

Back From The Ashes? A Next Generation of ICT Regulations and Their Implications



International Telecommunications Society

April 17 2015

Agenda

8:30AM Event Registration and Check-In

9:00AM Overview: Government Intervention in an Online World
Moderator: James Alleman, University of Colorado - Boulder

- *Regulation 3.0 for Infrastructure 3.0*, **Eli Noam**, Columbia University
- *Regulation: Rulemaking as a Tool of Democracy*, **Michael Lipsky** Demos

9:40AM ICT's Policy Framework
Moderator: Bob Atkinson, Columbia University

- *Optimal Policy/Regulatory Framework: Centralized or Decentralized?* **Raul Katz**, Columbia University
- *Government Network Infrastructure: Lessons from Australia*. **Henry Ergas**, University of Wollongong
- *National Broadband Plans in Latin America: Government's Role*, **Judith Mariscal Avilés**, Centro de Investigación y Docencia Económicas (CIDE)
- Discussant: **Gregg C. Sayre**, Commissioner, New York Public Service Commission

11:00AM Coffee Break

11:20AM Regulatory and Deregulatory Failures?
Moderator: Darcy Gerbarg, Columbia University

- *Endogenizing Marginal Costs*, **Enrico Rossi**/Jonathan Liebenau, London School of Economics
- *Progressive Capitalism in the Information Age*, **Mark Cooper**, Consumer Federation of America
- *Marginal Costs under Uncertainty - Implications for LRIC*, **James Alleman**, University of Colorado - Boulder
- Discussant: **Len Waverman**, McMaster University

12:50PM Lunch

2:00PM *Privacy, Anonymity and Security*
Len Waverman, McMaster University

2:30PM Regulation's Impact: What is the evidence?
Moderator: Jason Buckweitz, CITI, Columbia University

- *Rethinking Regulation for Northern Canada and Alaska*, **Heather Hudson**, University of Alaska & University of California – Berkeley
- *Regulation of ICT Sector: An Empirical Analysis of OECD Countries*, **Paul Rappoport**, Temple University
- *How to Fund an Open, Ubiquitous, Fast, Broadband Internet Utility*, **Bruce Kushnick**, New Networks Institute
- Discussant: **Raul Katz**, Columbia University

3:50PM Coffee Break

4:10PM What we can take away from these papers?
Moderator: Heather Hudson, University of Alaska & University of California – Berkeley

- **James Alleman**, University of Colorado – Boulder
- **Henry Ergas**, University of Wollongong
- **Eli Noam**, Columbia University
- **Gregg C. Sayre**, Commissioner, New York Public Service Commission
- **Len Waverman**, McMaster University

5:00PM Reception

James Alleman is Professor Emeritus at the University of Colorado – Boulder and a Senior Fellow and Director of Research at [Columbia Institute of Tele-Information \(CITI\)](#), Columbia Business School, Columbia University. He was recently awarded a Senior Fellowship at Institut Barcelona d'Estudis Internacional (Barcelona, Spain) to research regulation of Information and Communications Technology (ICT) in Latin America.

Dr. Alleman was a Visiting Senior Scholar at [IDATE](#) in Montpellier, France in the fall of 2005 and continues his involvement in IDATE's scholarly activities. During calendar years 2001 and 2002, he was a Visiting Professor in the Economics and Finance Division at Columbia Business School, Columbia University.

Dr. Alleman was previously the Director of the International Center for Telecommunications Management at the University of Nebraska at Omaha, Director of Policy Research for GTE, and an economist for the International Telecommunication Union. He has conducted research in the area of telecommunications policy, with emphasis on pricing, costing, and regulation as well as on interconnection, international telephony settlements, communications in the infrastructure and related areas. More recently, he has been researching the application of real options valuation techniques to network industries and issues of income and wealth inequality. He provides litigation support in these areas.

Eli M. Noam is Professor of Economics and Finance at the Columbia Business School since 1976, and its Garrett Professor of Public Policy and Business Responsibility. Served for three years as a Commissioner for Public Services of New York State. Appointed by the White House to the President's IT Advisory Committee. Director of the Columbia Institute for Tele-Information, a research center focusing on management and policy issues in telecommunications, internet, and electronic mass media. He has also taught at Columbia Law School, Princeton University's Economics Department and Woodrow Wilson School, and the University of St. Gallen, and is active in the development of electronic distance education. Noam has published 29 books and over 350 articles in economics journals, law reviews, and interdisciplinary journals, and is a regular columnist for the *Financial Times* online edition. His recent books include *Broadband Networks and Smart Grids* (Springer, 2013); *Media Ownership and Concentration in America* (Oxford, 2009); *Peer to Peer Video* (Springer, 2008); and *Ultrabroadband* (IDATE, 2008). He is completing a 4-volume series on *Media Management*, and leads a 30-country team on international media ownership. Chairman of the International Media Management Association (2012/13).

