able to make progress in answering many of the significant questions presented in this report. Building and sustaining research on e-rulemaking should be part of any strategy to improve the way government makes rules that in turn affect every major aspect of our society.

# Preface

Taken together, over one hundred federal regulatory agencies and subagencies issue more than 4,500 new regulations each year.[1] Crafting these regulations imposes significant information demands on government agencies such as the U.S. Department of Agriculture, Environmental Protection Agency, Federal Aviation Administration, Internal Revenue Service, or Nuclear Regulatory Commission. Before adopting a new regulation, agencies such as these are required to publish a notice of proposed rulemaking in the *Federal Register* and allow an opportunity for the public to comment on the proposed rule.[2] They also need to complete scientific, engineering, and economic analyses, as well as respond to comments submitted by outside organizations and individuals.[3] It is not uncommon for the federal rulemaking process to require three years or more before an agency issues a new regulation.[4] The demands of analysis and information processing can strain limited agency staffs, as well as limit the public's capacity to review and comment upon major regulations as they are developed.

Electronic rulemaking, or e-rulemaking, offers the potential to overcome some of the informational burdens associated with developing regulations. E-rulemaking harnesses the power of advanced digital technologies and may help make the rulemaking process more manageable for federal agencies, as well as help expand and enhance the public's involvement in the rulemaking process. In recent years, many agencies have constructed websites with rulemaking documents, allowed citizens to submit comments electronically, and offered systems (such as chat rooms and listserves) for interactive deliberation over pending rulemakings.[5] A few of the more prominent examples include the Nuclear Regulatory Commission's RuleNet project, which relied on Internet technology in all facets of the agency's rulemaking process;[6] the Bureau of Land Management's use of scanning and network systems to process more than 30,000 public comments on a proposed rangelands rule;[7] and the Federal Aviation Administration's on-line rulemaking for small-scale rockets.[8] After examining some of the new initiatives in this area, the U.S. General Accounting Office recently suggested that the use of information technology in rulemaking can improve the transparency of the regulatory process and reduce the managerial burden of rulemaking to government agencies.[9]

Interest in e-rulemaking is growing in Washington. Electronic government has become a major element of the Bush Administration's overall management plan, and e-rulemaking forms one of the components of this e-government strategy.[10] In early 2003, the administration launched a web portal designed to facilitate electronic filing of public comments on proposed regulations (www.regulations.gov), an accomplishment that represented the first phase of the administration's e-rulemaking strategy.[11] In addition, the Bush Administration's Office of Management and Budget has incorporated e-rulemaking into its own regulatory review process, making all of its studies and decisions accessible via the Internet.[12] Efforts such as these will almost certainly persist beyond the current administration, if for no reason other than the enactment of the E-Government Act of 2002.[13] The E-Government Act calls for future federal

initiatives to promote the use of information technology by federal agencies in adjudicatory and rulemaking proceedings.[14]

In order to ensure that the growing interest in e-rulemaking leads to effective and meaningful innovations, new computer technologies will need to be appropriately integrated into the institutional design of the federal regulatory process.[15] Decisions about the design and implementation of new technologies will therefore need to take into account the legal, political, and managerial dimensions of the rulemaking process. In addition, to take full advantage of new technologies, existing institutional structures and rulemaking practices may themselves need to be reconfigured. For these reasons, effective deployment of information to assist with government rulemaking will require an integration of both technological and institutional analysis.

To develop and advance a research agenda on the technological and institutional issues related to e-rulemaking, the Kennedy School of Government convened two research workshops: one in Washington, DC, in March 2002, the other at Harvard University in January 2003.[16] Sponsored by the National Science Foundation's Digital Government Research Program, these workshops brought together academic experts from computer sciences, law, and public management, along with key public officials involved in managing federal regulation, to forge a forward-looking research agenda needed to improve the rulemaking process through the development and deployment of new information technologies. This report summarizes the discussion that took place at these sessions and outlines an agenda for future research on information technologies and the rulemaking process.

# Acknowledgments

This report would not have been possible without the many insights offered by those who participated in the workshops on e-rulemaking organized by the Regulatory Policy Program in Washington, DC, and at Harvard University. The participants at these sessions gave generously of their time and expertise, and produced both an exceptional discussion and an impressive collection of overheads, notes, and outlines on which this report has drawn.

The Digital Government Research Program at the National Science Foundation made this project possible under award number EIA-0226053. The program's managers, Larry Brandt, Valerie Gregg, and Sue Stendebach, gave helpful guidance and encouragement at each step of the project. An experienced regulatory analyst and rule-writer at the Environmental Protection Agency on an agency assignment with NSF, Sue Stendebach offered insights that bridged the perspectives of digital government research and the practice of rulemaking. Her summary of the workshop proved particularly helpful in formulating a draft of this report.

In planning the two-day workshop held in Cambridge, members of our e-rulemaking executive committee also offered many constructive suggestions and valuable questions. Steve Balla, Jamie Callan, Bob Carlitz, Neil Eisner, Roger Hurwitz, Kincho Law, Stuart Shulman, Sue Stendebach, and Peter Strauss helped enormously in the discussions leading up to the Cambridge workshop.

Ed Hovy and Beth Noveck produced exceedingly helpful syntheses at the closing panel of the Cambridge workshop that guided the development of the final section of this report. A revised version of the synthesis that Ed Hovy initiated appears as an appendix to this report. In addition, Liz Liddy produced an extensive list of applications of information technology to rulemaking that also appears as an appendix to this report. All of the material produced in connection with this project, as well as other relevant material on e-rulemaking, can be found at www.e-rulemaking.org.

We received many helpful comments and suggestions on earlier drafts from Steve Balla, Jean Camp, Bob Carlitz, Claire Cardie, Sharon Dawes, Jeremy de Roxas, Jane Fountain, Ed Hovy, Roger Hurwitz, Neil Kerwin, Kincho Law, Liz Liddy, Jeff Lubbers, Beth Novack, Rick Otis, Jarrett Perlow, Ed Schwalenberg, Peter Shane, Stuart Shulman, Geoff Steele, Sue Stendebach, Chris Weare, and Gio Wiederhold.

Sam Walsh provided excellent overall research assistance and helped draft the report's executive summary, glossary, and summary of laws and executive orders. Mark Finlayson created most of the tables and figures and provided guidance on various technical issues, including the information science portions of the glossary. Ha Nguyen handled the design and layout of the report, and Hope Steele provided copyediting. Allan Friedman, Sabine Schaffer, Özlem Uzuner, and Sarah Wilford produced detailed and helpful notes of the Cambridge workshop. Bernie Cahill, Amy Christopher, Kate Dodson, Eric Lockwood, Todd Olmstead, and Camiliakumari Wankaner, all of the Center for Business and Government, played key roles in supporting this project.

Special thanks are owed to Jennifer Nash, the Director of the Regulatory Policy Program, for her leadership of this initiative from its inception.

This report represents an effort to summarize and synthesize the perspectives that emerged at the Regulatory Policy Program's workshops. The views expressed do not necessarily reflect those of its author, the Regulatory Policy Program, the Kennedy School of Government, Harvard University, or any of the sponsoring organizations. Furthermore, although this report summarizes workshop discussions, it does not necessarily represent the views of all the participants nor should it be construed to represent any consensus statement or shared set of findings or recommendations. Portions of this report have been excerpted in articles in the *Social Science Computer Review* and the *Administrative Law Review*.

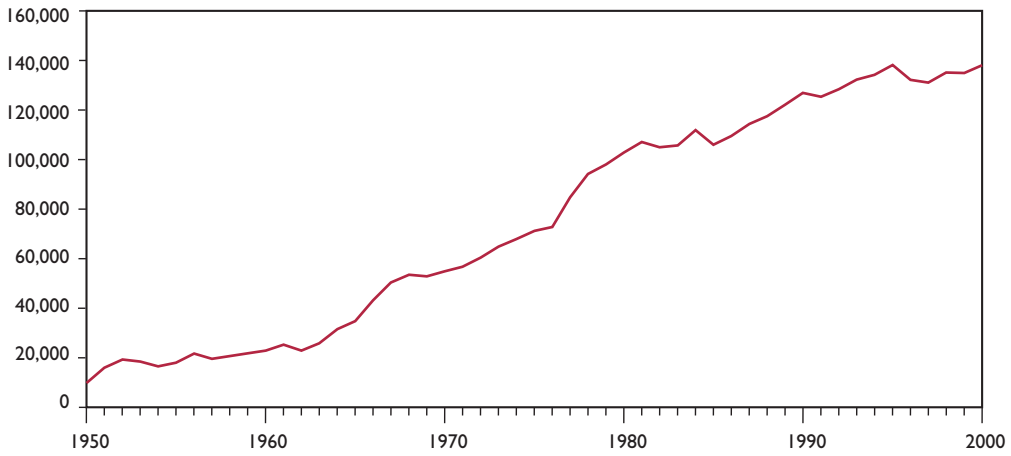
# Introduction

Every major aspect of contemporary life is affected by government rules. Efficient and productive markets depend on appropriate regulation of key sectors such as banking, securities, communications, energy, and transportation. Government regulation also helps secure vital public benefits such as food safety, environmental quality, effective medical care, and consumer protection. All of the social and economic impacts of government regulation derive from thousands of rules that regulatory agencies issue every year.

Regulatory agencies, whether cabinet level departments such as the Department of Transportation or independent agencies such as the Federal Communications Commissions, may not always receive the same high-level media attention as Congress or the president—but their decisions are at least as vital to the public, often more so.[17] Indeed, on many issues, Congress offers only the most general guidance in statutes, leaving it to the expertise and discretion of agency administrators to make the tough choices that have tangible effects on the public.[18]

Since 1950, the volume of rules appearing in the *Code of Federal Regulations* (CFR), the official repository of all binding regulations issued by federal agencies, has increased more than tenfold (Figure 1).[19] These agency rules, which have the same force of law as statutes passed by Congress, have enormous economic and social effects. Although it is difficult to determine the precise costs and benefits of all the regulations in the CFR, the Office of Management and Budget has estimated, in a 2001 report to Congress, that health, safety, and environmental regulations yield up to $250 billion to $1 trillion in benefits each year.[20] OMB also estimated, however, that these same federal regulations impose annual costs of up to $150 billion to $230 billion.[21] Other federal regulations, in areas such as transportation, energy, telecommunications, and international trade, may impose additional costs of up to $230 billion per year.[22]

Figure 1: Cumulative Pages in the *Code of Federal Regulations*, 1950–2000



With such enormous stakes, rulemaking can create significant political and management challenges for government agencies. The rulemaking process often requires that agency staff process and analyze large amounts of information, communicate effectively with a diverse set of interested parties, and ultimately make difficult public policy trade-offs.[23] The stakes involved in rulemaking also raise questions of democratic legitimacy, for regulatory agencies are not themselves directly accountable to the public.[24]

Given the high stakes and voluminous output of government rulemaking, any innovation deserves careful consideration if it could help improve rulemaking management, increase public participation, or enhance regulatory decision making. E-rulemaking is one such emerging new practice. E-rulemaking, or the use of new digital technologies in the development and implementation of regulations, may help streamline and improve regulatory management as well as help inform citizens about governmental decision making and involve them more meaningfully in the rulemaking process.[25] Among other things, new technologies may help agency staff retrieve and analyze vast quantities of information, often from diverse sources. Information is vital for understanding complex problems, identifying the need for regulation, and predicting the effects of different regulatory options. By taking advantage of advances in digital technologies, agencies might also be able to increase the public's access to and involvement in rulemaking.[26] For example, in recent years, agencies have constructed websites containing rulemaking documents and have allowed the public to submit electronic comments on proposed rules, thus making it easier for members of the public to learn about and participate in the rulemaking process.[27]

Policy developments to encourage or take advantage of e-rulemaking are beginning to emerge. The Clinton Administration's National Performance Review encouraged government agencies to explore new applications of information technology,[28] and e-rulemaking has formed a major part of the Bush Administration's e-government initiative.[29] The E-Government Act of 2002 directs regulatory agencies in the coming years to develop the use of technologies designed to enhance public participation in government decision making.[30] Serious research on these new technologies and their impacts in this area has only recently begun to take root, but the growing interest among policymakers brings greater urgency to the need to establish a research agenda on the technological and institutional dimensions of e-rulemaking.

In cooperation with the National Science Foundation's Digital Government Program, the Regulatory Policy Program at Harvard University initiated a major dialogue between researchers and regulatory officials on the future direction for research on e-rulemaking. The Program convened a one-day working session in Washington, DC, in March, 2002, as well as a two-day workshop held at Harvard University in January, 2003. These sessions brought together specialists from the information sciences, law, social sciences, and public management, as well as key regulatory officials from more than ten different government agencies. The aim was to forge a research agenda for the next five to ten years that addressed major and persistent questions raised about the use of information technology in the rulemaking process.

The workshop sessions elicited broad recognition from participants about the significance of e-rulemaking as a new arena for research and policy development. These sessions also helped forge linkages across research communities and connected researchers who are already beginning to pursue new, interdisciplinary research on the role of information technology in the rulemaking process. This report summarizes the discussions that took place at the Regulatory Policy Program's workshops; its aim is to help expand the community of researchers and policy analysts in this new area.

Part I of this report details the rulemaking process, outlining the procedures agencies must currently follow in developing new regulations and highlighting some of the problems generally associated with rulemaking. Part II considers ways that information technology may be able to improve the rulemaking process, as well as discusses some of the chief goals, choices, and challenges associated with e-rulemaking. Part III presents a cross-disciplinary agenda for research intended to contribute to e-rulemaking's long term potential for improving government regulation and enhancing the management and legitimacy of the rulemaking process.

PART I

# The Rulemaking Process

Until about the middle of the twentieth century, regulatory agencies in the United States frequently established regulatory policy by following court-like procedures and deciding individual cases involving particular regulated parties.[31] By adjudicating cases involving individual firms, regulatory agencies would effectively establish new "rules" but they would do so by creating precedents to guide other firms in similar industrial sectors.[32]

With the adoption in 1946 of the Administrative Procedure Act (APA), however, Congress specifically authorized agencies to issue general rules outside the context of individual case adjudication and even without adhering to formal court-like procedures.[33] Although the APA still allowed agencies to engage in adjudication and use formal processes, it also permitted agencies to use an informal rulemaking process that required little more than giving notice of proposed new rules and an opportunity for the public to comment on them.[34] This meant that regulatory agencies no longer had to search for a suitable individual case before setting general policy, and that the agencies could follow more simple procedures in creating new rules.

By the 1960s and 1970s, a period during which Congress established a number of new regulatory agencies and statutes, informal rulemaking had become one of the most significant methods for establishing regulatory policy in the United States.[35] Through informal rulemaking, regulatory agencies have issued rules governing the quality of drinking water, the safe operation of airlines, and the installation of air bags in automobiles—among many other significant policy issues. In fact, over the past several decades, regulatory agencies have adopted about ten times more rules than Congress has passed laws, even though both have the same binding legal effect on regulated entities.[36] Just as with statutes, individuals and firms who violate rules issued by regulatory agencies can find themselves subject to substantial penalties.[37]

## The Basic Procedural Framework

Thirty years ago, legal scholar Kenneth Culp Davis declared rulemaking to be "one of the greatest inventions of modern government," largely because the APA's procedural steps for informal rulemaking are so minimal.[38] In order to issue a rule, a regulatory agency must simply:

(1) publish a "[g]eneral notice of proposed rule making . . . in the Federal Register;"

(2) "give interested persons an opportunity to participate in the rule making through submission of written data, views, or argument;" and

(3) "[a]fter consideration of the relevant matter presented, . . . incorporate in the rules adopted a concise general statement of their basis and purpose."[39]

These three basic steps provide the procedural contours of what has aptly become known as "notice-and-comment" rulemaking (Figure 2).

Figure 2: Notice-and-Comment Rulemaking


Under notice-and-comment rulemaking, the agency first informs the public of its intentions by publishing a notice of proposed rulemaking (NPRM) in the *Federal Register*, a daily government publication that contains regulatory notices and other announcements from the executive branch.[40] In addition to giving the language of the proposed rule, the NPRM will typically provide a discussion of the agency's reasons for proposing a new rule as well as describe any underlying data and analysis.[41] The NPRM may also present alternative options the agency is considering and invite the public to offer comments on these alternatives.

