EVOLVING BROADBAND POLICY: TAKING ADAPTIVE STANCES TO FOSTER OPTIMAL INTERNET PLATFORMS

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"I don't care who writes a nation's laws—or crafts its advanced treaties—if I can write its economic textbooks." Paul A. Samuelson[1]

I. INTRODUCTION

So what is the big deal about broadband? Why should we care whether or not consumers have access to high-speed Internet connectivity? What is so unique about this particular infrastructure that we worry over crafting national broadband plans and strategies, and devoting billions of dollars in government economic stimulus spending, and encouraging corporations to spend their own tens of billions of dollars—just to get more of it? And what is behind the ongoing clash between network providers and users over broadband as a means of gaining "open" access to the Internet?

Much ink has been spilled in recent years over the legal and regulatory issues surrounding broadband networks and services. This paper will sacrifice a little more in the hope of casting additional light on how policymakers should fashion public policy that fully and effectively enables broadband as an optimal Internet platform. In particular, by focusing largely on the technical, economic, and legal grounding of broadband networks, and offering some specific

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[1] James Surrowiecki, *Class Action*, THE NEW YORKER, Nov. 7, 2005, at 46 (quoting Paul Samuelson, the Nobel Prize-winning M.I.T. economist).

potential policy projects, I hope in some manner to further a healthy debate over the appropriate policy regime to govern this generative infrastructure.

This work incorporates and expands on two previous papers. In an initial piece co-authored with Stephen Schultze, we introduced the concept of "emergence economics" to describe a unified framework built on the latest findings of various schools of economic theory.[2] In a second piece I explicated the concept of "Adaptive Policymaking" by governments, including some guiding principles and framing tools for utilization in the public policy design space.[3] Here, I present some specific ways that policymakers should use these concepts and frameworks to grapple with current controversies in the regulatory treatment of broadband networks.

First, the Article provides a brief overview of emergence economics, emphasizing the unique role of the Internet in creating and furthering innovation and economic growth. Adaptive Policymaking by governments then is summarized, and some guiding principles and a public policy design space are presented. The design space includes a proposed adaptive toolkit for use by policymakers, including institutions (the how), organizations (the who), conceptual frames and tools (the which, when, and where), and actual projects (the what).

Next, the Article explains how communications policymakers should define an overarching public policy goal of "more good ideas" and a concomitant public policy objective of "harnessing broadband networks." The Article stresses how policymakers should take a particular interest in encouraging broadband as an optimal platform for accessing the Internet, and how communications policy should incorporate various realities of the physics and economics of deploying broadband networks. The Article also explores the three dimensions of the availability of broadband infrastructure, the sufficiency of Net capacity, and the integrity of Net access as necessary components of broadband networks serving as optimal pathways to the Internet.

After the suggested framework for Adaptive Policymaking is established, the Article applies it to the development of a public policy design space specifically for broadband infrastructure. The clash of incentives and mindsets by market players is explored, including the public policy objective to foment optimal broadband deployment against the countervailing market backdrop of broadband providers facing limited competitive challenges, significant and growing positive externalities, and the pecuniary benefits from prioritizing Internet traffic, and supplying managed networks. The institutional arrangements

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[2] Richard S. Whitt & Stephen Schultze, *The New "Emergence Economics" of Innovation and Growth, and What It Means for Communications Policy*, 7 J. OF TELECOMM. AND HIGH TECH. L. (forthcoming 2009) (manuscript at 1).

[3] Richard S. Whitt, *Adaptive Policymaking: Evolving and Applying Emergent Solutions for U.S. Communications Policy*, 61 FED. COMM. L.J. (forthcoming June 2009) (manuscript at 1–2). [hereinafter Whitt, *Adaptive Policymaking*].

that traditionally have governed communications infrastructure—including the common law roots of common carriage—are examined in light of the policy-making framework. That examination focuses on the increasingly forgotten common carriage prongs of public callings and voluntary bailment. Finally the Article delves into the prospect of evolving policy solutions to deal with the objective of creating optimal broadband infrastructure for Internet access, including utilizing the appropriate organizations, institutions, and tools. In contrast to more prescriptive remedies that, for now at least, should be resisted, the Article puts forward some suggested adaptive projects to deal with concerns about maintaining and extending robust broadband as an optimal platform to the Internet.

II. THE ECONOMIC AND SOCIAL ROOTS OF ADAPTIVE POLICYMAKING

For too long, too many policymakers in the United States have assumed that "Old School Economics"—a term I have employed previously to represent the outdated versions of economic theory still deemed to be received wisdom in the policy world—accurately represents the realities of the marketplace.[4] As a result, today's public policy discussions often seem rooted to the past in the form of economic and technological assumptions that more or less ended in the 1960s.[5] The rise of new economic thinking combined with new technology platforms culminating in the Internet directly challenges many of those chief assumptions. In particular, in a rapidly evolving global marketplace, new ideas and technologies are the fodder that fuels a nation's economic growth; they also bring a raft of other personal and social benefits. The extent of the public policy implications is too important to be ignored.

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4 *See* William H. Page, *The Chicago School and the Evolution of Antitrust: Characterization, Antitrust Injury and Evidentiary Sufficiency*, 75 VA. L. REV. 1221, 1242–43 (1989); S.J. Liebowitz & Stephen E. Margolis, *Should Technology Choice Be a Concern of Antitrust Policy?*, 9 HARV. J.L. & TECH. 284, 288–89 (1996); *see also* The Chicago School, http://cepa.newschool.edu/net/schools/chicago.htm (last visited Mar. 12, 2009) ("The term 'Chicago School' is associated with a particular brand of economics which adheres strictly to Neoclassical price theory in its economic analysis, 'free market' libertarianism in much of its policy work and a methodology which is relatively adverse to too much mathematical formalism and will forego careful general equilibrium reasoning in favor of more results-oriented parital equilibrium analysis."); Whitt & Schultze, supra note 2, at 77.

5 *See infra* Part II.A; *see e.g.*, Christopher Caldwell, *Old School Economics*, N.Y. TIMES MAGAZINE, Jan. 27, 2008, at 11 (discussing presidential candidates' focus on appealing to factory workers, when the percentage of Americans working in manufacturing has declined to 15% in 2008 from 30% in 1950); *see also* Whitt & Schultze, supra note 2, at 2.

A. Introducing Emergence Economics

Emergence economics is my umbrella term for the latest findings from a wide variety of cutting-edge schools of thought including behavioral economics, game theory, complexity science, network science, new growth theory, and competition theory.[6] Collectively these different theories offer the promise of a new conceptual framework—a way of approaching and understanding the growth-oriented network economy created by the Internet. That framework seeks neither to engineer deterministically the dynamic economy, nor to assume blindly that it is evolving toward perfect efficiency.

The hoary economics presented by policymakers in public policy debates maintains, for example, that the market is linear and always seeks equilibrium; that economic actors are perfectly rational, with perfect knowledge of themselves and the marketplace; that production is generated only by capital markets or government subsidy; that growth is exogenous; and the whole of the economic system is always equal to the sum of its parts. It turns out that every one of these key assumptions is either overstated, or plain wrong.[7]

Emergence economics helps clarify, for example, that knowledge and technology are not just outputs of the economy, but also essential inputs that drive economic growth and countless other social benefits. Further, game-changing disruptive innovations tend to emerge from the edges of the Net.[8] These innovations in turn create far-reaching benefits to unaffiliated entities throughout the network, in the form of economic innovation "spillovers," and through outputs serving non-pecuniary personal, social, and democratic values.[9] This sort of edge-driven, broadly beneficial, mutually reinforcing activity thrives in an environment of open "generativity" where no market player—whether government or firm—unilaterally can pick winners and losers.[10]

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6 Whitt & Schultze, *supra* note 2, at 1 (explaining that emergence economics generally views market economies as consisting of "individual agents, acting though interconnected networks, engag[ing] in the evolutionary market processes of differentiating, selecting, and amplifying certain business plans and technologies, which in turn generates a host of positive emergent economic phenomena").

7 *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 3.

8 *See*, *e.g.*, Natalie Klym & Marie José Montpetit, *Innovation at the Edge: Social TV and Beyond* 3, (Sept. 1, 2008) (un-published article), *available at* http://cfp.mit.edu/publications/CFP_Papers/Social%20TV%20Final%202008.09.01%20for%20distribution.pdf (explaining that devices at the edge of Internet protocol based television systems drive "social TV"); *see also* Whitt & Schultze, *supra* note 2, at 62–63.

9 *See*, *e.g.*, ADAM B. JAFFE, ECONOMIC ANALYSIS OF RESEARCH SPILLOVERS: IMPLICATIONS FOR THE ADVANCED TECHNOLOGY PROGRAM (1996), http://www.atp.nist.gov/eao/gcr708.htm ("Economists use the term 'spillover' to capture the idea that some of the economic benefits of Research and Development (R&D) activities accrue to economic agents other than the party that undertakes the research.").

10 *See* Jonathan L. Zittrain, *The Generative Internet*, 119 HARV. L. REV. 1975, 1981–82 (2006) ("Generativity is a function of a technology's capacity for leverage across a range of

The economy is multi-faceted, and can be seen in different ways, depending on one's perspective. Several conceptual prisms through which to view the market are examined below.

1. An Emergent Economy

Emergence economics helps to us understand how the market operates as a complex adaptive system ("CAS"). Complexity science has demonstrated how emergent properties arise spontaneously from interactions between the components of a complex system.[11] In essence, individual agents acting through interconnected networks engage in the evolutionary market processes of differentiating, selecting, and amplifying certain business plans and technologies, which in turn generates a host of positive emergent economic phenomena.[12] This leads to what previously was termed the "rough formula" for CAS-spawned emergence: agents + networks + evolution = emergence.[13]

2. A Human Economy

We live in a *human* economy, where economic actors are not the hyper-rational creatures of perfect information and consistent wants and needs. Instead, the market is peopled with human beings operating under a range of cognitive constraints and limitations. Concomitantly, those same agents are highly flexible and adaptable, with a myriad of ever-changing desires, both economic and non-economic in nature. People are economic creatures, but not just that; we value many things that have little or no commercial value.[14] Old school economics has a difficult time accounting for these facets of human life.[15]

3. A Networked Economy

We live in a *networked* economy, formed bottom-up by interactions between people in a highly connected marketplace. This networked economy thrives where space is available for experimental evolution in which new ideas emerge and technology constantly is refined. The Internet is a notable and perhaps

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tasks, adaptability to a range of different tasks, ease of mastery, and accessibility.").

[11] Whitt & Schultze, *supra* note 2, at 23–24.

[12] ERIC BEINHOCKER, THE ORGIN OF WEALTH: EVOLUTION, COMPLEXITY, AND THE RADICAL REMAKING OF ECONOMICS 16, 18–19 (2006).

[13] *Id*. at 97; *see* Whitt & Schultze, *supra* note 2, at 11.

[14] *See* HUMAN WELL-BEING AND ECONOMIC GOALS 22–26 (Frank Ackerman et al. eds., 1997).

[15] *See id*. at 22–33.

unique product of these market and non-market forces. Where the Internet at its birth was something new and interesting, now it is something essential. The Net's unique architecture—its modular, end-to-end ("e2e") interconnected design, with the agnostic Internet Protocol ("IP") at its core[16]—allows it to operate as a platform for broad-based innovation without permission and other user-based activities.

4. An Evolving Economy

We live in an *evolving* economy, which consists of a population of firms differentiating themselves as a result of different routines developed by each firm. These routines are analogous to the genes of biological organisms,[17] and they influence the specific characteristics of the output produced by each firm. Market processes then winnow the population of firms by selecting the services and products of some firms—physical technologies (designs for working with objects), social technologies (methods for organizing people), and business plans (concrete commercial designs)—over those of others. The selected firms then become more successful than those not selected. This evolutionary process engenders the most effective and meritocratic solutions that best fit the environment. As Francis Crick instructs, "evolution is cleverer than you are."[18]

5. A Growth Economy

We also live in a potential *growth* economy in which the chief currency is ideas and the primary mechanism for growth is innovation. While traditional economics tells us that productivity comes simply from adding more capital or generating greater efficiency,[19] emergence economics emphasizes ways in which new technologies endogenously create better recipes for economic growth.[20] In Paul Romer's words, "technological change . . . lies at the heart of

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16 *See* Ethan Zuckerman & Andrew McLaughlin, Introduction to the Internet Architecture and Institituions, http://cyber.law.harvard.edu/digitaldemocracy/internetarchitecture.html (last visited Mar. 19, 2009).

17 *See* Whitt & Schultze, *supra* note 2, at 18–19.

18 DANIEL C. DENNETT, DARWIN'S DANGEROUS IDEA: EVOLUTION AND THE MEANINGS OF LIFE 74 (1995).

19 *See* CHARLES L. COLE, MICROECONOMICS: A CONTEMPORARY APPROACH 117–20 (1973).

20 *See* Whitt & Schultze, *supra* note 2, at 41–43; *see also* Robert M. Solow, *Heavy Thinker*, THE NEW REPUBLIC (May 21, 2007), *available at* http://www.powells.com/review/2007_07_12 ("I think that it is Schumpter's main legacy to economics: the role of technological and organizational innovation in driving and shaping the growth trajectory of capitalist economies.").

economic growth."[21] The resulting emergent market phenomena include not just economic growth, but also "Net effects" such as innovation spillovers or positive externalities, peer production, and a whole social layer of activity.[22]

6. A Political Economy

Finally, we live in a *political* economy, where markets and governments co-evolve with each other as social processes and complex adaptive systems. This means that the government policymaker must devise a constructive role to deal with an emergent, network-connected, innovation-fueled economy. The inherent complexity, dynamism, and uncertainty of markets inherently make the task of government policy-making difficult, even treacherous. Nonetheless, the tools of government—when employed carefully, deliberately, and in the right context—can successfully facilitate a more optimal environment for the emergence of innovative new ideas, economic growth, and human freedom. With the economic prisms of the emergent, human, networked, evolving, growth, and political economy established, their application to the public policy environment can be further examined.

B. Sketching Out A Public Policy Design Space

In my paper on Adaptive Policymaking, I laid out some systematic ways to consider applying the teachings of emergence economics to the public policy environment.[23] As I explained, creating a public policy design space involves articulating all the components necessary to achieve successfully policy ends in a dynamic market environment. Because the policy-making function is a complex system,[24] each component constitutes a separate set of decisions, which in turn affects other decisions in diverse and sometimes unpredictable ways. The design space framework includes both the means and the ends components, and should be governed by overarching rules. In particular, where a market is contestable, policymakers should only tinker with certain useful inputs, ultimately allowing the market to function with minimal interference.

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21 Paul M. Romer, *Endogenous Technological Change*, 98 J. OF POLITICAL ECON. S71, S72 (1990).

22 *See* Brian Regan, Comment, *Ushering Universal Service Reform: Politically Feasible Legislative Principles*, 16 COMMLAW CONSPECTUS 471, 472 n.4 (2008) (discussing the difference between network externalities and network effects); JAFFE, *supra* note 9 and accompanying text; *see also* Whitt & Schultze, *supra* note 2, at 46–47.

23 *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 13–16.

24 *See* Ramalingam, *supra* note 11, at ix (discussing the use of complexity science in the work undertaken by development and humanitarian agencies to "embrace what were previously seen as messy realities").

1. Elements of the Framework

When crafting a policy design space, the different elements must first be distinguished, particularly the means and ends. The overall purpose for policy activities, the "why," is straightforward: policymakers seek to discipline the market behavior of particular economic agents.[25] This is accomplished directly or indirectly.[26] Other ends components (the "why") include public policy goals and objectives. The means components of the design space include the "who" and "how" (organizations and institutions); the "which," "when," and "where" (tools); and the "what" (projects).

More concretely, the public policy goals are the largest, longest-term elements to be accomplished. Take, for example, the goal of landing on Mars. The objectives are the intermediate term elements, which aim to support the public policy goal: building and testing a rocket ship to send to Mars. The organizations are the players involved, including—in the Mars mission example—Congress, NASA, contractors, sub-contractors, and taxpayers. The institutions are the legal instruments and other rules of the game; the laws, regulations, and contracts. The tools are the practical mechanisms utilized for achieving the policy goals and objectives, for example computer programs that model different components of the rocket ship, while the projects are the specific, short-term aims, such as devising elements of the engine that will power the rocket. The chief aim is to be bold about the vision of goals and objectives, while more modest yet flexible about the particular programs and tools used to accomplish them.[27]

The next elements of the design space are the "how" (institutions) and the "who" (organizations), the rules and the players of the public policy game, respectively. One key takeaway is the amazing range and scope of institutional and organizational options, which typically are beyond the ordinary expectations of policymakers.[28] Of course, these institutions and organizations involve inherent tradeoffs between values like flexibility and adaptability, versus coer-

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[25] Chee Keong Low, *A Road Map for Corporate Governance in East Asia*, 25 N.W. J. INT'L L. & BUS. 165, 196 (2004) (quoting WORLD BANK, CORPORATE GOVERNANCE IN ASIA 5–7 (2003), *available at* http://www.oecd.org/dataoecd/48/55/25778905.pdf); *see* Whitt, *Adaptive Policymaking*, *supra* note 3, at 28.

[26] *Id*.; *see* John M. Hyde, *Is Contingent Valuation Worth the Trouble?*, 62 U. CHI. L. REV. 331, 338–39 (1995) (explaining that indirect methods infer value based upon the item's market behavior, while direct methods of market behavior determine value based upon use and nonuse values).

[27] Previously I also discussed some of the basic elements for taking an adaptive stance in the public policy realm. In particular I recommended that policymakers be cautious, incremental, experimental, grounded, flexible, reversible, accountable, sustainable, and incentivized. Whitt, *Adaptive Policymaking*, *supra* note 3, at 13–16.

[28] *See id*. at 63.

cion and accountability.[29] These institutions can be thought of as occupying a blend of public and private spaces.

We also have the "which," "when," and "where" components: frames, models, and tools. These components include conceptual tools such as metaphors, fitness landscapes,[30] and network layered models.[31] Finally, the actual projects answer the "what" question in the form of specific programs designed to achieve the policy goals and objectives. These elements; the "who," "how," "which," "where," "when," "why," and "what" can be applied to craft specific frameworks for a public policy design space, including an adaptive policymaking framework.

2. The Adaptive Approach: Tinkering Without Tampering

An adaptive policy framework can be achieved using a "tinker, don't tamper" formula. Where markets are contestable, and supporting legal institutions are in place and functioning correctly, policymakers generally should avoid dictating, or tampering with the primary evolutionary forces of market players differentiating, selecting, and amplifying particular business plans and technologies. Instead—and only where necessary—policymakers should rely on enabling or tinkering with narrow market gaps and inputs to the econosphere.[32] The fundamental point is to improve the market's ability to formulate and present different options to agents—Business Plans ("BPs"), Physical Technologies ("PTs"), and Social Technologies ("STs")—while leaving undisturbed the selection processes. In other words, policymakers should improve the quantity of options without harming the quality of options.

Adaptive policymakers can accomplish environmental enabling or tinkering with various market gaps in at least four different ways:

(1) feed the evolutionary algorithm—such as investing in government-sponsored re-

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[29] *Id*. at 25.

[30] *See* Barbara A. Cherry, *The Telecommunications Economy and Regulation as Coevolving Complex Adaptive Systems: Implications for Federalism*, 59 FED. COMM. L. J. 369, 380–81 (2007) ("A fitness landscape—a concept developed in evolutionary biology—consists of varying fitness level potentials for an organism in a given environment, with peaks, valleys, and planes of the landscape representing the fitness potential of different combinations of behavioral schemata and organism structures.").

[31] *See* Richard S. Whitt, *A Horizontal Leap Forward: Formulating A New Communications Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587, 621–24 (2004) [hereinafter Whitt, *A Horizontal Leap Forward*]. Most of these "network layers" models divide the increasingly packet-based Internet world into at least four distinct layers: (1) Content Layer; (2) Applications Layer; (3) Logical/Code Layer; and, (4) Physical/Infrastructure Layer. *See id*.

[32] Whitt & Schultze, *supra* note 2, at 17 ("Economic and social systems are essentially dynamic, and not static. Some have termed it the 'econosphere'—the economy as a dynamic, evolving system." (citations omitted)).

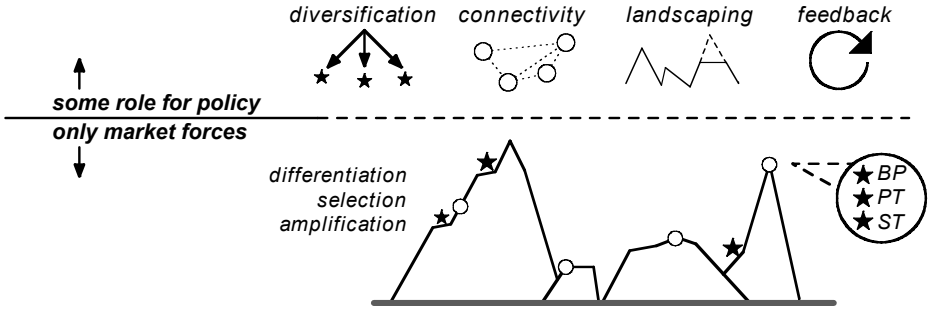
search and development;

(2) foster agent connectivity—such as enabling more communications links;

(3) shape the fitness landscape—such as creating market incentives for investment; and

(4) enhance feedback mechanisms—such as generating greater information transparency.

The dichotomy between acceptable enabling and unacceptable dictating in the workings of the marketplace is usefully conceptualized:



Thus, in contestable markets the government's role should be to experiment with the optimal background conditions for a dynamic, unpredictable, and evolving environment. In particular, adaptive policymakers should determine whether and how to tinker with the market's inputs, connectivity, incentives, and feedback, and then let the process unfold with little to no additional involvement. With empowered agents working through connected networks via evolutionary processes, policymakers and market participants are far more likely to unlock the full-blown emergence of new ideas and innovation, economic growth, and non-pecuniary network effects. Only when private markets and public policies learn to work constructively with each other and not in needless conflict can the emergent benefits be more fully realized.