Noam has been a member of advisory boards for the Federal government's telecommunications network, and of the IRS computer system, of the National Computer Systems Laboratory, the National Commission on the Status of Women in Computing, the Governor's Task Force on New Media, and of the Intek Corporation. His academic, advisory, and non-profit board and trustee memberships include the Nexus Mundi Foundation (Chairman), Oxford Internet Institute, Jones International University (the first accredited online university), the Electronic Privacy Information Center, the Minority Media Council, and several committees of the National Research Council. He served on advisory boards for the governments of Ireland and Sweden. Noam is a Fellow of the World Economic Forum, a member of the Council on

Foreign Relations, and a commercially rated pilot. He served in the Israel Air Force in the 1967 and 1973 wars, and is an active search and rescue pilot with the Civil Air Patrol (1st Lt.). He is married to Nadine Strossen, a law professor and national president of the American Civil Liberties Union for 18 years. He received the degrees of BA, MA, Ph.D (Economics) and JD from Harvard University, and honorary doctorates from the University of Munich (2006) and the University of Marseilles (2008). Contact: noam@columbia.edu.

Michael Lipsky is a Distinguished Senior Fellow at Demos, a public policy research and advocacy organization based in New York. Before coming to Demos in 2003, he served for twelve years as a Senior Program Officer in the Ford Foundation's Peace and Social Justice Program, where he made grants on government performance and accountability. A political scientist, he has taught at the University of Wisconsin, Harvard University's Graduate School of Education, and for 21 years at the Massachusetts Institute of Technology. In addition to many journal articles, his publications include *Protest in City Politics*; the award-winning *Street Level Bureaucracy*; and *Nonprofits for Hire: The Welfare State in the Age of Contracting* (with Steven Rathgeb Smith). He is a graduate of Oberlin College and received an M.P.A. and PhD (in politics) from Princeton University. He lives in northern Virginia.

Robert (Bob) C. Atkinson joined the Columbia Institute for Tele-Information (CITI) at the Columbia Business School in mid-2000 after serving for 18 months as Deputy Chief of the Federal Communications Commission's Common Carrier Bureau. At CITI, he serves as Director of Policy Research, speaks and writes on a variety of telecom issues and assists federal, state and local government agencies with respect to telecom policy matters.

From 1985 until he joined the FCC at the beginning of 1999, Mr. Atkinson was responsible for the regulatory, public policy and external affairs activities of the Teleport Communications Group (TCG), the first Competitive Access Provider (CAP) and Competitive Local Exchange Carrier (CLEC) in the United States.

Mr. Atkinson graduated from the University of Virginia in 1972 with a Bachelor of Arts degree in Government and Foreign Affairs. He received a law degree from Georgetown University Law Center (evening program) in 1979. While at Georgetown, Mr. Atkinson was a member of the *Georgetown Law Journal*.

Raul L. Katz is Director of Business Strategy Research at the Columbia Institute for Tele-Information and an Adjunct Professor in the Finance and Economics Division at Columbia Business School. He is also President of Telecom Advisory Services (www.teleadvs.com), a firm that advises technology clients in the fields of strategy, regulation and business development. In 2004, Dr. Katz retired as a Lead Partner at Booz Allen Hamilton, where he was a member of the firm's Leadership Team and Head of the US and Latin America Telecommunication practices.

During his career, he has worked extensively in the planning and development of high technology businesses, particularly telecommunications. He has also led engagements in the

United States, Europe, Asia and Latin America, advising governments on telecommunications universal service policies, carrier privatization, industry liberalization and national software strategies. In the last four years, Dr. Katz has been focused on analyzing the economic impact of broadband, and the development of national broadband plans.

Dr. Katz has published articles in journals such as *Telecommunications Policy*, *Telephony*, *Communications and Strategy*, *Intereconomics*, *Strategy and Business*, *America's Network* and *The Information Society*. He has also published four books: *The Information Society: an International Perspective* (Praeger, 1988), *Creative Destruction: Business Survival Strategies in the Global Internet Economy* (MIT Press, 2000) and *The role of ICT in Economic development* (Planeta, 2010), *Driving demand for broadband networks and services* (Springer, 2014).

Dr. Katz received his Ph.D. in Management Science and Political Science and an M.S. in Communications Technology and Policy from the Massachusetts Institute of Technology. In addition, he holds a Licence in History and a Maîtrise in Political Science from the University of Paris-Sorbonne, as well as a Licence and a Maîtrise (with honors) in Communication Sciences from the University of Paris.

Henry Ergas is Professor of Infrastructure Economics at the University of Wollongong's SMART Infrastructure Facility and a columnist for *The Australian*. He is the author of [*Wrong Number: Resolving Australia's Telecommunications Impasse*](#) (2008) and has served as a member of a broad range of official inquiries, including the Independent Review of the National Broadband Network (2014), as well as chairing the Intellectual Property and Competition Policy Review.

From 1978 to 1993 Dr. Ergas was at the OECD in Paris where amongst other roles he headed the Secretary-General's Task Force on Structural Adjustment and was Counsellor for Structural Policy in the Economics Department. He has taught at a wide range of universities, including the École nationale de la statistique et de l'administration économique in Paris (1980-1990), the Kennedy School of Government at Harvard (1994-1995) and Monash University in Melbourne (1988-1990). He chaired the Intellectual Property and Competition Policy Review undertaken by the Howard government in 1999-2001, and was a member of the Export Infrastructure Review in 2005. Henry is a lay member of the New Zealand High Court.