The NPRM will specify a time period for public comment on the proposed rule and will provide an address where public comments can be sent. If the agency plans to hold public hearings or meetings about the proposed rule and collect oral comments, those meetings will also be announced in the *Federal Register*. Agencies will typically specify a time period when comments should be filed. Although the length of the comment period can vary, agencies frequently allow from one to three months during which comments can be submitted.[42]

After reviewing all the comments received, the agency makes any revisions to the proposed rule and publishes its final rule in the *Federal Register*. In the main body of the *Federal Register* announcement—a section referred to as the *preamble*—the agency provides a written justification for the rule in its final form and an explanation of the policy choices it represents. Although the APA requires only "a concise general statement" of the basis of the rule, preambles for the most significant rules can take up many more pages in the *Federal Register* than the rules themselves, occasionally even taking up a hundred pages or more for a single new rule.[43] In addition to providing the justification for the new rule, the final rule document also indicates the effective date for the rule (i.e., the date when the rule becomes legally binding on regulated entities). Typically, rules will not take effect until a month or more after they have been published in the *Federal Register*.[44]

### Additional Steps in the Rulemaking Process

This three-step process—notice, comment, and final rule—forms the basic contour of rulemaking across all federal regulatory agencies. As such, the procedures outlined in the APA are important to understand when designing information technologies for rulemaking. Nevertheless, the three-step process illustrated in Figure 2 is also incomplete in important ways. In reality, the practice of rulemaking is both procedurally and institutionally more complicated than the rulemaking procedures outlined in the APA would suggest.[45]

The APA procedures cover only a part of the chronology of rulemaking, beginning with the NPRM and ending with the publication of the final rule. Much, if not most, of the work takes place prior to the development of the NPRM, both within the agency and in interaction between the agency staff and other governmental and nongovernmental actors.[46] Decisions need to be made about whether to develop a new rule and what priority it should be given on the agency's agenda. Twice each year, agencies publish a "regulatory agenda" in the *Federal Register*, which lists brief information about all the rules each agency is contemplating or in the process of developing.[47] The semiannual regulatory agenda usually provides the first public notification that the agency is developing a proposed rule. As they develop their proposals, agencies also need to gather information and analyze the underlying problem and possible regulatory solutions. Toward this end, agency staff members frequently engage in early consultations with regulated firms and their representatives, other interested parties, and other executive branch or legislative staff.[48] In some cases, agencies will issue an Advance Notice of Proposed Rulemaking (ANPRM), providing more detailed information than is available in the regulatory agenda and encouraging the public to provide comments prior to the issuance of the proposed rule.[49]

Furthermore, the rulemaking process does not necessarily end with the publication of the final rule in the *Federal Register*.[50] The operative text of the rule—without any of the preamble—is subsequently published in the appropriate section of the *Code of Federal Regulations*, an annual government publication organizing regulations by topic. In addition, after the final rule is issued, organizations with objections to the rule may file a legal challenge, which can require the agency to defend its rule in court. The Administrative Procedure Act provides that all agency rules are subject to judicial review; other statutes permit organizations to file lawsuits challenging certain rules even before the agency enforces them.[51] Courts can send rules back to agencies if they find that the rules conflict with the agency's statutory authority, violate the U.S. Constitution, arose through improper procedures, or are otherwise "arbitrary and capricious."[52] In order to settle the lawsuit or respond to an adverse court ruling, agencies sometimes need to revise their rules even after they are published in the *Federal Register*.[53] In addition, after rules are published in the *Federal Register*, they need to be communicated more directly to the regulated entities and other steps need to be taken to see that the new rules are followed. Finally, as the agency implements and applies a new rule, it may learn of ways that the rule needs to be modified and therefore start a new rulemaking proceeding to amend the existing rule.[54] In this way, the rulemaking process is iterative and ongoing.

In addition to starting earlier and extending longer than the APA would suggest, rulemaking is also more complicated because Congress, the president, and the courts have imposed a number of additional rulemaking requirements on agencies (Box 1). These requirements go beyond the simple notice-and-comment procedures. Some apply only to the most significant new rules. For example, since 1981, agencies have been required by executive orders issued by the president to conduct economic analysis of "major" or "significant" proposed regulations and to have their analyses reviewed by the Office of Management and Budget (OMB).[55] These executive order requirements have been effectively codified by the 1995 Unfunded Mandates Reform Act, which also requires agencies to analyze the costs and benefits of any proposed regulation that would impose annual costs of more than $100 million on the economy.[56] As a result, OMB's Office of Information and Regulatory Affairs plays a key role in reviewing, and sometimes asking for revisions of, significant proposed and final rules before agencies publish them in the *Federal Register*.[57]

## Box 1: Major Laws and Executive Orders Affecting Rulemaking

### MAJOR LAWS

**Administrative Procedure Act (APA) (5 U.S.C. §§ 551–559, 701–706)**

The APA creates a three-step procedure for informal rulemaking: (1) publish a notice of proposed rulemaking (NPRM), (2) allow the public an opportunity to comment on the proposed rule, and (3) publish its final rule in the *Federal Register* along with a statement of the rule's "basis and purpose" (5 U.S.C § 553). The APA also allows for judicial review of any agency rule, authorizing courts to set aside rules if they are, among other things, deemed by the court to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" (5 U.S.C. § 706).

**E-Government Act (166 Stat. 2899)**

The E-Government Act of 2002 requires agencies to accept public comments electronically and publish their regulatory dockets on-line according to a timetable to be determined by the agencies in consultation with the Office of Management and Budget (OMB).

**Negotiated Rulemaking Act (5 U.S.C. §§ 561–570)**

In a negotiated rulemaking, regulators and affected parties come to a mutual agreement over the text of a proposed rule before the three-step process required by the APA begins. Enacted in 1990, the Negotiated Rulemaking Act creates a procedural framework for agencies to use if they should decide to use negotiated rulemaking.

**Freedom of Information Act (FOIA) (5 U.S.C. § 552)**

FOIA requires agencies to make available for inspection and copying virtually all government documents including agency manuals, guidance documents, opinions, and interpretations of law. Certain documents are exempted from the rule, including those that, if released, could compromise national security, private trade secrets, or intra-agency deliberation.

**Paperwork Reduction Act (44 U.S.C. §§ 3501–3520)**

The Paperwork Reduction Act requires agencies to attain approval from OMB for any "collection of information" from the public entailed in a new rule. If OMB decides to disapprove an agency's collection of information, it must give an explanation for its decision, but its decision is not subject to judicial review.

**Unfunded Mandates Reform Act (2 U.S.C. §§ 1501–1571)**

The Unfunded Mandates Reform Act requires agencies to conduct a cost-benefit analysis of any proposed regulation that would require aggregate expenditures by state, local, or private actors in excess of 100 million dollars. For such proposed rules, the agency must "identify and consider a reasonable number of alternatives and from those alternatives, select the least costly, most cost-effective or least burdensome alternatives that achieves the objectives of the rule" (§ 1535).

**Government in the Sunshine Act (5 U.S.C. § 552b)**

The Government in the Sunshine Act requires federal agencies headed by collegial bodies (such as the SEC, FTC, NLRB, and FCC) to conduct open meetings in which anyone may observe, although not necessarily participate. There are 10 exemptions to this rule that roughly parallel the exemptions to the Freedom of Information Act.[58]

**Regulatory Flexibility Act (5 U.S.C. §§ 601–612)**

The Regulatory Flexibility Act requires agencies to analyze the potential impact of proposed rules on small businesses and local governments. This analysis, called a Regulatory Flexibility Analysis (RFA), is itself subject to public comment. The Act also requires agencies to publish a regulatory agenda twice each year.

**National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321–4347)**

NEPA requires agencies to prepare an Environmental Impact Statement (EIS) for any proposed rule that would "significantly affect … the quality of the human environment" (§ 4332c).

**Congressional Review Act**

Passed in 1996 as part of the Small Business Regulatory Enforcement Fairness Act, the Congressional Review Act provides for a set of "fast-track" procedures that Congress can use to set aside major agency rules by passing new legislation. To take advantage of these fast-track procedures, Congress must act within 60 days of the publication of an agency's final rule.

### EXECUTIVE ORDERS

**Executive Order No. 12,866, September 30, 1993 (58 Fed. Reg. 51,735)**

This executive order requires agencies to perform cost-benefit analyses of all rules expected to have impacts in excess of 100 million dollars. The Office of Information and Regulatory Affairs (OIRA) within OMB reviews all cost-benefit analyses.

**Executive Order No. 13,132, August 4, 1999 (64 Fed. Reg. 43,255)**

This executive order urges agencies to adhere to basic principles of federalism and to consult with state governments before promulgating any rules that have "federalism implications." Agencies are expected to provide a discussion of such consultations when publishing their final rules in the *Federal Register*.

**Executive Order No. 12,630, March 15, 1988 (53 Fed. Reg. 8,859)**

This executive order urges agencies to adhere strictly to the constitutional requirement not to take private property without just compensation and to refrain from action that would impinge disproportionately on the rights of property owners.

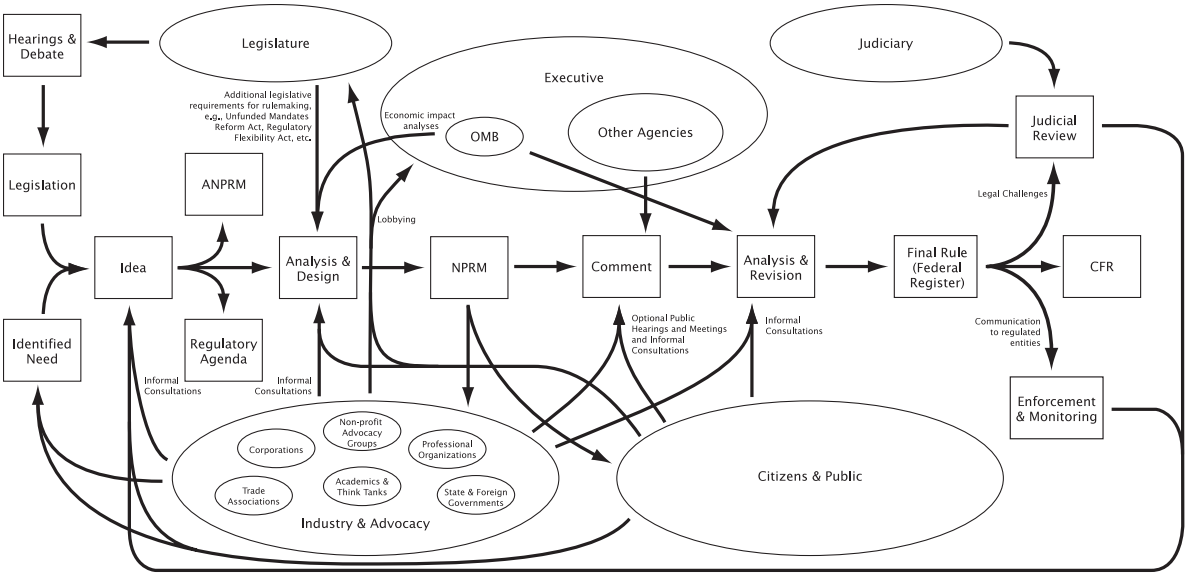
In addition to mandating economic analysis, other statutes and executive orders require agencies to conduct other types of analyses. The National Environmental Policy Act, for example, requires agencies to prepare environmental impact statements for any major governmental actions affecting the environment.[59] In addition, for certain rules agencies are required to conduct analyses of impacts on state and local governments, small businesses, and private property rights.[60] Agencies that issue rules requiring businesses or individuals to fill out forms or report information must assess the burdens their rules impose and observe other standards provided in the Paperwork Reduction Act.[61]

Other rulemaking procedures govern the availability and disclosure of government-held information. For example, the Freedom of Information Act requires that, with some exceptions, all agency information supporting a rulemaking be publicly available.[62] Court decisions and some statutory provisions have resulted in agencies developing "dockets" for each rulemaking proceeding.[63] These dockets contain all the supporting documents associated with each rulemaking, as well as copies of all the public comments filed with the agency and summaries of communications agency staff have with those from outside of government after the NPRM is issued (so-called ex parte communications).[64] The Federal Advisory Committee Act,[65] Negotiated Rulemaking Act,[66] and Government in the Sunshine Act[67] all impose requirements on certain agency interactions with regulated firms and other members of the public. The Congressional Review Act[68] requires that agencies report to Congress on their most major rules, giving Congress an opportunity (which it has so far only exercised once) to invoke fast-track legislative procedures to rescind the rule before its effective date.[69]

## Rulemaking's Key Characteristics

Taken together, the various requirements from statutes, executive orders, and court decisions make the rulemaking process much more complex than the terms "informal" or "notice-and-comment" rulemaking might otherwise imply.[70] Figure 3 illustrates the more complex reality of rulemaking.

### Figure 3: Complex Reality of Rulemaking



The complexity of rulemaking holds at least two important implications for the use of information technology in this governmental process. First, the complexity of rulemaking creates institutional and decision-making challenges that information technology may help regulatory agencies overcome. Second, designing information systems that will be used effectively by regulatory agencies requires a clear understanding of the complex institutional environment within which rulemaking takes place. In other words, the development of effective e-rulemaking demands institutional analysis as well as technological research. To ensure the design of effective e-rulemaking initiatives, it will therefore help to keep in mind both the salient characteristics of rulemaking and the problems often associated with rulemaking that information technology might help address.

One of the most notable characteristics of rulemaking is its information intensity. Rulemaking presents government decision makers with some of society's most pressing issues that demand extensive information collection and analysis.[71] In addition, government agencies address many routine issues through rulemaking and, while each of these routine rules may demand little in the way of new information, in the aggregate these more routine rules can place significant processing demands on regulatory agencies. Rulemaking is not only information-rich, but it is particularly rich in language-based information. After all, rules themselves are text, as are public comments and other communications with the various governmental and non-governmental participants in the rulemaking process. The volume of both text-based and data-based information associated with making even a single rule can be vast, and all this information can be formatted in different ways.

Information used in rulemaking is varied because many different types of individuals and institutions are involved in the process. Developing rules requires cooperation across different offices and staffs within a regulatory agency, each with their own needs and professional expertise. The development and implementation of a new rule is usually an interdisciplinary effort, with different types of analysts—legal, economic, and scientific—contributing to the process. Furthermore, actors from outside the agency—various governmental oversight bodies, such as the OMB, Congress, and the courts—provide relevant information to agency decision makers. Interest groups, business firms, and the press also factor into deliberation and decision making.[72] Moreover, the process of developing a new rule is supposed to be transparent to those outside the government, which means that information should be communicated effectively. Finally, the end product of the process—the rule itself—must also be communicated to hundreds of thousands of users, both in and out of government.

In one form or another, the tasks of gathering, processing, analyzing, and communicating information make up most of the administrative costs associated with rulemaking. For many government agencies, information management can be a significant burden.[73] Early input from interested parties often depends on in-person meetings, which can be costly and time-consuming to organize. As a result, these kinds of consultations may not be held as frequently as might be optimal. When members of the public offer formal comments on rules, until recently they have been expected to file their comments in hard copy format (sometimes in triplicate), delivered by hand or by mail.[74] As with public comments, communication of key analyses and drafts between government officials, such as between agency staff and OMB, also often takes place by exchanging hard copies, often delivered by couriers. Furthermore, regulatory agencies' dockets consist literally of large rooms of file cabinets, sometimes with documents later archived on microfiche that is also filed in cabinets. These docket rooms are cumbersome to access by those outside of the agency, especially those living beyond the Washington, DC, beltway. At least until recently,

agencies' proposed and final rules themselves were relatively inaccessible to the general public, with access limited to hard copies of the *Federal Register* and *Code of Federal Regulations* available only at certain public or law libraries.[75]

Perhaps in part due to information management burdens, government regulation has come in for substantial criticism over the past few decades. For some observers, the expanding sweep of government regulation has become unacceptably incoherent and inefficient.[76] Problems of poor data quality and inconsistent reporting are sometimes said to increase problems of regulatory incoherence.[77] Still others have argued that the rulemaking process has become ossified, pointing out that rulemaking has become more burdensome and time-consuming than the informal, notice-and-comment framework of the APA seemed to suggest, especially for agencies with shrinking budgets.[78] In addition, in the face of resource constraints, extensive engagement with the public has not always been the top priority of regulators. Yet some have argued that regulatory policy—made by unelected government officials—suffers from a democratic deficit.[79] With more extensive and effective public participation, agencies may gain insights needed to craft better regulatory policy as well as be able to enhance the perceived legitimacy of government regulation.[80] Given the controversial and significant policy choices embedded in regulatory policy, any steps that can improve agency management and enhance public participation seem likely to help in addressing the criticisms of rulemaking and promoting more effective, efficient, and legitimate regulatory policy.

PART II

# E-Rulemaking: Prospects and Challenges

Advances in information technology promise new ways for government agencies to manage significant information demands and thereby help improve both the process and substance of rulemaking.[81] E-rulemaking could enable government agencies to manage the rulemaking process more productively; it could also expand and enhance the public's involvement in this process.[82] In addition to making incremental improvements to rulemaking as it is currently practiced, innovative uses of information technologies could even facilitate a more significant redesign of the rulemaking process. As a number of workshop participants stated, future developments in information technology might revolutionize the rulemaking process, transforming it in ways that few can now imagine—and certainly in ways that no one would have imagined at the time the Administrative Procedure Act was adopted in 1946.

## The Rise of E-Rulemaking

Attention to the use of digital technologies in government rulemaking dates back only about a decade. Beginning in the late 1980s, the now-defunct Administrative Conference of the United States started commissioning reports prepared by administrative law scholar Henry Perritt on the application of information technology to different aspects of government record-keeping and rulemaking.[83] The Clinton Administration's National Performance Review issued reports in the early 1990s calling upon federal agencies to increase their use of information technology in developing and implementing regulations.[84] In 1994, the Office of the Federal Register made the *Federal Register* available free to the public via the Internet, with the *Code of Federal Regulations* going on-line shortly thereafter.[85] By the mid-1990s, Congress also began to take action, adopting amendments to the Paperwork Reduction Act and the Freedom of Information Act that aimed at increasing the availability of government agency information via the Internet.[85]

During this same period, regulatory agencies themselves began to take advantage of advances in information technologies.[87] Many agencies, for example, began to use e-mail to send and edit documents internally when designing new rules. Some agencies developed electronic word processing "templates" to encourage more standardized reporting of information in rulemaking documents. Agencies also began to use the Internet to enhance transparency and public participation in rulemaking. Some began posting key studies and other rulemaking documents on their websites. Others used information technology to analyze public comments submitted on proposed rules. For example, the Bureau of Land Management used scanning technologies to process more than 30,000 public comments on a proposed rangelands rule.[88] Still other agencies began to allow the public to submit comments via e-mail. For example, the Food and Drug Administration used electronic scanning of documents in its 1996 tobacco marketing rulemak-

ing,[89] and e-mail comments played a role in the Federal Aviation Administration's rulemaking on small-scale rockets[90] and the Department of Agriculture's rulemaking on the labeling of organic foods.[91] Other early adopters of electronic commenting included the Nuclear Regulatory Commission and the Federal Communications Commission.[92]

In 1998, the Department of Transportation (DOT) became the first regulatory agency to make available an on-line, department-wide regulatory docket, providing full access to all studies, comments, and other documents contained in the agency's rulemaking records.[93] The DOT system also allows the public to submit electronic comments on all rules proposed by the department. A few years later, the Environmental Protection Agency (EPA) also adopted an agency-wide system called EDOCKET.[94] Several other agencies have begun implementing similar docket management systems.