This cycle of decision-making highlights several often overlooked elements: the right organizations choosing the right policy institutions, utilizing the correct frames and tools to best assess one's constraints and opportunities, limiting active policy functions to devising market inputs, and monitoring and adjusting to the market's emergent phenomena. To be clear, these observations lead to assumed preferences, not certainty. Any presumptions should be a product of empirically-derived decision-making and overcome through either sound technology and economics-based evidence, or a showing that broad public interests are better served by alternative approaches. Once an adaptive policy-making framework has been established, one can examine its application to specific policies and the market outputs the framework may produce.

III. BROADBAND DECONSTRUCTED: THE PHYSICS AND FINANCES OF INFRASTRUCTURE

Before plunging into the pertinent broadband policy issues, first it is helpful to look more closely at the reality of broadband. As the FCC recently acknowledged, "broadband can be defined in myriad ways."[33] This section addresses some basic misunderstandings about broadband and its uses, as well as the fundamental economics of broadband networks. The conceptual tool of modularity will assist in this exercise in deconstruction.[34]

A. The Physics of Broadband

1. What Broadband Is

To understand broadband as a policy concept, first it needs to be appreciated as a technological reality. Broadband is made up of a series of technology modules—transmission lines, modems, routers—that when aggregated create the high-speed communications connectivity that end users experience.[35] In sum, broadband can be thought of as communications, transportation, information, and interactivity infrastructure.

There are different network configurations that enable broadband functionality. Like the Internet Protocol, broadband can be indifferent to the underlying facilities. Nonetheless, the network topology of different broadband facilities can have an enormous impact on the way policymakers and market participants approach policy projects.[36] For example, AT&T's U-Verse is a shared IP platform running over a mix of fiber and copper, with bandwidth allocated in-band between video, voice, and Internet.[37] Verizon's FiOS network is built on fiber to the home ("FTTH"), and assigns on a fixed basis different laser light to

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[33] *In re* A National Broadband Plan for Our Future, *Notice of Inquiry*, GN Docket No. 90-51, ¶ 15 (Apr. 8, 2009).

[34] *See* Whitt, *A Horizontal Leap Forward*, *supra* note 31, at 653–62 (explaining the utility of a network layered model for analyzing broadband-related policy issues); *see also* Whitt, *Adaptive Policymaking*, *supra* note 3, at 60–63 (delineating modular network models as one potential conceptual tool for policymakers to employ in analyzing communications network-related matters).

[35] *See* FCC Strategic Goals, Broadband, http://www.fcc.gov/broadband/ (last visited Mar. 12, 2009).

[36] *See*, *e.g.*, Geoff Huston, Best Efforts Networking, http://au.net/ispcol/2001-09/2001-09-best.pdf (last visited Jan. 26, 2009) ("IP networks are often described as 'best efforts' networks. This refers to the approach to service quality where the network itself does not actively differentiate in its treatment of services that transit the network.").

[37] *See* AT&T U-verse, http://www.att.com/Uverse/files/HowUverseIsDelivered_2-22.pdf (last visited Apr. 7, 2009).

video, voice, and Internet functions.[38] Comcast and other cable companies employ hybrid fiber-coaxial ("HFC") topology using a Data Over Cable Service Interface Specification ("DOCSIS") platform, deployed on a neighborhood-sharing basis, but with structurally separate bandwidth between their traditional video service and other uses.[39] Finally, many advanced wireless platforms, whether 3G or 4G,[40] and whether WiMAX[41] or LTE,[42] use radios that share frequencies and air space dynamically, often requiring extensive management techniques.[43]

The broadband end-user's experience entails more than the last mile connectivity to and from the home.[44] In order for broadband to function as a conduit to the Internet, providers also utilize middle mile connections and Internet back-

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[38] Verizon, Fiber to the Premises and FiOS, http://www2.verizon.com/about/community/fl/technology/technology.html (last visited Apr. 18, 2009).

[39] *See* Dane Jasper, Slaughtering the Hogs, http://corp.sonic.net/ceo/2008/08/28/slaughtering-the-hogs/ (last visited Mar. 27, 2009).

[40] AT&T, Inc., 3G, http://www.wireless.att.com/learn/why/technology/3g-umts.jsp?wt.srch=1 (explaining that "3G provides accelerated data speeds" for wireless devices; download speeds of up to 1.7 Mbps); 3G Americas, Q & A: '4G' or IMT-Advanced, http://www.3gamericas.org/index.cfm?fuseaction=page&pageid=560 ("The [International Telecommunications Union] is currently establishing criteria for IMT-Advanced (4G) and will be screening various technologies for inclusion in the IMT-Advanced family. Only then will it be understood what is, and can be rightly and credibly called, 4G."); INTERNATIONAL TELECOMMUNICATIONS UNION, RADIOCOMMUNICATION STUDY GROUPS, WORKING PARTY 5D, BACKGROUND ON IMT-ADVANCED (2008), *available at* http://www.itu.int/md/R07-IMT.ADV-C-0001/en (listing key features of IMT-Advanced including: "high quality mobile services;" "enhanced peak data rates to support advanced services and applications;" and "worldwide roaming capability").

[41] PHILIPPE LAINE, CHRISTOPHE BOSCHER, DIETRICH BOETTLE & LAURANCE FEIJT, WI-MAX: MAKING UBIQUITOUS HIGH-SPEED DATA SERVICES A REALITY 1 (2004), *available at* http://www1.alcatel-lucent.com/publications/abstract.jhtml?repositoryItem=tcm:172-44851635 ("Worldwide Interoperability for Microwave Access (WiMAX) is the common name associated with the IEEE 802.16a/REVd/e standards. . . . WiMAX can offer very high data rates and extended coverage.").

[42] TOWARDS GLOBAL MOBILE BROADBAND: STANDARDISING THE FUTURE OF MOBILE COMMUNICATIONS WITH LTE (LONG TERM EVOLUTION) 1 (2008) ("Long Term Evolution (LTE) describes standardization work by the Third Generation Partnership Project (3GPP) to define a new high-speed radio access method for mobile communications systems.").

[43] *See* Michael Finneran, LTE or WiMAX: The Road to 4G, Unified Communications Strategies, http://www.ucstrategies.com/detail_print.aspx?id=2730 (last visited Jan. 26, 2009) (discussing the problem of limited bandwidth for wireless technologies, and advanced management techniques employed to ensure efficiency and reliability, including Orthogonal Frequency Division Multiplexing, Multiple Input-Multiple Output antennas, and forward error correction).

[44] *See* James B. Speta, *Handicapping the Race for the Last Mile? A Critique of Open Access Rules for Broadband Platforms*, 17 YALE J. ON REG. 39, 45 (2000) (explaining that the "last mile" is a section of a network "run[ning] from a user to the nearest aggregation point or hub").

bone facilities to carry the traffic to and from other Internet service providers.[45]

So what then is broadband? In the context of this paper, broadband is treated as a high-speed communications platform, a means of connecting people, transporting information, and a means of enabling highly desired emergent properties.[46] It provides both a means of commerce and personal, social, and democratic expression.[47] It is infrastructure for both transportation of bits and communications (of people), of conveying content (information), and establishing relationships (interactivity). In this way, broadband resembles the Internet as a potential platform for human activity.

2. What Broadband is Not

Just as it is necessary to understand what constitutes broadband as a form of communications infrastructure, there is a compelling need to understand the many misnomers about broadband to determine what it is not. Employing a modular framework is useful to help tease out these crucial differences and their policy implications.

a. Broadband Is Not the Internet or Internet Access

First, broadband is not the Internet. The Net is a global network of networks that allows modern day computers to communicate with each other and share information.[48] It is a modern day Agora[49]—in its broadest sense, as a place for trading and interacting in myriad ways—but with more limited means of entry and exit. Broadband networks serve as the entry and exit ways to and from the Internet. This crucial distinction often is lost in the regulatory context. For example, by imposing certain requirements or principles on those entryways, one is not necessarily also regulating the Agora.

Moreover, broadband is not synonymous with Internet access. As much as

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45 Lawrence A. Sullivan, *Is Competition Policy Possible in High Tech Markets? An Inquiry into Antitrust, Intellectual Property, and Broadband Regulation as Applied to "the New Economy"*, 52 CASE W. RES. L. REV. 41, 76 (2001).

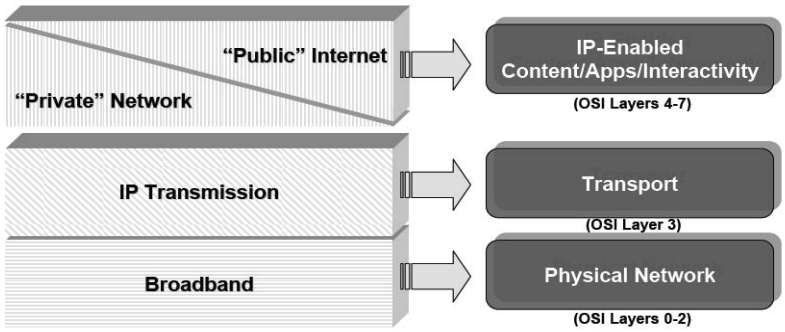
46 Whitt & Schultze, *supra* note 2, at 24 ("Emergent properties are physical aspects of a system not otherwise exhibited by the component parts.").

47 *See id*. at 66 (citing Susan P. Crawford, *The Internet and the Project of Communications Law*, 55 UCLA L. REV. 359, 392–93 (2007) (explaining that the independent functions of the Internet allow individuals to decipher between good and bad ideas, which enables the good ideas to "persist and replicate")).

48 Kevin Werbach, *The Centripetal Network: How the Internet Holds Itself Together, and the Forces Tearing It Apart*, 42 U.C. DAVIS L. REV. 343, 347–49 (2008).

49 The Agora was the main marketplace of Ancient Athens as well as the center of the city's civic life. WEBSTER'S ENCYCLOPEDIC UNABRIDGED DICTIONARY OF THE ENGLISH LANGUAGE 40 (1996).

some at the FCC and Supreme Court may have consumers believe,[50] broadband merely is last-mile infrastructure of a certain speed and carrying capacity. By contrast, Internet access is the actual capability of reaching the Internet using that infrastructure.[51] In other words, broadband is the physical connective pathway that allows consumers to access the Internet. I dealt with this dichotomy in some detail in a previous paper on a layered approach to communications regulation.[52] Using the network layers model, one should think of the Internet metaphorically as "riding on top of" broadband networks, or "Internet over broadband." In modular terms, broadband is at Layers 0-2 of the Open Systems Interconnection ("OSI") protocol[53] stack, while Internet access (along with private network services like IPTV) is at Layers 3 and above:



BROADBAND "DECONSTRUCTED"

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[50] *See*, *e.g.*, Nat'l Cable and Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005) (affirming the FCC's determination that cable modem service is not in part a "cable service" or "telecommunications service," but rather is in total an "information service").

[51] *See* Daniel F. Spulber & Christopher S. Yoo, *Rethinking Broadband Internet Access*, 22 HARV. J.L. & TECH. 1, 50–51 (2008).

[52] Whitt, *A Horizontal Leap Forward*, *supra* note 31, at 653–62. Whether this distinction means that the two should be regulated differently is a separate, and intriguing, question. As Susan Crawford points out, it is unclear why policymakers simply assume that Internet access by itself constitutes an information service. Susan P. Crawford, *Transporting Communications*, 89 B.U. L. REV. (forthcoming 2009) [hereinafter Crawford, *Transporting Communications*]. Nonetheless, the FCC continues to treat as unregulated the TCP/IP layer of the network. For a further discussion of a possible "operational split" model, *see infra* Part V.III.C.1.c.

[53] Network Layers, http://www.comptechdoc.org/independent/networking/protocol/protlayers.html (last visited Jan. 26, 2009) ("Each layer of a specific network model may be responsible for a different function of the network. Each layer will pass information up and down to the next subsequent layer as data is processed."); *see* Cisco, Internetworking Basics, http://www.cisco.com/en/US/docs/internetworking/technology/handbook/Intro-to-Internet.pdf (last visited Mar. 27, 2009).

The real-world implications of the Internet over broadband distinction are just as important. Broadband is not necessarily valued as a policy matter for what it is, but rather for what it enables: access to the Internet. More to the point, the Internet is the "killer app" for broadband.

b. Broadband is Not Just A Content Delivery Mechanism

Just as broadband facilitates Internet access, it also facilitates delivering various forms of content such as streaming video.[54] Broadband infrastructure also allows for the provision of better health care at reduced cost,[55] helps institutions streamline operations,[56] and improves the quality and diversity of teaching methods at schools and other educational facilities.[57] Over time, broadband also is expected to facilitate access to new online technologies like pervasive computing,[58] smart houses,[59] and cloud computing.[60]

Importantly, using broadband as a one-way entertainment medium is not the same as using it as an interactive, two-way information, communications, or entertainment medium.[61] This suggests that policymakers should have different

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[54] *See* Cable-Modem.net, Streaming Media's Big Boom: Programming That's Cookin', http://www.cable-modem.net/topics/stream.html (explaining that streaming video "taps broadband's capacity to move a lot of data very fast to deliver full-motion audio and video").

[55] ALEXANDER H. VO, THE TELEHEALTH PROMISE: BETTER HEALTH CARE AND COST SAVINGS FOR THE 21ST CENTURY 11 (2008) (estimating the cost savings from using teleconsultation at approximately $3.61 billion).

[56] *See* Motorola, Wireless Broadband for Education, http://www.motorola.com/Business/USEN/Business+Solutions/Industry+Solutions/Education/MOTOwi4_US-EN (last visited Jan. 26, 2009).

[57] *See id.*

[58] *See* PARLIAMENTARY OFFICE OF SCIENCE AND TECHNOLOGY, POSTNOTE: PERVASIVE COMPUTING 1 (2006), http://www.parliament.uk/documents/upload/postpn263.pdf ("Pervasive computing . . . refers to the increasing integration of [information and communication technologies] into people's lives and environments, made possible by the growing availability of microprocessors with inbuilt communications facilities.").

[59] *See*, *e.g.*, Smart Home Technology: Changing One Way Houses Operate, http://articles.castelarhost.com/smart_home_technology.htm (last visited Jan. 11, 2009) ("Smart home technology will allow all sorts of electronics and appliances to . . . communicate with each other and perform a variety of tasks.").

[60] *See* Eric Knorr & Galen Gruman, *What Cloud Computing Really Means*, INFOWORLD, Apr. 7, 2008, http://www.infoworld.com/article/08/04/07/15FE-cloud-computing-reality_1.html ("Cloud computing encompasses any subscription-based or pay-per-use service that, in real time over the Internet, extends IT's existing capabilities.").

[61] Some have questioned the assumption that broadband providers should be attempting to build special IP-enabled networks designed to stream video. Andrew Odlyzko, The Delusions of Net Neutrality 1–4 (Aug. 31, 2008) (unpublished manuscript), *available at* http://www.dtc.umn.edu/~odlyzko/doc/net.neutrality.delusions.pdf. Among other points, Odlyzko observes that many service providers appear to have fallen for the myths that movies are a gold mine, and should be delivered in streaming mode. *Id.* at 1. In his view, "con-

priorities and different policies geared towards these varied uses. As one example, it is worth considering whether taxpayers should be asked to subsidize a universal broadband fund,[62] where the money may end up supporting not only Internet access over broadband, but also—and perhaps predominantly—paid proprietary content distributed via those same broadband facilities.

c. Broadband is Not Universally Demanded

Not all consumers demand or require network access. We tend to lose sight of the fact that everyday consumer demand is a critical aspect of the deployment equation. In the headlong rush to create more, bigger, and open broadband pipes, policymakers and market participants sometimes come dangerously close to unrealistic demands that consumers must have, for example, 100 Mbps or 1 Gbps of capacity by tomorrow. The utility of broadband may be lost on many consumers, which may or may not dictate a policy role to encourage greater demand. We should be appropriately cautious about policies premised on the need for bigger pipes at any cost.

B. The Finances of Broadband

It is not enough to understand the physical properties of broadband networks. We also must realize the unique financial properties of these networks. First and foremost, broadband is infrastructure. While this seems obvious, the economic implications often are lost, even on those trained in economic theory. It is easy to assume that the economics governing the creation of a box of widgets applies equally to a broadband network. However, the economics are very different.[63] As one example, "networks can be distinguished from typical goods by reference to their *increasing* returns to scale, which makes network markets resistant to discipline of competition."[64] The differing economic characteristics

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nectivity has almost universally been valued much more highly and brought much higher revenues [than movies]." *Id*. at 2.

62 *See In re* High-Cost Universal Service Support; Federal-State Joint Board on Universal Service, *Recommended Decision*, 22 F.C.C.R. 20,477, ¶¶ 11–15 (Nov. 19, 2007) [hereinafter *Joint Board Recommended Decision*] (discussing the recommendation to create a universal broadband fund within the Universal Service Fund).

63 One author puts it more generally, "the provision of telecommunications services is not like the production and sale of raisins. Even if pure competitive markets are possible in agriculture, they are not possible in telecommunications, notwithstanding the hype in support of this assertion." Richard A. Epstein, *The AT&T Consent Decree: In Praise of Interconnection Only*, 61 FED. COMM. L.J. 149, 153 (2008). I would have used the word "infrastructure" for "service," but otherwise the point holds.

64 Thomas B. Nachbar, *The Public Network*, 17 COMMLAW CONSPECTUS 67, 100–01 (2008).

of broadband include high fixed costs, reliance on public resources, concentrated market, and substantial externalities.

1. High Fixed Costs

Broadband is characterized most centrally by the requirement for exceedingly high up-front fixed capital investments.[65] Like other forms of infrastructure, such as roads, bridges, railroads, and electrical grids, broadband demands enormous start-up costs and has relatively modest marginal costs.[66] Robert Atkinson has referred to "the engineers' perspective" on broadband, which focuses on this salient economic characteristic.[67] Fixed costs may represent some 80% to 90% of the total cost of providing broadband service.[68] This cost structure means that building the infrastructure requires high capital investment; once completed, however, the cost per additional user is relatively smaller in comparison.

Even where an incumbent carrier merely is swapping out one form of transport for another, the "truck roll" and other additional expenses can be considerable.[69] Further, wireless networks are not immune from these costs. Such networks still require access to radio spectrum, typically sold for billions of dollars at FCC auctions,[70] as well as cell towers, which cost an average of $100,000 to build or between $18,000 and $30,000 per year to lease,[71] the middle mile backhaul, and Internet backbone facilities.[72]

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[65] *Id*. at 108.

[66] *See* MICHAEL HELLER, THE GRIDLOCK ECONOMY 105 (2008). Heller observes that broadband policy in the United States is problematic because it "has combined spectrum underuse with patent thickets and regulatory gridlock," translating to "lost wealth, wrecked markets, and missed entrepreneurial opportunities." *Id*. at 106.

[67] ROBERT ATKINSON, THE INFO. TECH. & INNOVATION FOUND., THE ROLE OF COMPETITION IN A NATIONAL BROADBAND POLICY 3–4 (2007), http://www.itif.org/files/BroadbandCompetition.pdf [hereinafter ATKINSON, THE ROLE OF COMPETITION IN A NATIONAL BROADBAND POLICY].

[68] Saul Hansell, Time Warner: Download Too Much and You Might Pay $30 a Movie, N.Y. Times Bits Blog (Jan. 17, 2008), http://bits.blogs.nytimes.com/2008/01/17/time-warner-download-too-much-and-you-might-pay-30-a-movie/.

[69] *See* Saul Hansell, A Bear Speaks: Why Verizon's Pricey FiOS Bet Won't Pay Off, N.Y. Times Bits Blog (Aug. 19, 2008), http://bits.blogs.nytimes.com/2008/08/19/a-bear-speaks-why-verizons-pricey-fios-bet-wont-pay-off/?pagemode=print [hereinafter Hansell, A Bear Speaks] (explaining that the capital costs to bring Verizon's fiber network to consumers is approximately $4000 per customer).

[70] FCC: About Auctions, http://wireless.fcc.gov/auctions/default.htm?job=about_auctions&page=1 (last visited Apr. 7, 2008).

[71] Steel in the Air, Municipalities—Building and Owning a Cell Tower, http://www.steelintheair.com/municipalities-building-your-own-cell-tower.html (last visited Jan. 26, 2009).

[72] Anna J. Zichterman, *Developments in Regulatory High-Speed Internet Access: Cable*

2. Reliance on Public Resources

Unlike many other forms of economic activity, broadband relies to varying degrees on benefits from the public sector. These include access to rights of way, mandated access to poles and conduits,[73] and subsidies and tax incentives.[74] No broadband infrastructure can hope to exist absent many of these business inputs, made possible by the government. A combination of federal, state, and local government authorities control these public sector resources.[75]

3. Concentrated Market

Given the twin economic characteristics of broadband—high fixed costs and reliance on public resources—it is no surprise that there is not always an ample supply of it, and that this supply is provided by relatively few firms. The market will never sustain dozens of individual broadband service providers. The current market remains dominated by the pre-existing providers of fixed telephone service and cable television service.[76] Given the enormous fixed costs and reliance on public resources, a duopoly is predictable. Broadband over powerline ("BPL")[77] is the only other potential wireline competitor, at least on a ubiquitous basis. However, after a decade of promises, its wide scale adoption and deployment still appear unlikely.[78]

Spectrum-based broadband has emerged as the true wild card—and possibly the only feasible alternative to the current wireline-dominated marketplace.[79]

Modems, DSL, & Wi-Fi, 21 BERKLEY TECH. L.J. 593, 599 (2006) ("The 'middle mile' consists of those facilities built by telephone and cable companies for ordering telecommunications and cable services.").

73 47 U.S.C. § 224(f) (2000).

74 *See Joint Board Recommended Decision*, *supra* note 62, at ¶¶ 1–2.

75 *See* Julian Sanchez, *$7.2 Billion for Broadband . . . Now What?*, ARS TECHNICA, Mar. 23, 2009, http://arstechnica.com/tech-policy/news/2009/03/72-billion-for-broadband-now-what.ars (discussing the early 2009 appropriation to NTIA for broadband grants).