Professor Ergas has broad interests in, and experience of, virtually every area of applied economics, focusing on issues of efficient resource allocation. He is an expert on the economics of telecommunications and has worked on telecommunications assignments worldwide. He has been closely involved in dealing with regulatory issues in many other industries, including public utilities, defense, aviation, surface transport and financial services. Additionally, Henry has worked over many years on issues in the economics of health and aged care.

Judith Mariscal Avilés, Centro de Investigación y Docencia Económicas (CIDE)

Gregg C. Sayre was appointed Commissioner of the New York State Public Service Commission on June 21, 2012. His term runs through February 1, 2018. He is also a member of

the Federal-State Joint Conference on Advanced Telecommunications Services, also known as the Section 706 Joint Conference.

Prior to starting with the Commission, Mr. Sayre was Associate General Counsel of Frontier Communications Corporation. While at Frontier, Mr. Sayre was responsible for all regulatory legal issues and proceedings in New York, Pennsylvania, Michigan and Indiana.

Mr. Sayre began his career with a law firm in Portland, Oregon. Later, he became an attorney in the Rates Division of the Pennsylvania Public Utility Commission Law Bureau. After leaving the Pennsylvania Commission, Mr. Sayre worked as a regulatory attorney for the Chesapeake and Potomac Telephone Cos. Subsequently, he joined Frontier's predecessor company, Rochester Telephone Corporation.

Mr. Sayre obtained his B.A. degree from Grinnell College, his J.D. degree from Harvard Law School, and a Master of Science in Information Technology degree from Rochester Institute of Technology. Mr. Sayre was admitted to the bar in 1975.

Darcy Gerbarg is the Director Operations for CineGrid Inc., an international technology nonprofit, whose members experiment with large media files over the global LambdaRail scientific fiber optic network. Ms. Gerbarg has been a Senior Fellow at the Columbia Institute for Tele Information (CITI), Columbia University Business School since 1997. She is a past Executive Director of the Marconi Society. Prior to that she held research positions at Courant Institute for Mathematical Sciences, New York University and the Computer Graphics Lab, New York Institute of Technology. For many years she was an adjunct faculty member at New York University, the State University of New York at Stony Brook and other universities. She started and directed the graduate program in Computer Art at the School of Visual Arts where she was also the Director of the Computer Institute for the Arts. Ms. Gerbarg did a comprehensive broadband study for Sullivan County and continues to consult for them on rural broadband issues. She is an Associate Editor for the *International Journal of Digital Television*.

Ms. Gerbarg is a pioneer computer artist. Her work has been exhibited in galleries and museums internationally. She was Chairman of the first Computer Art Shows for SIGGRAPH. She has lectured, organized, and conducted panels, workshops and presentations for industries, companies and universities. Conferences she has organized for CITI include The Future of Digital TV, Venture Capital in New Media, Rural Broadband many others.

Ms. Gerbarg's edited publications include; *Television Goes Digital*, Springer, 2009, *The Economics, Technology and Content of Digital TV*, Kluwer Academic Publishers, 1999 and *Internet TV*, Lawrence Erlbaum Assoc., 2003 and *The Marconi Century*, Guglielmo Marconi International Fellowship Foundation, 2004. She is the series editor for *The Economics of Information, Communication and Entertainment: The Impacts of Digital Technology in the 21st Century*, Springer as well as Associate Editor for the USA, *The International Journal of Digital Television*, Intellect press.

Ms. Gerbarg holds an MBA from New York University and a BA from the University of Pennsylvania.

Enrico Rossi is a third year PhD candidate at the London School of Economics. After his studies in industrial engineering at the university of Bologna in Italy (bachelor + master), he moved to Rome where he worked as a business consultant for Ernst & Young, business advisor division. Since 2011 he is a PhD student at the London School of Economics, where he researches the regulation and antitrust of the ICT sector, with a special focus on the economic and welfare aspects of the relationship between ownership patterns and production and transmission technologies.

Mark Cooper, Consumer Federation of America (CFA), holds a Ph.D. from Yale University and is a former Yale University and Fulbright Fellow. Dr. Cooper is Director of Research at the CFA, an adjunct fellow at the Silicon Flatirons at the University of Colorado, and senior fellow for economic analysis at the Institute for Energy and the Environment at Vermont Law School. He has provided expert testimony over 350 times for public interest clients including Attorneys General, People's Counsels, and citizen interveners before state and federal agencies, courts and legislators in almost four dozen jurisdictions in the U.S. and Canada. Dr. Cooper has published six books and hundreds of articles and papers on energy, media, telecommunications and high technology industries. His current research is focused on the analysis of the role of progressive capitalism in the evolution of the industrial economy and articulating a comprehensive framework for implementing progressive policies in regulatory filings, conference papers, journal articles, books and chapters, with an emphasis on the convergence of the communications and energy resource systems in the digital economy.

Leonard Waverman joined McMaster as Dean of the DeGroote School of Business in January 2013.

Prior to this appointment, Leonard was Dean at the Haskayne School of Business from 2008 through 2012. He was a professor of economics at the London Business School from 2001 through 2007 and chair of the economics subject area 2003–2007. Earlier, he was a professor of Economics at the University of Toronto. His recent research concentrates on the growth and productivity impacts of the roll-out of the internet, as well as the services and applications it enables.