These early e-rulemaking efforts have captured the attention of academic researchers as well as policymakers. In 1998, the *Administrative Law Review* published an article by law professor Stephen Johnson that predicted that the Internet would "change everything" when it came to public participation in federal rulemaking.[95] A few years later, the National Science Foundation's Digital Government Program, together with Drake University and the Council for Excellence in Government, helped launch the first gathering of academics and agency managers to discuss long-term research needs on information technology and rulemaking.[96]

In a major effort to expand information technology capabilities across the federal government, the Bush Administration launched an e-government initiative as part of the President's Management Agenda.[97] The administration's e-government initiative, which is being coordinated through the Office of Management and Budget, consists of approximately two dozen projects, one of which is e-rulemaking.[98] A key goal for the administration's e-rulemaking project is to make it easier for the public to access information about government regulations and participate in the rulemaking process.[99] In addition, administration officials believe that better use of information technology will also improve regulatory decisions and increase the quality of government rules.

OMB selected EPA to be the interagency team leader on the administration's e-rulemaking project, with a core group of other agencies playing key roles as well. The project consists of three stages. The first stage, which was completed in January 2003, involved the creation of a search-and-comment portal located at www.regulations.gov.[100] The Regulations.gov portal relies on the Office of Federal Register's listings of notices of proposed rules and enables users to search all proposed rules that are open for public comment. Building on software originally developed by the Food and Drug Administration, EPA hosts a comment-processing system that enables members of the public to comment on any proposed rule issued by any government agency, all from a single location on the Internet.[101] Comments submitted electronically at Regulations.gov are then distributed to the relevant agencies.

The second stage of the Bush Administration's e-rulemaking project will expand on the first-stage efforts to create a government-wide e-docket system. The administration's current plan is to enhance the EPA's EDOCKET system to take into account the docketing requirements of other agencies and eventually to create a comprehensive on-line docket that will enable the public to access all documents related to every new regulation across the government.[102] Administration officials expect that the development of a government-wide e-docket will be followed by a third stage, involving the development of an "electronic desktop" for regulators. Plans for this third stage have yet to be fully developed, but this final stage reflects the administration's

long-term goal of creating a suite of knowledge management tools to aid with regulatory analysis and decision making.[103]

The current administration's e-rulemaking efforts seem likely to be continued in future years due to the passage of the E-Government Act in 2002.[104] This law aims to promote the use of information technology throughout government in order to increase opportunities for public participation, improve government decision making, and enhance the ability of government agencies to achieve their programmatic and policy goals. The Act specifically directs regulatory agencies to accept electronically submitted comments and to establish comprehensive electronic dockets for all rulemakings.[105] The Act also creates a new office of Electronic Government within OMB, requires that office to produce guidelines for all agency websites, and generally calls upon agencies to adopt innovative uses of information technologies.[106]

## E-Rulemaking's Potential

Despite all the recent governmental efforts to promote the use of e-rulemaking, many workshop participants recognized that these early steps toward e-rulemaking only scratch the surface of what information technology makes possible. The advances reflected in the e-docketing systems installed by agencies such as DOT or EPA, for example, are not the norm across the federal government. Only a handful of agencies have developed automated docketing systems and, even among those that have, some agencies have used such dockets only for a select number of rules.[107] Furthermore, even though Regulations.gov now permits the public to file electronic comments on any new proposed rule, in some agencies any comments submitted through Regulations.gov must still be printed out by government staff and stored in hard copy in cumbersome file cabinets.[108]

More significantly, even the most advanced applications of information technology in government rulemaking, such as the DOT or EPA's docket systems, only capture a small part of the potential uses for information technology in the regulatory process. As one workshop participant noted, e-rulemaking can be much more than just a "bunch of websites." Advances in information technology make it possible to retrieve, categorize, extract, and analyze information in markedly more effective ways that would help dramatically improve government rulemaking.[109] As noted earlier, developing a regulation requires agency analysts and rule writers to review a large volume of studies, public comments, and other relevant documents. To manage this information more effectively, agency analysts should rely more extensively on ad hoc information retrieval (IR) systems to identify relevant information.[110] IR systems—one of the most well-known is the popular search engine Google—allow the information user to input a query, and then the system searches all the documents based on the query and returns matching documents.[111] If some of the documents are in a foreign language, machine translation technology could be used to translate these documents into the language of the user.[112]

Once information is retrieved through an IR system, it needs to be organized, a process that can also be automated. For example, text categorization systems could sort public comments according to the different issues presented in a rulemaking. In other contexts, state-of-the-art text categorization systems can organize documents into dozens of categories with upward of about 85 percent accuracy.[113]

For many purposes, the relevant information contained within a given rulemaking document will often consist of only a small fraction of the entire document. To gather only the most pertinent information from each relevant document, agencies could rely on information extrac-

tion (IE) systems to extract these key parts. These key parts can themselves be used as metadata that can be used to organize the documents still further in ways that may be useful to the rule writer.[114] In this way, computer systems could enable users to retrieve focused and relevant information from all the comments, background documents, and studies relevant to each subprovision of a new rule, as well as to provide summarization and analysis of this information.

In addition to systems that retrieve, categorize, and extract information, other natural language processing systems could be of value to government regulators.[115] For example, some information systems allow the public to submit questions and receive the answers (in addition to documents that contain the answers). Still other technologies are beginning to be able to produce summaries of large documents, condensing a high volume of information into a form that can make them more useable for busy decision makers.

Greater use of these natural language processing systems will also facilitate increased development of digital libraries.[116] Digital libraries contain information in multiple media formats and have the flexibility needed to make relevant information available to a large number of users.[117] The use of digital libraries and advanced information retrieval systems could help regulatory agencies more effectively share common information across different program offices and even different rulemakings.

Table 1: E-Rulemaking's Potential

| Possible E-Rulemaking Technology | Degree of Institutional Reform Required | Degree of Technological Innovation Required |
|---|---|---|
| **Data mining**<br>Identifying and incorporating relevant data into the rulemaking process | Low | Med |
| **Web-publishing of rules**<br>Creating websites that document rule creation and justification; automatic cross-linking to relevant data, text, and external services | Low | Low |
| **Rule consistency checking**<br>Analyzing the meaning of rules for internal and external consistency | Low | High |
| **Automatic alert of interested parties**<br>Identifying and communicating with parties that may be affected by new or altered rules | Med | Med |
| **Rule-compliance wizards**<br>Helping interested parties conform to rules by question-and-answer software packages | Med | Med |
| **"Plain English" translation software**<br>Developing translators that render rules in plain English to assist with public understanding and compliance | Med | High |
| **Analysis of public commentary**<br>Automatically summarizing and categorizing public commentary on a rule | Med | High |
| **Digital juries**<br>Assembling interested parties in far-flung places via "electronic town hall" technology | High | Low |

Overall, many possibilities exist for applying information technologies in new ways to government rulemaking. Some of these ideas could be implemented with existing technologies and without any significant institutional reforms, while other ideas would require either new technological innovation or substantial changes in existing institutional practices. The ideas articulated by workshop participants included:

- ***Improved data mining capabilities.*** Many agencies keep compliance or incident data, but the staff who write rules often have to travel to regional offices to get this information. Data mining technologies—which range from simple web search engines to more sophisticated multi-database search and integration systems—could enable rule writers to learn from the various data sources available throughout their agencies.[118]

- ***Web-publishing of rules.*** Web-accessible hyperlinks can relate the provisions in the regulations to the preamble, and from the preamble to prior documents, including the public comments.[119] Only a click would be needed to find the supporting analysis for aspects of a regulation or provisions in the underlying statute. Recent advances in topic detection and tracking have made it possible to automate this cross-linking function to a limited extent.[120]

- ***Conflict identification tools.*** Information technology could help rule drafters identify obvious conflicts in rules and help ensure consistency, both within and across rules. Also, expert systems and software that creates representations and inferences from text could spot differences between proposed and final rules to help agencies ensure that they have provided adequate notice of any changes before promulgating the final version.[121]

- ***Customizable, automatic alerts.*** Long before an agency issues a notice of proposed rulemaking, it announces its intentions in the semiannual regulatory agenda.[122] Interested users could sign up for e-mail alerts of rules added to an agency's regulatory agenda. In addition, when a user visits a website for a particular rule, agency systems could inform the user about other rules that those visiting the same website have visited (much as Amazon.com® does for books).[123]

- ***Rule-compliance wizards.*** Information technology could lead to a reconceptualization of the form in which rules are promulgated, transforming rules from text contained in the CFR to software packages akin to the popular TurboTax® or other commercially available compliance software. Researchers at Stanford University have demonstrated how wheelchair accessibility standards could be defined using software that simulates in-use performance rather than relying on constraining, text-based rules.[124]

- ***Plain language tools.*** To help make rules clearer, automatic "plain English" (or other language) translators could be developed to aid agency staff in drafting rule language. Current natural language technology is still limited in its translation ability, but highly specified applications appear possible in the near term.[125] In addition, such tools could also be used to assist with regulatory compliance.

- ***Analysis of public comments.*** After issuing a notice of proposed rulemaking, agencies solicit comments from the public. Especially for rules that elicit a large number of comments, information technology may help agencies summarize and categorize the public feedback they receive. Natural language processing tools could be developed to enable agency staff to cluster comments by the issues they address and the opinions they express.

- ***On-line regulatory hearings or digital "juries."*** Digital technology might be used to foster public deliberation about new regulations. Regulatory officials could enlist randomly selected panels of citizens with the task of advising on core policy issues to be decided in a rulemaking.[126] One participant spoke of a rulemaking that affected various Native American tribes in Alaska and recounted the difficulties the agency and the tribes experienced in their consultations. Technology such as bulletin boards or user profiling could facilitate communication in such situations or any time a rule affects a dispersed portion of the public, such as small businesses.

In addition, many of these technologies could be used for the many policy statements and guidance documents that agencies issue. These are not binding rules, but in practice they may sometimes be nearly as important as rules.[127] Automated text summarization technology could be used to improve the accessibility, transparency, and management of such guidance documents just as with rules.

The ideas generated by workshop participants suggest that current e-rulemaking efforts are but first steps toward the full exploitation of information technology.[128] Making regulatory dockets available on-line and allowing citizens to submit electronic comments will indeed help make it easier for the public to follow government rulemaking, but these early steps have only barely begun to tap the full potential for existing and new forms of information technology in the rulemaking process.

## Goals for E-Rulemaking

Although advances in information technology raise many possibilities for changes in rulemaking practice, deciding whether to pursue any of these alternatives raises the question of what e-rulemaking should seek to accomplish. As already noted, e-rulemaking is generally thought to hold the potential to help improve the management and legitimacy of the rulemaking process.[129] It may also help in overcoming some of the problems commonly attributed to the rulemaking process, such as those related to incoherence, sluggishness, or lack of transparency.[130]

Addressing some of rulemaking's various challenges, workshop participants identified several goals for e-rulemaking as well as possible metrics for defining the success of e-rulemaking. Participants recognized that, in assessing new applications of information technology, it is necessary to compare e-rulemaking with the counterfactual, or with the results that would have been obtained in the absence of the information technology. By making such a comparison using the goals and metrics discussed in this section, analysts will be able to determine whether specific applications of e-rulemaking make a meaningful and positive difference to rulemaking. What follows are four major goals for e-rulemaking that participants noted during the workshop discussions.

### Goal 1: Increase Democratic Legitimacy

Even though rulemaking has significant effects on society and the economy, the officials making rulemaking decisions are themselves neither elected nor otherwise immediately accountable to the larger public.[131] Indeed, career professionals conduct the major analysis and drafting of rules, even though the political appointees heading the agencies do play a role in reviewing and approving key decisions. Yet from the standpoint of democratic legitimacy, the very significance of rulemaking combined with its distance from the public eye make it all the more important that regulatory officials engage the public in the process.[132] In-person public hearings or advisory committee meetings, as well as the conventional comment period, provide the traditional means for public input into the rulemaking process. Information technology may be able to broaden public outreach both by fostering greater public awareness of rulemaking as well as by making it easier for citizens to add their voices to the decision-making process.[133]

Of course, without more specification, the goal of increasing democratic legitimacy will seem almost too general to assist information systems designers or regulatory officials. Participants characterized this goal in more specific ways, which should prove helpful to decision makers and designers. These specific aims include: (1) increasing public understanding of rulemaking, (2) increasing both the quality and quantity of public comment on rulemaking, (3) making the public comment process more interactive and deliberative, and (4) enhancing the ability of more democratically accountable institutions, such as Congress or the president, to oversee the rulemaking process.

At present, the public has relatively little understanding of either the rules that specific agencies are developing or the process by which the agencies promulgate their rules.[134] Yet such knowledge of the issues and the process are essential precursors to participating effectively in government rulemaking. Information technology may provide better ways of communicating the steps of the rulemaking process to the public, notifying them of rules that may affect their work or their lives, and facilitating access to information that will enable members of the public to comprehend the policy choices embedded in rulemaking.

With greater understanding of the issues, the quality of public comments may improve.[135] For example, instead of comments expressing general support for or opposition to a rule, better-informed members of the public may be able to explain why they support or oppose the rule. That said, at least one workshop participant expressed concern that pursuing a goal of increasing the quality of public comments might be patronizing, for government's proper role may simply be to respond to public input rather than try to improve it.

Even without affecting the quality of public comment, information technology could increase the quantity of comments.[136] Many participants were convinced that information technology would lead to a dramatic increase in the number of comments submitted on agency rules. In addition to bringing about an overall increase in public comments, e-rulemaking could also affect the types of commentators, such as by increasing the proportion of previously underrepresented voices in the rulemaking process.[137] This is another way that information technology could be seen to increase the democratic legitimacy of rulemaking.

Information technology could also change the way that the public comments on rules, thereby shifting the mode of communication from a relatively unidirectional one to a more deliberative and interactive process. Citizens and government officials could interact with each other in dialogues facilitated through electronic communication technologies. In addition, members of the public could begin to comment on each others' comments as well.[138]

Finally, information technology could enable other institutions and actors to monitor what agencies are doing and seek to influence the direction of regulatory policy. Not only could information technology make it easier for political appointees within agencies to follow and manage the work of civil service professionals, but it could also facilitate monitoring by congressional committees, White House staff, outside interest groups, and independent analysts.[139]

Given these different ways of characterizing the goal of increased democratic legitimacy, some of the specific metrics that might be used to operationalize legitimacy include:

- Public knowledge about the rulemaking process or substantive regulatory issues
- Number of comments submitted
- Distribution of viewpoints or sectors reflected in comments
- Number and type of issues raised in comments
- Frequency of litigation challenging agency rules
- Frequency or type of intervention by Congress or other oversight bodies
- Public support for government regulation

### Goal 2: Improve Policy Decisions

If information technologies make it easier for rule writers to retrieve and process information needed to develop sound regulatory policy, then e-rulemaking should presumably lead to better decisions. After all, making good regulatory decisions usually requires having extensive information about the underlying problem, its causes, and the predicted effects of different possible solutions.[140] Information technology could make it easier for regulatory officials to analyze large volumes of data drawn from multiple sources.

With a better understanding of the underlying behavioral and technical conditions that affect regulatory problems and their solutions, regulators would be better positioned to draft rules that are more effective, as well as perhaps more cost-effective or efficient. Of course, even if information technology clearly makes regulatory decision makers better informed, the introduction of such technology is worthwhile only if regulators make decisions that draw upon and are consistent with the additional information they acquire.[141] The goal of regulators should be to make decisions that are superior to the those they would have made without the benefit of information technology. If a regulatory agency ends up writing the same kinds of rules it would have otherwise written before the introduction of some new type of information technology, then e-rulemaking will not have met the goal of improving policy decisions.[142]

As with the goal of democratic legitimacy, the goal of improving policy decisions can be characterized more concretely. In particular, designers and decision makers can distinguish between three main ways of improving regulatory policy. The first way is to consider the *impact* the regulation has in terms of solving the regulatory problem.[143] The regulatory problem might be, for example, either health risks from air pollution or fatalities from automobile accidents. If the goal is just to increase the impacts—or benefits—of a rule, then e-rulemaking would meet this goal if it enabled agencies to craft regulations that decreased air pollution risks or reduced the number of crash-related fatalities, at least relative to rules crafted without the benefit of the relevant information technology.

A second way to improve regulatory policy is to improve its *cost-effectiveness*.[144] In order to achieve benefits such as reduced air pollution or greater automobile safety, regulated firms incur costs, such as those for installing safety or pollution control devices. These costs should be taken into account, in addition to the benefits, when assessing the quality of a rule. If Rule A achieves the same level of benefits as Rule B, but the economic costs associated with complying with

Rule A are less than the costs associated with Rule B, then Rule A is more cost-effective than Rule B. If technology improves the regulator's ability to analyze available information about costs as well as benefits, e-rulemaking can lead to more cost-effective rules.

In the same way, information technology might help regulators improve the *efficiency* of their rules, the third way policy improvement can be understood.[145] Like the cost-effectiveness criterion, efficiency takes both benefits and costs into account. Unlike cost-effectiveness, however, which is all about achieving a given level of benefits for the lowest cost possible, efficiency asks whether the benefits outweigh the costs.[146] In other words, even the most cost-effective regulation might, in some situations, impose costs that exceed the value of the benefits to be gained. In contrast, efficient policies will maximize positive net benefits, that is, total benefits minus total costs.[147]

Other criteria, such as the distribution of costs and benefits of regulation across society, could also be used to measure the quality of rulemaking.[148] Overall, the goal of improving regulatory policy through e-rulemaking could be expressed in metrics that include:

- Benefits to society, such as reductions in risks or other regulatory problems
- Costs to society, in terms of the compliance and opportunity costs associated with achieving the required regulatory benefits
- Comparisons of costs and benefits, either in terms of cost-effectiveness or efficiency
- Equity considerations related to the distribution of costs and benefits

### Goal 3: Decrease Administrative Costs

Managing the rulemaking process can be costly and at times burdensome to regulatory agencies. A third goal for e-rulemaking would be to decrease the administrative costs associated with rulemaking, that is, to lower the costs that government incurs in developing new rules. Information technology may allow agencies to carry out existing rulemaking responsibilities in less costly ways. For example, the Department of Transportation has reported saving more than a million dollars in storage costs each year from its investment in an on-line docket system.[149]

Information technology may also help agency managers coordinate rulemaking staff and other resources better. For example, a docketing system that tracks each rule may provide information to managers about common procedural bottlenecks, perhaps suggesting areas where staffing levels should be adjusted in order to reduce delays.[150] Information systems may also be used to evaluate the performance of rulemaking staff, improve communication across the agency and with OMB, and allow enforcement offices to monitor new rules proactively and plan compliance strategies accordingly.