76 HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF JUNE 30, 2007 3 (2008) (indicating that 50.6% of high-speed residential Internet users were served by cable modem connections, while approximately 40% were served by technologies utilized by telephone companies); *see* Part VII.B.1.a.

77 The FCC defines BPL as a "type of carrier current technology that provides access to high speed broadband services using electric utility companies' power lines." *In re* Amendment of Part 15 Regarding New Requirements and Measurement Guidelines for Access Broadband Over Power Line Systems; Carrier Current Systems, Including Broadband over Power Line Systems, *Report and Order*, 19 F.C.C.R. 21,265, ¶ 1 (Oct. 14, 2004).

78 *See*, *e.g.*, Glenn Fleishman, BPL Powers Down, http://www.wifinetnews.com/archives/cat_power_line.html (last visited Jan. 26, 2009); Andrew D. Smith, *Plan for Net over Power Lines Dies; Oncor to Buy System*, DALLAS MORNING NEWS, May 2, 2008, at 4D.

79 *See* BENJAMIN LENNETT, THE LOBBY THAT CRIED WOLF: NAB'S CAMPAIGN AGAINST USING TV WHITE SPACE FOLLOWS A FAMILIAR SCRIPT, NEW AMERICA FOUNDATION ISSUE

As more spectrum becomes available and mobile electronics become one-stop-shop technology solutions, true broadband data speeds are necessary for mobile phones to become mobile Internet computers. The direct impact of spectrum-based broadband remains uncertain.[80] Theoretically, however, new generations of wireless networks would exert some pressure on the existing broadband marketplace, forcing incumbents to innovate and better serve user interests.

4. Substantial Externalities

Finally, broadband networks can generate tremendous amounts of externalities.[81] Most forms of infrastructure typically are responsible for large social benefits not captured by the infrastructure provider.[82] For broadband networks, "because effects"—money made because of something—are greater than "with effects"—money made from selling that something.[83] In essence the "because effects" of broadband are the sum total of the impact of the Internet.[84] Robert Atkinson notes, "broadband is unique in that the social returns of broadband investment exceed the private returns to companies and consumers."[85] In other words, broadband providers face, relatively speaking, broadly-spread benefits and narrowly-borne costs. Now, with the salient characteristics of broadband defined, some aspirational policy goals and objectives can be sketched out.

BRIEF NO. 23, at 1, *available at* http://www.newamerica.net/files/TheLobbythatCried%20Wolf.PDF.

[80] *See*, *e.g.*, Amol Sharma, *Clearwire's WiMax Rollout Faces Steep Hurdles*, WALL ST. J., Dec. 17, 2008, at B5 (noting that the new WiMAX joint venture faces major challenges in deploying and competing against entrenched incumbents).

[81] Whitt & Schultze, *supra* note 2, at 66 (noting that broadband is "changing the world in countless beneficial ways" including being a catalyst for "innovation, productivity growth, job creation, and global competitiveness"). For a discussion of network externalities, see Regan, *supra* note 22, at 472 n.2.

[82] *See* Robert D. Atkinson, *Framing A National Broadband Policy*, 16 COMMLAW CONSPECTUS 145, 153 (2007) [hereinafter Atkinson, *Framing A National Broadband Policy*].

[83] *See* Brett M Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 259–61 (2007).

[84] *See* Atkinson, *Framing A National Broadband Policy*, *supra* note 82, at 153–64 (2007). Atkinson sees four kinds of positive externalities attributable to broadband networks: (1) network externalities, both direct and indirect; (2) prosumer investments, where consumers become both users and producers; (3) competitiveness externalities, or international leadership in technology; and (4) regional externalities, particularly impacts on rural communities. *Id.*

[85] *Id.* at 145.

IV. DEFINING OUR PUBLIC POLICY GOALS AND OBJECTIVES IN THE BROADBAND ERA

As explained in previous papers, markets and governments are two complex adaptive systems with "intertwined social constructs that rely upon each other."[86] As one part of that dynamic mix, communications policy stands out as having a profound impact on economic well-being.[87] Armed with new insights from emergence economics, primary goals and objectives, and conceptual tools, legislators and regulators have a range of roles to play in the communications space. These roles employ the various components of an adaptive toolkit to examine and decide difficult policy issues.

As Patricia Longstaff argues, "[g]oal selection is a critical part of a successful [public policy]."[88] We need to define our ultimate goals before pursuing a rational public policy. As explained below, communications policymakers should adopt the overarching goal of "More Good Ideas."[89] In turn this goal can be achieved in part through the suggested policy objective of harnessing broadband networks as optimal on-ramps to the Internet.

A. The Policy Goal: More Good Ideas

The open dissemination of and access to information through the Internet plays a critical role in innovation, economic growth, and countless non-economic benefits.[90] The open flow of information ensures that an idea engendered in one place can impact economies globally.[91] Because of nonrivalry[92] and increasing returns of ideas, growth in the world's stock of knowledge

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86 Whitt, *Adaptive Policymaking*, supra note 3, at 8; *see* Barbara A. Cherry, *Institutional Governance for Essential Industries Under Complexity: Providing Resilience Within the Rule of Law*, 17 COMMLAW CONSPECTUS 1, 14 (2008) [hereinafter Cherry, *Institutional Governance for Essential Industries*].

87 Whitt, *Adaptive Policymaking*, *supra* note 3, at 40.

88 PATRICIA LONGSTAFF, THE COMMUNICATIONS TOOLKIT, HOW TO BUILD AND REGULATE ANY COMMUNICATIONS BUSINESS 19–20 (2002).

89 *See* Whitt & Schultze, *supra* note 2, at 64; Whitt, *Adaptive Policymaking*, *supra* note 3, at 41–45.

90 LONGSTAFF, *supra* note 88, at 41.

91 CHARLES I. JONES, INTRODUCTION TO ECONOMIC GROWTH 73 (1998). Thomas Jefferson was prescient on the point: nature made it possible "[t]hat ideas should freely spread from one to another over the globe . . . like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation." Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813) *in* 13 THE WRITINGS THOMAS JEFFERSON 333–34 (Andrew A. Lipscomb & Albert Ellery Bergh, eds., 1903).

92 *See* JONES, *supra* note 91, at 73 ("[I]deas are *nonrivalrous*. The fact that Toyota takes advantage of just-in-time inventory methods does not preclude GM from taking advantage of the same technique.").

drives the rate of growth in every country. Ideas create growth and all its emergent benefits.

New technologies—products, processes, and forms of organization—are "the most important determinant of long-term economic growth."[93] The free flow of information can lead directly to a raft of Business Plans, built with Physical Technologies and Social Technologies, that compete vigorously and effectively in the marketplace. The free flow of information also can generate and encourage the proliferation of information, entertainment, political discourse, and commercial and non-commercial speech. As Adam Gopnik aptly wrote: "Our world rests on science and democracy, on seeing *and* saying; it rests on thinking new thoughts and getting them heard by a lot of people."[94]

An ideal overarching goal for policymakers—especially in the communications field—is to see the market generate a greater number of useful ideas that will drive the evolutionary process to optimal heights. Paul Romer calls for a "combinatorial explosion" of ideas.[95] By increasing the quantity of beneficial new ideas, more potential innovation is enabled. After all, innovation is "heavily dependent upon freedom of movement of ideas and information among many individuals and organizations."[96]

Importantly, ideas are the fodder not just for economic growth, but also for other benefits. The concept of More Good Ideas is not limited to those that lead solely to pecuniary outcomes for market players. Ideas can be economic, social, and personal. Moreover, ideas are understood to be a classic public good; everyone benefits from useful inventions.[97] An adaptive society must "find and maintain the means to explore new ideas."[98] Mechanisms generating new ideas, which are expressed culturally in human society, "are as important as access to abundant resources for economic growth and economic adaptation."[99] Ideas

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93 RICHARD G. LIPSEY, KENNETH I. CARLAW & CLIFFORD T. BEKAR, ECONOMIC TRANSFORMATIONS: GENERAL PURPOSE TECHNOLOGIES AND LONG-TERM ECONOMIC GROWTH 11 (2005).

94 ADAM GOPNIK, ANGELS AND AGES: A SHORT BOOK ABOUT DARWIN, LINCOLN, AND MODERN LIFE 22 (2009).

95 Kevin Kelly & Paul Romer, The Economics of Ideas, http://www.versaggi.net/ecommerce/articles/romer-econideas.htm (last visited Jan. 11, 2008).

96 Roger Clarke, *Business Models to Support Content Commons*, 4 SCRIPT-ED 59, 62 (2007), http://www.law.ed.ac.uk/ahrc/SCRIPT-ed/vol4-1/clarke.asp.

97 Dan Kahan, *The Logic of Reciprocity: Trust Collective Action, and Law*, 102 MICH. L. REV. 71, 90 (2003); *See also* Frischmann & Lemley, *supra* note 83 at 268. Frischmann also points out that ideas, as intellectual and mental goods, are tied up inextricably with our concepts of speech. Brett M. Frischmann, *Speech, Spillovers, and the First Amendment*, 2008 U. CHI. LEGAL F. (forthcoming 2009) (manuscript at 17), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1082497.

98 GEERAT J. VERMEIJ, NATURE: AN ECONOMIC HISTORY 308 (2004).

99 *Id*. at 310.

also are the currency of cyberspace.[100] As a result, we should want More Good Ideas—they will serve as a proxy for maximizing technological change, and hence economic growth and general human well being.[101]

There are differing views on what constitutes a good idea, or how many ideas are adequate. From the public policy perspective, the notion of "more" is the quantity function, which involves having an optimal number of inputs available to and from the market agents.[102] The notion of "good" is the quality function, which involves the evolutionary function of market agents identifying, selecting, and amplifying the ideas they desire.[103] In other words, we trust ordinary people to decide what ideas they prefer over others. The suggested premise is that the quantity function of ideas in the market may be lacking in some instances, requiring some public policy role. Put in rough terms, the more is where tailored public policy may need to enter the picture, while the good is where the market agents—properly buttressed by enabling institutions and organizations—firmly should be in command. As will be demonstrated, this dichotomy can lead to government tinkering to provide additional inputs, connectivity, incentives, and transparency to the market. These enabling elements can help improve opportunities for More Good Ideas to be created, heard, and accepted.

B. The Policy Objective: Harnessing Broadband Networks

We have already seen that broadband infrastructure is important to users and consumers for what it enables.[104] As a general-purpose technology,[105] broadband has numerous present and potential uses, [106] such as a one-way entertainment system. However, as a policy matter—and as communications capability subject to federal regulatory oversight—the chief importance of broadband is as an optimal means for accessing the Internet, which in turn leads to positive externalities and the generation of More Good Ideas.[107]

Communications bandwidth is a core economic input, a basic foundation for

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100 JONATHAN ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT 161 (2008).

101 *See* Whitt & Schultze, *supra* note 2 at 64.

102 *Id*. at 73.

103 *Id*. at 71.

104 *See supra* Part III.A.

105 *See* Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, 5 J. ON TELECOMM. & HIGH TECH. L. 329, 385 (2007) (discussing broadband as a "general purpose technology" that offers "a generic functionality that can potentially be applied in a large number of sectors within the economy").

106 Johannes M. Bauer, Junghyun & Steven S. Wildman, *An Integrated Framework For Assessing Broadband Policy Options*, 2005 MICH. ST. L. REV. 21, 25 (2005).

107 *See* Whitt & Schultze, *supra* note 2, at 64–65; Whitt, *Adaptive Policymaking*, *supra* note 3, at 66–68.

"most other economic activities [and] . . . provides substantial positive externalities."[108] The externalities include a host of social and personal goods often overlooked under traditional, "old school" economic analyses.[109] Stable, reliable, and ubiquitous network access also acts as a mechanism to reduce transaction costs for its users.[110] Broadband is indeed essential infrastructure.[111]

To employ a helpful metaphor, a chief purpose of broadband is to serve as a platform for allowing end users to utilize the capabilities of the Internet. Of course, broadband connectivity enables other online services, applications, and content as well. However, it is the Internet access component above all that makes broadband so compelling as a public policy matter.[112]

It is widely acknowledged that broadband Internet access is central to the economic future of the United States.[113] The Organisation for Economic Co-operation and Development ("OECD") has found that broadband-enabled Internet access "plays a critical role in the workings of the economy," because "it connects consumers, business, and governments and facilitates social interaction."[114] Numerous benefits have been touted for next generation broadband networks, including enabling faster file transfers, video streaming applications, real-time collaboration, cloud computing, and simultaneous use of multiple bandwidth-hungry applications; these in turn will enhance the quality of health care delivery, foster citizen participation in government and society, and im-

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108 *See* Eli Noam, *Beyond Liberalization II: The Impending Doom of Common Carriage*, 18 TELECOMMC'NS POL'Y 435, 439 (1994) [hereinafter Noam, *Beyond Liberalization*]; *see also* van Schewick, *supra* note 105, at 385.

109 A related concept is the "keystone species." Like other communications and transportation and financial industries, broadband-based Internet access has massive ramifications for the economy as a whole. A failure of this keystone species to thrive will have devastating effects on the other species reliant on its success. *See* MARCO IANSITI AND ROY LEVIEN, THE KEYSTONE ADVANTAGE: WHAT THE NEW DYNAMICS OF BUSINESS ECOSYSTEMS MEAN FOR STRATEGY, INNOVATION, AND SUSTAINABILITY 40, 82 (2004).

110 Nachbar, *supra* note 64, at 108.

111 ROBERT CRANDALL, WILLIAM LEHR, & ROBERT LITAN, THE EFFECTS OF BROADBAND DEPLOYMENT ON OUTPUT AND EMPLOYMENT: A CROSS-SECTIONAL ANALYSIS OF U.S. DATA, BROOKINGS INST. ISSUES IN ECON. POL'Y, NO. 6, at 6 (July 2007), *available at* http://www3.brookings.edu/views/papers/crandall/200706litan.pdf. *See* BRETT FRISCHMANN, MEMO ON INFRASTRUCTURE INVESTMENT 2 (2008) ("Infrastructure resources are means to many ends in the sense that they enable, frame, and support a wide range of human activities. From a functional, systems-based perspective, infrastructure can best be understood as the foundational resources that enable and/or structure more complex systems of human activity.").

112 *See* discussion *infra* Part III.

113 Crawford, *Transporting Communications*, *supra* note 52, at 46–47 ("The centrality of high-speed Internet access to the economic future of the U.S. has been acknowledged at every level of government.").

114 ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, BROADBAND GROWTH AND POLICIES IN OECD COUNTRIES: MAIN FINDINGS 3 (2008), *available at* http://www.oecd.org/Dataoecd/ 32/58/40629032.pdf.

prove access to education and entertainment.[115] Major studies demonstrate that broadband access to the Internet has a sizable positive impact on economic growth in real and measurable ways.[116] There is a significant causal link between broadband penetration in a country and economic growth.[117]

Broadband networks are important as a policy matter because of what they enable: conveyance of More Good Ideas. Broadband empowers "companies and individuals to use more efficient processes and helps make information technology-producing companies more competitive internationally."[118] To be clear, the concept of ideas is not limited to that which leads to material economic benefits. Susan Crawford has explained how the most important aspect of online communications is "complex human relationships," including "the evolution of human connections and relationships online."[119] Per Romer, Crawford believes that the freedom for more people to look for new ideas and new technologies is fundamental to economic growth: "Bad ideas really do lead to good ideas, in that the diversity of ideas as a whole allows exploration to discover what is useful."[120] In essence, ideas potentially are far more valuable than goods, the Internet is potentially far more valuable than other forms of communication, and broadband allows both to flourish.[121] Concomitantly, the success of broadband as a platform for the conveyance of good ideas over the Internet in turn improves the value of the broadband network to all of its users.

More particularly, as indicated above, infrastructure investment can increase

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[115] *See* STEPHEN EZELL ET AL., INFO. TECH. & INNOVATION FOUND., THE NEED FOR SPEED: THE IMPORTANCE OF NEXT-GENERATION BROADBAND NETWORKS 5–29 (2009), http://itif.org/files/2009-needforspeed.pdf.

[116] *See*, *e.g.*, WILLIAM H. LEHR, CARLOS A. OSARIO, SHARON E. GILLETT & MARVIN A. SIRBU, MEASURING BROADBAND'S ECONOMIC IMPACT 3–4 (2006), *available at* http://www.eda.gov/PDF/MITCMUBBImpactReport.pdf ("The results [of the author's study] support the view that broadband access does enhance economic growth and performance, and that the assumed economic impact of broadband are real and measurable.").

[117] *See id*. at 20; PANTELIS KOUTROUMPIS, THE ECONOMIC IMPACT OF BROADBAND ON GROWTH: A SIMULTANEOUS APPROACH 5, 23–24 (2008), *available at* http://www.canavents.com/its2008/abstracts/102.pdf.

[118] ROBERT ATKINSON & HOWARD WIAL, BOOSTING PRODUCTIVITY, INNOVATION, AND GROWTH THROUGH A NATIONAL INNOVATION FOUNDATION 10 (2008).

[119] Susan P. Crawford, *The Internet and the Project of Communications Law*, 55 UCLA L. REV. 359, 380–81 (2007) [hereinafter Crawford, *The Internet and the Project of Communications Law*].

[120] *Id*. at 384 (citing Paul Romer, *Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?* 14 (Nat'l Bureau of Econ. Research Working Paper No. W7723, 2000), *available at* http://ssrn.com/abstract=230163.

[121] The Internet is also different from former communications modalities because it provides feedback, allows interesting new species and new ways to make a living, and provides a central social place. The Net serves as a substrate that enables new ideas and new forms of social organisms to emerge, created by many different decisions to pay attention. It serves as the "human communications layer of the Internet." *See* Crawford, *The Internet and the Project of Communications Law*, *supra* note 119, at 389, 404.

economic growth in various ways, as "the important spillovers of broadband networks results in externalities in the other sectors of the economy."[122] Broadband networks have unique characteristics of "the information intensity and the breadth of activities that can be supported by high level software applications—ranging from business critical processes to entertainment and e-learning."[123]

As noted above, the social gains from broadband-based Internet connectivity outweigh the private gains to its providers.[124] Broadband is an important basic infrastructure that is expected to produce spillovers and wide-reaching benefits across the economy.[125] Increased broadband deployment fosters a network effect multiplier, encouraging investment in industries that create new and innovative applications and services.[126] Broadband also plays a vital role as a connectivity platform, with numerous economic and non-economic benefits or spillovers.[127]

Broadband is also characterized by what some call the "comedy of the commons,"[128] which describes how the overall social benefits of infrastructure exceed their social costs because of the increasing returns to use.[129] In essence, there is a wedge between broadband providers' private interests and the nation's social interests.[130] A key question then is whether broadband providers possess adequate economic incentives to invest in their networks when they cannot capture the full economic benefit. The policies that policymakers adopt, and in particular the types of institutions and projects employed, may depend to a large extent on an analysis of the ability of market forces to send the proper economic signals.

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122 Koutroumpis, *supra* note 117, at 2.

123 *Id*.

124 *See supra* Part III.B.4; Frischmann & Lemley, *supra* note 83, at 259–61 (discussing spillovers).

125 CRANDALL, LEHR, & LITAN, *supra* note 111, at 2–3.

126 ROBERT D. ATKINSON, DANIEL CASTRO, AND STEPHEN J. EZELL, THE DIGITAL ROAD TO RECOVERY: A STIMULUS PLAN TO CREATE JOBS, BOOST PRODUCTIVITY, AND REVITALIZE AMERICA 7–9 (2009).

127 *See* Whitt & Schultze, *supra* note 2, at 26.

128 *See* Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 723 (1986) (explaining that commerce as an example of comedy of the commons "has been thought to enhance the sociability of the members of an otherwise atomized society").

129 *See* Brett M. Frischmann & Barbara van Schewick, *Network Neutrality and the Economics of An Information Superhighway: A Reply to Professor Yoo*, 47 JURIMETRICS 383, 390 (2007).

130 *Id*.

V. ENVISIONING BROADBAND AS AN OPTIMAL INTERNET PLATFORM

There appears to be a solid consensus that broadband penetration, speed, and price could be better in the United States.[131] By most measures the United States is behind other nations in broadband performance, and its rank has been falling since 2001.[132] Even if one disagrees that the broadband market can yield better results or whether there is any role for government to play in encouraging the deployment of broadband networks, few can disagree that government policy can and does have a major impact.[133] This is especially the case when looking at next-generation broadband networks—also called "ultra-broadband" in some quarters in the United States, and "super-fast broadband" in the UK—operating at user download speeds of 40 Mbps or greater.[134] Therefore, we should strive to better understand how government policy can maximize the quality and quantity of broadband in ways that best support a robust Internet—in other words, to understand how government policy can achieve optimal connectivity for Internet over broadband. As Charlie Firestone puts it: "The role of government should be to '[g]overn so as to promote environmental conditions conducive to maximizing the social bandwidth made possible by these technologies.'"[135]

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[131] *See*, *e.g.*, Press Release, U.S. Broadband Coalition, A Call to Action for a National Broadband Strategy 1–2 (Dec. 2, 2008), http://www.newamerica.net/files/nbs%20call%20to%action.pdf; http://bb4us.net/id8.html. The U.S. Broadband Coalition is comprised of "high technology companies, manufacturers, consumers, labor unions, public interest groups, educators, state and local governments" and other stakeholders. The group announced a framework for a National Broadband Strategy and urged its adoption. *See also* ROBERT D. ATKINSON, DANIEL K. CORREA & JULIE A. HEDLUND, THE INFO. TECH. AND INNOVATION FOUND., EXPLAINING INTERNATIONAL BROADBAND LEADERSHIP vii (2008).

[132] *See* ATKINSON ET AL., *supra* note 131, at vii; *see also* INTERNET FOR EVERYONE, ONE NATION ONLINE 3 fig. 2, *available at* http://www.freepress.net/files/IFE_Brochure.pdf (noting the United States' decline in broadband penetration ranking from 4th to 15th from 2001 through 2007, according to OECD data). *But see* GEORGE S. FORD, THOMAS M. KOUTSKY & LAWRENCE J. SPIWAK, THE BROADBAND EFFICIENCY INDEX: WHAT REALLY DRIVES BROADBAND ADOPTION ACROSS THE OECD?, PHOENIX CENTER POLICY PAPER NO. 33, at 1, 3–4, (2008), *available at* http://www.phoenix-center.org/pcpp/PCPP33final.pdf.