Dr. Waverman authored the influential “Connectivity Scorecard”, an annual index that ranks countries according to how advanced their communications networks are in promoting productivity and economic growth. He co-authored “Telecommunications Infrastructure and Economic Development”—his most cited publication—which appeared in the *American Economic Review*. In 2009, he was recognized as one of the world's top 50 most influential thought leaders in the telecommunications industry by *Global Telecoms Magazine*. His research on mobile phones and economic growth was the subject of the Economics Focus section, and Front Cover of *The Economist*, March 12, 2005.

Professor Waverman is on the Academic Advisory Board of Columbia University's Centre for Tele-Information, the Academic Advisory Board of Georgetown University's McDonough

Business School's Business and Public Policy Center, and is a Fellow of the University of California at Berkeley's Fisher IT Center.

He is a citizen of Canada and France, and has been awarded the *Chevalier dans l'Ordre des Palmes Académiques* from the Government of France for his distinguished contributions to education.

His undergraduate *alma mater* University College, University of Toronto, honored him as one of its "Top 100 Alumnae of Distinction" in 2012.

Heather Hudson is Professor of Communications Policy at the Institute of Social and Economic Research (ISER), University of Alaska Anchorage. She was previously Director of ISER and founding Director of the Telecommunications Management and Policy Program at the University of San Francisco. She is currently a Sproul Fellow and Visiting Scholar in the Information School at the University of California, Berkeley. Her research focuses on applications of information and communication technologies for socio-economic development, regulatory issues, and policies and strategies to extend affordable access to communications, particularly in rural areas. She has planned and evaluated communication projects in Alaska and northern Canada and more than 50 developing countries and emerging economies. Dr. Hudson is the author of numerous articles and several books and is the recipient of two Fulbright awards and a Sloan Industry Fellowship at CITI. She has consulted for international organizations, government agencies, the private sector, and consumer and indigenous organizations, and has testified before regulators in the U.S. and Canada. Her most recent book is *Connecting Alaskans: Telecommunications in Alaska from Telegraph to Broadband* (University of Alaska Press, 2015).

Paul Rappoport is the lead partner at SBRC and Associates, an analytics consultancy based in Philadelphia, PA. He has over 40 years of teaching and research experience focusing on business intelligence, forecasting and data analysis, modeling and statistical assessments.

Dr. Rappoport was the Chairman and CEO of PNR & Associates, a telecommunications consulting firm he founded in 1981. At PNR, he created a number of widely used products including "Bill Harvesting", a database of actual bill detail and surveys ReQuest (residential demand) and Businesswave (business demand). At PNR Dr. Rappoport created and managed the National Telecom Demand Study (NTDS). NTDS was a consortium of local exchange carriers. PNR pooled customer data to develop pricing models for regulatory hearings, marketing models and demand analyses. PNR was sold to TNS in 2000.

Dr. Rappoport was Centris' Chief Intelligence Officer and Executive Vice-President from 2002 to 2013 where he led a team of analysts providing market intelligence to the media and communication industries. At Centris Dr. Rappoport created innovative solutions for analyzing competition in local markets, created a national model for tracking voice, video and data market share, created new methodologies for scoring households and for modeling advertising and direct mail performance.

Dr. Rappoport is Professor Emeritus of Economics at Temple University. He received his Ph.D. in economics from the Ohio State University in 1974. He is a Senior Fellow at Columbia University's Institute for Tele-Information.

Bruce Kushnick has been a telecom analyst for 32 years and is currently the executive director of New Networks Institute, a market research and consulting firm and chairman of Teletruth, an independent customer advocacy group focusing on broadband and telecom issues. Teletruth was a member of FCC Consumer Advisory Committee in 2003-2004 and has worked with the Small Business Administration's Office of Advocacy on competitive issues. It also helped to create the Broadband Bill of Rights and research through Teletruth's phone bill auditing services has led to class action suits and major refunds for phone bill overcharging.

OVERVIEW: GOVERNMENT INTERVENTION IN AN ONLINE WORLD**Regulation 3.0 for Infrastructure 3.0, Eli Noam**

Communications infrastructure, both in telecom and in mass media, goes through technology-induced phases, and the regulatory regime follows. Infrastructure 1.0, based on copper wires, was monopolistic/oligopolistic in market structure and led to a Regulation 1.0 with government ownership or control. Wireless and multichannel broadcasting technologies enabled the opening of that system to one of multi-carrier provision, with Regulation 2.0 stressing privatization, entry, liberalization, and competition. But now, fiber and high-capacity wireless are raising scale economies and network effects, leading to a more concentrated market. At the same time, the rapidly growing importance of infrastructure, coupled with periodic severe economic instabilities, increase the importance of upgrade investments. All this leads to the return of the role of the state in a *Regulation 3.0* which incorporates many elements (though using a different terminology) of the traditional regulatory system— universal service, common carrier, cross subsidies, structural restrictions, industrial policy, even price and profit controls. At the same time, the growing role of telecommunications networks of carriers of mass media and entertainment content will also lead to increasing obligations on network providers to police their networks and assure the maintenance of various societal objectives tied to mass media.