Finally, information technology may help administrators with the task of reviewing and responding to public comments. At present, agencies sometimes will delegate the task of analyzing public comments in major rulemakings to private contractors, some of whom will physically cut and paste hard copies of the comments in order to sort them into manageable categories. Information technology may provide superior and less costly methods of analyzing comments, identifying different issues and opinions expressed in them, and even perhaps providing automatic summaries of them.[151]

Possible metrics that reflect the broader goal of reducing administrative costs could include:

- Amount of time it takes to develop a rule, from initial consideration to final rule
- Number of staff members (or full-time equivalents) used
- Budgetary costs related to rulemaking

### Goal 4: Increase Regulatory Compliance

A final goal of e-rulemaking could be to increase compliance with the rules agencies promulgate. Regulation is designed to achieve social goals by bringing the behavior of businesses and individuals into alignment with the law. To the extent that information technology can help increase compliance with rules, it can help in achieving the underlying social goals that the rules are intended to serve.

Of course, if those who are targeted by regulation do not know about or understand the rules that apply to them, compliance will be at best something that is hit or miss. Perhaps some actors will comply for reasons unrelated to the rules, but many undoubtedly will not. So the first step in increasing compliance will be to increase awareness and understanding of regulations.[152] Compliance assistance systems may make it easier for businesses to identify rules that apply to them. For example, even though a small print shop may be unable to afford to hire an attorney, the owner or shop manager could more easily use a software package that asks a series of questions about the shop's operations and then provides information about what rules apply to the facility.[153]

In addition to knowing which rules apply, regulated entities also need to understand exactly what to do in order to comply with the rules. Unfortunately, the rules in the *Code of Federal Regulations* are neither always clear nor always easy for non–legal professionals to follow. The same kind of compliance assistance system that could help the small business identify rules to follow could also translate those rules into plain English (or another language) and provide easy-to-follow information about what the facility needs to do to comply with the applicable regulations.

The possible metrics for the goal of increasing compliance include:

- Level of knowledge of rule and what it requires of the regulated sector
- Extent of compliance with rule

### Relationships and Trade-Offs Between Goals

Any consideration of the goals for e-rulemaking should first take into account whose goals they are. Different users will have different goals. For e-rulemaking, the users will be a highly diverse lot, including those who work within various agency offices, Congress, the White House, other agencies, regulated firms and trade associations, nongovernmental organizations, citizens, academic researchers, and professional organizations. Goals are likely to vary depending on who are the primary users of any new technology in the rulemaking process. Moreover, the users may have different goals from those who are funding new technologies or who otherwise oversee the users.

Designers and decision makers also need to recognize that some types of information technologies will be better suited for some goals rather than for others. E-rulemaking is not a single strategy, but a general term that encompasses many different types of tools and procedures that rely upon information technology. Some tools will be better suited for achieving certain goals than others. For example, issuing rules in software format rather than as conventional text—a "TurboTax® approach" to rulemaking—might help with compliance, but it probably would not, by itself, directly improve the substance of the rules.

That said, many e-rulemaking efforts will probably have an impact on more than one goal, sometimes even posing trade-offs across different goals. For instance, a TurboTax®-type rule might help with compliance, but it could be more costly for the agency to produce. It might also raise concerns about legitimacy because, as one workshop participant noted, a software package

may be less transparent and harder for the public or courts to scrutinize than a traditional text-based rule.

Another example of a trade-off might be when information technologies increase the number of comments (a possible indicator of increased democratic legitimacy), but in doing so they also increase the administrative costs associated with rulemaking.[154] More comments may correspond to more viewpoints, more concerns, and more conflicts or issues that need resolution, thus potentially making the rulemaking process take longer to complete.[155] Even if information technology makes it easier to process the information contained in a larger volume of comments, this information could potentially make the decision calculus for the agency more complex or uncertain, especially if the information submitted is internally inconsistent.[156] Quite plausibly a trade-off exists between the amount of time needed to issue a rule and the rule's quality (or the level of satisfaction with the rule, which may not necessarily equate with quality).[157]

Of course, the ideal situation would be to find IT applications that resolve trade-offs or minimize them. Recognizing that such trade-offs exist, though, will be the first step toward finding ways to overcome them. Furthermore, in many cases such trade-offs will not be resolvable (at least in the near term), so systems designers and agency decision makers will need to make choices about priorities between the various goals for e-rulemaking.

### Technology Design Choices

Key choices about information technology should be made in ways that advance e-rulemaking's goals. Workshop participants highlighted a variety of design choices, such as those about flexibility, accuracy, security, and other characteristics or dimensions of IT systems. Making choices about these various dimensions will depend on the desired goals of e-rulemaking and the needs and capabilities of system users. Some of the design choices noted during the workshop included the following:

(1) ***Degree of Uniformity.*** Systems can rely on globally uniform lexicons, structures, and categorizations—or they can be adaptable to different terminology and needs across different rulemaking proceedings or different agencies. Some participants argued that uniformity will be important to achieve across government, especially to help public users who work with multiple agencies. Also, uniform systems may better exploit economies of scale, though perhaps with the negative effect of decreasing the innovation that decentralized systems would foster. Others argued that domain-specific systems will be more sustainable and useable. Where problems overlap, computer systems can provide mappings among terms that are used with different connotations in the interaction of those domains. Advocates of smaller, more modular systems believed systems should be designed to accommodate different needs. Some argued that systems could eventually "learn on their own" by adapting system ontologies or lexicons based on the texts that they process.

(2) ***Degree of Complexity.*** Systems can be structured in complex ways that mirror the complexity of regulatory issues and processes, or they can be based on simpler and more general models. Where regulatory issues are complex, complexity of information presentation cannot be avoided, but modern information tools can still make the system interface convenient for users to interact with and understand.

(3) ***Use of Metadata.*** Metadata are descriptions of data. Systems can be designed to search the data themselves or to search by metadata instead (or sometimes to search by both).

(4) ***Structure Definition.*** Who should define how systems are structured? Systems can be structured in a manner determined by the agency's upper management, or they can be structured by the users themselves and hence customized to different uses and needs.

(5) ***Scalability.*** Systems can be designed for different numbers of users or different volumes of data. To what scale should e-rulemaking systems be designed? Or should systems be designed so that their scale can vary depending on users' needs?

(6) ***Privacy.*** Privacy issues arise in a number of contexts. One involves the protection of confidential business information as it pertains to rulemaking, a matter related to security issues. Another privacy concern involves the treatment of public comments in on-line dockets. The Department of Transportation currently creates an on-line list of commentators by name, while the EPA does not.[158] Should the identities of individuals or organizations filing comments be easily searchable in agency dockets?[159]

(7) ***Security.*** Security typically is ensured through access control, restricting who gains access to information contained on agency systems. But security could also be obtained through release control—or filtering information as it leaves a system. One participant noted that release control will be more effective than access control, but it is probably also more costly.

(8) ***Accuracy.*** Especially with respect to information retrieval systems, accuracy will be a key issue. How accurate do such systems need to be? Do systems need to be 100 percent accurate, as accurate as a human, or accurate to some other degree? Also, will it be more important to avoid false positives or false negatives?

(9) ***Human-Computer Interface.*** When designing IT systems to support government rulemaking, numerous design choices will arise about how to communicate information to users. E-rulemaking will therefore raise many issues involving human-computer interface and graphical design.[160]

(10) ***Public Outreach.*** Agencies can obtain comments from self-selected commentators who take the time to contact the agency or they can seek out comments from the public, such as through randomly selected surveys.[161] The current practice of opening up proposed rules for comment is reactive: the agency issues a notice and waits for the public to submit comments. The other approach, which may be made easier by information technology, is for the agency to be proactive and reach out by contacting individuals and soliciting their input. Furthermore, comments could be designed at varying levels of interaction between government and other commentators—ranging from the typical one-shot submission of comments to on-line deliberations between commentators. Such deliberations could be either moderated or unmoderated.[162]

(11) ***Structure of Public Input.*** A related choice is between open-ended versus structured comments from the public. An agency could structure input by providing a list of key issues from which commentators can check specific boxes reflecting their preferences. Garnering structured comments would probably make it easier to categorize and analyze them, which may make them more helpful to agency, but open-ended comments may fit better with the goal of democratic legitimacy. Of course, even if an agency did seek structured comments, the system could also be designed to allow commentators to override the structure and offer open-ended responses instead of, or in addition to, structured responses.[163]

(12) ***System Costs.*** Different design choices will have different costs associated with them and agencies will need to make decisions about how much they would like to spend on the design and operation of information technology. Although this point may seem obvious, recognition of the financial implications of design choices raises the more general point that e-rulemaking must confront institutional challenges and constraints in addition to technological ones.

## Institutional Challenges and Constraints

Undoubtedly e-rulemaking will present significant and interesting technological challenges in terms of semantic representation, human-computer interface, privacy and security, and the adaptability of systems. But workshop participants also recognized that to be successful e-rulemaking must also take into account a series of no less significant institutional challenges. Systems that agencies cannot afford, or that do not fit well with the needs or practices of agency officials, will probably prove to be ineffective no matter how technologically innovative they may be. Successful e-rulemaking efforts will therefore need to integrate both technological and institutional analysis, taking organizational needs and constraints explicitly into account in designing information systems. Participants noted at least three specific institutional constraints or challenges that will likely influence the incorporation of information technologies into the rulemaking process.

The first major institutional challenge is the need for cooperation both within and across government agencies. Particularly with efforts to build uniform or government-wide platforms, coordination across agencies will be important but challenging.[164] Getting different staffs, offices, and agencies to work together in designing a system generates transaction costs and may reveal that participants have different, perhaps even sometimes incompatible, preferences about the design and performance of systems. This kind of cooperation is often not easy to accomplish, even within the same agency. As a result, the implementation of e-rulemaking may take longer if all systems need to be uniform and not merely compatible. Seeking uniformity may also affect the quality of information technology if cooperation is achieved by designing systems to the lowest common denominator.

The second institutional consideration participants noted was organizational inertia. E-rulemaking may necessitate what some participants called a cultural change within government agencies. Many agency personnel have been doing what they are currently doing for quite some time, without innovative forms of information technology. As a result, many of them may fail to see the advantages of e-rulemaking. Not only will training be essential when new systems are introduced, but so will ongoing technical support and a management commitment to new

technology. Participants predicted resistance to new systems and a risk of atrophy over time. For example, agency staff will have little incentive to favor systems that facilitate the submission of additional comments, since this will mean additional work for them and raise fears that opponents of a rule could flood the agency with comments. Similarly, agency staff can be expected to oppose new docket management systems that allow agency managers to monitor staff performance more closely. Ultimately, leadership from the top will be important to the long-term sustainability of e-rulemaking, especially in order to keep information systems up to date.[165] But even leadership will be a challenge, since the appointees who head agencies turn over frequently and thus typically have a short-term focus.

Participants pointed to administrative law and existing rulemaking procedures as a final institutional constraint.[166] At a minimum, information systems will need to be designed to comport with proper legal procedures. For example, security practices must be designed to meet existing legal standards for protecting confidential business information.[167] This may require that software be designed to allow agency staff to redact portions of documents electronically before placing them in agency dockets. In addition, information systems will need to adapt to changes in legal procedures. If new procedural requirements (such as adding steps or requiring new analysis) are added to the rulemaking process, then information systems will need to be able to accommodate these changes.

Still more challenging is the question of whether law itself should change in light of the capabilities of new information technologies.[168] For example, at the present time, many agencies document so-called ex parte conversations—that is, conversations with outside interests—by drafting memoranda summarizing these conversations and submitting them to the rulemaking docket. Digital technologies would make it increasingly easy to record such ex parte communications digitally and then upload the audio file to the on-line docket.[169] We are living in an era where such "ultra-transparency" to the governmental process is now possible. Is it also desirable?

A further question about the role of agency expertise can be raised by the ease with which agencies will be able to solicit public comment. Much of administrative law is still based on deference to agency expertise, and agencies are charged with carrying out their congressional mandates in ways that comport with their expert judgments about what best serves the public interest. But when information technology now makes it possible for hundreds of thousands of citizens to submit comments on a proposed rule, pressure may mount to reexamine the role of democratic responsiveness in rulemaking.[170] Over time, judges and others may view legislative policy making by agencies as appropriately conducted like legislative policy making by the Congress. Perhaps courts will demand stronger justifications for decisions that run contrary to overwhelming expressions in public comments. If so, we will have witnessed a shift away from a reliance on agency expertise and toward rulemaking by plebiscite.

In this way, e-rulemaking raises important questions about the future of administrative law. Moving forward to craft effective e-rulemaking will require careful consideration of legal and institutional issues, as well as matters of technological design. Although choices about system design should be guided by decision makers' goals for e-rulemaking, achieving these goals will also require that designers and decision makers work within existing institutional settings and overcome a series of organizational constraints. Indeed, the technological constraints on e-rulemaking may prove easier to overcome than the organizational ones. A robust research agenda should therefore focus on both technology and institutions, as well as on the relationships between the two.

PART III

# Directions for Future Research

In the short term, agencies have available to them a variety of technologies that stand ready to be used in rulemaking as soon as institutional barriers to their widespread adoption can be overcome. These near-term technologies will build upon the existing rulemaking process, providing greater access and transparency to the work of regulatory agencies. But in the medium to longer terms, e-rulemaking has the potential to go well beyond merely digitizing the current process. With the appropriate institutional adoption of innovations in technology, some aspects of the rulemaking process could be improved significantly, if not redesigned altogether. Some workshop participants predicted revolutionary changes over the long term with the development of new technologies.[171]

In order to tap e-rulemaking's fullest possible potential, research will be needed from across a variety of disciplines, including computer sciences, law, economics, political science, and organizational theory. This final part of the report offers guidance for cross-disciplinary research aimed at making medium- and long-term impacts on e-rulemaking. It presents a policy analysis framework for organizing future research, highlights the different functional aspects of rulemaking deserving of research, and outlines a series of research questions raised by workshop participants. With coordinated input from both informational and institutional disciplines, researchers will be able to contribute to the development of more effective technological solutions and better assess the impact that IT-based tools have on agency rulemaking.

## A Policy Analytic Research Framework

The ultimate test for e-rulemaking will be whether it improves either the substance or process of rulemaking (or both). Since information technology offers potential solutions to problems with rulemaking, research will be needed to determine the extent to which information technology actually mitigates these problems or advances the goals of those who implement it. Previous sections of this report have highlighted some of the problems with rulemaking and have articulated different goals for e-rulemaking.[172] In this section, rulemaking problems and e-rulemaking solutions are organized within the framework of policy analysis or evaluation. This framework is intended to illuminate the different roles for institutional and informational research in finding ways to improve government rulemaking.

The conventional approach to policy analysis begins by specifying and studying problems.[173] With respect to rulemaking, as noted in Part I of this report, observers have variously defined the problems as ones of inefficiency, delays, lack of democratic responsiveness, or incomplete compliance. Merely stating that a problem exists, however, is but the first step in policy research. The researcher next defines the problem as precisely as possible, measures the extent of the problem, and identifies trends in the problem.[174] Is the problem getting worse or better? Most

importantly, the researcher examines the causes of the problem because knowing the underlying causes will help in identifying solutions.

By understanding the problem better, the policy researcher is able to specify criteria by which alternative solutions to the problem can be assessed.[175] Some of these criteria will relate directly to the problem, such as by selecting metrics to determine how well a particular solution reduces the problem.[176] Other criteria will relate to constraints on decision makers or organizations.[177] In the rulemaking context, for example, solutions that might improve regulatory compliance will also impose administrative costs on agencies. Decision makers need to reduce the problem of noncompliance (or any other problem) within their financial constraints. Researchers should therefore assess alternative solutions along a number of dimensions, such as the impact on the problem as well as on factors such as administrative costs or legal feasibility. In selecting criteria, e-rulemaking researchers will be able to draw on goals and metrics such as those discussed earlier in this report.

After analyzing the problem and selecting criteria, the next step is to identify alternative solutions.[178] Policy research compares alternatives, of which at least two always exist: (1) the status quo, and (2) something that would change the status quo.[179] No matter how many alternative solutions are considered, the status quo (or the "do nothing" option) is always included as a benchmark against which the alternatives are measured. Often there will be several alternative ways of changing the status quo that the researcher will want to consider. E-rulemaking encompasses a broad range of applications of information technology, each of which can have different design choices embedded within it.[180] Each relevant type and design of information technology can be considered as a separate solution.

The analysis of the solutions consists of assessing each of the alternative solutions against all of the relevant criteria. How well do each of them solve the problem and avoid the constraints? If solutions have yet to be implemented, this analysis becomes prospective and must be based on forecasts or inferences from other comparable settings. If solutions have been implemented, then the analysis can consist of empirical study of their effects, comparing each of these results with the status quo or with the effects of other alternatives.[181]

On the basis of the analysis, a recommendation or decision can be made about whether to implement or continue implementing the solution. In many cases, there will be trade-offs to be made across criteria. In other words, some solutions may solve one problem well but create new problems of their own, or may cost more than other solutions. Choices will still need to be made, but they will be choices informed by a clearer understanding of the impacts of different options along the relevant criteria.[182]

Of course, the purpose of this overview of policy analysis is not to suggest that all research on e-rulemaking must or even should be approached as policy analysis. Rather, it is to provide an overarching framework for integrating the contributions of various disciplines—computer sciences, social sciences, and the law—in the advancement of e-rulemaking. Research from each discipline contributes in different ways to different parts of the policy analysis framework. For example, social scientists seek to understand organizational and individual behavior in the rulemaking context.[183] Their research on the rulemaking process provides a better basis for understanding problems and their causes. It also provides a baseline understanding of the status quo. In contrast, the information sciences are particularly useful in identifying possible solutions. The innovative technologies developed by information scientists make up the alternative solutions that merit assessment for effectiveness.