[133] "It's time to reject the view that somehow this is a zero-sum game between corporate America and government. Both must clearly play a leadership role if we are to make headway on broadband performance." ATKINSON ET AL., *supra* note 132, at ix.

[134] *See generally* EZELL ET AL., *supra* note 115, at 29–31; DELIVERING SUPER-FAST BROADBAND IN THE UK: PROMOTING INVESTMENT AND COMPETITION 3 (Mar. 3, 2009), *available at* http://www.ofcom.org.uk/consult/condocs/nga_future_broadband/statement/statement.pdf.

[135] Charles Firestone, Maximizing Social Bandwidth in the Gigabit Society 8, Presentation at the Columbia Inst. For Teleinformation's 25th Anniversary Int'l Summit on Media & Commc'n. (Oct. 30–31, 2008), *available at* http://www.elinoam.com/summit2008/presentations/firestone.pdf.

This section addresses the key characteristics of broadband as an optimal Internet platform ("BAOIP"). Brett Frischmann and Barbara van Schewick effectively summarize the unique role of the broadband-based Internet in generating More Good Ideas, and the challenge of employing the market to generate the economic incentives for a richer broadband experience of the Net:

> As an infrastructure resource, the Internet generates significant value as an input into a wide variety of productive activities engaged in by users. The Internet has had a transformative impact on many different social systems, spurring widespread systematic change not only in many different industries but also in many different nonindustrial sectors of our society: It is transforming commerce, community, culture, education, government, health, politics, and science—all information and communications-intensive systems. The Internet spurs this transformation by empowering people to participate and engage in socially valuable, productive activities. These activities produce significant external benefits that accrue to society as a whole and are not captured or necessarily even appreciated by the participants. As [broadband] network providers cannot capture these externalities either, their decisions will not take account of society's interest in these uses.[136]

As addressed below, these crucial decisions made by broadband network providers include the availability of broadband infrastructure, the sufficiency of Net capacity, and the integrity of Net access.

Optimal broadband Internet platforms can be defined as the right blend of supply (more, bigger), demand (popularity), and support for Internet access (robust and open).[137] I would submit that there are three general dimensions to BAOIP. The first is the availability of physical infrastructure to support access to the Internet. Policymakers and others raise questions about the relative limited availability of broadband, including few competitive options and limited alternatives in terms of pricing, speeds, and geography.[138]

Together the other two dimensions of BAOIP constitute the availability of virtual infrastructure to support access to the Net. The first form of platform support centers on a lack of constraints on the suitability of broadband platforms to support Internet access.[139] This corresponds to having adequate capacity available on broadband platforms for robust Internet access. One can think

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[136] Frischmann & van Schewick, *supra* note 129, at 427–28 (citations omitted).

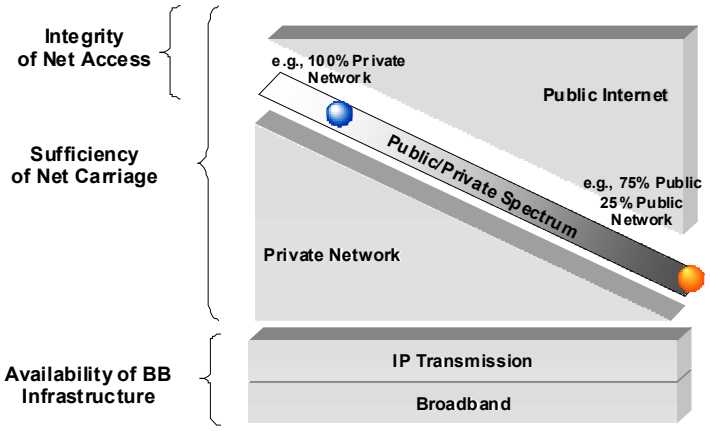
[137] The OECD similarly has looked at five main categories deemed important for assessing broadband markets: penetration, coverage, services and speed, usage, and prices. OECD, Directorate for Science, Technology, and Industry, Broadband Portal, http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_1,00.html (last visited Jan. 26, 2009). Roughly, these categories of availability break down to actual lines available, the capacity of those lines, and the actual lines in use—or more pipes, bigger pipes, and popular pipes.

[138] Utilizing the language of complexity theory, Barbara Cherry refers to "the desired emergent properties of widespread availability, affordability, and reliability of critical communications infrastructure." Cherry, *Institutional Governance for Essential Industries Under Complexity*, *supra* note 86, at 7.

[139] *See* Policy Post 13.8, June 01, 2007, http://www.cdt.org/publications/policyposts/2007/8 (last visited Mar. 13, 2009).

of this as "sufficiency of Net capacity." To date, neither side in the network neutrality debate has prominently addressed concerns about the sufficiency of Net capacity.[140]

The second form of platform openness centers on a lack of constraints on the availability of Internet access, which covers both consumers (discriminatory pricing, blocking, and degradation), third party content and applications providers (anticompetitive pricing, blocking, degradation, and prioritization). This form of platform openness with respect to both consumers and third party providers matches roughly to recent discussions around traditional network neutrality, and can be thought of as "integrity of Net access."[141]



THREE ELEMENTS OF BROADBAND AS AN OPTIMAL INTERNET PLATFORM

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[140] Generally speaking, network neutrality is:

> "[t]he proposed principle that a network must nondiscriminately deliver packets, with no awareness of what specific application, device, or end-user generated them. The issue of network neutrality regulation has become a bone of contention between pipe-owners (i.e., bandwidth providers), on the one hand, and application service providers and content providers, on the other hand, whose services and/or content consume bandwidth and may be in competition with the pipe-owners . . . ."

HARRY NEWTON, NEWTON'S TELECOM DICTIONARY 643 (23d ed. 2007).

[141] Richard S. Whitt, Emerging Implications of Broadband: Wrestling with Convergence and Communications Policy, Remarks at NARUC Winter Meetings 12–14 (Feb. 15, 2009), *available at* http://www.narucmeetings.org/Presentations/RSW%20Google%20Preso%20NARUC%20Conference%20Feb%202009%20FINAL%20021309.pdf; *see also* Atkinson, *Framing A National Broadband Policy*, *supra* note 82, at 151–53, 162–66.

Obviously judging factors like the prevalence, capacity, uptake, and openness of broadband connections as a means of reaching the Internet is not an entirely objective exercise, and each component will change over time. Achieving BAOIP is an ongoing strategy, a process, with no finite end point. Tensions also may exist between these various dimensions—such as capacity versus openness or ubiquity, making policy tradeoffs inevitable.[142] Optimality here is contextual. As Frank Pasquale puts it, optimization of access to the Internet relates to "the ideal environment for self-expression, community formation, entertainment, and all the other cultural and political functions served by online applications and services."[143] Old School Economics alone cannot properly value these attributes.[144] However, properly aligning economic incentive structures will enable these availability, sufficiency, and integrity dimensions of broadband networks to balance and reinforce each other as technology continues to evolve.[145] The policy debate needs to shift to focus more on the paramount issue: getting as many U.S. households as possible using a plethora of economically-viable, readily-available broadband networks to fully utilize the rich capabilities of the Internet and other online resources.

A. Availability of Broadband Infrastructure

Some suggest that a choice necessarily exists between deployment of broadband networks and broadband as an optimal platform for Internet access.[146]

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[142] Atkinson, *Framing A National Broadband Policy*, *supra* note 82, at 165.

[143] Frank Pasquale, The Promise of Comparativism: Expanding the Bases of Expertise in Internet Policymaking 23 (Dec. 5–6, 2008), http://lgst.wharton.upenn.edu/cmcl/papers/2008/pasquale.pdf. I hasten to add that I do not share the author's proposed extension of network bottleneck theory to Internet-based applications such as search engines and social networks.

[144] *Id*.

[145] Physicist Stuart Kauffman explains how technological evolution is a process attempting to optimize systems riddled with conflicting constraints:

> Optimal solutions to one part of the overall design problem conflict with optimal solutions to other parts of the overall design. Then we must find *compromise* solutions to the joint problem that meet the conflicting constraints of the different subproblems. . . . How should these conflicting requirements be jointly optimized? A tree may utilize metabolic resources to make chemical toxins to ward off insects, rather than utilize the same resources to build leaves to capture sunlight. How should the tree solve the conflicting constraints in its budget allocation?

STUART KAUFFMAN, AT HOME IN THE UNIVERSE: THE SEARCH FOR LAWS OF SELF-ORGANIZATION AND COMPLEXITY 179–80 (1995).

[146] *See*, *e.g.*, *In re* Broadband Industry Practices, *Comments of Comcast Corporation*, WC Docket No. 07-52, at 11–12 (Feb. 12, 2008) (accessible via FCC Electronic Comment Filing System).

> Notwithstanding the enormous capacity and flexibility of the cable infrastructure, there

This appears to be a false choice. These broadband pipes are valued precisely because they carry the Internet. By the same token, investment in telecommunications infrastructure can be a skittish business, exacerbated by signs of regulatory gridlock and uncertainty.[147] In short, policymakers should embrace the virtual commons created by the Net, while avoiding or limiting the anticommons of telecom infrastructure investment. This can be addressed by seeking to foster more, larger platforms and encouraging higher demand or popularity of the platforms.

We do need to carefully consider what aspects of broadband infrastructure constitute an optimal Internet platform from the end user's perspective. For example, increasing ubiquity at a certain point tips to positive network effects, increasing symmetry at a certain point tips to user-generated functionality, and increasing speeds at a certain point tips to video-centric user experience. Where each of those inflection points resides is a difficult task indeed, at least for the policymaker, and certainly beyond the scope of this paper.[148] However, we will consider below several components of the dimension of broadband availability that, in varying measures, can help bring us optimal Internet platforms.

1. More Broadband Internet Platforms

More—the first piece of the dimension of available broadband—can be interpreted in at least three different ways: competitive platforms, ubiquitous platforms, and mobile platforms.

The conventional free market wisdom that more options create more competition, which is better for consumers,[149] is no less applicable in the market for broadband. The more broadband options consumers have, it is argued, the more effective competition is in driving down prices and driving up quality.[150]

> are (and always will be) some throughput limitations. Thus, the question is not whether all customers will be able to use shared bandwidth indiscriminately for any purpose they choose regardless of the effects their use has on other customers but, rather, how to optimize every customer's online experience and ability to access all Internet content and use all Internet applications and services.

Id.

147 *See* HELLER, *supra* note 66, at 106–07.

148 It is well established that making the jump from dial-up modems to broadband speeds "represented an inflection point making possible a myriad of services that were previously impractical." EZELL ET AL., *supra* note 115, at 4.

149 HERBERT HOVENKAMP, ECONOMICS AND FEDERAL ANTITRUST LAW 1–2 (1985) ("Market economies are dedicated to the principle that people are best off if they can make voluntary exchanges of goods and services in competitive markets. . . . If all exchanges take pace at a competitive price, society as a whole will be wealthier. . . .").

150 *See*, *e.g.*, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, NETWORKED NATION: BROADBAND IN AMERICA 2007, at iii (2008), *available at*

To ensure adequate market competition, however, policymakers should want to encourage the deployment of more platforms, both wired and wireless, owned by different players with different business models. At the same time, there are very real economic constraints on multiple competing facilities-based broadband networks.[151]

Furthermore, if it is not already, ubiquitous broadband should be a primary objective. Less than 10% of U.S. homes remain unserved by a terrestrial broadband provider, but it is estimated to cost some $20 to 30 billion to deploy broadband services to pass those six to eight million households.[152] The National Academy of Sciences ("NAS") argues that ubiquitous broadband capability can be expected to do as much to drive innovation, the economy, and job creation in the twenty-first century as did access to the telephone, interstate highways, and air travel in the twentieth century."[153] As Kevin Werbach frames the issue, "the real question is not how to provide ubiquitous wireless [broadband] connectivity in the abstract, but how to address concrete needs and market opportunities."[154]

Indeed, fostering ubiquitous access to broadband networks, and the pervasive, always-on experience of bandwidth-rich applications they provide, may be more valuable than simply aiming for higher speeds or capacity.[155] This view challenges the conventional wisdom that we simply need bigger pipes, at least as the guiding principle for a national broadband policy. For example, Mark Cooper and the Consumer Federation of America ("CFA") have promoted grassroots-based community broadband networks that provide a common symmetric speed of 5 to 10 Mbps on a ubiquitous basis.[156] Scholars at the

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http://www.ntia.doc.gov/reports/2008/NetworkedNationBroadbandinAmerica2007.pdf ("Escalating competition among broadband platforms and service providers has yielded both a proliferation of new communications and entertainment services and affordable broadband pricing for American consumers.").

[151] *See infra* Part VII.B.1.b–c.

[152] S. DEREK TURNER, FREE PRESS, DOWN PAYMENT ON OUR DIGITAL FUTURE: STIMULUS POLICIES FOR THE 21ST-CENTURY ECONOMY 8–9 (2008), http://www.freepress.net/files/DownPayment_DigitalFuture.pdf.

[153] NATIONAL ACADEMY OF SCIENCES ET AL., RISING ABOVE THE GATHERING STORM: ENERGIZING AND EMPLOYING AMERICA FOR A BRIGHTER ECONOMIC FUTURE 201–10 (2007), *available at* http://books.nap.edu/openbook.php?record_id=11463&page=201. In addition, the NAS has determined that "Congress and the administration should take action—mainly in the regulatory arena and in spectrum management—to ensure widespread affordable broadband access in the very near future." *Id*. at 201.

[154] KEVIN WERBACH, RADIO REVOLUTION 39 (2004), http://werbach.com/docs/RadioRevolution.pdf.

[155] In a similar vein, Andrew Odlyzko insists that the real value in broadband is not content, but connectivity. Andrew Odlyzko, Content Is Not King 1–2 (Jan. 3, 2001) (unpublished manuscript), available at http://www.dtc.umn.edu/~odlyzko/doc/history.communications2.pdf.

[156] Mark Cooper, *Building a New Communications System for America at the Grassroots*

Information Technology and Innovation Foundation ("ITIF") similarly argue that the new broadband stimulus measures in the American Recovery and Reinvestment Act ("ARRA") should be used to support the deployment of moderate speed broadband to homes or businesses in unserved areas of the country.[157] It may well be that ubiquity should be our primary near-term goal, with larger, ultra-broadband pipes as the longer term goal of a comprehensive national broadband plan.

Finally, policymakers should want broadband platforms that are mobile. As George Ou has stated, "[i]n a world where wired broadband such as DSL, cable, and fiber are the last mile of the Internet, wireless technology is becoming more important,"[158] even to the extent that "it's easy to envision a day when wireless broadband access will surpass wired broadband services."[159] Mobility certainly will provide a new dimension to the future of the Internet.[160] Bringing the Web to mobile platforms will completely transform the way consumers interact with online services and each other.[161] Nonetheless there are immense hurdles to making this potentiality a reality.[162]

2. Bigger Broadband Internet Platforms

Bigger broadband pipes are the next major challenge in maximizing the supply availability component in the optimal broadband equation. A recent Communications Workers of America ("CWA") survey of broadband subscribers across the United States shows that the median download speed in this country is 1.9 Mbps.[163] Others put the number at somewhere under 5 Mbps.[164] By comparison, the median download speed in Japan is 63 Mbps, or over thirty times faster.[165] The United States "also trails South Korea at 45 Mbps, Finland at 21 Mbps, France at 17 Mbps, and Canada at 7.6 Mbps."[166] As Mark Cooper of the Consumers Union correctly points out, Asian nations such as Japan and

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Level, HUFFINGTON POST, Jan. 14, 2009, http://www.huffingtonpost.com/mark-cooper/building-a-new-communicat_b_157899.html.

157 EZELL ET AL., *supra* note 115, at 35.

158 *See generally* GEORGE OU, MANAGING BROADBAND NETWORKS: A POLICYMAKER'S GUIDE 35 (2008), http://www.itif.org/files/Network_Management.pdf.

159 *See id*.

160 *Id*.

161 EZELL ET AL., *supra* note 115, at 2.

162 *See*, *e.g.*, *id*. at 36 (discussing the bandwidth constraints and infrastructure costs of new wireless broadband technologies).

163 COMMUNICATIONS WORKERS OF AMERICA, SPEED MATTERS: A REPORT ON INTERNET SPEEDS IN ALL 50 STATES 2 (2008), http://www.speedmatters.org/document-library/sourcematerials/cwa_report_on_internet_speeds_2008.pdf.

164 EZELL ET AL., *supra* note 115, at 3.

165 COMMUNICATIONS WORKERS OF AMERICA, SPEED MATTERS, *supra* note 163, at 1.

166 *Id*.

Korea have faster speeds at less than half the prices of what U.S. consumers pay.[167]

As of June 2008, the United States was ranked fourteenth in broadband speed among thirty OECD nations.[168] As Rob Frieden writes, "the United States lags many developed and even developing nations using credible measures such as market penetration, cost, correlation with per capita Gross Domestic Product, annual growth, deployment of fiber optics links, and average speed."[169] Frieden attributes this failing to "politicized, distracted, and ineffectual" policy-making by the U.S. government.[170] On the other hand, the ITIF estimates that approximately three-quarters of this difference in deployment, speeds, and price can be attributed to non-policy factors, such as population density and copper loop lengths.[171] If accurate, this raises important questions about the extent to which government can effectively bolster the remaining policy quarter to tackle the technology possibility frontier.

For many, fiber is the ultimate technology to increase broadband capacity and reduce servicing costs. Verizon's deployment of its all-fiber FiOS network[172] is a good marker for the challenge of encouraging ultrabroadband investments in fiber-to-the-home. Verizon reportedly spends $4000 in capital cost per individual home to deploy the fiber necessary for FiOS service, which exceeds the $2500 to $3300 in projected incremental revenues and cost savings.[173] If accurate, these numbers point to the conclusion that it may be uneconomic for a private company to deploy fiber-to-the-home to many geographic regions and markets. On the other hand, given the sunk investment in passing approximately 18 million homes, greater revenues can be expected in the future to offset some of the costs.[174] Interestingly, some 70% of the total costs of fiber deployment is in the public works component, meaning the costs of utilizing labor, securing the rights of way, and digging trenches.[175]

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167 MARK COOPER, CONSUMER FEDERATION OF AMERICA, BROADBAND IN AMERICA 20 (2008), http://www.consumersunion.org/pub/pdf/broadband-america.pdf.

168 OECD, Directorate for Science, Technology, and Industry, Broadband Portal, Broadband Portal, http://www.oecd.org/dataoecd/22/45/39575011.xls (last visited Mar. 26, 2009).

169 Rob Frieden, *Lies, Damn Lies, and Statistics: Developing a Clearer Assessment of Market Penetration and Broadband Competition in the United State*s 27 (Dickinson School of Law Legal Studies Research Paper No. 13-2008, 2008) [hereinafter Frieden, *Lies, Damn Lies, and Statistics*], *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1159727.

170 *Id*.

171 ATKINSON ET AL., *supra* note 131, at 10.

172 Verizon, Fiber to the Premises and FiOS, *supra* note 38.

173 Hansell, A Bear Speaks, *supra* note 69. This number apparently does not include the additional costs of middle mile and backhaul services, which a non-incumbent provider would need to procure.

174 *Id*.

175 ATKINSON ET AL., *supra* note 131, at 27.

3. Popular Broadband Internet Platforms

In 2007, roughly half of all American households did not subscribe to a broadband service.[176] While the reasons for low subscribership are varied—ownership of a computer,[177] price, lack of perceived utility,[178] and other factors—the larger point is the room to capture the significant economic upside of increased broadband penetration. For example, according to the Brookings Institute, "for every one percentage point increase in broadband penetration in a state, employment is projected to increase by 0.2 to 0.3 percent per year," or about 300,000 jobs.[179] This demonstrates the important economic impact of the demand side of the equation.

Several nations surpass the United States in developing broadband access for homes, schools, and businesses.[180] According to the OECD, Denmark, the Netherlands, Norway, Switzerland, Iceland, Sweden, Korea and Finland lead in broadband penetration, each surpassing 30 subscribers per 100 inhabitants—despite the fact that the United States market is more than two-and-a-half times the next largest: Japan.[181]

As of 2008, the United States is ranked 18th in broadband pricing among thirty OECD nations, as ranked by ITIF.[182] Further, the United States ranks fifteenth in per capita broadband subscribership,[183] and broadband penetration growth in the United States is now the second slowest in the OECD on a percentage basis.[184] In fact, Korea's fiber penetration of 12.2 per 100 inhabitants is higher than total broadband penetration in five OECD countries.[185] Some analysts contend that "[t]he surest route to lower prices is provided by increasing competition in the delivery of broadband services."[186]

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176 COOPER, *supra* note 167, at 13.

177 Only two-thirds of Americans have a computer at home. ATKINSON ET AL., *supra* note 131, at ix.

178 Apparently, the primary barrier to consumer uptake of broadband, more than availability or price, is relevance. *See* John R. Harrington, Obama's Online Opportunities II, at 2 (2008); *see also* Scott Wallsten, *Broadband and Unbundling Regulations in OECD Countries* 18 (AEI-Brookings Joint Center for Regulatory Studies, Working Paper No. 06-16, 2006) ("[I]t is clear that some Americans do not have broadband simply because they do not want it, not because they cannot afford it or because it is not available.").

179 CRANDALL, LEHR & LITAN, *supra* note 111, at 2.

180 RISING ABOVE THE GATHERING STORM, *supra* note 153, at 12.

181 OECD, Directorate for Science, Technology, and Industry, Broadband Portal, http://www.oecd.org/dataoecd/21/35/39574709.xls (last visited Apr. 7, 2009).

182 THE INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION, 2008 ITIF BROADBAND RANKINGS 1 (2008), http://www.itif.org/files/2008BBRankings.pdf.

183 *Id*.

184 ATKINSON & WIAL, *supra* note 118, at 10.

185 *See* OECD, Broadband Portal, *supra* note 181.