Regulation: Rulemaking as a Tool of Democracy, Michael Lipsky

A fundamental task of government is to enact rules for human interactions. As Adam Smith explained long ago, among the functions of such rules is establishing binding agreements among people, making possible private property and contracts, the essential ingredients of commerce. In more modern times, governments also develop rules to protect people who cannot protect themselves, and to protect the commons now and for the future.

Like all decision-making in a democracy, rule-making requires diverse parties coming together to agree on the desired objectives and to assess the benefits and costs of different ways of achieving them. This pragmatic approach to rule-making is challenged today by advocates of an ideological perspective who appear to regard virtually all laws designed to set rules for business activities as inconsistent with prosperity and a well-functioning society.

These advocates regard unimpeded markets as the primary instruments of societal well-being. They claim that commercial interests will be harmed if constraints are imposed on business behavior, and they also insist that regulation is inconsistent with the common good in principle.

Libertarians present this perspective in purist form. The Cato Institute declares on its website: "... there is no greater impediment to American prosperity than the immense body of regulations

chronicled in the Federal Register.” The think tank in response proposes to “set forth a market-oriented vision of ‘regulatory rollback’ that relies on the incentive forces of private property rights to create competitive markets and...provide consumer information and protection.”

Others closer to the political fray seemingly condemn virtually all efforts to solve significant social problems through legislative initiatives if they give rise to regulations that may impact business. Referring to recent efforts to expand health insurance, reduce volatility in financial markets, and address critical issues of global warming, Thomas Donahue, President of the U.S. Chamber of Commerce, proclaimed that the “onslaught of rules is creating uncertainty, stifling hiring and investment, and undermining our recovery. It is upsetting the constitutional balance of powers and giving unelected bureaucrats unprecedented control over the lives and businesses of people across this nation.”

The familiar argument that regulation is generally harmful because it constrains business activity and interferes with market efficiency is faulty on at least two general grounds. It is wrong empirically: business activity unconstrained by rules generates unacceptable social conditions such as child labor and fouled water supplies.

It is wrong theoretically: modern markets frequently bear little resemblance to the academic models from which economists derive their notions of how markets work. To be sure, we have a widely accepted interest in insuring that markets work effectively. There are few propositions on which people of divergent political viewpoints agree more. But that does not mean that all business activity is consistent with the public interest or achieves optimal market results. Our economy requires a balance between well-functioning markets free of unnecessary impediments and an empowered public sector to insure that our economic system works well and works for all.

In today’s polarized debates about the role of government, no one is suggesting that all regulation should be dismantled. Yet the relentless drumbeat of anti-regulatory rhetoric from ideological advocates, trade associations, and other interested parties has made regulation more difficult and elevated de-regulation almost to a default position in everyday politics. As a result, we are in danger of losing sight of the centrality of rule-making as a critical dimension of democratic practice and economic success.

We need to talk about regulation differently, articulating and amplifying the idea that regulation is fundamentally about making the right rules to balance society’s multiple and often conflicting interests. We also need to cultivate a common understanding of the democratic principles and processes that produce regulation. In this formulation, the interests of business are important, but they are not the only interests requiring attention, and, in any event, business interests frequently benefit from regulation, in a number of different ways.

The proposition that rules and markets work together should be a matter of common sense and general consensus.

I challenge the perspective reflected by many in current political debates that protective safeguards are intrinsically suspect. I argue, instead, that regulation, in concert with healthy

markets and effective social policy, is essential for securing the common good. I start with a reminder of the evident public benefits of regulatory safeguards, and describe some contributions of regulation to our political system—contributions to the quality of everyday life, and to our collective well-being as expressions of democratic activism. I review some of the many ways business interests are served by the nation’s regulatory system, and then turn to some of the flaws in the arguments of anti-regulation advocates when they assert that the logic of markets provides a guide to real-world prosperity. Not only are some of the core arguments of free-marketers inapplicable in theory, but I demonstrate recent efforts to discredit regulation on the basis of empirical evidence are unsupportable as well. I conclude with some notes on how advocates of a respected place for regulation in democratic politics can begin to retrieve the shattered discourse from the misguided voices currently dominating the discussion.

For full article, see [www.demos.org/sites/default/files/publications/Rulemaking as a Tool of Democracy.pdf](http://www.demos.org/sites/default/files/publications/Rulemaking%20as%20a%20Tool%20of%20Democracy.pdf)

ICT’S POLICY FRAMEWORK

Optimal Policy/Regulatory Framework: Centralized or Decentralized? Raul Katz

This paper focuses on the assessment of institutional frameworks designed for formulating/managing policy and regulating the information and communication technologies sector. It is based on case studies of the experience of countries such as South Korea, Finland, Singapore, Colombia and Chile. The case studies allow to distill three policy/regulatory model “ideal types”: centralized model, decentralized model, and agency model. Each “ideal type” has different characteristics in terms of its institutional framework, the participation of the executive branch in policy formulation, the coordination mechanisms across government entities (ministries, central agencies, and sub-sovereign units such as states and local governments), and private sector participation.

The centralized model features a high degree of central accountability for policy formulation, putting even into question the notion of independent regulatory agency. It is complemented by extensive involvement of the highest authority in the executive branch of government, and moderate to high coordination with other government entities. At the opposite end of the spectrum, the decentralized model lacks a central unit for policy formulation, but exhibits a high level of coordination across government units. Private sector participation in ICT policy formulation can be either formal (roles of private representatives are designated in government entities) or informal (private sector involvement is restricted to public consultations).