Social science research can inform the work of information scientists in vital ways. After all, information scientists need to understand the underlying structure of information and decision making in the rulemaking process. By identifying the causes of slow or inefficient decision making, social scientists contribute insights that will enable information scientists to design systems that can address these causal factors and better meet users' needs.

In addition to the contributions made by the social and computer sciences, legal research will contribute to a better understanding of the constraints under which new technologies must operate. Administrative law scholars can also identify legal innovations and procedural changes that may complement or facilitate the application of innovations in information technology.[184] These legal changes will themselves constitute alternative solutions meriting their own evaluation.

Finally, all disciplines can contribute research on the impacts of new technologies on the rulemaking process. Research that measures the effects of e-rulemaking will be relevant not only to decision makers but also to researchers from across the disciplines. Information scientists will want to know if their solutions have been effective and will benefit from evaluation results in order to refine technologies or search for new solutions. Social scientists and administrative law scholars will learn how information technology affects behaviors and outcomes in the rulemaking process.

Research from all disciplines will help in putting together the pieces of the policy analysis puzzle. Should new technologies be applied to rulemaking? If so, which ones? How should they be designed? What are the appropriate criteria or metrics for evaluating the impact of e-rulemaking? Answering these policy questions will require coordinated efforts across computer sciences, social sciences, and law.

## Functional Aspects of Rulemaking

E-rulemaking research can benefit not only from an analytic framework but also from a functional perspective on rulemaking. Such a perspective considers the tasks that agency staff and other users undertake in developing and implementing rules.

A functional perspective differs in some ways from the perspective that social scientists and administrative law scholars typically offer. The typical perspective—outlined in Part I of this report—portrays rulemaking in a procedural manner, as a series of steps or hurdles that must be cleared.[185] Although e-rulemaking researchers do need to appreciate the procedural steps of rulemaking, this is not the only way to conceptualize the rulemaking process. A functional account of rulemaking emphasizes *tasks* instead of *procedures*. These tasks are ones that agency staff and other users must perform at a particular stage or at several stages of the rulemaking process (see Table 2). Many workshop participants characterized future research needs around different functional aspects of rulemaking.

Some of these functional aspects are closely related to a particular procedural stage in rulemaking, while others cut across more than one stage. The tasks that workshop participants highlighted and thought were most likely to benefit from advanced information technology include the following:

- ***Gathering information.*** In order understand the extent of regulatory problems and analyze different solutions, agency staff must gather large quantities of information in the form of internal or external studies and analyses of available data. Relevant technologies include information retrieval, data and text mining, information extraction, summarization, and semantic analysis.

Table 2: Rulemaking Stages and Associated Functional Tasks

| Stages in the Rulemaking Process | Functional Tasks |
|---|---|
| **Idea** | • Gathering information<br>• Securing public input<br>• Identifying interested parties |
| **Regulatory agenda** | • Rule management and planning |
| **Analysis & design** | • Gathering data<br>• Analyzing data<br>• Drafting the rule<br>• Identifying related rules and laws<br>• Consistency checking |
| **NPRM & comment** | • Identifying and notifying interested parties<br>• Securing and analyzing public input<br>• Presenting data and arguments |
| **Analysis & revision** | • Collecting data<br>• Securing public input |
| **Rule publishing** | • Archiving of dockets and relevant data |
| **Enforcement & monitoring** | • Identifying and notifying affected parties<br>• Fostering public understanding<br>• Securing compliance<br>• Collecting data on rule effectiveness<br>• Analyzing rule effectiveness<br>• Providing feedback into regulatory agenda |

- ***Securing public input.*** Public input is another major source of information for regulatory decision makers, so agencies need to capture and analyze this input. Information technologies that facilitate digital deliberation will be relevant, as will be text classification and summarization technologies.
- ***Drafting rules.*** The process of writing a rule can be laborious, especially if it contains many parts or addresses complex problems. In addition, writing a rule often involves input from a number of staff members from different professional backgrounds (e.g., lawyers, engineers, economists, and enforcement staff). Style-checking software, templates, and collaborative drafting tools are among the IT tools relevant to this task.
- ***Sharing information.*** An important part of rulemaking is sharing information with the public and with others in different parts of the government. Digital libraries, information retrieval, and question and answering systems are possible tools for sharing information.
- ***Securing compliance.*** One of the major tasks of any regulatory agency is ensuring that regulated actors come into compliance. Regulatory enforcement has traditionally served this role, but information technology may be able to help too. Relevant technologies could include regulatory conformance software or remote sensing technologies.

- ***Managing rulemaking.*** Managers within regulatory agencies need to make strategic choices about which rules to develop and how to allocate agency resources toward rulemaking. Relevant technologies could include systems that track the development of rules from inception through enforcement, as well as systems that can be used to set priorities and make budgetary decisions.

For the most part, the functional aspects of developing regulation have remained understudied. More research will therefore be useful for uncovering the specific challenges regulatory officials face in addressing each of these tasks. Another important area for research will be to determine whether variation exists in these tasks. It seems likely that the functional tasks of rulemaking will differ for different types of rules. If nothing more, the relative difficulty of these tasks seems likely to vary from rule to rule. Assuming this variation correlates with other identifiable features of rulemaking, it should be possible to design systems that offer different features designed to take such differences in tasks into account. Table 3 shows how the different functional tasks in rulemaking correspond with different types of information technologies.

Table 3: Functional Tasks and Associated Information Technologies

| Functional Tasks | Relevant Information Technology |
|---|---|
| **Gathering data** | • Data mining/information retrieval<br>• Databases<br>• Information extraction<br>• Automatic summarization<br>• Interagency electronic libraries and databases |
| **Analyzing data** | • Modeling software<br>• Semantic analysis |
| **Identifying interested parties** | • Data mining/information retrieval<br>• Electronic communication |
| **Rule management and planning** | • Project management software<br>• Bookkeeping software |
| **Rule drafting** | • Consistency checking<br>• Interagency communication<br>• Electronic templates |
| **Notifying interested parties** | • Electronic communication |
| **Securing public input** | • Electronic communication<br>• Electronic conferencing<br>• Web input |
| **Analyzing public input** | • Semantic analysis<br>• Automatic classification software |
| **Archiving dockets and relevant data** | • On-line libraries<br>• Automatic website generation |
| **Fostering public understanding** | • Electronic communication<br>• Automatic website generation |
| **Securing compliance** | • Rule formatting<br>• Data gathering<br>• Data analysis |

From the standpoint of evaluation, each different task can be viewed as a type of a problem, for each is a problem that the staff responsible for dealing with it must solve. Correspondingly, different types or designs of relevant information technology can be considered alternative solutions to these problems. Research organized around the functional aspects of rulemaking can assess how well different technological solutions impact the completion of the relevant task along various criteria, such as timeliness, expense, and effectiveness.

## Research Directions in E-Rulemaking

Having recognized that research should assess the actual impacts of e-rulemaking on problems and functions, workshop participants articulated a broad range of specific questions that they believed future research should address. The workshop dialogue covered a wide-ranging but interconnected set of research issues.[186] For purposes of presentation, the ideas for future research that emerged can be organized into four main categories: (1) developments in information technology, (2) agency management of rulemaking, (3) public involvement in the rulemaking process, and (4) regulatory compliance.

### Developments in Information Technology

E-rulemaking raises a series of challenges for research in the information sciences.[187] The long-term potential for e-rulemaking will depend on adapting existing technologies to the rulemaking process as well as on making more fundamental progress in areas such as modeling, natural language processing, and human–computer interface. Some specific research questions directed at developing new IT applications include:

- How should IT tools be designed to perform automated cross-indexing and linking to related rules, docket records, and other relevant documents?
- How can rulemaking systems be designed to be clear and easy to use for a variety of users, from agency specialists to ordinary citizens?
- What structures and system designs will best facilitate clear and effective communication of the complex policy and procedural issues that characterize rulemaking?
- How can agencies structure technologies for public input that will encourage more members of the public to participate more meaningfully in the rulemaking process?
- What kinds of technologies can be used for question-and-answer exchanges with the public? Can the technologies used by large companies to answer on-line user questions help agencies provide focused assistance to members of the public?
- How can IT tools be designed to help agency staff process and analyze commentary and dialogue from the public? Can systems be designed to categorize and summarize comments and generate responses to them?
- What technologies can best support interactive dialogue between the public and agency staff?

- How can general simulation and modeling packages—such as those designed to assist with economic analysis—be constructed so they are useful to different regulatory agencies or for a variety of regulatory issues?
- How can software be designed to perform automated checking of rule documents for internal and external consistency?

### Agency Management of Rulemaking

Information technology can help in overcoming certain management challenges associated with rulemaking, but it may also create new management challenges of its own.[188] The application of new information technologies to the rulemaking process generates a series of research questions for those interested in public management.

- What effects do information technologies have on agencies' ability to gather more or better information required for writing rules? Do these technologies enable rule writers to conduct analyses or perform functions more quickly or with greater quality?
- What degree of flexibility is needed in IT systems that support rulemaking? Will structured systems help streamline the production process for new rules or will it create more work to adapt structured systems to meet contingencies related to each rule?
- How do agency staff members perceive the benefits and costs of information technologies in the rulemaking process?
- How does information technology affect the decision making within regulatory agencies? Does it change the relative influence that various professional staffs have inside an agency? For example, could lawyers lose influence over technical staff if IT systems made it easier for non-lawyers to draft rules?
- What kinds of changes, if any, does e-rulemaking bring to the relationships between regulatory agencies and other governmental actors, such as staff in Congress or the OMB?
- What aspects of the organizational culture within agencies are relevant to e-rulemaking? How can agencies make the organizational changes that might be needed in order to secure the full benefits of e-rulemaking?

### Public Involvement with Rulemaking

E-rulemaking can affect both the internal management of regulatory agencies and the interaction between agencies and the public. Indeed, the management of public input is itself an important part of the strategic management of regulatory agencies, if for no reason other than that the rulemaking process is generally transparent to the public and involves extensive participation by outside organizations.[189] Research on how information technology affects public participation

will be of interest to those who study both public management and democratic politics. Some of the more important questions for research will include:

- Does public awareness of the rulemaking process increase after the introduction of new IT tools? Is this awareness increased more for some segments of the public than others?
- Does IT increase the number of comments submitted on proposed rules? Does it change who comments? Does it change the nature of the discourse?
- How does the public respond to different types of communication and deliberative technologies? How do different means of obtaining public input—e-mail, videoconferencing, or chatroom—perform according to different metrics?
- What does greater access of information do to media coverage? Does it make it less or more relevant? Does it increase coverage of regulatory issues? Does IT change the role of other information brokers (e.g., lawyers, trade associations) in the rulemaking process?
- Do comments have a different impact on agency decision making when agencies use information retrieval software to analyze comments than when they use staff or consultants to analyze them?
- How do people "feel" after participating via these different means? Do they feel differently about e-mail than a written comment, or about a videoconference than an in-person hearing?
- Does e-rulemaking affect the public's sense of legitimacy of regulations? Does it reduce conflict or decrease the incidence of litigation?

### Regulatory Compliance

The final set of research questions concerns the role of information technology in promoting regulatory compliance. The point of making rules, after all, is to have them change the behavior of those they regulate. Research can be directed toward finding ways for information technology to promote regulatory compliance as well as determining the impact that information technologies have on the behavior of government enforcement staff and regulated firms.[190] Some of the pertinent research questions include:

- How well can compliance assistance systems process users' descriptions of their situations and then identify all the relevant rules for users? Can effective systems be designed to help firms identify their own compliance and noncompliance with rules?
- What are the most effective ways to communicate regulatory requirements in compliance assistance software?
- How can systems best display or explain compliance to users, especially with respect to regulatory issues that possess "gray areas"?
- How should compliance systems take enforcement discretion into account?

- What role can information and data acquisition technology play in improving evaluations of regulations? Can remote sensing technologies, for example, be used to link changes in underlying conditions with regulatory changes?
- How can systems be designed to process data on regulatory compliance in ways that will prove helpful for agency staff when revising old rules or creating new ones?

# Conclusion

Through the rulemaking process, government agencies set standards that affect every major aspect of economic and social life in the United States. The volume and impact of government regulations have grown significantly over the past half century, making rulemaking one of the most important vehicles for government policymaking today.[191] As a result, any proposal that promises to improve the rulemaking process by making it more efficient, less burdensome, or more accountable merits careful attention by both regulatory officials and policy researchers. E-rulemaking is one such proposal.

The term "e-rulemaking" actually encompasses a broad range of applications of information technology to the rulemaking process. Although some agencies are beginning to make rulemaking documents available on the Internet, information technology could play a still more significant role. As participants in the Regulatory Policy Program's e-rulemaking workshops suggested, the potential for using IT in the rulemaking process is considerable. Agencies may be able to use new technologies to communicate more effectively with the public, conduct more informed regulatory analyses, and implement rules more quickly and efficiently.

Not only may digital technologies promise better ways for agencies to complete existing tasks, but they also may lead to a significant redefinition of the existing tasks and processes of rulemaking. For example, information technology may make it possible for agencies to be much more systematic about generating widespread public deliberation over proposed rules, perhaps enabling rulemaking in the future to be driven more by public preferences than by expert judgments.[192] Whatever the merits of this or any other institutional change, it is clear that maximizing e-rulemaking's potential will depend on creating a good fit between information technologies and regulatory institutions.

Research from across the information and social sciences will therefore have much to offer to the development of e-rulemaking. Researchers working across disciplines can help design information systems that better meet the institutional routines and requirements of the rulemaking process. They can also evaluate the impacts of information technology on regulatory outcomes and behaviors.[193] The effective use of information technology promises to advance important goals, such as improving regulatory decisions, enhancing democratic legitimacy, decreasing administrative burdens, and increasing regulatory compliance. Careful research will be needed, however, to assess whether specific applications of technology actually advance these goals.

This report has identified numerous ways that information technology can be used to try to solve some of the problems associated with rulemaking. It has also highlighted key avenues for future research on e-rulemaking. Through coordinated efforts over the next decade, researchers should be able to answer many of the significant questions posed in this report and help bring about the development of more effective IT applications for rulemaking. The

e-rulemaking efforts made so far by OMB and a core group of leading regulatory agencies represent important first steps,[194] but sustained cooperation between these regulatory agencies and the research community will be essential to take e-rulemaking into its next generation.

# Notes

[1] John D. Graham, Remarks Prepared for Delivery to the National Economists Club, Library of Congress (March 7, 2002) *available at* http://www.whitehouse.gov/omb/legislative/testimony/graham030702.html.

[2] 5 U.S.C. § 553 (2000).

[3] *See generally* CORNELIUS M. KERWIN, RULEMAKING: HOW GOVERNMENT AGENCIES WRITE LAW AND MAKE POLICY 75–82 (3d ed. 2003).

[4] Cornelius M. Kerwin & Scott Furlong, *Time and Rulemaking: An Empirical Test of Theory,* 2 J. PUB. ADMIN. RES. & THEORY 124 (1992); Stephen Johnson, *The Internet Changes Everything: Revolutionizing Public Participation and Access to Government Information through the Internet*, 50 ADMIN. L. REV. 277, 282 (1998).

[5] *See* KERWIN, *supra* note 3, at 193–6.

[6] MICHELE FERENZ AND COLIN RULE. *RULENET: An Experiment in Online Consensus Building*, in LAWRENCE SUSSKIND, SARAH MCKEARNAN & JENNIFER THOMAS-LARMER, EDS., THE CONSENSUS BUILDING HANDBOOK: A COMPREHENSIVE GUIDE TO REACHING AGREEMENT 879–898 (1999).

[7] *See* KERWIN, *supra* note 3, at 194.

[8] Press Release, Federal Aviation Administration, FAA First-Ever-On-Line Public Forum Proves Successful in Gaining Rulemaking Input (Mar. 30, 2000) *available at* http://www.faa.gov/apa/pr/pr.cfm?id=1009

[9] Letter from Michael Brostek, Associate Director, Federal Management and Workforce Issues, Government Accounting Office, to U.S. Representative Henry A. Waxman and U.S. Senator Joseph I. Lieberman, (June 30, 2000) *available at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Rulemaking_IT_Participation.pdf.

[10] White House Office of Management and the Budget ("OMB"), "Implementing the President's Management Agenda for E-Government," (April 2003) *available at* http://www.whitehouse.gov/omb/egov/2003egov_strat.pdf.

[11] Cindy Skrzycki, *U.S. Opens Online Portal to Rulemaking; Web Site Invites Wider Participation in the Regulatory Process,* WASH. POST, Jan. 23, 2003, at E1.

[12] *See generally* OMB website *at* http://www.whitehouse.gov/omb/inforeg/xmlreports.html; *see also* Memorandum from OIRA Administrator John D. Graham, to OIRA staff (Oct. 18, 2001) *available at* http://www.whitehouse.gov/omb/inforeg/oira_disclosure_memo-b.html.

[13] E-Government Act of 2002, Pub. L. No. 107-347, 166 Stat. 2899 (2002).

[14] *Id*.

[15] *See* JANE E. FOUNTAIN, BUILDING THE VIRTUAL STATE: INFORMATION TECHNOLOGY AND INSTITUTIONAL CHANGE (2001).

[16] For more information about these workshops, including presentations and related materials, see www.e-rulemaking.org.

[17] On media coverage of regulatory policymaking, see Cary Coglianese & Margaret Howard, *Getting the Message Out: Regulatory Policy and the Press*, 3 HARV. INT'L. J. OF PRESS/POLITICS 39 (1998); Terry Moe, *Political Institutions: The Neglected Side of the Story*, 6 J. L. ECON & ORG. 213 (1990).

[18] *See* Richard Stewart, *The Reformation of American Administrative Law,* 88 Harv. L. Rev. 1669 (1975); KERWIN, *supra* note 3, at 74.

[19] Cary Coglianese, *Empirical Analysis and Administrative Law,* 2002 U. ILL. L. REV. 1111, 1128 (2002).