186 CRANDALL, LEHR & LITAN, *supra* note 111, at 14.

B. Sufficiency of Net Capacity

Merely having the physical broadband infrastructure available is not sufficient in itself to guarantee an optimal platform for consumer access to the Internet. The broadband provider also must supply sufficient capacity on the network to support robust Internet access to allow for the full exchange of ideas and growth of commerce. This dimension can be thought of as the sufficiency of Net carriage; in this role the broadband providers are carrying Internet traffic on behalf of their end user customers.

The reality of the dynamic, multinet character of broadband is that it can be used for more than Internet access. For example, cable modems typically use only one of over 100 channels on a given cable system,[187] which arguably leaves sufficient capacity, at least for now, for a robust Internet experience for consumers. However, the countervailing economic incentives for broadband providers to fill their pipes with other services that generate a maximum direct return on investment must be acknowledged.[188] Newer technologies, such as next generation networks ("NGN") and IP Multimedia Subsystem ("IMS"), also make it easier for providers to partition their networks in ways that establish these private lanes separate and apart from access to the best-efforts public Internet.[189]

The notion of ensuring robust enough access to the Internet has not been well explored. Weiser and Atkinson made it one part of their overall "Third Way" strategy, acknowledging the incentives for broadband providers to limit access to "a basic level of open, best-efforts Internet access."[190] The objective is to ensure that users can access the Internet at fast, commercially viable speeds, while simultaneously sustaining the incentives for access providers to improve capacity dedicated to Internet access.[191]

Importantly, protecting the openness of Internet access itself, which has been the focus of the network neutrality debate,[192] may not be sufficient to create the right incentives for robust Internet access. For example, broadband pro-

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187 Saul Hansell, *Does Broadband Need a Stimulus?*, N.Y. Times Bits Blog (Jan. 21, 2009), http://bits.blogs.nytimes.com/2009/01/21/does-broadband-need-a-stimulus/.

188 *See* ANGELE A. GILROY, CRS REPORT FOR CONGRESS, NET NEUTRALITY: BACKGROUND AND ISSUES 1–2 (2008) [hereinafter GILROY, NET NEUTRALITY: BACKGROUND AND ISSUES], *available at* http://www.fas.org/sgp/crs/misc/RS22444.pdf (noting the financial incentive for network providers to charge content providers to prioritize their content above that of others and the problems and potential for abuse that such a multi-tiered system would create).

189 *See infra* notes 270–271 and accompanying text.

190 Robert D. Atkinson & Philip J. Weiser, *A "Third Way" on Network Neutrality*, NEW ATLANTIS, Summer 2006, at 55–56, *available at* http://www.thenewatlantis.com/publications/a-third-way-on-network-neutrality.

191 *Id*. at 2, 14.

192 *See* GILROY, NET NEUTRALITY: BACKGROUND AND ISSUES, *supra* note 188, at 1–2.

viders could decide to offer a broadband pipe that includes one or more private lanes of ever-expanding bandwidth, alongside an open Internet access component that is limited to, say, 256 Kbps. The resulting bandwidth-starved open Internet access service, even if it comports fully with whatever definitions of network neutrality govern at the time, would be bad for Internet consumers, competition, and innovation, and thus would not constitute an optimal broadband platform.

C. Integrity of Net Access

The final dimension of BAOIP is one that has garnered most attention in recent years: an open Internet, also known as network neutrality.[193] Traditional network neutrality refers to maintaining access to the totality of the public Internet, so that the "best efforts" Internet can continue to flourish.[194] Network neutrality is a shorthand term for talking about open on-ramps to the Internet—that is, last-mile Internet access over broadband facilities.[195] The concept of openness here means that broadband access providers should not be unduly discriminating among applications and content of users' choice.

The FCC's formulation of network neutrality is that all users of the Internet should expect, in an open and competitive marketplace, to retain the ability freely to utilize connectivity to send, receive, and interact with any and all combinations of applications and content, through any and all interoperable devices.[196] To an extent openness is in the eye of the beholder. Some argue that

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[193] *See generally id.* (describing network neutrality and the debate with which it is surrounded).

[194] *See id.*; NEWTON'S TELECOM DICTIONARY, *supra* note 140, at 643; *see also* Huston, *supra* note 36, at 1 (defining "best efforts" network).

[195] *See* Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. OF TELECOMM. & HIGH TECH. 141, 141–49 (2003).

[196] *In re* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities; Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services; Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review—Review of Computer III and ONA Safeguards and Requirements; Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment of Broadband Access to the Internet Over Cable Facilities, *Policy Statement*, 20 F.C.C.R. 14,986, ¶ 4 (Aug. 5, 2005) [hereinafter *Internet Policy Statement*]. According to the Open Internet Coalition, openness should be defined in terms of three complementary values. The first is consumer choice. End-users have the ability to access the lawful applications and content of their choice, and broadband access providers do not block, degrade, or impair users' access. The second is a level competitive playing field. Application and content providers can reach all end-users on a level competitive playing field, because broadband access providers do not unfairly discriminate among applications or content or provide faster access to some third-parties but not others. The third is innovation without permission. Innovators can deploy and make available to end users new

open means that a technology platform has either no restrictions or reasonable and non-discriminatory restrictions.[197]

One way to think about the concept of openness is to extend the philosophy of the various architectural elements of the Internet to broadband networks. Thus, fostering the integrity of Net access means maintaining the e2e principle, agnostic bearer protocols, and network interconnectivity, with no central planner.[198] In particular, the technical rule of e2e seems to map well to the legal rule of nondiscrimination, so that no network provider should disrupt the end-to-end nature of traffic between users. As some correctly have pointed out, the Internet is not a neutral place, at least in terms of market activities.[199] But the many exceptions to the e2e principle should not negate its simple power. The larger point is that we are talking about broadband networks. As long as the Internet remains robustly competitive, the various non-neutral elements should not be cause for major concern.[200] Thus, the proposed third BAOIP dimension of integrity of Net access can be influenced by the Internet's own e2e architecture, but need not reflect it completely.

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applications, content, social communities, and other software-based creations without having to get permission first from broadband access providers. *In re* Broadband Industry Practices, *Comments of the Open Internet Coalition*, W.C. Docket No. 07-52, at i–ii (June 15, 2007). *See* JOHN WINDHAUSEN JR., A BLUEPRINT FOR BIG BROADBAND 4, 74 (2008), http://net.educause.edu/ir/library/ pdf/EPO0801.pdf.

197 Thomas R. Eisenmann et al., *Opening Platforms: How, When, and Why?* 1 (Harvard Bus. Sch., Working Paper 09-030, 2008), *available at* http://www.hbs.edu/research/pdf/09-030.pdf.

198 Whitt and Schultze, supra note 2, at 31–35.

199 *See*, *e.g.*, Craig McTaggart, Was the Internet Ever Neutral? 1 (2006) (unpublished manuscript prepared for the 34th Research Conference on Communication, Information, and Internet Policy at George Mason University School of Law), *available at* http://web.si.umich.edu/tprc/papers/2006/593/mctaggart_tprc06rev.pdf (the Internet is not a neutral platform because of "preferential content arrangements, distributed computing, filtering and blocking to control network abuse, differential interconnection and interconnectivity, and the impact of resource-intensive applications and users"); John Crowcroft, *Network Neutrality: The Technical Side of the Debate—A White Paper*, INT'L J. OF COMMC'NS 567–579 (2007), *available at* http://ijoc.org/ojs/index.php/ijoc/article/viewFile/159/84 (the Internet has never been a level playing field, for many accidental and some deliberate reasons). In particular, Geoff Huston argues that, while the basic transmissions and switching functions of the Internet remain end-to-end, the edge of the Internet appears to be evolving into a "middleware" system dominated by firewalls, filters, Network Address Translators ("NATs"), Web caches, DNS interceptors, load balancers, and various constrained edge devices. The End of End to End?, http://www.potaroo.net/ispcol/2008-05/eoe2e.html (last visited Apr. 18, 2009). Nonetheless, these many exceptions to the e2e principle do not yet appear to have swallowed the principle outright.

200 On the other hand, there is fresh evidence that Internet backbone providers may be prioritizing traffic flows coming from different sources, as well as discriminating against UDP and BitTorrent traffic. *See* Ying Zhang, Z. Morley Mao, & Ming Zhang, Ascertaining the Reality of Network Neutrality Violation in Backbone ISPs 6 (2008) (unpublished manuscript), *available at* http://conferences.sigcomm.org/hotnets/2008/papers/21new.pdf.

Communications networks should be open for fundamental economic and non-economic reasons. Paul Budde explains that such networks are the most basic and profound aspect of a nation's infrastructure, deliver better overall economic performance than a more closed or restricted network, provide fertile ground necessary for the next big—and not so big—ideas, and are necessary to prevent network owners from exploiting end users.[201] In particular, some assuredness of an open Net—whether through the market, the state, or some combination of the two—means that providers of applications and content will be incented to create new innovations, resulting in a virtuous innovation cycle that ultimately benefits end users.[202] Some assuredness of more and bigger broadband pipes leads to broadband-optimized software, which broadband consumers will then take up and use.[203] Other consumers will want broadband access in order to utilize the new applications and content, which drives broadband popularity, in turn driving broadband deployment.[204]

This paper will not wade deeply into current disputes over network neutrality, at least on the familiar terms of that debate. Instead, the focus will be shifted from the ends of an open Internet to the means. Even many opponents of network neutrality regulation indicate that they favor an open Internet.[205] The issue for them is what, if anything, the government does to encourage an

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[201] PAUL BUDDE, BIG-THINK STRATEGIES: OPEN ACCESS 2–3 (2009), http://www.buddle.com.au/presentations/content/2009_Big_Think_-_OAP_-_Public_Copy.pdf.

[202] This also plays into the inherent uncertainties of markets, particularly highly dynamic and disaggregated ones like the Internet. If policymakers and/or market players do not know what users want—or worse, think they know, but incorrectly—the risk of making decisions that will result in sub-optimal economic outcomes is high. An open broadband platform is best equipped to deal with these uncertainties. Further, to employ the conceptual lens of the evolving fitness landscape, e2e allows for the survival of the fittest, and not the favored. *See* Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69, 83–84 (2004).

[203] *See*, *e.g.*, AOL with Broadband, http://broadband.aol.com/broadband/aol-with-broadband.adp (last visited Mar. 9, 2009).

[204] Jonathan Zittrain discusses how open systems are prone to abuse, which invites calls to tighten or close the systems altogether. Our familiar toolkits for handling problems such as abuses of open systems are not particularly attuned to maintaining generativity; traditional regulatory interventions are both under- and over-inclusive. ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 150.

[205] *In re* Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications; Broadband Industry Practices Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management," *Memorandum Opinion and Order*, 23 F.C.C.R. 13,028, 13,088 (Aug. 1, 2008) (McDowell, Comm'r, dissenting) [hereinafter *Comcast Order*] (dissenting to the Commission's decision to censure Comcast for undertaking unreasonable management techniques, while stating: "The Internet should remain open and free").

open Internet.[206] An open Net is not a prescription; it is an environment. So it is not the ends but the means employed that has become the source of most controversy, and the topic explored later in this Article.

VI. A CLASH OF INCENTIVES: THE CURRENT STATE OF THE FITNESS LANDSCAPE

Now we have reached the point of combining the components of the policy design space with what we know of the broadband market. Like the economy as a whole, the telecommunications sector constitutes a complex, evolving system.[207] Telecom policy is embedded in multiple layers of social arrangements such as constitutional provisions, statutory provisions, and specific regulatory institutions.[208] By one formulation, public policy-making includes setting the agenda, specifying alternative policy choices, selecting a policy, and implementing the decision.[209] A successful policy outcome depends on success in all these processes.[210] Once policymakers decide that some form of government involvement is warranted, choices are made among different organizations and institutions.[211]

In this part, the conceptual tool of the fitness landscape is employed to assess how the exisiting incentive structures of the market, and their potential mismatch with our suggested public policy objective or BAOIP, raise unique public policy concerns. In Part VII, the various institutional options for crafting a framework for government oversight of broadband networks are examined. Finally, Part VIII will complete the paper with a discussion of the prescriptive and adaptive approaches to public policy, and suggest an assortment of adaptive tinkering[212] solutions for policymakers to consider.

As demonstrated in a previous paper, the FCC's decisions "do not always match up well with the dynamic ecosystem with which it is coevolving."[213] The

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206 *See*, *e.g.*, *id*. ("Our policies, and the policies of all governments everywhere, should promote [an open and free Internet].").

207 *See* Barbara A. Cherry & Johannes M. Bauer, Adaptive Regulation: Contours of a Policy Model for the Internet Economy 1–3 (2008) (unpublished manuscript), *available at* http://quello.msu.edu/complexity/ cherry-bauer.pdf.

208 *See* Johannes M. Bauer & Steven S. Wildman, *Looking Backwards and Looking Forwards in Contemplating the Next Rewrite of the Communications Act*, 58 FED. COMM. L.J. 415, 419 (2006).

209 *See* Barbara Cherry, *Analyzing the Network Neutrality Debate Through Awareness of Agenda Denial*, 1 INT'L J. OF COMMC'N 580, 580 (2007) [hereinafter Cherry, *Analyzing the Network Neutrality Debate Through Awareness of Agenda Denial*].

210 *See id*.

211 Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 GEO. WASH. L. REV. 1, 6–7 (2008).

212 *See* discussion *supra* Part II.B.2.

213 Whitt, *Adaptive Policymaking*, *supra* note 3, at 52.

FCC's greatest challenge may be to discipline effectively market behavior with a quick and light touch. In order to buttress the forces of current and unborn innovation, spur economic growth, and safeguard all forms of social connectivity, policymakers should invest in adaptive policies—those that are more cautious, macroscopic, incremental, experimental, contextual, flexible, provisional, accountable, and sustainable.

The operative question here is whether the market—without a governing legal framework, institutional overlays, or policy projects in place—will incent broadband companies to provide all three physical and virtual dimensions of optimal Internet platforms to consumers. The mismatch of market incentives and policy objectives may help to understand the postures of the major players. There are at least four provisional answers to consider: the prospect of ruinous broadband competition, the explosion of positive externalities from the Internet, financial incentives for broadband providers to prioritize traffic both within the Internet and via managed networks, and clashing mindsets of the major market agents.

A. The Prospect of Ruinous Competition

Robert Atkinson reminds us "competition is a means to an end, not an end in itself."[214] Among other things, this observation should lead policymakers to examine the premise that fostering more facilities-based broadband competition should be a public policy priority. But is that necessarily the case?

There is reason to believe that additional competition in the broadband market actually harms incentives to invest. This is based on the economics of broadband discussed previously—high fixed costs mean few competitors, while adding more competitors will increase everyone's costs relative to a limited pool of consumer revenues.[215] Atkinson explains this as "the engineers' view"[216] of competing broadband pipes:

> If in the face of more competitors, broadband providers are forced to amortize the fixed costs of their networks over significantly fewer customers, total broadband costs will rise—and prices will almost certainly have to rise as well, even if profits are squeezed and efficiencies maximized. The only way this situation could be averted would be if a new entrant was not successful in gaining any broadband customers. In this case, overall broadband costs would still increase but the costs would be borne by the new entrant's bondholders and stockholders. If all new entrants gained customers, however, then the incumbents by definition would have fewer customers and hence

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214 *See* ATKINSON, *supra* note 67, at 1 ("[I]t's a mistake for policymakers to assume that if they simply 'push the competition lever,' all the problems with broadband policy will be resolved.").

215 *See id*. at 5.

216 *Id*. at 3.

less revenue to amortize the costs of their networks.[217]

Thus, if multiple competing physical networks bring these kinds of costs, competition actually can produce inefficient investment patterns, with companies making duplicative investment not needed in a more rational marketplace.[218] Ultimately, it may not be efficient economically to have additional competing providers in the broadband market. If so, then Christopher Yoo, among others, is off-base when he claims that the central goal of broadband policy is to improve the competitiveness of the last mile.[219]

The policy conundrum boils down to choosing between one or two cost-effective pipes versus many non-cost-effective competing pipes. Atkinson says that the policy solutions include keeping the current duopoly, creating more pipes (which may be economically inefficient and even damaging), regulating open pipes (network unbundling), or regulating duopoly pipes (network neutrality).[220] The issue is to "attain the right balance between the cost-efficiency of fewer networks and the competitive benefits of more networks," which is a difficult task for all involved.[221]

If robust multi-platform competition is unlikely—or even ruinous—other public policy objectives should be examined. There may be related normative commitments at stake in the policy debate, including the goal of More Good Ideas and the objective of harnessing BAOIP.

B. Spilling Over from the Public Internet

Another potential clash between economic incentives and policy objectives arises in the form of positive externalities—or spillovers—generated by broad-

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[217] *Id*. at 5.

[218] *See* ATKINSON, *supra* note 67, at 4–6; *see also* F.A. Hayek, *Competition as a Discovery Procedure*, QUARTERLY J. AUSTRIAN ECON., Fall 2002, at 9, 10 (translation from German of 1968 Hayek lecture *Der Wettbewerb als Entdeckungsverfahren*).

[219] *See* Chistopher S. Yoo, Network Neutrality, Consumers, and Innovation, 43, 97–98 (Univ. of Penn. L. Sch., Inst. for Law & Econ., Research Paper No. 08-40, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1262845; *see also* Frischmann & van Schewick, *supra* note 129, at 390 ("[Yoo's] analysis of network neutrality is grounded on the view that the 'central goal of broadband policy' is 'improving the competitiveness of the last mile.' This is too narrow a frame."). Spulber and Yoo argue that duplication of costs is an inevitable part of the market-based economy, and in any event is not a rational basis for governmental intervention. Daniel F. Spulber & Chistopher S. Yoo, *Toward a Unified Theory of Access to Local Telephone Networks*, 61 FED. COMM. L. J. 43, 69–70 (2008) [hereinafter Spulber & Yoo, *Toward a Unified Theory of Access*]. Nonetheless the upfront costs of building local/regional telecom plant are considerable. In any event, the argument here is not for or against regulation, but simply to examine the implications for broadband competition as a public policy objective. *Id*.

[220] *See* ATKINSON, *supra* note 67, at 6–9.

[221] *See id*. at 5.

band platforms when they facilitate Internet access.[222] There is a wedge between broadband providers' private interests and the larger social interests.[223] Of the various network externalities that emerge from broadband networks, the direct effects pertain to benefits derived by subscribers from joining a network, while the indirect effects pertain to broadband's empowerment of applications and content.[224] Even those who believe that platform owners have powerful economic incentives to welcome all broadband applications acknowledge a number of important exceptions to that claimed rule.[225] This is one of the reasons that some consider Internet content and applications companies to be freeriders on the backs of the broadband providers.[226] Broadband providers see the tradeoff as "extract[ing] some if not most of the rent that might otherwise flow to the developers of applications, innovations, in exchange for making these available for use by their clientele."[227] However, the inability to discriminate among users and uses precludes broadband providers from extracting a share of the uncaptured spillovers.[228]

There are significant social welfare benefits to a spillover-rich infrastructure environment, many of which would be lost if the infrastructure owners were allowed to internalize them.[229] As an infrastructure resource, the Internet serves as an input to the production of a wide range of private, public, and nonmarket goods. The positive externalities associated with the various productive activities that users enjoy and the positive spillovers associated with the public and nonmarket goods they produce have the potential to create significant social value.[230]

As Frischman and van Schewick suggest, "productive users will not internalize these externalities . . . [and] network providers do not internalize these

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222 *See* discussion *supra* Part IV.B.

223 Frischmann & van Schewick, *supra* note 129, at 390.

224 EZELL ET AL., *supra* note 115, at 29.

225 *See* Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J.L. & TECH. 85, 89, 105 (2003).

226 Paul A. David, *Economic Policy Analysis and the Internet: Coming to Terms with a Telecommunications Anomaly* 9 (Stanford Institute for Economic Policy Research, SIEPR Discussion Paper No. 06-04, 2006), [hereinafter David, *Economics Policy Analysis and the Internet*], http://www.stanford.edu/group/siepr/?q=system/files/shared/pubs/papers/pdf/06-04.pdf (describing how Skype VoIP freerides on Broadband).

227 *Id*.

228 Frischmann & Lemley, *supra* note 83, at 294 (describing how broadband providers "cannot base access decisions or pricing on who is sending packets or how those packets may be used; nor can they optimize the infrastructure for a particular class of end uses or end users").

229 *See id*. at 277–79.

230 *See*, *e.g*., *id*. at 257–58 (explaining, as a starting point, that "[t]here is abundant evidence that the social value of innovations far exceeds the private value" and that there "is also good evidence that . . . these spillovers actually encourage greater innovation").

externalities either."[231] Further, "network policymakers face the classic tradeoff of securing the immediate benefits of closed standardization by sacrificing the technological flexibility that is conducive to future radical innovations."[232] Conversely, broadband providers who curtail innovation on their networks prove the existence of externalities: the provider does not pay the full social costs of reduced innovation and growth, which is the inverse of not capturing full positive spillovers.[233]

Broadband providers may not be a direct part of the Internet value chain—aside, of course, from providing their own broadband-based applications and content—and yet they need financial incentives to build and upgrade infrastructure.[234] Due to this combination of broad shared benefits and narrow private costs, it is entirely possible that "the economically and socially optimal network will never be financed and built by private entities."[235] A recent ITIF paper puts it more directly: given the significant positive externalities, "market forces alone will not deliver the societally-optimal level of next-generation broadband."[236] This situation invites some compelling questions. How do we integrate positive—and negative—externalities into our economic system? How do we find a way to give spillovers positive economic value so broadband providers will have an incentive to protect them? How do users internalize the true benefits of the Internet, while also accounting for the actual costs of broadband infrastructure? Or as Brett Frischmann asks, how do we compensate infrastructure capacity producers for their investments?[237] Is it the proper role of the government to find ways to fill in that gap?[238] These questions merit some attention in the discussion of the current and projected fitness landscape. Further, the issue of capturing or creating positive spillovers is implicated in another issue regarding broadband providers: the right to prioritize.

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231 Frischman & van Schewick, *supra* note 129, at 424.