Models appear to be suited to different sector challenges. In general, emerging countries facing the need to rapidly develop an ICT sector in order to maximize economic impact tend to adopt centralized models while advanced information societies tend to favor decentralized frameworks. In sum, no single institutional framework appears to be suited to all contexts. The choice depends on national objectives and challenges.

From A to B and Back Again: Lessons from Australia. Henry Ergas

Since telecommunications reform began in the late 1980s, Australia has gone from an initial approach, characterized by a prescriptive regulatory regime applied to a government owned

carrier, then on to a stage in which a regime that was intended to be more light handed was applied to a privatized carrier, and now back to a prescriptive regime applied to a government owned carrier. The presentation examines this cycle and explores the factors that can explain it.

National Broadband Plans in Latin America: Government's Role, Judith Mariscal Avilés

REGULATORY AND DEREGULATORY FAILURES?

Broadband Funding: The Hunger Games, Darcy Gerbarg

While top down decision making, including telecom regulation, may in the past have resulted in a lack of competition, bottom up control has its own limitations.

The Sullivan County will be discussed as a case study, from a "man on the ground" perspective, highlighting the problems with the Federal Communications Commission's (FCC) and New York State's efforts to guarantee universal broadband. These problems include not only the FCC and state governments' well intended but none-the-less misguided efforts to equitably and appropriately distribute the \$6B USF monies that are collected annually, but also the limitations of financially and human resource strapped local counties and towns.

New York state alone estimates that it has millions of unserved local residents and businesses. It has identified exactly how many and where they are located so why cannot the available monies be targeted precisely to remedy this situation?

In our rush to convert all telephone voice service to broadband are we, as a nation, willing to have a country where millions of residents are unable to get telephone service, not because the technology to provide it doesn't exist, but only because no service provider is willing to offer them broadband? Wasn't this decided years ago with the creation of the universal service fund?

Endogenizing "subjective marginal costs" in welfare economics and regulation, Enrico Rossi & Jonathan Liebenau

Arguably one of the most important characteristics of the new electronic communication industry is the technological and economic convergence of different (previously separated) markets into one single sector, deriving from the decoupling between the service layer and the platform/transport layer. This unprecedented separation between service characteristics, physical infrastructures, production (or transmission) technology and final service markets, is raising numerous challenges and new problems for today's economists and policy makers. The reason for this is quite clear: since the early Cambridge (or Marshallian) school in welfare economics, normative economics has always assumed a very strict (univocal) link between the production technology of producers and the characteristics of the final consumption market. This approach eventually led to the approach currently adopted by regulatory and antitrust economics that still analyses "competition" only looking at the demand side, thus interpreting competitive interactions exclusively as a mere substitution in the final product, or service, market (remember that monopoly power is given by the elasticity of the demand).

The shortcomings of this approach are evident: it can provide sensible normative results concerning the optimal allocation of resources only if the production factors controlled and owned by the firms satisfy the Marshallian assumption of single-market production technologies and dedicated facilities. Yet, under the conditions of convergence of different final markets into

multi-service platforms on the one hand, and technological neutrality and ubiquitous provision of services on the other, this quite narrow framework clearly breaks-down. Drawing on the lessons and intuitions developed in the field of organizational and institutional economics, but reinterpreting and extending them to achieve new results and intuitions, the present work has two aims.

The first aim of the paper is to show that when producers can redeploy their (multi-service) facilities *across* alternative competing markets (implying market-convergence), the well-known marginal rule defining the optimal level of quantities and prices within an industry breaks down even in the absence of market failures such as monopoly power, or market imperfections, such as positive transaction costs or asymmetric information. The basic intuition is that when producers can employ multi-service facilities, they are confronted with a set of competing productive options, shifting the original partial-equilibrium problem over scale, to a problem over scope. Consistent with the literature in option theory in management and antitrust, the paper argues that if an actor is faced with a positive option denoting the way in which he can actually employ (use) her resources (or assets), the way in which contemporary normative microeconomics define “marginal cost” constantly underestimates the subjective marginal cost perceived by the actor. “Actors” are here mainly intended as producers, but it is important to note that the same considerations hold if applied to final users (defined consumers in a partial equilibrium framework where no *option set in use* is available).

Secondly, the paper briefly compares the intuitions developed in the previous point, with the recent incentive-theory of regulation, with a specific focus on the role of ownership. The paper argues that, though similar, the considerations here expressed differ substantially from the approach adopted by the incentive-based theory of regulation. This is true especially when the role of ownership is considered with respect to the distinction between actors’ ex-ante and ex-post incentives to distort their marginal valuations.

Progressive Capitalism in the Information Age: Regulatory Institutions for a Dynamic, Digital Economy, Mark Cooper

Historical analysis shows that the current crisis of the digital revolution is the fifth such crisis industrial capitalism has confronted in the past quarter of a millennium. The challenge for policymakers as the digital revolution moves past the “Turning Point” in its “quarter-life crisis” is to build a socio-institutional framework that supports the economic engine built on information and communications technology that has emerged as the heart of the new mode of production.