[20] OMB, "Making Sense of Regulation: 2001 Report to Congress on the Costs and Benefits of Regulations and Unfunded Mandates on State, Local and Tribal Entities," (2001) *available at* http://www.whitehouse.gov/omb/inforeg/costbenefitreport.pdf; *see also* OMB, "Stimulating Smarter Regulation: 2002 Report to Congress on the Costs and Benefits of Regulations and Unfunded Mandates on State, Local and Tribal Entities," *available at* http://www.whitehouse.gov/omb/inforeg/2002_report_to_congress.pdf (estimating that annual costs for regulations promulgated between April 1, 1995 and September 30, 2001 are between $50 billion and $53 billion and annual benefits are between $48 billion and $102 billion; OMB "Informing Regulatory Decisions: 2003 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local and Tribal Entities," *available at* http://www.whitehouse.gov/omb/inforeg/2003_cost-ben_final_rpt.pdf (reviewing 107 major regulations promulgated between 1992 and 2002 and estimating annual benefits from $146 billion to $230 billion and annual costs from $36 billion to $42 billion). *See also* Robert W. Hahn & Erin Layburn, *Tracking the Value of Regulation*, 26 REG., Fall 2003 at 16–21.

[21] OMB, "Making Sense of Regulation: 2001 Report to Congress on the Costs and Benefits of Regulations and Unfunded Mandates on State, Local and Tribal Entities," (2001) *available at* http://www.whitehouse.gov/omb/inforeg/costbenefitreport.pdf.

[22] *Id*.

[23] *See* KERWIN, *supra* note 3, at 144–7, 52–57, 28–36.

[24] *See generally* THEODORE J. LOWI, THE END OF LIBERALISM: THE SECOND REPUBLIC OF THE UNITED STATES (1979); DAVID SCHOENBROD, POWER WITHOUT RESPONSIBILITY: HOW CONGRESS ABUSES THE PEOPLE THROUGH DELEGATION (1993).

[25] *See* Barbara H. Brandon & Robert D. Carlitz, *Online Rulemaking and Other Tools for Strengthening Our Civic Infrastructure,* 54 ADMIN. L. REV. 1421 (2003); Johnson, *supra* note 4.

[26] Stephen Zavestoski & Stuart W. Shulman, *The Internet and Environmental Decision Making: An Introduction*, 15 ORG. & ENV'T 323 (2002).

[27] Brandon & Carlitz, *supra* note 25, at 1422.

[28] *See, e.g.,* NATIONAL PERFORMANCE REVIEW, "IT03: Develop Integrated Electronic Access to Government Information and Services" (Sept. 1993) *available at* http://govinfo.library.unt.edu/npr/library/reports/it03.html; NATIONAL PERFORMANCE REVIEW, "REG04: Enhance Public Awareness and Participation" (Sept. 1993) *available at* http://govinfo.library.unt.edu/npr/library/reports/reg04.html.

[29] *See* OMB, *supra* note 10.

[30] E-Government Act of 2002, Pub. L. No. 107-347, 166 Stat. 2899 (2002).

[31] *See* KENNETH CULP DAVIS, ADMINISTRATIVE LAW TREATISE, § 1.6, at 22 (3rd ed., 1994); *see also* Todd D. Rakoff, *The Choice Between Formal and Informal Modes of Administrative Regulation*, 52 ADMIN L. REV. 159, 163 (2000).

[32] *Id*.

[33] Administrative Procedure Act ("APA"), 5 U.S.C. § 553 (2000).

[34] *Id*.

[35] *See* KERWIN, *supra* note 3, at 13–16.

[36] OMB has reported that from October 1 2001 to September 30, 2002, the federal government published 4,153 new rules. OMB, *supra* note 20, at 6. Over the same period, Congress enacted 245 statutes. *See* Pub. L. 107–45 (Oct. 1, 2001); Pub. L. 107–229 (Sept. 30, 2002). *See also* Bill Walsh, *Unelected Make the Laws; Agencies' Rules Far Outnumber Congress',* TIMES PICAYUNE, Aug. 7, 2003, at 10 (noting 269 new laws and over 4,000 new rules over the past year).

[37] Peter L. Strauss, *The Rulemaking Continuum,* 41 DUKE L. J. 1463, 1466–67 (1992) (noting that an agency rule "has the force and effect of a statute on all those who are subject to it. It binds the agency, private parties, and the courts, and may preempt state statutes. If a statute so authorizes, its violation may form the basis for penal consequences").

[38] 1 KENNETH CULP DAVIS, ADMINISTRATIVE LAW TREATISE § 6.15, at 283 (1st ed. Supp. 1970).

[39] APA, 5 U.S.C. § 553 (2000).

[40] APA, 5 U.S.C. § 553(b) (2000).

[41] *See* APA, 5 U.S.C. § 553(b)(3) (2000) (requiring "either the terms or substance of the proposed rule or a description of the subjects and issues involved").

[42] The APA requires at least 30 days between NPRM and the rule's effective date. APA, 5 U.S.C. § 553(d) (2000). But agencies will frequently allow longer comment periods. *See, e.g.*, National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule; Extension of Comment Period, 68 Fed. Reg. 58,057 (Oct. 8, 2003).

[43] *See, e.g.*, 55 Fed. Reg. 22520 (June 1, 1990).

[44] APA, 5 U.S.C. § 553(d) (2000).

[45] *See* KERWIN, *supra* note 3, at 70.

[46] *See* KERWIN, *supra* note 3, at 179–92. *See, e.g.,* Thomas O. McGarity, "The Internal Structure of EPA Rulemaking" 54 LAW AND CONTEMP. PROBS. 57 (1991).

[47] Regulatory Flexibility Act, 5 U.S.C. § 602 (2000); *see, e.g.,* 68 Fed. Reg. 30920 (May 27, 2003).

[48] *See* PETER L. STRAUSS ET AL., ADMINISTRATIVE LAW 629 (10TH ED. 2003).

[49] *See, e.g.,* 68 Fed. Reg. 1991 (Jan. 15 2003).

[50] Cary Coglianese, *Assessing the Advocacy of Negotiated Rulemaking: A Response to Phillip Harter*, 9 N.Y.U. ENVTL. L.J. 410 (2001).

[51] APA, 5 U.S.C. § 702 (2000).

[52] APA, 5 U.S.C. § 706 (2000). *See also* Motor Vehicle Manufacturers Association v. State Farm Mutual Automobile Insurance Co., 463 U.S. 29 (1983).

[53] *See* Cary Coglianese, *Assessing the Advocacy of Negotiated Rulemaking: A Response to Phillip Harter*, 9 N.Y.U. ENVTL. L.J. 386, 410–11 (2001).

[54] *Id*.

[55] Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 17 1981); Exec. Order No. 12,886, 58 Fed. Reg. 51,735 (Sept. 30 1993).

[56] Unfunded Mandates Reform Act, 2 U.S.C. § 1532 (2000).

[57] Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).

[58] WILLIAM F. FUNK ET AL., FEDERAL ADMINISTRATIVE PROCEDURE SOURCEBOOK (3rd ed.) (2000) at 530.

[59] National Environmental Policy Act, 42 U.S.C. § 4332 (2000).

[60] Exec. Order No. 13,132, 64 Fed. Reg. 43,255 (August 10, 1999) (federalism); Exec. Order No. 13,272, 67 Fed. Reg. 53,461 (small businesses); Exec. Order No. 12,630, 53 Fed. Reg. 8859 (March 15, 1988) (property rights).

[61] Paperwork Reduction Act, 44 U.S.C. § § 3501–21 (2000).

[62] Freedom of Information Act (FOIA), 5 U.S.C. § 552 (2000). FOIA enumerates nine exceptions to the disclosure requirement. 5 U.S.C. § 552(b) (2000). For example, the government is under no obligation to disclose trade secrets belonging to private parties. *See* Chrysler Corp. v. Brown, 441 U.S. 281 (1979).

[63] *See, e.g.*, Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402 (1971); Home Box Office, Inc. v. Fed. Communications Comm'n, 567 F.2d 9 (D.C. Cir. 1977), cert. denied 434 U.S. 829 (1977); Sierra Club v. Costle 657 F.2d 298 (D.C. Cir 1981).

[64] *Id*.

[65] Federal Advisory Committee Act, 5 U.S.C. App. 2 § § 1–16 (2000).

[66] Negotiated Rulemaking Act, 5 U.S.C. § § 561–570a (2000).

[67] Government in the Sunshine Act, 5 U.S.C. § 552(g)(h) (2000).

[68] Congressional Review Act, 5 U.S.C. § § 801–808 (2000).

[69] The Congressional Review Act was used to repeal a rule promulgated by the Department of Labor setting ergonomics standards. Pub. L. 107–5 (Mar. 20, 2001). More recently, the Senate passed a resolution disapproving a rule promulgated by the F.C.C. that would liberalize media ownership. S.J. Res. 17, 108th Cong. (2003).

[70] *See generally* Thomas O. McGarity, *Some Thoughts on "Deossifying the Rulemaking Process,"* 41 DUKE L.J. 1385 (1992).

[71] *See* Rakoff, *supra* note 31, at 165.

[72] *See* KERWIN, *supra* note 3, at 182–84.

[73] *See* KERWIN, *supra* note 3, at 144–47.

[74] *See, e.g.*, "Hazardous Waste Management System; Testing and Monitoring Activities" 55 Fed. Reg. 4440 (Feb. 8, 1990) (requiring comments in triplicate).

[75] *See* Government Printing Office website *at* http://www.gpoaccess.gov/fdlp.html.

[76] *See* STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE (1992); John F. Morrall III, *A Review of the Record,* 10 REG. 25 (1986).

[77] *See* Coglianese, *supra* note 19.

[78] *See, e.g.*, McGarity, *supra* note 69; Jerry L. Mashaw, *Improving the Environment of Agency Rulemaking: An Essay on Management, Games, and Accountability,* 57 J. L. & CONTEMP. PROB. 185 (1994).

[79] *See* LOWI, *supra* note 24; SCHOENBROD, *supra* note 24.

[80] *See* KERWIN, *supra* note 3, at 158.

[81] *See* Brandon & Carlitz, *supra* note 25.

[82] *See* Johnson, *supra* note 4.

[83] *See* HENRY H. PERRITT, JR., REPORT TO THE ADMINISTRATIVE CONFERENCE OF THE UNITED STATES, ELECTRONIC DOCKETS: THE USE OF INFORMATION TECHNOLOGY IN RULEMAKING AND ADJUDICATION, (1995); HENRY H. PERRITT, JR., REPORT TO THE ADMINISTRATIVE CONFERENCE OF THE UNITED STATES, FEDERAL AGENCY ELECTRONIC RECORDS MANAGEMENT AND ARCHIVES (1990).

[84] *See* NATIONAL PERFORMANCE REVIEW, *supra* note 28.

[85] *See* Government Printing Office website *at* http://www.gpoaccess.gov/nara/index.html.

[86] 1995 Paperwork Reduction Act Amendments, Pub. L. 104-14, 109 Stat. 186 (1995) (codified at 44 U.S.C. § § 3501–21 (2000)); Pub. L. No. 104-231, 110 Stat. 3048 (1996) (codified at 5 U.S.C. § 552 (2000)).

[87] *See* Brandon & Carlitz, *supra* note 25.

[88] *See* KERWIN, *supra* note 3, at 194.

[89] 60 Fed. Reg. 41314 (proposed Aug. 11, 1995).

[90] *See* FAA, *supra* note 8.

[91] 62 Fed. Reg. 65859 (Dec. 16, 1997); *see also* Stuart W. Shulman, *An Experiment in Digital Government at the United States National Organic Program*, 20 AGRIC. & HUM.VALUES (forthcoming fall 2003).

[92] *See* MICHELE FERENZ & COLIN RULE, *RULENET: An Experiment in Online Consensus Building*, in THE CONSENSUS BUILDING HANDBOOK: A COMPREHENSIVE GUIDE TO REACHING AGREEMENT 879 - 98 (Lawrence Susskind et al. ed., 1999); JoAnne Holman & Michael A. McGregor, *"Thank You for Taking the Time to Read This:" Public Participation via New Communication Technologies at the FCC, 2* JOURNALISM & COMM. MONOGRAPHS 158 (2001).

[93] *See* U.S. DEPARTMENT OF TRANSPORTATION, DEPARTMENT OF TRANSPORTATION'S DOCKET MANAGEMENT SYSTEM, *at* http://www.diggov.org/archive/library/dgo2001/DGOMAC/MEDIA/MEERS.PDF.

[94] *See* U.S. Environmental Protection Agency website *at* http://cascade.epa.gov/RightSite/dk_public_home.htm.

[95] Johnson, *supra* note 4.

[96] *See* website of Drake University Professor Stuart W. Shulman *at* http://www.drake.edu/artsci/faculty/sshulman/DC2001.

[97] *See* OMB, The President's Management Agenda, Fiscal Year 2002, *available at* http://www.whitehouse.gov/omb/budget/fy2002/mgmt.pdf; *see also* OMB, *supra* note 10. Like other aspects of the President's Management Agenda, implementation of the e-government initiative is scored by OMB on a 'traffic light' system. *See* Stephen Barr, *In Mid-Year Score-Card Assessment, Some Agencies Miss the Mark*, WASH. POST, July 29, 2002 at B2.

[98] *See* OMB, The President's Management Agenda, Fiscal Year 2002, *available at* http://www.whitehouse.gov/omb/budget/fy2002/mgmt.pdf.

[99] *See* OMB, *supra* note 10, at 26.

[100] *See* Skrzycki, *supra* note 11.

[101] *See* Rick Otis, e-Rulemaking, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Otis_Presentation.pdf; Oscar Morales, eRulemaking Initiative: Trials and Tribulations of a Frustrated Bureaucrat or the Proof is in the Details, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Morales_presentation.pdf.

[102] *See* Otis, *supra* note 101; Morales, *supra* note 101.

[103] *See* Otis, *supra* note 101; Morales, *supra* note 101.

[104] E-Government Act of 2002, Pub. L. No. 107–347, 166 Stat. 2899 (2002).

[105] *Id.*

[106] *Id.*

[107] *See* Brandon & Carlitz, *supra* note 25, at 1433–35.

[108] *See* GAO, ELECTRONIC RULEMAKING: EFFORTS TO FACILITATE PUBLIC PARTICIPATION CAN BE IMPROVED, REPORT TO THE COMMITTEE ON GOVERNMENTAL AFFAIRS, U.S. SENATE (Sept. 17, 2003) *available at* http://www.gao.gov/new.items/d03901.pdf.

[109] *See* Eduard Hovy, e-Rulemaking: Research Problems for IT, Presentation to the National Conference on Digital Government Research (May 20, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Hovy_Presentation_Fnl.pdf; Elizabeth D. Liddy, 30 Applications of Information Technology to E-Rulemaking, Presentation to the National Conference on Digital Government Research (May 20, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Liddy_Applications_IT.pdf.

[110] *See* Claire Cardie, Natural Language Technologies for E-Rulemaking, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Cardie_Presentation.pdf.

[111] *See* RICARDO BAEZA-YATES & BERTHIER RIBIERO-NETO, MODERN INFORMATION RETRIEVAL 381 (1999).

[112] *See* Bonnie J. Dorr & Douglas W. Oard, Evaluating Resources for Query Translation in Cross-Language Information Retrieval, Proceedings of the First International Conference on Language Resources and Evaluation 759-763 (1998), *at* ftp://ftp.umiacs.umd.edu/pub/bonnie/granadaps-a.pdf (last retrieved Feb. 20, 2004).

[113] *See* Cardie, *supra* note 110, at 13.

[114] *See* MURTHA BACA, ED., INTRODUCTION TO METADATA: PATHWAYS TO DIGITAL INFORMATION (1998).

[115] *See* Boris Katz et al., BETTER PUBLIC POLICY THROUGH NATURAL LANGUAGE INFORMATION ACCESS, MIT ARTIFICIAL INTELLIGENCE LABORATORY (2003) *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Hurwitz_LanguageInfo_Access.pdf.

[116] *See* Edward A. Fox, Digital Libraries for E-Rulemaking: Integrating the Information Fields (Hypertext, Information Retrieval, Multimedia, etc.), Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003) *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Fox_Presentation.pdf.

[117] *See* EDWARD A. FOX, ED., SOURCEBOOK ON DIGITAL LIBRARIES (1993).

[118] For overviews of data mining, see DAVID J. HAND, HEIKKI MANNILA, PADHRAIC SMYTH, PRINCIPLES OF DATA MINING (2001); Marti A. Hearst, *Text Data Mining*, in RUSLAN MITKOV, ED., THE OXFORD HANDBOOK OF COMPUTATIONAL LINGUISTICS 616 (2003).

119 *See* JEFFREY S. LUBBERS, THE FUTURE OF ELECTRONIC RULEMAKING: A RESEARCH AGENDA, REGULATORY POLICY PROGRAM WORKING PAPER RPP-2002-04 (2002) *at* http://www.ksg.harvard.edu/cbg/research/rpp/RPP-2002-04.pdf.

120 For a good overview of topic detection and tracking, see Charles L. Wayne, Topic Detection and Tracking (TDT): Overview and Perspective, presented at the DARPA Broadcast News Transcription and Understanding Workshop (1998), at http:www.nist.gov/speech/publications/darpa98/pdf/tdt10.pdf.

121 Conflict identification can also be used in compliance assistance. For a description of systems that can identify conflicts between rules and users' performance, see Shawn Kerrigan, Charles Heenan, and Kincho H. Law, Regnet: An Infrastructure for Regulatory Information Management and Compliance Assistance, Proceedings of the National Conference on Digital Government Research, Los Angeles, California, pp. 377–382 (2002), at http://eil.stanford.edu/publications/shawn_kerrigan/DGO2002_FinalPaper_Kerrigan_Heenan_Law.pdf.

122 *See* Regulatory Flexibility Act, 5 U.S.C. § 602 (2000).

123 *See* Liddy, *supra* note 109.

124 Charles S. Han, et al., *A Performance Based Approach to Wheelchair Accessible Route Analysis*, 16 ADVANCED ENGINEERING INFORMATICS 53 (2002).

125 *See generally* Ehud Reiter and Robert Dale, *Building Applied Natural Language Generation Systems*, 3 J. NAT. LANG. ENGIN. 1, 2.2 (1997), at http:www.ics.mq.edu.au/~rdale/publications/papers/1997/jnle97.pdf.