232 David, *Economics Policy Analysis and the Internet*, *supra* note 226. When considering the property rights of broadband providers, the property rights of applications providers normally are not included.

233 *See* Frischmann & Lemley, *supra* note 83, at 298.

234 *See id*. at 296 (explaining that with respect to broadband deployment, "[t]here is little doubt that investment incentives matter").

235 BUDDE, *supra* note 201, at 10.

236 EZELL ET AL., *supra* note 115, at 29.

237 Brett M. Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917, 1021 (2005).

238 Per Kenneth Arrow, a neoclassical economist, when social returns exceed private returns, government should consider an investment role, but not necessarily a more direct role. Arrow's point merits closer consideration. KENNETH J. ARROW, ECONOMIC WELFARE AND THE ALLOCATION OF RESOURCES FOR INVENTION 20 (1959).

C. Prioritizing within the Public Internet

The overarching policy objective of optimal broadband deployment—bigger and better on-ramps to the Net—may benefit from leveraging market incentives. If BAOIP is an important policy objective, which policy best produces the necessary market incentives to invest in such networks: one that allows traffic prioritization, or one that does not?[239]

Prioritization is a term generally used to describe the preferential treatment of some Internet traffic over other traffic, typically by moving to the head of the line those packets with certain IP or Ethernet header information.[240] Routers equipped with deep packet inspection ("DPI") technology are but one way of achieving this technical goal.[241] Engineers disagree vehemently over whether or not prioritization of certain Internet traffic is necessary as a form of network management.[242] For the purpose of this Article, the claim that prioritization is not inherently an unreasonable network management practice when applied to Internet traffic is accepted as true.[243] In particular, there is evidence to suggest that adding more capacity by itself is insufficient to obviate the need for traffic management, and that prioritization mechanisms like "DIFF-SERV"[244] can optimize the end user's ability to utilize network services based on the three interrelated characteristics of low packet delay, high bandwidth, and high volume.[245] Moreover, given the varying network topologies and configurations among

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[239] This discussion will not address the possibility that allowing broadband providers to engage in traffic prioritization can amount to harmful tampering in the market's evolutionary process.

[240] *See* Philip J. Weiser, *The Next Frontier for Network Neutrality*, 60 ADMIN. L. REV. 273, 277–78 (2008) [hereinafter Weiser, *The Next Frontier for Network Neutrality*].

[241] M. CHRIS RILEY & BEN SCOTT, DEEP PACKET INSPECTION: THE END OF THE INTERNET AS WE KNOW IT? 13–14 (2009).

[242] *Compare Hearing on Net Neutrality Before S. Comm. on Commerce, Science and Transp.*, 109th Cong. 2 (2006) (statement of Gary R. Bachula, Vice President, Internet2), *with* OU, *supra* note 158, at 38.

[243] *See* OU, *supra* note 158, at 10–13. It is certainly the case that broadband providers today manage their networks and enhance user experience via various mechanisms such as VPNs, CDNs, and local caching. To the extent these functionalities are replicable by others in a competitive market, there should be significantly less concern about them than with router-based prioritization mechanisms.

[244] *See* Diffserv vs. MPLS, http://www.protocols.com/papers/diffserv.htm (last visited Jan. 28, 2009). Diff-serv is an Internet Protocol which "relies on traffic conditioners sitting at the edge of the network to indicate each packet's requirements." *Id*.

[245] OU, *supra* note 158, at 22. Some observe that broadband providers must have the ability to manage their networks in order to preserve Internet innovation and creativity. CHARLES M. DAVIDSON & MICHAEL J. SANTORELLI, NETWORK EFFECTS: AN INTRODUCTION TO BROADBAND TECHNOLOGY & REGULATION 12 (2008), http://www.ncta.com/DocumentBinary.aspx?id=774. One can accept this argument and still question whether and when network management can morph into paid prioritization or other practices unrelated to the task of alleviating overall network congestion.

different broadband providers, it likely would be difficult to fashion a one size fits all network management policy.[246]

The more interesting question is whether to allow broadband providers to prioritize Internet traffic not for reasons of reasonable network management, but rather to gain additional revenues from third party applications or content providers.[247] Broadband providers claim they need additional resources from paid commercial deals to prioritize Internet traffic, via Quality of Service ("QoS") and other techniques, to finance the further build-out of their networks, and ultimately to provide beneficial new services to consumers.[248] Christopher Yoo and others argue that prioritization is consistent with the nature of the Internet as a two-sided market; with consumers on one end, and applications and content providers on the other end.[249] In essence, prioritization can allow the broadband provider to capture at least some of the spillovers of their network investments.

Proponents of network neutrality disfavor prioritization, because of the resulting economic incentives structure.[250] One argument they raise is that traffic prioritization in the form of third party agreements threatens innovation and competition online; under this view, access providers can use priority to advantage certain application or content providers irrespective of user preferences.[251]

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246 Christopher S. Yoo, *Network Neutrality, Consumers, and Innovation*, 2008 U. CHI. LEGAL F. 179, 201. For example, in hybrid fiber coaxial architecture, traffic is aggregated so that consumers share bandwidth with traffic from their neighbors. By contrast, DSL traffic typically is not aggregated until it reaches the central office ("CO"), so the local connection between the consumer and the CO is not subject to congestion at the neighborhood level. *See id*.

247 Atkinson & Weiser, *supra* note 190, at 47, 49–50. Some call this form of paid prioritization "access tiering." Kevin Werbach, *Only Connect*, 22 BERKELEY TECH. L.J. 1233, 1273 (2007) [hereinafter Werbach, *Only Connect*].

248 It is noteworthy that many of the same telephone companies used the "incentives to invest" argument successfully, first to significantly reduce competitive carriers' regulatory rights to broadband network inputs, and then to eliminate independent ISPs' regulatory rights to nondiscriminatory network access. One can posit whether the mere fact that such threats can be made—and apparently believed—confirms the fact that there are few if any competitive broadband alternatives available. As Schumpeter points out repeatedly, robust competition normally creates its own healthy incentives to invest. *See* ATKINSON, THE ROLE OF COMPETITION IN A NATIONAL BROADBAND POLICY, *supra* note 67, at 7 (citing JOSEPH SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY (1942)).

249 *See* Yoo, *supra* note 246, at 203. One response is to ask why this two-sided market is not divided as between the consumer and end user fees, and the Internet backbone provider and peering or transiting fees. One also could argue that establishing a private relationship between the broadband provider and a third party changes the unique nature of the Net itself. Perhaps one answer is that the best efforts public Internet—however defined—is a one-sided market, while private networks are two-sided markets.

250 *See* Nachbar, *supra* note 64, at 120, 123 (discussing network neutrality proponents' arguments that prioritization will harm competition and stifle innovation).

251 Moreover, broadband providers who can define the economic and technical arrangements for reaching its users are "unlikely to optimize for the unexpected and uncertain bene-

The broadband providers assume a gatekeeper role, picking those who will succeed and fail based solely on what they pay.

A second argument made by proponents of network neutrality against prioritization is that the ability to get paid to prioritize certain traffic also threatens to undermine the incentive to invest in expanding overall broadband capacity.[252] By definition one cannot have a fast lane without a slow lane. Once prioritization becomes a profit center for the broadband provider, that provider has less incentive to eliminate the capacity constraints that justify QoS fees to customers. Relying on QoS for a return on investment thus can deter broadband providers from building bigger, faster, ubiquitous broadband pipes. Prioritization quickly can become an unspoken rationale to maintain artificial broadband scarcity. The resulting market structure also would be inconsistent with an environment of innovation without permission that has fostered so much of the Internet's success.

Some believe the broadband market is robustly competitive, with private investment of literally hundreds of billions of dollars.[253] If true, this level of investment suggests that there is no need for subsidies, and further, no need for prioritization to support infrastructure investment. On the other hand, it is also unclear whether a ban on paid prioritization pushes the broadband providers' incentives to deploy infrastructure "below a socially efficient level."[254] A further argument is that "[u]ltimately, the level of profits needed to guarantee efficiency incentives is unknown, making it difficult to assess the extent of the problem."[255]

Non-prioritized broadband connections actually may create their own enhanced incentives to invest in broadband facilities. For example, a recent econometric study found that cable and telephone companies providing broadband services are more likely to further develop their infrastructure—resulting in higher data speeds—if they do not charge Web-based content companies for preferential treatment.[256] Another study concludes that non-neutral networks

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fits of new market entrants." Werbach, *Only Connect*, *supra* note 247, at 1275.

[252] *See* Nachbar, *supra* note 64, at 120.

[253] *See* JEFFREY A. EISENACH, BROADBAND POLICY: DOES THE U.S. HAVE IT RIGHT AFTER ALL? 1 (2008), http://www.itif.org/files/Eisenach_USbroadbandpolicy.pdf (stating that broadband providers invest tens of billions of dollars annually).

[254] Frischmann & van Schewick, *supra* note 129, at 420.

[255] *Id*. at 421.

[256] HSING KENNETH CHENG, SUBHAJYOTI BANDYOPADHYAY & HONG GUO, THE DEBATE ON NET NEUTRALITY: A POLICY PERSPECTIVE 30 (2007), *available at* http://www.hearusnow.org/fileadmin/sitecontent/thedebatenonetneutrality.pdf. As the authors concluded, based on detailed economic analysis, "the incentive for the broadband service provider to expand under net neutrality is unambiguously higher than under the no net neutrality regime." *Id*. Obviously this outcome "goes against the assertion of the broadband service providers that under net neutrality, they have limited incentive to expand." *Id*. Certainly the fact that Verizon has pursued its expensive investment in fiber-to-the-home net-

are not a prerequisite to the promotion of network infrastructure investment, but instead "will ultimately stifle the creation of a rich competitive eco-system consisting of both infrastructure and downstream service/content providers."[257] That same study explains that end users are more satisfied in a neutral Internet access environment, due to the inherent market uncertainty created by the Internet.[258] Further, if the broadband provider must rely on the public Internet to reach consumers like everyone else, that provider may be more likely to want to ensure that network capacity is built-out more quickly to accommodate its own service offerings.

Finally, above and beyond the need for some form of network management, broadband providers argue that they need the flexibility to create network-based innovations and pro-consumer offerings.[259] This is a valid point and should not be discounted. Government's proper place is not to throttle innovation, whether at the edge or in the core of the network. The key question is whether there are prioritization deals between network owners and application providers that do not undermine investment incentives in broadband capacity, and still promote robust and open Internet access.[260] Certainly the possibility should not be dismissed outright, although the bar would appear to be set rather high.[261] Regardless, these kinds of highly technical and nuanced engineering issues suggest that detailed prospective regulation of market behavior may not be the best course of action.[262]

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works, even without third-party prioritization deals, lends additional support to this view.

[257] Mark Gaynor & Scott Bradner, *Statistical Framework to Value Network Neutrality*, 17 MEDIA L. & POL'Y 24, 24 (2007).

[258] *Id*. at 26, 28 ("Market uncertainty is the inability of service and content providers to predict what users will like and how users value the features of a service or the selection of content. This uncertainty exists partly because users often don't know what they want until they see it.").

[259] *See* Yoo, *supra* note 246, at 217.

[260] For example, Atkinson and Weiser suggest a standard that requires the broadband provider to convincingly justify that any such arrangement is a pro-competition and efficiency-enhancing business practice. Atkinson & Weiser, *supra* note 190, at 57.

[261] At least one study claims that allowing broadband providers to provide paid "premium transmission" for content providers increases innovation at the network edge incents greater infrastructure build-out, and increases subscribership. Mark A. Jamison & Janice A. Hauge, Getting What You Pay For: Analyzing the Net Neutrality Debate 2, April 20, 2008, http://www.cba.ufl.edu/purc/purcdocs/papers/0705_Jamison_getting_what_you.pdf. Notably, as the study's authors admit, the economic model includes assumptions and limitations including: (1) the broadband provider is not also providing content; (2) the broadband provider commits to maintain "standard transmission service" speeds; (3) "lower value" content sites have the incentive and ability to outbid "higher value" content sites for premium service; and (4) the effects of peer-to-peer communications are not analyzed. *Id*. at 12–20. Each of these assumptions appears open to challenge, which in turn may undermine the model's efficacy.

[262] As Yoo points out, for example, various broadband technologies differ widely in their susceptibility to local congestion. Yoo, *supra* note 246, at 199. At least some of the techni-

In sum, economic incentive arguments with respect to prioritization must be considered seriously, but not just one set of arguments from one set of entities. There are two general types of incentives involved: investing in broadband networks generally—to support all types of applications and content, including private networks and proprietary content, and investing in Internet access—to support all Net-based applications and content. Further, to capture the full picture of market incentives, our worldview should include incentives to invest in applications, content, and devices as well. The next subsection addresses another facet of the incentive structure for broadband providers.

D. Favoring Managed Networks

Aside from avoiding ruinous competition, capturing externalities, and signing paid prioritization deals, broadband providers are faced with at least one further element of their incentive structure: building private, managed networks to carry non-Internet traffic. These new networks hold the potential to generate significant revenues without the feared constraints of network neutrality, but do raise other pertinent policy concerns.[263]

This scenario is likely and already occurs in practice.[264] Of course different types of networks employ different private network revenue models. Cable operators in the United States typically reserve more than 90% of the frequency spectrum over their cable infrastructure for their own phone and television service, "leaving only a few channels to their Internet service."[265] AT&T's

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cal, and hence market, reasons to utilize prioritization to combat latency (time required to move packets across a network) may go away at sufficiently high broadband capacities. Nonetheless, jitter (bursting traffic competing for space in the arrival queue) remains a difficult issue, even in relatively high-capacity networks. See Douglas A. Hass, *The Never-Was-Neutral Net and Why Informed End Users Can End the Net Neutrality Debates*, 22 BERKLEY TECH. L.J. 1565, 1627 n.339 (2007).

[263] This section does not address the separate but important challenge of defining "private networks" versus the "public Internet." For example, should a definition focus on the use of networking resources like IP addresses, or the fact that the content or applications in question originated at some point on the Internet? Indeed, as the policy implications of private networks become clearer, whether and how we can draw and police this line will take on more urgency.

[264] *See*, *e.g.*, HughesNet, Private Networks Via Broadband Satellite, http://business.hughesnet.com/resources/brochures/private-networks (last visited Apr. 9, 2009) (describing HughesNet's service offering as an "easy-to-deploy private network that doesn't touch the internet" and allowing "multilevel prioritizations" so that "mission-critical applications can be set to high priority to ensure whatever applications require the highest priority get though all the time").

[265] ANDREA RENDA, I OWN THE PIPES, YOU CALL THE TUNE: THE NET NEUTRALITY DEBATE AND ITS (IR)RELEVANCE FOR EUROPE 16 (2008), http://shop.ceps.eu/downfree.php?item_id=1755.

U-Verse[266] shares bandwidth with its best-efforts public Internet access,[267] while Verizon employs different lasers for the Internet and its own private network.[268] The commonality is the incentive to use a considerable portion of broadband capacity for these managed, private networks.

Business models based on prioritization can be implemented either in the public Internet, or through separate private networks. Again, the broadband providers' incentives are important. George Ou finds, for example, that prohibiting or limiting paid prioritization on the public Internet compels broadband providers to move to a private network partition, using circuit-switching networks on the same physical cables.[269] On the other hand, one can imagine the broadband providers prefer the public Internet, and its ready audience of billions of eyeballs, as the platform for their proprietary content and applications, rather than relying on new service platforms. The interrelationship between the two business models, and how public policy can affect them, should not be discounted.

One possible way that broadband providers could institute a managed network is through NGN technologies. For example, IMS is the "overlay to end all overlays," a new network layer that creates a foundation of future service delivery infrastructure.[270] IMS essentially enables service providers to create a "stateful network" that moves intelligence into the transport layer to support new service functionalities. More ominously, according to one commentator, the emerging consensus is that broadband providers could begin using IMS to monetize certain traffic flows by "put[ting] a control layer and a cash register over the Internet and creatively charge for it."[271]

However one views the advent of NGN technologies like IMS, there is little

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[266] AT&T U-Verse is a residential interactive digital video recording and television service. AT&T U-Verse TV, https://uma.att.com/components/VideoBasic/104297-5-AMSS-X-DMA1-IFRAME.html (last visited Jan. 28, 2009).

[267] AT&T U-Verse, Internet Protocol Television (IPTV), https://uma.att.com/general/1684-AMSS-X-DMA1-IFRAME.html (last visited Jan. 28, 2009).

[268] Verizon, Fiber to the Premises and FiOS, *supra* note 38.

[269] Ou, *supra* note 158, at 41 ("When that happens, they'll use fixed bandwidth allocation to the Internet service and the television service so . . . the bandwidth cannot be dynamically shifted to the Internet service and the consumer gets less Internet bandwidth.").

[270] JOE MCGARVEY, IMS STATUS REPORT: A PROTRACTED ADOPTION (2008), http://www.currentanalysis.com/m/ericsson/CurrentAnalysis-IMS.pdf (last visited Apr. 18, 2009).

[271] John G. Waclawsky, *IMS 101: What You Need to Know Now*, BUS. COMM. REV., June 2005, 18, 23. The title of one recent Cisco white paper seems to encapsulate this darker view: *Managing "Over-the-Top" Web-Based Content and Services*. *See* Cisco, Managing "Over-the-Top" Web-Based Content and Services, http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns549/ns746/net_implementtion_white_paper0900aecd8066427b_ns537_Networking_Solutions_White_Paper.html (last visited Apr. 18, 2009).

dispute that they challenge the ability of end user devices and software to replicate the network's own functionality. That challenge may only represent the progress of better technology, which policymakers should be loathe to discourage, but it also may be more (or less) than that. For example, if IMS-hosted applications servers are more efficient and better performing than servers deployed to carry best-efforts Internet traffic, should we care? Perhaps if Net servers are deliberately not upgraded, or end user Net capacity is noticeability constrained, or all Net traffic must traverse the private network first.

Jonathan Zittrain suggests that network neutrality advocates to date generally have disregarded what he sees as blatantly non-neutral walled gardens, consisting of "traditional and emerging appliancized services that are not open to third-party tinkering."[272] It seems unlikely that public policy will attempt to restrict unduly the ability of broadband providers to adopt these private network models. Nonetheless, providers have concrete ways to create incentives for consumers to shy away from the public Internet in favor of using proprietary services provided over private networks. For example, providers recently have begun experimenting with imposing bandwidth limits, download limits, and pricing limits, such as tiered and metered pricing, ostensibly as acceptable ways to manage congestion on their networks.[273] These same practices, inadvertently or not, can have the effect of deterring consumer use of Internet applications and content, and concomitantly, Internet-based competitive options.

E. Locking in Mindsets

Emergence economics suggests that when analyzing a market structure, there are other factors to consider beyond how agents respond to financial incentives.[274] Behavioral economics and game theory show that firm managers approach market situations with certain mindsets, based in part on levels of trust with third parties.[275] Sometimes these views are irrational, adversely af-

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[272] ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 181. Because these closed services often seek to exploit the benefits of third party contributions generated via the Internet, Zittrain suggests regulation of this "bait and switch." *Id*. at 183.

[273] *See*, *e.g*., Grant Gross, *Comcast Sets Monthly Bandwidth Limit for Customers*, PCWORLD, Aug. 2008, http://www.pcworld.com/businesscenter/article/150451/comcast_sets_monthly _bandwidth_limit_for_customers.html

[274] *See generally* Peter H. Huang, *How Do Securities Laws Influence Affect, Happiness, & Trust?*, 3 J. BUS. L. TECH. 257, 259–60 (2008) (arguing for a cost benefit analysis in securities regulation that focuses on "measuring investors' confidence, happiness, and moods").

[275] *See generally* Donald C. Langevoort, *Selling Hope, Selling Risk: Some Lessons for Law from Behavorial Economics About Stockbrokers and Sophisticated Customers*, 84 CAL. L. REV. 627, 632–34 (1996) (arguing that the centerpiece of relationships in behavorial economics is trust).

fecting market behavior.[276] Regardless, an important maxim of game theory is to "understand the other player's perspective . . . what they know, what motivates them, and even how they think about you."[277] With regard to broadband-related policy issues, perhaps each side in the debate simply is trapped within its own cognitive biases. For some "Net heads,"[278] the Internet is perfect as is, and broadband providers should be content to serve as dumb pipes. For many in the broadband provider camp, by contrast, the Internet is inherently imperfect and requires various degrees of ordering, prioritizing, and channelizing to best serve consumer needs.

In addition, agents' responses can depend on their sense of trust in other players in the market. One major problem separating the Net and Broadband communities is that neither one fully trusts the other. The Net community fears that the broadband providers are not committed to an open Net, while the Broadband community fears that the Net community is not committed to deployment of robust and multi-faceted broadband networks.[279] Whether one believes these claims or not is beside the point; the issue is whether the market agent itself is committed to that viewpoint. If the players themselves believe, the fear-generated incentives surely will follow. For instance, if senior management at a broadband provider is convinced that any government regulation inevitably thwarts its incentives to invest in broadband networks, that mindset will dictate behavior, regardless of the veracity of the belief.[280]

Market uncertainty is a critical factor in determining the relative value of BAOIP because providers of network-based services exhibit a high level of uncertainty predicting "what users will like and how users value the features of

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[276] ARINASH K. DIXIT & BARRY J. NALEBUFF, THE ART OF STRATEGY: A GAME THEORIST'S GUIDE TO SUCCESS IN BUSINESS & LIFE 26–27 (2008) (pointing out that in many strategic interactions, the "invisible hand" of prices is unavailable to guide behavior, leading to actions based on pride, spite, and irrationality).

[277] *Id*. at 28.

[278] "Net head" is a term used frequently to describe people who are "so passionate about the [I]nternet that [they] know[] how to operate almost all of the programs and uses them for business or pleasure on a daily basis." Net Lingo, Nethead, http://www.netlingo.com/lookup.cfm?term=Net%20head (last visited Jan. 25, 2009).

[279] One example of the differing perspectives between the two sides is the definition of a "best efforts" Internet. To those who come from the Net community, that phrase traditionally has meant to "do your best." However, there is concern that to those who come from the Broadband community, that phrase may mean something like "do your least."