Although the early installation of the digital revolution was dubbed a triumph of *laissez faire* economics, active public policy played a key role in creating the conditions for market success. The severe disruption caused by the inevitable bursting of the new Gilded Age bubbles (Dot.Com and financial/housing), reawakens society to the need for regulation to promote stable development. While the initial need for regulation is to respond to the crisis, the long-term challenge is to build a new set of regulatory institutions to guide economic activity.

Historical analysis also shows that to successfully overcome the challenge, a constellation of coherent progressive policies and new regulatory institutions is needed to ensure sufficient demand, promote market success and discipline excessive and abusive practices. Building new

regulatory institutions required the adaptation, not abandonment of traditional social values, strengthening of policies that had laid the groundwork for the techno-economic revolution and institutionalization of the emerging successful economic relationships.

The digital revolution represents a greater challenge than the previous industrial revolutions because in many respects it requires a change in direction from the historic path of the industrial economy, as suggested by the following table. For over two centuries, centralization in pyramidal hierarchies and standardization of homogeneous, resource intensive, stable products to yield economies of scale at the firm and national levels was the line of march. The digital revolution shifts toward, decentralized, horizontal production of diverse, rapidly changing output from producers in new, networked platforms that require different forms of coordination.

The paper argues that neither *laissez faire* deregulation nor Twentieth century utility-style regulation are appropriate. A new form of regulation must be developed that allows for continuous entrepreneurial experimentation by establishing bright lines that ensure access to essential inputs, but do not regulate activities in the newly created spaces. To allow for diversity and flexibility, there must be a shift toward *ex post* and crowd-sourced enforcement, with ongoing multi-stakeholder processes to set the constraints on behavior. To ensure the achievement of the single most important goal of communications policy, universal service, the extent the sector specific regulation affords the authority and resources, it should adopt broad policies to ensure full deployment of the new communications infrastructure and provide incentive for socially desirable investment in customer-oriented products (both hardware, e.g. customer premise equipment and software, e.g. applications).

Challenges to Evolving New Regulatory Institutions in the Transition from the Second to the Third Industrial Revolution

Twentieth Century:	Twentieth-first Century:	
Mass Production	Information & Communications Technology (ICT)	Major Challenges for New Regulatory Structure
Macro Level Paradigms		
<i>Techno-Economic</i>		
Mass production/mass markets	Segmentation of markets/ proliferation of niches	Open standards
Mass standardization	Componentization, Hyper segmentation	Multi-stakeholder collaboration
Standardization of production	Heterogeneity, diversity, adaptability	Homogeneity > Diversity
Energy intensity, Synthetic materials	Information intensity, Microelectronic-ICT	Material > Immaterial
Horizontal integration	Inward and outward cooperation and clusters	Firms > Platforms
Functional specialization	Decentralized integration	Transactions > Commercial Coordination
Hierarchical pyramids	Network structures	National > Global
National powers, world agreements	Globalization	
Centralized/metropolitan-suburbanization	Instantaneous global contact, action & communications	Stasis > Rapid change
<i>Micro Level Productive Organization Command and Control</i>		
Centralized command, Vertical control	Central goal-setting and coordination	Bureaucratic planning > Entrepreneurial experimentation
Cascade of supervisory levels	Local autonomy/Horizontal self-control	Passive edge > Active, autonomous edge Command > Participatory governance

Management knows best	Self-assessing/self-improving units	Stability > Flexibility
	Participatory decision-making	
<i>Structure and Growth</i>		
Stable routine, Planned change	Continuous innovation	Stability > Flexibility
Clear vertical links	Interactive, cooperative links between	
<i>Suppliers, Clients & Competitors</i>		
Separation from outside world	Strong interaction with outside world	End-user input
Foster price competition among suppliers	Collaborative links with suppliers & Collaborate with some competitors	Identify/open choke points, promote open customer and some competitors' standards
Arms-length oligopoly with competitors		Multi-stakeholder collaboration
The firms as a closed system	The firm as an open system	Refined view of Joint Ventures

Source: Description of the Industrial Revolutions, Carlota Perez, "Technological Revolutions, Paradigm Shifts and Socio-Institutional Change," Erik Reinert (Ed.), *Globalization, Economic Development and Inequality: An Alternative Perspective*, 2004, p. 5; Carlota Perez, *Technological Revolutions and Techno-economic Paradigms*, Working Papers in Technology Governance and Economic Dynamics, January 2009:18, regulatory challenges, Comments of the Consumer Federation of America, Federal Communications Commission, Order On Remand, Declaratory Ruling, And Order. In the Matter of Protecting and Promoting the Open Internet, FCC 15-24, GN Docket No. 14-28, February 20, 2014, July 15, 2014.

Marginal Costs under Uncertainty – Implications for LRIC, James Alleman & Paul Rappoport

The efficiency results of marginal-cost pricing have been used to justify the imposition of regulatory policy tools to determine optional pricing. In the more sophisticated form, Ramsey pricing methodology is recommended as a pricing-policy tool. These methods are static. Nevertheless, they are applied to major infrastructure industries such as telecommunications. At best, these methods assume prospective events with certainty; they do not account for stochastic changes in cash flows. However, uncertainty can make a significant difference in the vector of optional prices. Moreover, in a regulatory environment, regulatory constraints can affect the inputs of the firm. Regulators' principal impact is on the magnitude and cost of the firm's investment, directly and, perhaps just as importantly, indirectly. We first develop a model which determines the optional price in the spirit of traditional marginal-cost pricing and then move context of the multiproduct firm with scale and scope economies. With these benchmark models, we then turn to the more complex case of the introduction of uncertainty into the cash flows.