126 *See* CARY COGLIANESE, THE INTERNET AND PUBLIC PARTICIPATION IN RULEMAKING, REGULATORY POLICY PROGRAM WORKING PAPER RPP-2003-05 (2003) *at* http://www.ksg.harvard.edu/cbg/research/rpp/RPP-2003-05.pdf

127 *See* Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals, and the Like—Should Federal Agencies Use Them To Bind The Public*, 41 DUKE L. J. 1311 (1992); Robert A. Anthony & David A. Codevilla, *Pro-Ossification: A Harder Look at Agency Policy Statements*, 31 WAKE FOREST L. REV. 667 (1996); *see also* United States v. Mead Corp., 533 U.S. 218 (2001).

128 For still further ideas, see Appendix B.

129 *See supra* notes 81–82, 110–127, and accompanying text.

130 *See supra* notes 81–82, 110–127, and accompanying text.

131 *See* LOWI, *supra* note 24; SCHOENBROD, *supra* note 24.

132 *Id*.

133 *See* Johnson, *supra* note 4.

134 *See* KERWIN, *supra* note 3. On the media's failure to cover regulatory policy, see Coglianese & Howard, *supra* note 17.

135 *See* Stuart W. Shulman et al., *Electronic Rulemaking: New Frontiers in Public Participation*, 21 SOC. SCI COMPUTER REV. 162–178.

136 *See id*.

137 The current level of participation by citizens in the rulemaking process is quite limited. In one study of comments submitted in 25 EPA rulemakings, comments by individual citizens made up only about 6 percent of all the comments filed with the agency. Cary Coglianese, Challenging the Rules: Litigation and Bargaining in the Administrative Process (1994) (unpublished Ph.D. dissertation University of Michigan) (on file with author); *see also* KERWIN, *supra* note 3, at 182–84; Marissa Golden, *Interest Groups in the Rulemaking Process*, 8 J. PUB. ADMIN. RES. & THEORY 245 (1998). However, information technology may have its own limitations in the form of a "digital divide." National Telecommunications and Information Administration, Falling Through the Net: Defining the Digital Divide (July 8, 1999), *summarized at* http://www.ntia.doc.gov/ntiahome/press/fttn070899.htm. *See also* PIPPA NORRIS, DIGITAL DIVIDE: CIVIC ENGAGEMENT, INFORMATION POVERTY AND THE INTERNET WORLDWIDE (2001).

138 *See* THOMAS C. BEIERLE, RESOURCES FOR THE FUTURE, DISCUSSING THE RULES: ELECTRONIC RULEMAKING AND DEMOCRATIC DELIBERATION (2003), *available at* http://www.rff.org/Documents/RFF-DP-03-2.pdf; Brandon & Carlitz, *supra* note 25; Johnson, *supra* note 4.

139 For example, Robert Hahn and Robert Litan have proposed that agencies provide consistent reporting of regulatory analysis results for this reason. *See* Robert W. Hahn & Robert E. Litan, Recommendations for Improving Regulatory Accountability and Transparency, Testimony before the House Government Reform Committee, Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs, at 10, (March 2, 2003) *available at* http://aei-brookings.org/admin/pdffiles/phpk0.pdf; Robert W. Hahn & Cass R. Sunstein, *A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis*, 150 U. PENN. L. REV. 1489, 1517 (2002).

140 *See* AARON B. WILDAVSKY, SPEAKING TRUTH TO POWER: THE ART AND CRAFT OF POLICY ANALYSIS, (1979); DAVID L. WEIMER & AIDAN VINING, POLICY ANALYSIS: CONCEPTS AND PRACTICE (1992).

141 *See* Coglianese, *Empirical Analysis*, *supra* note 19, at 1122–23.

142 *Id*.

143 LAWRENCE B. MOHR, IMPACT ANALYSIS FOR PROGRAM EVALUATION (2D ED. 1995).

144 For the distinction between efficiency and cost-effectiveness, see Robert W. Hahn et al., *Environmental Regulation in the 1990s: A Retrospective Analysis*, 27 HARV. ENVTL. L. REV. 377, 377 n.1 (2003).

145 Efficiency is usually thought of as either "Pareto efficiency," in which an outcome is more efficient if nobody is made worse off and at least one person is made better off, or "Kaldor-Hicks efficiency," in which an outcome is efficient if it maximizes the economic value of social resources. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 12-13 (6th ed. 2003)

146 *See generally* MATTHEW D. ADLER & ERIC A. POSNER, EDS., COST-BENEFIT ANALYSIS: LEGAL, ECONOMIC, AND PHILOSOPHICAL PERSPECTIVES (2000); EDWARD M. GRAMLICH, A GUIDE TO BENEFIT-COST ANALYSIS (2d ed. 1997).

147 *See* GRAMLICH, *supra* note 146.

148 *See* ARTHUR OKUN, EQUALITY AND EFFICIENCY: THE BIG TRADEOFF (1975).

149 *See* Neil Eisner, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking 76 (Jan. 21, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Eisner_Presentation.pdf.

150 *Id*.

151 *See* Brandon & Carlitz, *supra* note 25, at 1452.

152 DOROTHY THORNTON, ET AL., GENERAL DETERRENCE AND CORPORATE ENVIRONMENTAL BEHAVIOR (Center for the Study of Law and Society Jurisprudence and Social Policy Program. JSP/Center for the Study of Law and Society Faculty Working Papers. Paper 16) *at* http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1015&context=csls.

153 On compliance assistance and regulation generally, see Shawn Kerrigan & Kincho H. Law, Logic-Based Regulation Compliance Assistance, submitted to the Ninth International Conference on Artificial Intelligence and Law (June 24-28, 2003, Edinburgh, Scotland, UK).

154 For a related argument on how high-volume participation can compromise deliberation, see Jim Rossi, *Participation Run Amok: The Costs of Mass Participation for Deliberative Agency Decisionmaking*, 92 NW. U. L. REV.173 (1997).

155 *See* Brandon & Carlitz, *supra* note 25, at 1452; BEIERLE, *supra* note 138, at 14.

156 *See* James K. Hammitt, *Can More Information Increase Uncertainty?,* 8 CHANCE (Summer 1995), at 15–17.

157 On the distinction between satisfaction and quality, see Cary Coglianese, *Is Satisfaction Success? Evaluating Public Participation in Regulatory Policy Making*, in ROSEMARY O'LEARY AND LISA BINGHAM, EDS., THE PROMISE AND PERFORMANCE OF ENVIRONMENTAL CONFLICT RESOLUTION 69(2003).

158 Barbara H. Brandon, *An Update on The E-Government Act and Electronic Rulemaking*, 29 ADMIN. & REG. L. NEWS, Fall 2003, at 7.

159 *See* Brandon & Carlitz, *supra* note 25; Lubbers, *supra* note 119.

160 *See* Hovy, *supra* note 109.

161 *See* Peter M. Shane, Online Deliberation Tools and Electronic Rulemaking, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003) *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Shane_Deliberation_Tools.pdf

162 *See* BEIERLE, *supra* note 138.

163 *See* Group A, Presentation to John F. Kennedy School of Government Workshop on E-Rulemaking (Jan. 21, 2003), *at* http://www.ksg.harvard.edu/cbg/Conferences/rpp_rulemaking/Liddy_Rapporteur.pdf.

164 *See* EUGENE BARDACH, GETTING AGENCIES TO WORK TOGETHER: THE PRACTICE AND THEORY OF MANAGERIAL CRAFTSMANSHIP (1998).

165 *See* ELAINE CIULLA KAMARCK & JOSEPH S. NYE, DEMOCRACY.COM?: GOVERNANCE IN A NETWORKED WORLD (1999).

166 *See* Lubbers, *supra* note 119.

167 For examples of rules related to confidential business information, see Department of Agriculture, Handling Information from a Private Business, 7 C.F.R. § 1.12 (2000); Environmental Protection Agency, Confidentiality of Business Information, 40 C.F.R. pt. 2, Subpart B; National Highway Traffic Safety Administration, Confidential Business Information, 49 C.F.R. § 512.1–10.

168 *See, e.g.*, James T. O'Reilly, *Let's Abandon Regulatory Creationism: The Case for Access to Draft Agency Rules*, 28 ADMIN. & REG. L. NEWS 4 (2003).

169 *See* Coglianese, *supra* note 126.

170 For a discussion of this point, which argues in favor of the existing emphasis on agency expertise over democratic responsiveness, see Randolph J. May, *Under Pressure: Campaign-Style Tactics Are the Wrong Way to Influence Agency Decisions*, LEGAL TIMES (July 7, 2003).

171 One administrative law scholar has even predicted that information technology will "change everything" when it comes to administrative rulemaking. Johnson, *supra* note 4, at 277 ("The Internet could be used to revolutionize each step of the process that agencies must follow under the APA by supplementing, rather than replacing, those processes.").

172 *See supra* notes 31–80 and accompanying text.

[173] *See, e.g.*, EDITH STOKEY & RICHARD ZECKHAUSER, A PRIMER FOR POLICY ANALYSIS (1978); DAVID L. WEIMER & AIDAN R. VINING, POLICY ANALYSIS: CONCEPTS AND PRACTICE (3rd ed. 1998).

[174] *See* STOKEY & ZECKHAUSER, *supra* note 173; WEIMER & VINING, *supra* note 173; EUGENE BARDACH, A PRACTICAL GUIDE FOR POLICY ANALYSIS: THE EIGHTFOLD PATH TO MORE EFFECTIVE PROBLEM SOLVING (2nd ed. 2000).

[175] *See generally* STOKEY & ZECKHAUSER, *supra* note 173; WEIMER & VINING, *supra* note 173; BARDACH, *supra* note 174.

[176] For examples of some possible criteria for e-rulemaking, see *supra* notes 140–147 and accompanying text.

[177] *See generally* STOKEY & ZECKHAUSER, *supra* note 173.

[178] *See* STOKEY & ZECKHAUSER, *supra* note 173; WEIMER & VINING, *supra* note 173; BARDACH, *supra* note 174.

[179] *See* Coglianese, *Empirical Analysis*, *supra* note 19, at 1116 (discussing the status quo counterfactual).

[180] *See supra* section on "Technology Design Choices" in Part II of this report.

[181] Coglianese, *Empirical Analysis*, *supra* note 19, at 1114-19.

[182] *See* STOKEY & ZECKHAUSER, *supra* note 173; WEIMER & VINING, *supra* note 173; BARDACH, *supra* note 174.

[183] *See, e.g.*, Scott R. Furlong, *Interest Group Influence on Rulemaking*, 29 ADMIN. & SOC. 213 (1997); MARISSA MARTINO GOLDEN, WHAT MOTIVATES BUREAUCRATS: POLITICS AND ADMINISTRATION DURING THE REAGAN YEARS (2000).

[184] *See* Lubbers, *supra* note 119.

[185] *See supra* notes 75–78 and accompanying text.

[186] For a complementary framework for future research, see Appendix A.

[187] *See* Hovy, *supra* note 109; Liddy, *supra* note 109.

[188] For a discussion of management challenges with the introduction of IT into other aspects of government, see FOUNTAIN, *supra* note 15.

[189] *See* MARK H. MOORE, CREATING PUBLIC VALUE: STRATEGIC MANAGEMENT IN GOVERNMENT (1995).

[190] *See, e.g.*, Kerrigan & Law, *supra* note 153.

[191] *Supra* notes 17–22 and accompanying text; *see also* KERWIN, *supra* note 3 at xi–xiii.

[192] *See supra* notes 131–139 and accompanying text.

[193] *See* Coglianese, *supra* note 19.

[194] *See supra* notes 83–106 and accompanying text.

Notes

# Glossary

### Administrative Adjudication

Administrative adjudication is the process of regulating firms through the resolution of individual proceedings. Formal administrative adjudication was the main way agencies pursued their regulatory tasks before the latter part of the last century. Today, it is used relatively infrequently, such as when required by Congress in specific areas of regulation.

### Advance Notice of Proposed Rulemaking (ANPRM)

Through an Advance Notice of Proposed Rulemaking (ANPRM) published in the *Federal Register*, an agency voluntarily gives the public advance notice that it intends to propose a rule at a future date.

### Automatic Categorization

Automatic categorization is the use of a computer to sort incoming data, such as emails or public comments, into piles reflecting their relatedness. The piles may be defined before sorting or may be created dynamically.

### *Code of Federal Regulations* (CFR)

The CFR is the annual publication of all federal agency regulations currently in force, with rules organized by subject matter. The CFR is available electronically at http://www.gpoaccess.gov/cfr/index.html.

### Data Mining

*See* **Information Extraction** and **Information Retrieval**

### Digital Libraries

Digital libraries are collections of digital information—such as searchable indexes, full-text, or data—that are available via electronic means. Many information technologists include in the definition of this term those services that operate on the information in the library and assist users in dealing with, organizing, or presenting that information.

### Docket

*See* **Regulatory Docket**

### Ex Parte Communications

Ex parte communications are conversations, meetings, or any other communications between agency officials or staff and those outside the agency, such as representatives from industry or

other interest groups. Ex parte communications frequently occur before the issuance of a notice of proposed rulemaking.

### *Federal Register*

The *Federal Register* is a daily publication in which federal agencies publish proposed and final rules as well as other announcements. Rules published in the *Federal Register* are organized in chronological order. The *Federal Register* is available electronically at http://www.gpoaccess.gov/fr/.

### Final Rule

After receiving public comments, agencies publish their final rules in the *Federal Register*. In addition to the text of the rule, the agency must publish a statement justifying the rule. Such a statement will usually include a discussion of the major policy issues involved, the evidence relied on for the decision, and a reply to any counterarguments presented in the public comments.

### Informal Rulemaking

Informal rulemaking is a process in which an agency publishes a proposed rule, receives public comments, and then publishes a final rule without holding a formal hearing on the record. Informal rulemaking is the most common way for agencies to issue regulations.

### Information Extraction (IE)

Information extraction is a technology that allows the extraction of structured information from natural-language text to produce the following sorts of information:

(1) Definitions of terms (e.g., that a dog is a common domesticated four-legged animal)
(2) Named entity recognition (recognizing people, places, events)
(3) Co-reference resolution (recognizing when the same object is referred to by different titles; for example, "Congress" might also be referred to as "Capitol Hill" or "the legislature")
(4) Anaphora resolution, or resolving ambiguities of references (especially pronouns) within or between sentences

### Information Retrieval (IR)

Information retrieval is often defined as finding and accessing digital information according to some search criteria. A simple form of information retrieval is a web search via a search engine such as Google or Yahoo. More complex forms of information retrieval would seek to move beyond keyword specifications to more general search formulations, such as "show me all rules related to the automotive industry" or "show me all rules in the past ten years that regulate fluoride in drinking water."

### Machine Translation

Machine translation is the use of the computer to translate between languages. This has been a goal of computer science nearly since its inception, but has been difficult because of issues with semantic analysis.

### Metadata

Commonly referred to as "data about data," the term metadata refers to a description of a digital object that allows for access and reconstitution of that object. Simple sorts of metadata for a particular digital file might include the file size, filename, file location, date of creation and last modification, the types of information contained in the file, what programs can be used to open the file, and what text keywords are relevant to the data in the file.

### National Performance Review

The National Performance Review was an initiative requested by President Clinton and overseen by Vice President Gore that encouraged government agencies to explore new applications of information technology and in other ways improve policy making, management, and service delivery.

### Natural Language Processing (NLP)

NLP is the processing of natural language, usually in electronic text format, by a computer in order to extract grammatical, lexical, or semantic information.

### Notice of Proposed Rulemaking (NPRM)

Agencies must publish a notice of proposed rulemaking in the *Federal Register* to inform the public of the underlying legal authority of the proposed rule and its specific terms. The NPRM also contains information about when and where to submit public comments.

### Preamble

When an agency publishes a notice of proposed rulemaking or a final rule in the *Federal Register*, it also publishes a statement explaining the purpose and background of the rule. This statement is the preamble. For final rules, the agency also responds to public comments in the preamble.

### President's Management Agenda

In 2001, the Bush Administration released the President's Management Agenda, a strategic document that included the expansion of electronic government as one of five goals for improving the management and performance of the federal government. E-rulemaking is one of the projects under the goal of expanding electronic government.

### Regulatory Agenda

The Regulatory Flexibility Act requires that agencies publish a regulatory agenda twice each year containing a description of the subject area of rules that the agencies intend to propose, an approximate schedule for completing action on rules that the agency has already proposed, and a listing of recently completed rules.

### Regulatory Docket

All materials and information related to a rulemaking are compiled in a regulatory docket. The docket includes studies, comments, and any other information on which the agency relies in developing a rule.

### Semantic Analysis

Semantic analysis refers to the analysis of either structure data or natural-language text to derive "meaning" or "semantics," as well as the use of that derived information for further processing.

# APPENDIX A

# E-Rulemaking: Research Problems for IT

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*Information Sciences Institute*
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Beth Simone Noveck
*New York Law School*

This document synthesizes some of the discussions held at the e-rulemaking workshop at the John F. Kennedy School of Government in January, 2003. It became apparent during the workshop that the following timeline of the rulemaking process provides a natural organization for IT research needs in this area:

(1) Assembly and Analysis: Locating Stakeholders and Acquiring Background Material
(2) Creating Rules
(3) Informing the Public and Capturing Commentary
(4) Analyzing Rules and Commentary
(5) Post-Promulgation Information Collection and Archiving
(6) Usage and Effectiveness of Rules
(7) Overall Administration of Rule Creation and Subsequent Lifetime

This document is organized around each of the above steps in the rulemaking process. For each step, we describe the general problem, frame one or more research questions, provide examples of the types of IT most relevant to the issues, and highlight key IT research challenges.

## 1. Assembly and Analysis: Locating Stakeholders and Acquiring Background Material

**Problems:** In the earliest stage of rulemaking, rule writers collect and systematize all kinds of information to aid their decision making. This source information often includes studies commissioned by the regulatory agency, existing studies performed by others, existing rules created earlier, articles in the press, statements by pressure groups, letters from the public, and more. In addition to collecting information, rule writers may decide to search for interested parties proactively, in order to bring citizens into the process early.