[280] *See* Philip J. Weiser, Exploring Self Regulatory Strategies for Network Management, Remarks Before the Flatirons Summit on Information Policy 11 (2008) [hereinafter Weiser, Exploring Self Regulatory Strategies], http://www.silicon-flatirons.org/documents/publications/summits/WeiserNetworkManagement.pdf (in the face of "rent extracts" by broadband providers, applications providers may decline to develop new applications; in the face of prohibitions on any new business opportunities, broadband providers' business strategies may be constrained).

a service or the selection of content."[281] Another way of looking at it is that the dynamic market forces of consumer selection and amplification are best unleashed in an environment where consumers have maximum flexibility to choose. From this perspective, an open network is the best market to capture all aspects of user demand.

There may be no easy answers to deal with these different market incentives, mindsets, and trust levels. Perhaps these are merely normal responses, symptomatic of disparate market sectors fighting for ultimate supremacy. However, the market evidence appears to point in another direction. After all, multiple innovation platforms ideally should feed off each other in positive ways, creating generative spillovers in many directions.[282] The broadband platform both leads to the Net—which incents innovation—and acts as its own means of innovation. The issue is whether broadband providers actually see the world this way; as Eli Noam points out, infrastructure providers should be as open as possible for their own good, so as to encourage the development of new rich content.[283] In turn, different kinds and degrees of openness create different means for innovation.

Further, a change in mindsets could lead to the recognition by both sides that they need each other. Paul Ormerod observes that a certain level of cooperative behavior within a competitive industry is necessary for the overall fitness of the industry.[284] Weiser also notes that coordination between broadband providers and Internet companies is important to the continued development of the Internet itself.[285]

Of course the larger issue is whether and how to unite these two objectives. Telecommunications industry analyst Blair Levin has described what he calls the "value chain tug-of-war" between Internet applications and content providers, and the broadband providers.[286] He claims that future years will witness an intensified struggle between these two sides for premium returns on the eco-

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281 Gaynor & Bradner, *supra* note 257, at 26.

282 Games don't have to have winners and losers. Some combination of commonality of interests and conflict coexist in most games of business, politics, and social interactions. DIXIT & NALEBUFF, *supra* note 276, at 40.

283 *See* Webcast: Eli Noam, If Fiber is the Medium, What is the Message? Next-Generation Content for Next-Generation Networks, *available at* http://webcast.oii.ox.ac.uk/?view=Webcast&ID=20081113_267.

284 PAUL ORMEROD, WHY MOST THINGS FAIL: EVOLUTION, EXTINCTION AND ECONOMICS 234 (2005).

285 Philip J. Weiser, *Internet Governance, Standard Setting, and Self-Regulation*, 28 N. KY. L. REV. 822, 824–25 (2001). He notes that the tools available to "enforce" such coordination include private contracts, social norms, public regulation, and self-regulatory frameworks. *Id*.

286 *See* Jessica Holzer, *A Yellow Light for the Internet*, FORBES.COM, June 9, 2006, http://www.forbes.com/2006/06/09/telecom-net-neutrality-cx_jh_0609netneutrality.html.

nomic value generated by the Internet and its broadband on-ramps.[287] Levin presents a compelling view of the current market, but a more optimistic scenario is based on a different viewpoint, what I term "value net synergies." Here the value is derived from a network, seen metaphorically as a pie, which grows exponentially and synergistically for everyone's recognized benefit. Ideally each side sees its own incentives system satisfied by the growth and success of the other side.

In *Adaptive Policymaking* I explained how the policy framework should invite government involvement only where necessary, and then through utilizing the appropriate institutional and organizational overlays.[288] Traditional prescriptive regulation tends to lead to over-regulation in some instances, and under-regulation in others. By better understanding the current fitness landscape of the broadband industry, policymakers can focus on relevant challenges like ruinous competition, positive externalities and spillovers, traffic prioritization, and existing mindsets. The next part examines in more detail the potential institutional foundations to help ensure optimal broadband networks, and begins to sketch out some ways to apply those foundations going forward.

VII. INSTITUTIONAL FOUNDATIONS FOR ACHIEVING OPTIMAL BROADBAND INTERNET PLATFORMS

Previous sections of this Article laid out the several interrelated components of the public policy design space. This part will focus on one particularly fruitful area: legal institutions as the underpinnings of the government's authority to take certain actions in the marketplace. Legal institutions have a critical role to play in ensuring that markets can function properly by establishing the rules of the road for market players and policymakers alike.[289] This part will examine institutions with regard to how prior conceptions for regulating communications and transportation infrastructure can help understand which, if any, of such rationales should survive in modern-day U.S. broadband policy. In other words, a better understanding of past justifications for a government role hopefully can lead to a sounder approach to a framework for broadband law and regulation, one that results in optimal broadband platforms.

Why should policymakers even consider subjecting broadband to any form of government regulation? As we have seen, a proper reading of economics

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287 *See id*.

288 *See* Whitt, *supra* note 3, at 2.

289 *See generally* Marlon A. Layton, *Is Private Securities Litigation Essential for the Development of China's Stock Markets?*, 83 N.Y.U. L. REV. 1948, 1950–52 (2008) (suggesting that strong legal institutions are a precondition to the success of large financial markets); Maurice E. Stucke, *Better Competition Advocacy*, 82 ST. JOHN'S L. REV. 951, 964–65 (2008) (arguing that market competition requires legal institutions, among other things).

suggests that broadband providers, if left solely to their own designs, probably will not produce optimal Internet platforms.[290] Together, the challenges of facilities-based competition, the existence of substantial spillovers, the desire to establish services based on prioritizing and managing network traffic, and current industry mindsets and mistrust suggest that broadband provider motivations do not match up precisely with some important public policy objectives. In particular there are doubts that the key dimensions of BAOIP—availability, sufficiency, and integrity—will be fully realized without some role for government policy.[291] As economist Daniel Bromley puts it more generally: "[f]or public policy the pertinent question becomes, will a commitment to the present institutional structure get us where we wish to be in the future? If the answer to that question is not promising, then a new institutional setup is called for."[292]

Broadband is infrastructure; the transportation of ideas versus the ideas themselves.[293] So what is the institutional basis for adopting and employing a public policy for achieving BAOIP? What is the legal or regulatory hook to whatever remedies may or may not be employed? A proper reading of the roots of communications and competition law, with the historic rationales for regulating infrastructure, can help us with these threshold inquiries.[294]

A. An Introduction: The Current Legal Conundrum

Recent history is relevant to an understanding of broadband infrastructure. Notably, at least three general broadband policy frameworks currently are utilized around the world. In Asia, heavy public investment appears to have led to superior deployment and speed metrics, albeit at the risk of possible mismanagement and waste.[295] In Europe, a mixed public/private investment scheme

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290 *See supra* Part III.B.2.

291 *See* Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 934 (2001). Put more generally "[t]he market is based on the idea of individual pursuit of self-interest. At the same time, however, a market system will work best if there is a clear limit to self-interest. . . . In short, the market must exist within an institutional and civic-value context that transcends individual self-interest and encourages actions that have a wider benefit for the common good." ROBERT H. NELSON, ECONOMICS AS RELIGION: FROM SAMUELSEN TO CHICAGO AND BEYOND 268 (2001).

292 DANIEL W. BROMLEY, SUFFICIENT REASON, VOLITIONAL PRAGMATISM AND THE MEANING OF ECONOMIC INSTITUTIONS 13 (2006).

293 *See supra* Part III.A.1.

294 *See* Lemley & Lessig, *supra* note 291, at 934–35 (arguing that the view that the best way to stimulate broadband is less regulation "ignores the history that gave the Internet its birth and threatens to reproduce the calcified network design that characterized [the] telecommunications network prior to the Internet").

295 *See* OECD, Directorate for Science, Technology, and Industry, Broadband Subscribers per 100 inhabitants (June 2008) [hereinafter OECD, Broadband Subscribers per 100 Inhabitants], http://www.oecd.org/dataoecd/21/35/39574709.xls (last visited Apr. 21, 2009);

that includes mandated access to incumbent networks has yielded generally good deployment figures and average speeds,[296] but mostly has been limited to copper deployment.[297] By contrast, in the United States, significant private investment in facilities-based competition has resulted in two parallel fixed wire platforms, which lag comparatively on deployment and speed metrics.[298]

The United States has made the fundamental choice to leave communications networks—including broadband—largely in the hands of the private sector, while subjecting the networks to certain statutory and regulatory requirements.[299] This Article does not challenge that historical decision, and the path dependency that has brought us to in this particular time and place in telecommunications history. Nonetheless, in the words of Kevin Werbach, "[modern] communications policy has rarely been so muddled or uncertain."[300] The heart of the issue is whether traditional communications law should be applied to privately-owned broadband networks and how to do so. As will be seen, it is constructive to walk through the historical path to uncover some common themes and insights. In so doing, we may be able to begin mapping the pertinent learnings of the past onto the pressing issues of today.

1. The Common Law Roots

The common law is part of the historical and contingent view of life. As Allan C. Hutchinson contends, it "has a present authority and significance . . . in resolving current disputes and negotiating future meanings. . . . [The past] binds because it has its own normative force. . . . [T]he most appropriate use of the legal past is . . . a dynamic and expansive meditation on the underlying rationales and structure."[301]

There are several potentially pertinent candidates to serve as the legal insti-

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OECD, Directorate for Science, Technology, and Industry, Average Advertised Download Speeds by Country (Oct. 2007) [hereinafter OECD, Average Advertised Download Speeds by Country], http://www.oecd.org/dataoecd/10/53/39575086.xls (last visited Apr. 21, 2009); *see* Hannibal Travis, *Wi-Fi Everywhere: Universal Broadband Access as Antitrust and Telecommunications Policy*, 55 AM. U. L. REV. 1697, 1790–94 (2006).

296 OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 295; OECD, Average Advertised Download Speeds by Country, *supra* note 295.

297 OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 295; OECD, Average Advertised Download Speeds by Country, *supra* note 295.

298 OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 295; OECD, Average Advertised Download Speeds by Country, *supra* note 295.

299 *See* OECD, Broadband Subscribers per 100 Inhabitants, *supra* note 295; OECD, Average Advertised Download Speeds by Country, *supra* note 295; *see also* Nachbar, *supra* note 64, at 76 ("Many nondiscrimination obligations traditionally imposed by common law are today controlled by statute.").

300 Werbach, *Only Connect*, *supra* note 247, at 1237.

301 ALLAN C. HUTCHINSON, EVOLUTION AND THE COMMON LAW 4–5, 9 (2005).

tutions to govern broadband networks. Most of these candidates are derived from the common law of common carriage, which goes back some 800 years.[302] This common law grew organically, over time, as a result of concrete cases considered individually by judicial authorities. In particular, there are three intertwined aspects of common carriage that show up at various times and places: the state of competition, the nature of the business, and holding oneself out as a carrier.[303] The market power component reappears later in the context of competition law, while the nature of the business and holding out components reappear later in statutory communications law.

Common carriage law has exisited in the English-speaking world since approximately 1250 as a part of common law and tort law.[304] The term "common" originally meant "open to public service" or "general."[305] As Eli Noam notes, the notion of common carriage often is identified with several other entities that frequently are used as synonyms such as "public utility" and "regulated monopoly," or concepts such as "universal service obligation" or "affordable rates."[306] As a result, common carriage can and has meant different things at different times to different people.[307]

In Europe, there was a lengthy list of "public callings" subject to common carriage requirements, eventually including all sorts of tradesmen: ship owners, innkeepers, stable keepers, bakers, brewers, cab drivers, freight carriers, ferrymen, millers, smiths, surgeons, tailors, and wharfingers.[308] By the 19th century in the United States, common carriage obligations were applied primarily to the infrastructure services of transportation and communications, such as dock owners, toll bridge operators, and telegraph network operators.[309] Later, railroads were regulated in the United States under various strands of common carriage law.[310]

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[302] *See* TERRENCE P. MCGARTY, THE PERSISTENCE OF COMMON CARRIAGE: CAN THE ILECS CHARGE BY THE VALUE OF A BIT? 1, 4 (2006), http://www.telmarc.com/Common%20Carriage%202006%2002%2015.pdf.

[303] Nachbar, *supra* note 64, at 76.

[304] MCGARTY, *supra* note 302, at 1; *see* OLIVER WENDELL HOLMES, THE COMMON LAW 165, 180 (1881).

[305] Noam, *Beyond Liberalization*, *supra* note 108, at 436.

[306] *Id*.

[307] *See* Susan Dente Ross, *Bell Had a Hammer: Using the First Amendment to Beat Down Entry Barriers*, *in* INTERCONNECTION AND THE INTERNET: SELECTED PAPERS FROM THE 1996 TELECOMMUNICATIONS POLICY RESEARCH CONFERENCE 259 (Gregory L Rosston & David Ubiterman eds., 1997) (citing "unenlightening" definitions from, among other sources, the FCC that defined common carriers as "any person engaged in rendering communications services for hire to the public").

[308] *See* Adam Candeub, *Network Interconnection and Takings*, 54 SYRACUSE L. REV. 369, 381 (2004); Noam, *Beyond Liberalization*, *supra* note 108, at 436; Nachbar, *supra* note 64, at 76–77.

[309] *See* Nachbar, *supra* note 64, at 103.

[310] *Id*. at 76, 106, 124–25.

Authorities have found several related duties for common carriers, most premised on an obligation to serve all customers upon reasonable request, and on a nondiscriminatory basis.[311] Carriers also were held to a high duty of care for the property entrusted to them.[312] Even a cursory glance at the historic role of communications technologies in United States history uncovers numerous examples where carriers of information were utilized in a discriminatory fashion, leading to government response.[313] One result was Congress' adoption of the Interstate Commerce Act and its eventual treatment of telegraph and telephone companies as common carriers, who were required to accept messages from any willing paying customer.[314] Similarly AT&T's resistance to allowing customer premises equipment ("CPE") interconnection in the 1950s and 1960s—the Hush-a-Phone and Carterfone controversies[315]—led to the *Computer Inquiry* rules,[316] and eventually the Modification of Final Judgment

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311 *Id*. at 89, 104, 117–18.

312 Noam, *Beyond Liberalization*, *supra* note 108, 437. This obligation arguably grew out of the common law principle of bailment or assumpsit. *See* Nachbar, *supra* note 64, at 87 n.138.

313 In 1753, for example, Benjamin Franklin was appointed to the Post Office to develop "mail pouch" privacy protections against the prying eyes of the British. PAUL STARR, THE CREATION OF THE MEDIA: POLITICAL ORGINS OF MODERN COMMUNICATION 95–96 (2004). In 1876, Western Union and the Associated Press took advantage of their respective telegraph and press monopolies to try to tilt the U.S. presidential election towards the Republican Party. *Id*. at 185–87. In that particular case, the content industry controlled the carrier. HAL ABELSON ET AL., BLOWN TO BITS: YOUR LIFE, LIBERTY, AND HAPPINESS AFTER THE DIGITAL EXPLOSION 314 (2008).

314 Interstate Commerce Act, ch. 309, 24 Stat. 379, sec. 7 (1887).

315 *See In re* Hush-A-Phone Corp. and Harry C. Tuttle, Complainants, American Telephone and Telegraph Co., et al., Defendants, *Decision*, 20 F.C.C. 391, ¶¶ 1–2 (Dec. 21, 1955), *rev'd*, Hush-A-Phone Corp. v. United States, 238 F.2d 266 (D.C. Cir. 1956), *on remand*, *In re* Hush-A-Phone Corp. and Harry C. Tuttle, Complainants v. American Telephone & Telegraph Co., et al., Defendants, *Decision and Order on Remand*, 22 F.C.C. 112, ¶¶ 3–4 (Feb. 6, 1957); *In re* Use of the Carterfone Device in Message Toll Telephone Service; Thomas F. Carter and Carter Electronics Corp., Dallas, Tex. (Complainants), v. American Telephone and Telegraph Co. Associated Bell System Companies, Southwestern Bell Telephone Co., and General Telephone of the Southwest (Defendants), *Decision*, 13 F.C.C.2d. 420 (June 26, 1968); *see also* Michael T. Hoeker, Comment, *From Carterfone to the iPhone: Consumer Choice in the Wireless Telecommunications Marketplace*, 17 COMMLAW CONSPECTUS 187, 191–92 (2008).

316 *In re* Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities, *Final Decision and Order*, 28 F.C.C.2d. 267 (Mar. 10, 1971) [hereinafter *First Computer Inquiry*]; *In re* Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), *Final Decision*, 77 F.C.C.2d 384 (Apr. 7, 1980) [hereinafter *Second Computer Inquiry*]; *In re* Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry); and Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Thereof; Communications Protocols under Section 64.702 of the Commission's Rules and Regulations, *Report and Order*, 104 F.C.C.2d. 958 (May 15, 1986) [hereinafter *Third Computer Inquiry*]. Collectively, the Computer Inquiry rules imposed certain

("MFJ"),[317] all of which relied in part on the concept of nondiscriminatory access to basic network interfaces.[318]

What most draws attention today are the reasons for government oversight and regulation of common carriage. Over the centuries governments employed competing and sometimes inconsistent rationales for common carriage. Early accounts generally offer two justifications for subjecting particular enterprises to these nondiscrimination requirements: they were "affected with the public interest," per Lord Chief Justice Matthew Hale,[319] or they were natural monopolies.[320] Public utility law later sprang up from the confluence of developments in common carriage law; once codified in federal or state law, the concept became something of a contractual relationship between public utilities and government, based on a quid pro quo for using rights of way and other government-derived benefits.[321] There was an inherent tradeoff between obligations and privileged, one whch many companies actively sought. For most part, public callings were deemed undertakings to serve the public.[322]

Susan Crawford argues that common carriage has its roots in the law of bailment, and the separate laws of franchise and monopoly.[323] Crawford also explains that nondiscrimination rules have been imposed on industries when they have been "affected with the public interest," and that such "industries usually are related to physical transportation or communications networks."[324] Tim Wu agrees that common carriage and nondiscrimination mandates historically were tied to the type of business in question, and not necessarily to the

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limits on incumbent local exchange carriers seeking to enter the data processing market. *See* Weiser, *The Next Frontier for Network Neutrality*, *supra* note 240, at 311.

317 Modification of Final Judgment, United States v. Am. Tel. & Tel. Co., 552 F. Supp. 131 (D.D.C. 1982) (No. 82-0192).

318 Barbara Cherry believes that nondiscrimination in dealing with retail customers was the hallmark requirement in the common law, derived from the Roman law notion of inherent fairness; this general concept then carried through to the statutory world of communications regulation. Barbara A. Cherry, *The Political Realities of Telecommunications Policies in the U.S.: How the Legacy of Public Utility Regulation Constrains Adoption of New Regulatory Models*, 2003 MICH. ST. DCL L. REV. 757, 762–63 [hereinafter Cherry, *The Political Realities of Telecommunications Policies in the U.S.*].

319 SIR MATTHEW HALE, DE PORTIBUS MARIS (1670) (transportation carriers are private businesses which are "affected with the public interest").

320 *See* Werbach, *Only Connect*, *supra* note 247, at 1246 n.53.

321 Cherry, *The Political Realities of Telecommunications Policies in the U.S.*, *supra* note 318, at 761–62.

322 *Id*. at 763.

323 Crawford, *Transporting Communications*, *supra* note 52, at 8. Crawford also believes that the Interstate Commerce Act of 1887, which established the Interstate Commerce Commission—and were themselves the basis for the Communications Act and the FCC, respectively—brought "the label 'common carriage' without its strict liability baggage from bailment," but still retained its central nondiscrimination obligation. *Id*. at 11.

324 *Id*. at 14.

presence of market power.[325]

Kevin Werbach argues to the contrary that, while common carriage rests primarily on a nondiscrimination approach, interconnection also has been an important aspect at various times.[326] Both Werbach and Noam believe the nondiscrimination aspect of common carriage should be discarded in favor of an approach built around the interconnection of different networks.[327] Noam suggests that policymakers replace common carriage altogether with a new principle of neutral interconnection; a carrier could be selective in its direct customers, but if it undertakes to interconnect and accept traffic from some, it must do the same for all.[328] Werbach makes a similar plea to substitute interconnection requirements for nondiscrimination mandates.[329]

From this twisting history, the economic function of a common carriage regime can be distilled. There appear to be three distinct components to the common law doctrine of common carriage, each of which is stressed in different ways at different times: the state of competition (market power); the nature of the business (transportation or communications infrastructure); and the holding out (traditional bailment).[330] The concept of nondiscrimination plays a vary-

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[325] Tim Wu, *Why Have a Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. ON TELECOMM. & HIGH TECH. L. 15, 30–31 (2006). *See also* F.M. Scherer, *The Historical Foundations of Communications Regulation*, at 2 (Harvard Kennedy School Faculty Research Working Papers Series, RWP08-050, 2008) (asserting that at common law "the availability of communications at modest prices was believed to foster commerce and hence to help build national strength").

[326] Werbach, *Only Connect*, *supra* note 247, at 1246. Cherry asserts that interconnection was a later statutory addition to deal with wholesale relationships, which the common law did not address. Cherry, *The Political Realities of Telecommunications Policies in the U.S.*, *supra* note 318, at 762.

[327] Noam, *Beyond Liberalization*, *supra* note 108, at 435. Counter-arguments by providers of communications infrastructure sound similar through the ages. As one example, Guglielmo Marconi refused to "intercommunicate" with other wireless companies: "In Marconi's view, since other companies did not pay for maintenance of his marine network, they ought not to be able to use it; as others saw his policy, he was trying to create a monopoly not just over a business, but over the use of the electromagnetic spectrum." STARR, *supra* note 313, at 216.

[328] Noam, *Beyond Liberalization*, *supra* note 108, at 452. This concept resembles to the notion of bailment: once you carry for some, you must carry for all.

[329] *See generally* Werbach, *Only Connect*, *supra* note 247 (arguing for interconnection rules to govern modern communications networks in place of antidiscrimination rules). Tim Wu argues somewhat differently that interconnection duties entail another form of nondiscrimination mandate that had been imposed on AT&T since the early 20th Century. Wu, *Why Have a Telecommunications Law?*, *supra* note 325, at 32.