We use the techniques of real options methodology to analyze the cash flows which in turn have an impact on investment valuations. One uniqueness of the model is allowing the economics depreciation to be determined endogenously in the spirit of Hotelling, rather than exogenously. The market value of the asset is determined by its prospective cash flows, which in turn determines its depreciation for the period. It is the interaction of stochastic consumer demand with the investment valuations which determines depreciation exogenously. We then solve for the social welfare maximum, namely, the maximization of the discounted value of producer's and consumers' surplus. (Because they fail to note the interaction between demand and economic depreciation, models which assume that depreciation is exogenously determined are in error.) Because the options values are not recognized in a static view of the world, the resultant price vectors of the traditional models are a poor policy guide.

Without regulatory constraints, the model shows that the uncertainty prices differ significantly from the results of both the traditional marginal-cost price and the Ramsey pricing vector. The policy implications of the result are material. For the telecommunications industry, the TELRIC

rates are theoretically incorrect, and, even if the rates derived from this theoretical construct were exactly as TELRIC would require, they would be erroneous.

Keywords: *Ramsey Pricing, Marginal-cost Pricing, Depreciation, Real Options, Investment, Economic Methodology; Pricing under Risk and Uncertainty, Regulatory Distortions*

JEL Classification: *B41, C44, D81, G13*

PRIVACY, ANONYMITY AND SECURITY

Privacy, Anonymity and Security, **Len Waverman**

REGULATION'S IMPACT: WHAT IS THE EVIDENCE?

Rethinking Regulation for Northern Canada and Alaska, **Heather Hudson**

Both the Canadian North and Alaska consist of huge land masses with small populations scattered in isolated communities, many without road access. Providing broadband services in these regions is both technically and financially challenging. Most remote villages in Alaska are served by satellite; in Canada, settlements in the central and eastern Arctic and northern parts of the provinces rely on fixed satellite service (FSS) with local redistribution for Internet access. Having deregulated FSS in 1999, after numerous recent complaints about FSS pricing and quality of service, the Canadian regulator (CRTC) initiated an inquiry in 2014 to determine whether FSS is a now de facto monopoly, and if it should be reregulated. This paper presents findings from its just released report, as well as the relevance of the report to a CRTC proceeding which will consider whether broadband should be part of basic service nationwide. In Alaska, a monopoly terrestrial middle-mile network has been installed to replace more than 75 satellite installations. However, despite numerous complaints about high prices to end users and resellers, there is currently no U.S. regulatory oversight for middle-mile service. The presentation examines these cases as examples of the need to consider regulation of broadband services in isolated regions.

Regulation of ICT Sector: An Empirical Analysis of OECD Countries, **Paul Rappoport & James Alleman**

Thirty years ago, virtually the entire telecommunications sector was state owned, managed and controlled. Government intervention was usually justified on the basis of monopoly/oligopoly power – a market failure. Without state intervention prices would be too high, demand would be restricted and excess profits (beyond the normal return on investment) would be obtained, which creates inefficiencies and leads to high social costs and loss of welfare. Because of the large fixed cost of provision of the services, it was felt a monopoly could provide the services at the lowest possible cost. The sector was perceived as a public utility. More recently, network externalities have been suggested as a rationale for intervention in this sector – that is the more people connected to the network, the more valuable it will be. Its public value is greater than its

private value. Thus virtually all of the telecommunications systems have been owned, managed and controlled by the state since their inception.

However, in the mid-1980s a movement towards privatization, liberalization and de-regulation took hold, pushed by President *Reagan's administration* in the United States and Prime Minister *Thatcher's administration* in the United Kingdom. Now the sector has been privatized in most countries and subjected to regulatory reform of one sort or another: liberalization, competition or “light-handed” regulation. The major reform occurred in the late 1990s (Estache *et al.* 2006). Since then the internet and cellular-mobile industries have advanced significantly. Mobile service has exploded, particularly, in the developing world. This has changed the dynamics of the industry dramatically.

The paper updates and expands the work on the efficacy of regulation using cross-country analysis of selected Organization for Economic Cooperation and Development (OECD) countries. It follows the frameworks of Röller and Waverman (2001); and Waverman *et al.* (2005); and Czernich *et al.* (2009). It is in the spirit of Estache *et al.* (2006) in that it examines outcomes after privatization and regulatory reform. It examines the metrics of success (or failure): increased penetration of the mobile telephone service. Related to these metrics is the requirement that investment incentives are maintained or enhanced.

The paper is organized as follows: A Literature Review following this Introduction/Overview. It reviews the economic literature on ICT's impact on economic growth and development and the research on the effectiveness of regulation. The third section describes the countries under review: their descriptive statistics. The fourth section describes the methodology and the sources of the data; the results are in the fifth section. The final section presents Conclusions and Recommendations