**Research Question 1:** How much does IT help rule writers find more or better background material required for writing the rule? *Evaluation metrics*: speed of acquisition, completeness/coverage of material, quality of rules.

**Research Question 2:** How much does IT help rule writers provide more or better background information to the public to generate informed support in writing the rule? *Evaluation metrics*: speed of acquisition, completeness/coverage of material, quality of rules.

**Research Question 3:** How well does IT help rule writers identify and find appropriate stakeholders? *Evaluation metrics*: number and appropriateness of stakeholders.

**Relevant IT:**

***Numerical Data***

IR, database wrapping and access planners, ontologies, data mining, presentation and display

***Textual Information***

IR, information extraction, summarization, text mining, NLP semantic analysis, clustering, interfaces

***Locating Stakeholders***

IR, privacy maintenance

**IT Research Challenges:**

***Numerical Data***

- Location: find relevant data from the world
- Acquisition: incorporate and align heterogeneous data collections
- Dispersal: cluster and stream apart data from different sources
- Update: recognize and manage significant changes in source data and data collection processes
- Analysis: identification of relevant data, and conversion to appropriate form

***Textual Information***

- Location: find relevant text from the world
- Acquisition and analysis: extraction of relevant material, categorization and clustering, automated recognition, and derivation of internal and crosswise relationships, especially to rule under construction

***Locating Stakeholders***

- Privacy: some people may not want others to know they are playing a role

## 2. Creating Rules

**Problems:** Rules can be dense (and therefore hard to understand), as well as inconsistent (both internally and with respect to other rules). To aid with writing clearer and more consistent rules, it may be desirable to have software partition a rule into its portions as separately annotated text blocks. Further IT may include style-checking software that reminds or requires the rule writer to create certain kinds of text in certain portions (for example, question syntax in the preamble, bullet points for each requirement specification, and imperative sentences for the requirements). Software may limit the rule writer to using certain terminology, or to providing hyperlinks to

associated documents. In short, agencies might find benefit from a rule-writing "wizard." Software-structured rules may provide a number of benefits:

- Pointed commentary (see below, topic 3);
- Automated cross-reference with background material and other rules
- Consistency checking
- Rule usage and enforcement following promulgation of the rule

Also, during rule-writing, agency decision makers may need to think through various alternatives. IT can help them model and simulate scenarios and record the results as justification for their eventual rules.

**Research Question 1:** How useful would IT be in helping the rule writer produce a suitably structured rule (i.e., does the structure enable more benefits than the work it takes)? *Evaluation metrics*: creation time versus time for subsequent processing.

**Research Question 2:** What degree of structure would rule writers accept, and would IT be flexible enough to accommodate different degrees of variation for different rules? *Evaluation metrics*: rule writer questionnaire.

**Research Question 3:** Can general simulation/modeling IT packages be built that are still specific enough to be pertinent and useful? *Evaluation metrics*: utility, generality, cost, ease of use.

**Research Question 4:** Can IT be used to create efficient, manageable, and targeted consultation processes to obtain stakeholder input in agenda setting and rule drafting? *Evaluation metrics*: effort expended versus quality of input; information without manipulation.

**Relevant IT:** information extraction, clustering, similarity judgment IR/NLP, simulation, modeling, visualization tools.

**IT Research Challenges:**

- Rule templates and interfaces, internal format correctness checking
- Cross-indexing/similarity measurement; document structure analysis
- Rule material consistency checkers: semantic analysis, argument dependency graphs
- Scenario/modeling/simulation tools
- Visualization tools

### 3. Informing the Public and Capturing Commentary

**Problems:** The stage during which an agency requests and collects comments may engender a large response. Many comments may be duplicative, and some may contain little of substantive value. IT may help focus commentary, structure it, relate it to the rule in consideration, and highlight possibly valuable material. IT may also help structure more deliberative comments that respond to each other, or it may create forums to elicit more deliberative feedback outside the traditional commenting process. In addition, the rule writer may need to initiate an ongoing, multi-stage deliberation; IT may help guide and summarize this.

**Research Question 1:** How can IT facilitate the solicitation of commentary by rule writers? In particular, how should commentary input websites be built that guide citizens to focus their

comments and to provide useful supporting material? *Evaluation metrics*: number, type, quality, and source of comments.

**Research Question 2:** How can IT facilitate the analysis and treatment of commentary by rule writers? IT can perform clustering (by similarity of content, of opinion, of specific topic, etc.) and summarizing or highlighting. *Evaluation metrics*: speed, coverage, completeness of rule writers' treatment of commentary.

**Research Question 3:** How well can IT support consultation processes to obtain stakeholder commentary? How can IT best support ongoing multi-stage dialogue? *Evaluation metrics*: rule writer questionnaire; effort expended versus quality of input; information without manipulation.

**Relevant IT:** text classification according to various criteria, summarization, other NLP, board management, dependency maintenance systems, and interfaces.

**IT Research Challenges:**

- Tools to create automatically a commentary questionnaire/website with appropriate subsections
- Technology used in "frequently asked questions" classification, used by large companies to automatically answer most online user questions, can help focus citizens and provide pre-anticipated responses to common comments
- NLP tools to automatically analyze and interpret commentary, to cluster it by genre, opinion, source, detail, and so on
- Technology to support various levels of dialogue, from chat rooms to distance meetings, records all the discussion, and cross-links it into the rules as appropriate

## 4. Analyzing Rules and Commentary

**Problems:** Rules and commentary can be more effectively created and managed if their component parts are cross-linked in various ways: from comment into rule; from rule into supporting material; from comment to supporting material; from rule, supporting material, and comment to other, pre-existing rules (including those from other agencies). Any new relevant material found automatically should be brought to the rule writer's attention. If possible, such analysis systems could check for inconsistencies among portions of rules or material, and bring any inconsistencies to the rule writer's attention.

**Research Question 1:** Can IT use the structure of a rule or commentary to perform automated cross-indexing of rules, or link rules to relevant data, text, or external services automatically? *Evaluation metrics*: degree and correctness of cross-indexing; satisfaction of citizens in locating all material of interest to them.

**Research Question 2:** Can IT perform automated consistency checking? *Evaluation metrics*: degree and correctness of consistency problems found (and missed).

**Relevant IT:** information extraction, clustering, similarity judgment IR/NLP, visualization tools.

**IT Research Challenges:**

- Rule templates and interfaces, internal format correctness checking
- Cross-indexing/similarity measurement; document structure analysis

- Rule material consistency checkers: semantic analysis, argument dependency graphs
- Scenario/modeling/simulation tools
- Visualization tools

### 5. Post-Promulgation Information Collection and Archiving

**Problems:** Once the rule is promulgated, IT can help disseminate it, support its use, track its life, and so on. Dissemination includes converting rules and commentary to non-mainstream groups, such as the visually and otherwise handicapped, and people speaking languages other than English. Supporting use includes helping people (enforcement agencies as well as citizens with plans) judge the conformance of their enterprises. IT can help locate and record all subsequent "activity" around the rule: press notices, court cases, and so on. IT can help identify and track researchers interested in studying the impact of the rule.

**Research Question 1:** What IT makes the information available the best for all stakeholders, including enforcement (such as end-users in the regulated industry), the disabled, and non-English speakers? *Evaluation metrics*: scope of dissemination, speed of dissemination, intelligibility, accessibility (also for the handicapped), multilinguality.

**Research Question 2:** Is IT useful for the continuous collection and integration of relevant material throughout the lifetime of the rule? How successful is it? Can this IT cross-link the new information to the most relevant portions of rules and background material? *Evaluation metrics*: systems, coverage, utility, correctness.

**Relevant IT:** MT systems, handicapped aids, IR, classification, and interfaces.

**IT Research Challenges:**

- Technology to assist the handicapped with regard to rules
- Machine translation of rules
- Systems that automatically locate in the press and elsewhere any information relevant to the rule and record it

### 6. Usage and Effectiveness of Rules

**Problems:** IT can assist enforcers and the public in using a rule throughout its life. Rule conformance software can indicate which parts of regulated entities' plans need to be changed, and how. Systems that automatically locate all rules pertinent to their plans can be of great use to the general public. In addition, IT may be able to help evaluate the success of a rule: What do people say about it? How many fines are issued? How much reduction in the underlying regulatory problem is obtained?

**Research Question 1:** How well can IT "understand" a citizen's plans in order to locate all relevant rules? *Evaluation metrics*: recall and precision.

**Research Question 2:** How well can IT "understand" a citizen's plans and compare them to a (possibly structured) rule in order to indicate rule compliance? How can compliance, and non-compliance, be best displayed and explained? *Evaluation metrics*: questionnaires for citizens, number of successful compliance experiences.

**Research Question 3:** How can rules be evaluated? How well can IT use rule structure to help citizens determine whether their plans conform? *Evaluation metrics*: satisfaction of rule writers or others, metrics of the underlying regulatory problem, costs to regulated community.

**Relevant IT:** IR, NLP, semantic modeling and dependency analysis, QA, evaluation/measure tools: data capture, analysis, and display.

**IT Research Challenges:**

- Technology to interpret citizen plans semantically
- Technology to compare rule requirements and user plans, and locate differences
- Technology to explain and display reasoning chains
- Evaluation metrics 1 (performance): # comments, diversity, quality, cost per *X*, time per *X*
- Evaluation metrics 2 (outcome): satisfaction, litigation, legitimacy, social results

## 7. Overall Administration of Rule Creation and Subsequent Lifetime

**Problems:** Managers of rule writers and archivists can use a single system to shepherd a rule throughout its whole lifetime, from inception, through promulgation, and eventually to being superseded. Examples of information to be recorded include: the statute, the authors, commentators, amounts of time spent in each stage, ancillary documentation, ongoing role in the world (as recorded in the press, lawsuits), and so on. All this can be placed into an archival record.

**Research Question:** What is the most useful configuration of modules to support rule writing and ongoing archiving? *Evaluation metrics*: software assembly, questionnaires for government managers.

**Relevant IT:** scheduling software, versioning software, digital libraries archiving software, software packaging.

**IT Research Challenges:**

- Bookkeeping system, with tools for noticing late schedule, bottlenecks, reports
- Archiving support

APPENDIX B

# 30 Applications of Information Technology to Rulemaking

Elizabeth D. Liddy

*Center for Natural Language Processing, School of Information Studies, Syracuse University*

## Prior to E-Rulemaking

(1) Data mining discovery of patterns/trends that suggest need for E-Rulemaking
(2) Organization/specialization/presentation of dockets

## During the Internal Development Stage of E-Rules

(3) Information extraction of essential elements from resource documents
(4) Text mining across these extracted elements
(5) Automatic cross-referencing between rules and outside sources during rule writing
(6) More natural access to information in structured databases, not SQL-style queries
(7) Drafting tools for assisting rule writers
(8) Ability to lay out argument structure of multiple options under consideration
(9) Propositional representation of rule content to see if rules conflict
(10) Collaborative negotiated rulemaking

## Commentary Stage for Input from Citizens and Other Interested Parties

(11) Cross-docket access without needing to know agency whose rule it is
(12) "What if" scenarios for public to understand clearly the impact of proposed rule
(13) Feedback to citizens who comment on proposed rules (e.g., CRM)
(14) Semantic abstraction to protect personal information (e.g., de-identification)
(15) Opinion-based clustering of comments
(16) Exposure of social networks based on comments and sources
(17) Visualization of clusters
(18) Dialogue-based interfaces for comments in order to ensure understandable input
(19) Structuring presentation of docket so that public commenters can have a semantically organized means to get to those sections on which they are interested in commenting
(20) Notify folks about other rules that folks with beliefs like theirs have commented on
(21) Consensus building software

### Post E-Rulemaking Evaluation

(22) Perform a semantic analysis of a) original prologue of the rule, b) the final version, and c) citizens' comments to determine whether sentiments expressed in citizens' comments are incorporated in final rule

(23) Automatic cross-referencing between rules and outside sources during later events such as court cases, fines, and so on

### Post E-Rulemaking Access to, and Presentation of, E-Rules for Citizens

(24) Precise question–answer access, not just list of documents

(25) Summarization

(26) Interactive site for citizens to find out the regulations that apply to them

(27) Automatic generation of metadata elements to represent e-rules

(28) Full-text search system in which the system accepts complex natural language queries that better represent the concern of the citizen

### Between E-Rulemaking Phases

(29) Preparation of record sets/documents in response to law suits

(30) Alert users to new information on a topic of interest related to the rules

# APPENDIX C

# Cambridge Workshop Agenda

E-Rulemaking: New Directions for Technology and Regulation

*Harvard University, John F. Kennedy School of Government*

**JANUARY 21, 2003**

Welcome and Introductions
Moderator: Cary Coglianese, Regulatory Policy Program, Harvard University

### Panel 1: First Generation Agency Challenges and Best Practices

This session focused on how information technology is currently being incorporated into existing rulemaking processes.

- Davis Hays, Department of Commerce
- Neil Eisner, Department of Transportation
- Rick Otis and Oscar Morales, Environmental Protection Agency
- Jane Fountain, Harvard University (Moderator)

### Panel 2: Toward a Next Generation of E-Rulemaking

This session reviewed existing IT capabilities and established a foundation for further discussion of a research agenda that extends five to ten years beyond the current best practices of e-rulemaking.

- Claire Cardie, Cornell University
- Ed Fox, Virginia Tech
- Gio Wiederhold, Stanford University
- Eduard Hovy, University of Southern California (Moderator)

### Breakout Session 1: Forging a Research Agenda on IT and the Management of the Rulemaking Process

Participants were assigned to three groups, with a mix of disciplinary and professional backgrounds in each group. The aim of the breakout sessions was to identify research issues related to the management of the rulemaking process (i.e., how agency personnel can improve internal communication, analysis, information storage, etc.).

### Plenary: IT and the Management of the Rulemaking Process

- Elizabeth Liddy, Syracuse University
- Peter Shane, Carnegie-Mellon University
- Jamie Callan, Carnegie-Mellon University

### Dinner

- Lawrence E. Brandt, Director, National Science Foundation's Digital Government Research Program
- Rick Otis, Deputy Assistant Administrator, Office of Environmental Information, Environmental Protection Agency

## JANUARY 22, 2003

### Recap of Day I and Directions for Day II

- Peter L. Strauss, Columbia University School of Law
- Roger Hurwitz, Massachusetts Institute of Technology

### Breakout Session 2: Forging a Research Agenda on E-Rulemaking and Public Participation

The focus of these sessions was on identifying research issues related to public participation and developing research strategies for advancing technology and social science knowledge.

### Plenary: E-Rulemaking and Public Participation

- Beth Noveck, New York Law School
- David Lazer, Harvard University
- Jose Fortes, University of Florida

### Conclusions and Next Steps

# APPENDIX D

# Cambridge Workshop Participants

E-Rulemaking: New Directions for Technology and Regulation

*Harvard University, John F. Kennedy School of Government*

**JANUARY 21–22, 2003**

**Micah Altman**
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Harvard-MIT Data Center
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**Steven J. Balla**
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Department of Political Science and
Elliott School of International Affairs
George Washington University

**Barbara Brandon**
Reference Librarian
University of Miami Law School

**Lawrence E. Brandt**
Program Director
Digital Government Research Program
National Science Foundation

**Jamie Callan**
Associate Professor
School of Computer Science and
Heinz School of Public Policy and Management
Carnegie Mellon University

**Claire Cardie**
Associate Professor
Department of Computer Science
Cornell University

**Bob Carlitz**
Executive Director
Information Renaissance

**Cary Coglianese**
Associate Professor of Public Policy
Chair, Regulatory Policy Program
John F. Kennedy School of Government
Harvard University

**Curtis Copeland**
Assistant Director
U.S. General Accounting Office

**Neil Eisner**
Office of General Counsel
U.S. Department of Transportation

**Jose A. B. Fortes**
Professor and BellSouth Eminent Scholar
Department of Electrical and Computer Engineering
University of Florida

**Jane Fountain**
Associate Professor
Director, National Center for Digital Government
John F. Kennedy School of Government
Harvard University

**Edward A. Fox**
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Department of Computer Science
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**Valerie Gregg**
Program Manager
Digital Government Research Program
National Science Foundation

**Davis A. Hays**
Senior Fisheries Manager
National Oceanic and Atmospheric Administration
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**Roger Hurwitz**
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**Elena Kagan**
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Harvard Law School

**Neil Kerwin**
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American University

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**Elizabeth D. Liddy**
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Syracuse University

**Oscar Morales**
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Office of Environmental Information
U.S. Environmental Protection Agency

**Jennifer Nash**
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**Beth Simone Noveck**
Associate Professor of Law
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**Rick Otis**
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# APPENDIX E

# Washington, DC, Workshop Agenda

Information Technology and Rulemaking

*Carnegie Endowment for International Peace*

**MARCH 26, 2002**

Welcome, Overview, and Introductions

- Cary Coglianese, Chair, Regulatory Policy Program, John F. Kennedy School of Government, Harvard University
- Lawrence E. Brandt, Program Director, Digital Government Research Program, National Science Foundation

## Panel 1: Current E-Rulemaking Initiatives and Emerging Practices

Many agencies have implemented or are planning new initiatives and e-rulemaking practices, and the Bush Administration has made e-rulemaking one of its priorities in the area of digital government. This session provided an overview of current practices and new initiatives.

- Jim Hemphill, Office of the Federal Register
- Neil Eisner, U.S. Department of Transportation
- Stanton Anderson, Office of Management and Budget

## Panel 2: Defining the Research Agenda: Interdisciplinary Perspectives

This session addressed opportunities for e-rulemaking research in computer and information sciences, social sciences, public management, and administrative law.

- Jeffrey S. Lubbers, Washington College of Law, American University
- Steven J. Balla, Department of Political Science and Elliott School of International Affairs, George Washington University
- Kincho Law, Department of Civil and Environmental Engineering, Stanford University

## Panel 3: Conclusions and Next Steps

- Sue Stendebach, Digital Government Research Program, National Science Foundation
- Cary Coglianese, John F. Kennedy School of Government, Harvard University

# APPENDIX F

# Washington, DC, Workshop Participants

## Information Technology and Rulemaking

*Carnegie Endowment for International Peace*

**MARCH 26, 2002**

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