[330] In 1980 Professor William Jones submitted an essay to the FCC in which he discerned two general sources of common carriage law: (1) the law of bailments (for the safe delivery of goods in the entity's possession); and (2) the law of franchises (for holders of public franchises using public thoroughfares). While the law of bailments rested on the concept of fiduciary responsibility of entities holding themselves out as a general carrier of such goods, the law of franchises depended on the entity having special privileges to use public

ing role in each component. The Article next will briefly survey the state of the statutory law in the United States, and then consider each of these three common carriage prongs in hopes of matching up the right legal rules to the right public policy concerns.

2. The Strange, Circular Fate of Title II

Various strands of the common law of common carriage found their way into the Interstate Commerce Act ("ICA") of 1887, which was designed to regulate the railroad industry.[331] The ICA became the model for public utility regulation in other industries as well, including communications.[332] The Communications Act of 1934 ("1934 Act") inherited the common carriage concepts and the public interest standard from the ICA.[333] The statute employs a circular definition of common carriers: those entities who perform common carriage duties.[334] Key to Title II of the 1934 Act, which delineates the duties of telecommunications carriers, is a prohibition against "unjust or unreasonable" discrimination in charges or practices by such carriers.[335]

In the 1970s the D.C. Circuit was presented with the FCC's longstanding view that the statute treats as common carriers those who are engaged in rendering to the public communication services for hire.[336] The D.C. Circuit agreed, in the process fashioning what has since become known as the "NARUC holding out" test.[337] A service is classified as common carriage because either: (1) the statute or regulation, in furtherance of the public interest, mandates that the service be offered on a common carrier basis; or (2) the provider holds itself out as providing transmission services indiscriminately to the public.[338] In the 1970s, the category of communications providers referred to

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thoroughfares (like an exclusive franchise) or monopoly power. William Jones, The Common Carrier Concept as Applied to Telecommunications: A Historical Perspective (1980), http://www.cybertelecom.org/notes/jones.

331 An Act to Regulate Commerce, ch. 104, 24 Stat. 379 (1887); *see* Crawford, *Transporting Communications*, *supra* note 52, at 11 (observing that "the ICC's job was primarily railroad regulation").

332 James Speta, *Resale Requirements and the Intersection of Antitrust and Regulated Industries*, 31 J. CORP. L. 307, 310 (2006).

333 Communications Act of 1934, ch. 652, 48 Stat. 1064.

334 *See* 47 U.S.C. § 153(44) (2000).

335 § 201(b).

336 *See generally* Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC (*NARUC I*), 525 F.2d. 630, 640 (D.C. Cir. 1976) *cert denied*, 425 U.S. 992 (1976); Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC (*NARUC II*), 533 F.2d. 601, 608 (D.C. Cir. 1976).

337 *NARUC I*, 525 F.2d. at 642; *see In re* Federal-State Joint Board on Universal Service, *Order on Remand*, 16 F.C.C.R. 571, ¶ 8 n.20 (Dec. 26, 2000); Cybertelcom Federal Internet Law & Policy, An Educational Project, http://www.cybertelecom.org/notes/telecom_carrier.htm (last visited Mar. 26, 2009)

338 *NARUC I*, 525 F.2d. at 641–42; *NARUC II*, 533 F.2d at 609. Interestingly, the D.C.

AT&T and its regional Bell Companies, the smaller independent local exchange carriers ("LECs"), and newer long-distance upstarts like MCI.[339] As late as 1994, the D.C. Circuit was articulating its finding in *NARUC II* that "the primary sine qua non of common carrier status is a quasi-public character, which arises out of the undertaking to carry for all people indifferently," as well as "customers transmit intelligence of their own design and choosing."[340] However, this common carriage test would not hold, as Susan Crawford has recently explained.[341]

Just a few years after the *NARUC* decisions, the FCC significantly altered the regulatory conception of common carriage.[342] In a 1981 order, the FCC adopted a new test, using market power as the essential element.[343] The agency essentially applied the first prong of the test—public interest reasons for deeming an entity to be a common carrier—in the narrowed context of existing market power. In specifying the legal dividing line between common carriers and private carriers, the FCC argued that the essential purpose of common carriage is to constrain market power abuses.[344] Under this revised test, traditional common carrier duties, such as tariff approval and market entry and exit requirements, were necessary only for "dominant" providers of communications services.[345] This market power rationale appears now to be the only remaining factor in the doctrine of common carriage as enunciated by the FCC under Title II of the Communications Act.[346]

Circuit panel dismissed the notion that the concept of common carriage is vague, observing that "the common law definition of common carrier is sufficiently definite as not to admit of agency discretion in the classification of operating communications entities." *NARUC I*, 525 F.2d at 644.

339 *NARUC I*, 525 F.2d. at 634, 637, 647; *see* JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATION POLICY IN THE INTERNET AGE 55–64 (2005).

340 Southwestern Bell Tel. Co. v. FCC, 19 F.3d 1475, 1480 (D.C. Cir. 1994). David Sieradzki and Winston Maxwell aptly point out that this two-pronged approach by the D.C. Circuit views *common* as offering to serve for all, while *carriage* means transmitting goods (or data) without altering its contents. David L. Sieradzki & Winston J. Maxwell, *The FCC's Network Neutrality Ruling in the* Comcast *Case: Towards A Consensus with Europe?*, 72 COMMC'NS AND STRATEGIES 73, 78 (2008).

341 Crawford, *Transporting Communications*, *supra* note 52, at 12–13.

342 *See id*.

343 *Id*. at 12–13.

344 *In re* Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, *Further Notice of Proposed Rulemaking*, 84 F.C.C.2d 445, ¶ 42 (Dec. 16, 1980) ("While this construction is not totally free from doubt . . . Congress intended to create a regulatory system to constrain the abuses market power portends."); *see* Crawford, *Transporting Communications*, *supra* note 52, at 13.

345 ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 221–22 (1983).

346 *See*, *e.g*., *In re* Qwest Petition for Forbearance Under 47 U.S.C. § 160(c) from Title II and *Computer Inquiry* Rules with Respect to Broadband Services, *Memorandum Opinion and Order*, 23 F.C.C.R. 12,262, ¶ 3 (Aug. 5, 2008).

3. Title I: The Great Sucking Sound

Beginning in the 1960s, the FCC considered ways to separate, for regulatory purposes, the nascent customer equipment and online data services from the underlying communications services on which the data services relied.[347] The FCC's "Carterfone" rules, adopted in 1968 and codified in Part 68 of the agency's rules, required that the Bell System allow independent providers of customer premises equipment ("CPE") to interconnect with the network.[348] In 1980 the FCC adopted the second of a series of decisions in the *Computer Inquiries*, where the basic and enhanced service distinction was first enunciated.[349] Basic services were the regulated communications services provided by common carriers, while enhanced services were the nascent data processing services or online services provided by companies like IBM, and later EDS, CompuServe, Prodigy, and America Online.[350] The Commission's rationale for adopting this distinction was twofold: to fence off the online world from unwarranted carrier-style regulation; and to establish structural (and later nonstructural) separation between the two worlds, so that providers of enhanced services had nondiscriminatory access to the underlying communications services.[351] The basic and enhanced regulatory dichotomy was mirrored in the Telecommunications Act of 1996 ("1996 Act"), with its definitional distinction

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[347] *See In re* Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities, *Notice of Inquiry*, 7 F.C.C.2d 11, 11–12 (Nov. 9, 1966) (seeking comment on what regulatory obligations, if any, should be applied to "services by which the computers and the user are given instantaneous access to each other").

[348] *In re* Use of the Carterfone Device in Message Toll Telephone Service; Thomas F. Carter and Carter Electronics Corp., Dallas, Tex. (Complainants), v. American Telephone and Telegraph Co., Associated Bell System Companies, Southwestern Bell Telephone Co., and General Telephone Co., of the Southwest (Defendants), 13 F.C.C.2d 420, 420–24 (1968) (codified at 47 CFR 68.01 et seq. (2008)).

[349] *Second Computer Inquiry*, *supra* note 316, ¶¶ 86–92. The FCC later relaxed the structural separation between basic and enhanced services, based on a nondiscrimination access requirement called Comparably Efficient Interconnection ("CEI"), and an unbundling of basic access arrangements called Open Network Architecture ("ONA"). *In re* Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry); and Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Thereof; Communications Protocols under Section 64.702 of the Commission's Rules and Regulations, *Report and Order*, 104 F.C.C. 2d 958, ¶¶ 4–6 (1986).

[350] *Id*. ¶¶ 93, 107 (defining communications service but refraining from offering an explicit definition for enhanced services); *see In re* Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), *Memorandum Opinion and Order*, 88 F.C.C. 2d. 50, ¶¶ 2–3 (Oct. 28, 1980) [hereinafter *Computer II Memorandum Opinion and Order*]

[351] *See Computer II Memorandum Opinion and Order*, *supra* note 350, ¶ 122. There would have been no Internet—at least as we now understand it—without this prescient policy decision made years before the successful rise of commercial online services for consumers.

between telecommunications services and information services.[352]

It did not take long for the incumbent broadband providers to benefit directly from the FCC's application of the telecommunications/information services distinction. In 2002, the Commission determined that cable companies should not be treated as common carriers when they provide consumers broadband service conjoined with Internet access service,[353] a conclusion that ultimately led to the Supreme Court's *Brand X* decision.[354] Instead, the FCC stated that in such a situation cable companies should be regulated under what is known as the agency's ancillary jurisdiction, pursuant to Title I of the Communications Act.[355] Once the Supreme Court upheld the agency's discretion to adopt such a dichotomy,[356] the Commission moved in the *Wireline Broadband Order* to extend that same legal finding to telecommunications companies providing broadband service and Internet service.[357] As a result, Susan Crawford claims, the Bell System now "is providing almost *nothing but* non-common-

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[352] S*ee* 47 U.S.C. § 153(20), (44). Information services are those services involving "generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications." § 153(20).

[353] *In re* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities; Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, *Declaratory Ruling and Notice of Proposed Rulemaking*, 17 F.C.C.R. 4798, ¶ 7 (Mar. 14, 2002) [hereinafter *Cable Modem Declaratory Ruling*] ("[W]e conclude that cable modem service . . . is property classified as an interstate information service, not as a cable service . . . ."); National Cable and Telecomm. Ass'n v. Brand X Internet Serv. (*Brand X*), 545 U.S. 967, 977–78 (2005).

[354] *See Brand X*, 545 U.S. at 1000–04.

[355] *See Cable Modem Declaratory Ruling*, *supra* note 353, ¶¶ 75–79; *see also* Rob Frieden, *What Do Pizza Delivery and Information Services Have in Common? Lessons From Recent Judicial and Regulatory Struggles with Convergence*, 32 RUTGERS COMPUTER & TECH. L.J. 247, 276 (2006) [hereinafter Frieden, *Lessons from Recent Judicial and Regulatory Struggles*] (discussing the Commissions use of its ancillary jurisdiction over information services for the imposition of E911 obligations on interconnected VoIP providers).

[356] *Brand X*, 545 U.S. at 1001–03. Rob Frieden has conducted a nuanced and critical examination of the *Brand X* decision. *See* Frieden, *Lessons from Recent Judicial and Regulatory Struggles*, *supra* note 355, at 252–57.

[357] *In re* Appropriate Framework for Broadband Access to the Internet over Wireline Facilities; Universal Service Obligations of Broadband Providers; Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services; Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review—Review of Computer III and ONA Safeguards and Requirements; Conditional Petition of the Verizon Telephone Companies for Forbearance Under 47 U.S.C. § 160(c) with Regard to Broadband Services Provided Via Fiber to the Premises; Petition of the Verizion Telephone Companies for Declaratory Ruling, or Alternatively, for Interim Waiver with Regard to Broadband Services Provided Via Fiber to the Premises; Consumer Protection in the Broadband Era, *Report and Order and Notice of Proposed Rulemaking*, 20 F.C.C.R. 14,853, ¶ 1 (Aug. 5, 2005) [hereinafter *Wireline Broadband Order*]. My previous articles critique the FCC's decision at some length. *See* Whitt & Schultze, *supra* note 2, at 61–63; Whitt, *Adaptive Policymaking*, *supra* note 3, at 54.

carriage services."[358]

The FCC's rationale for adopting this new regulatory regime is that the monopoly basis for regulation no longer applies to "competitive" broadband services.[359] Although one may disagree with the Commission's assessment of the competitive state of the broadband market, relying solely on that particular prong of the traditional common carriage regime has important consequences. Other potential reasons for maintaining some form of common carrier status for broadband providers—whether as providers of communications infrastructure, as users of government resources, or as entities holding themselves out as common carriers—were thrown out as well. With the end of the common carriage regime came, among other things, termination of the nondiscrimination duty for broadband providers.

Barbara Cherry argues persuasively that the *Wireline Broadband Order* was a radical departure from modern FCC precedent. Cherry explains that the decision eliminated both the traditional common law concept of nondiscrimination, and the interconnection strand that had developed under the 1934 Act to deal with wholesale relationships between service providers.[360] Both common carriage and statutory interconnection were stripped away without a firm explanation.[361] As Cherry explains, "the elimination of common law principles applied to broadband through deregulation, but without replacement by some other legal rules to fulfill a similar function, may render the development of critical communications infrastructures unsustainable with the desired emergent properties."[362] In other words, the time has come to develop an understanding of the legal institutions that can best foster BAOIP.

Unfortunately, the FCC has yet to provide a coherent and fulsome institutional basis for devising public policy for broadband providers under Title I of the Act. In its 2008 order denouncing Comcast's treatment of BitTorrent traffic over its broadband networks, the Commission relied on seven separate provisions of the Communications Act—among them Title I—to establish its legal

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358 Crawford, *Transporting Communications*, *supra* note 52, at 14. This observation may well be true for more advanced consumer-oriented services, but the incumbents still provide basic telecommunciations services, like local exchange and interstate interexchange, on a regulated basis.

359 *See Wireline Broadband Order*, *supra* note 357, ¶ 3.

360 *See* Cherry, *Institutional Governance for Essential Industries Complexity*, *supra* note 86, at 8–9.

361 *See* Barbara A. Cherry, *Misusing Network Neutrality to Eliminate Common Carriage Threatens Free Speech and the Postal System*, 33 N. KY. L. REV. 483, 497–98 (2006); *Wireline Broadband Order*, *supra* note 357, ¶¶ 12-16.

362 Cherry, *Institutional Governance for Essential Industries Complexity*, *supra* note 86, at 9. Kimberly Claffey calls network neutrality "an understandable post-traumatic reaction to the recent jettison of at least eight centuries of legal doctrine from our primary communications fabric." Claffey, *supra* note 638, at 9.

authority to enforce the *Internet Policy Statement* principles.[363] It remains to be seen whether the D.C. Circuit will agree with this latest effort by the Commission to redirect the statute to justify regulating providers of broadband infrastructure. Nonetheless, the original rationale for regulating physical telecommunications infrastructure is essential to an understanding of the appropriate institutions to govern broadband networks.

B. The Three Strands of Common Carriage

The three strands of common carriage—what I will term private concentration, public callings, and bailment—are further examined below. Regardless of whether and how we decide ultimately that policymakers should impose some form of regulation of broadband networks, we still need a cogent legal theory for why we even care about broadband in the first place. In essence the common law has found ample reasons to impose policy mandates on communications infrastructure because it is relatively scarce, profoundly important, and reliant on public resources. Each of these strands of scarcity, value, and publicness relate in various ways to the three dimensions of BAOIP raised earlier: availability of broadband infrastructure, sufficiency of Net capacity, and integrity of Net access.[364] Thus the institutions of the common law of common carriage offer us important building blocks for the foundation of a viable broadband policy under Title I.

1. Private Concentration

a. Market power in the era of broadband scarcity

Emergence economics can lead us to question both the presumption that perfect competition can be a stand-in for public welfare and the idea that self-interested actors invariably arrive at an ideal equilibrium.[365] As such, while government intervention can be unwarranted simply to strike down any hint of market power, policymakers do have a plausible role in shaping the market environment to foster innovation and promote free expression, leading to More Good Ideas. The agent behaviors that arise in a networked market are exceedingly difficult to predict. Compared to idealized markets, agents in network industries make decisions subject to many exceptions,[366] exceptions to those

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363 *Comcast Order*, *supra* note 205, ¶¶ 12–27.
364 *See supra* notes 138–141 and accompanying text.
365 *See* Whitt & Schultze, *supra* note 2, at 5–8.
366 *See* Farrell & Weiser, *supra* note 225, at 126–27.

exceptions,[367] and other unique dynamics.[368] This suggests that policymakers must analyze whether and how companies are subject to adequate market forces to discipline their behavior, but not necessarily whether the market is perfectly competitive.[369]

Many commenters point to concentration in the broadband market as a rationale for government intervention.[370] There should be little doubt that broadband market concentration is significant in the United States. No less an authority than the Congressional Research Service describes the current market as a "broadband duopoly," where telephone and cable companies face little real competition.[371] Applying the Department of Justice guidelines for measuring market concentration, the FCC found that the broadband market is highly concentrated.[372] Others using these formulas to conduct their own more recent

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[367] van Schewick, *supra* note 105, at 342–63.

[368] *See generally* Nicholas Economides, Competition Policy in Network Industries: An Introduction 3–4 (NET Institute Working Paper No. 04-23, 2004), *available at* http://ssrn.com/abstract=386626 (discussing unique features of networked industries including technical standards, consideration of the relation between number of firms and social benefits, and innovation races, among others).

[369] *See*, *e.g.*, James Alleman & Paul Rappoport, *Regulatory Failure: Time for a New Policy Paradigm*, 60 COMM. & STRATEGIES 105, 106–12 (2005), *available at* http://mpra.ub.uni-muenchen.de/2517 (discussing the general misapplication of competition policy in the telecommunications industry). The authors observe that communications markets are not perfectly competitive, and thus should not be relied on to produce the results of perfect competition. *Id*. at 117. Instead, they state "[a] more nuanced approach needs to be taken which accounts for market power, the substitution of alternatives (and who controls them), how will the dynamics play out etc. and how this will impact investment decisions." *Id*. at 117–18.

[370] *See*, *e.g.*, Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1893 (arguing that the broadband market, with the proper market defined, is "too congested for vertical integration to pose a threat to competition"); CHARLES B. GOLDFARB, CRS REPORT FOR CONGRESS, ACCESS TO BROADBAND NETWORKS 17 (2006).

[371] GOLDFARB, *supra* note 370, at 17.

[372] *In re* Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150–2162 and 2500–2690 MHz Bands; Part 1 of the Commission's Rules – Further Competitive Bidding Procedures; Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and the Instructional Television Fixed Service Amendment of Parts 21 and 74 to Engage in Fixed Two-Way Transmissions; Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Licensing in the Multipoint Distribution Service and in the Instructional Television Fixed Service for the gulf of Mexico, *Notice of Proposed Rulemaking and Memorandum Opinion and Order*, 18 F.C.C.R. 6722, ¶¶ 123–24 (Mar. 13, 2003) [hereinafter *Fixed and Mobile Broadband Access*]. The Herfindahl-Hirschman Index ("HHI") is a commonly accepted measure of market concentration, which is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. United States Department of Justice, The Herfindahl-Hirschman Index, http://www.usdoj.gov/atr/public/testimony/hhi.htm (last visited Jan. 28, 2009). As the FCC has noted, "under the *DOJ/FTC Guidelines*, a market with a [HHI] . . . that exceeds 1800 is considered highly concentrated." *In re* Application of EchoStar Communications Corporation (a Nevada Corporation), General Motors Corporation, and Hughes

analysis have determined that regional broadband Internet markets are very "highly concentrated."[373] Four companies—AT&T, Verizon, Comcast, and Time Warner—control almost 70% of residential Internet access in the United States.[374]

However, market share alone should not be the end of the story. One key to any analysis of market concentration is to focus on the source of the market power, and not just its mere existence. Does concentration stem from a successful innovation? Does concentration occur in a market characterized by low barriers to entry (so other would-be innovators can contest them through differentiation) or low switching costs (so consumers and other agents can freely exercise their evolutionary ability to select and amplify the innovations they prefer)? [375] Or are there other reasons, such as legacy placement due to government-derived advantages, high entry barriers, or high switching costs?[376] What is the source of the entry barriers: bandwagon effects with consumers; network effects with other agents; cost of research; cost of physical plant? Does it reflect the economics of things (relative scarcity), or the economics of ideas (relative abundance), or a mix of both? [377]

Joseph Schumpeter and Friedrich van Hayek, both renowned economists, stress that innovation can and does create monopolies.[378] In a truly dynamic market, the argument runs, monopolies attained through innovation will remain in place only as long as the unpredictable forces of the market allow. This temporary market power is the reward of innovation at the individual level, but also creates real benefits to the entire system.[379] Indeed, some believe that the

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Electronics Corporation (Delaware Corporations) Transferors; and Echostar Communications Corporation (a Delaware Corporation) Transferee, *Hearing Designation Order*, 17 F.C.C.R. 20,559, ¶ 134 (Oct. 9, 2002). In 2003, the FCC calculated the HHI for a variety of broadband market scenarios; those figures ranged from 5200–6000. *Fixed and Mobile Broadband Access*, *supra*, at ¶ 123.

373 *See* Bill D. Herman, *Opening Bottlenecks: On Behalf of Mandated Network Neutrality*, 59 FED. COMM. L. J. 103, 126–27 (2006) ("The typical broadband market has an HHI roughly three times that required for a market to be considered highly concentrated.").

374 Crawford, *Transporting Communications*, *supra* note 52, at 40 n.132.

375 ATKINSON, THE ROLE OF COMPETITION IN A NATIONAL BROADBAND POLICY, *supra* note 67, at 6–7.

376 *Id*. at 5.

377 *Id*. at 3–6.

378 *See* FRIEDRICH A. HAYEK, LAW, LEGISLATION AND LIBERTY: THE POLITICAL ORDER OF A FREE PEOPLE 72–73 (1979); JOSEPH SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 82–83 (3d ed. 1942); *see also* Thomas K. McGraw, *Schumepter's* Business Cycles *as Business History*, 80 BUS. HIST. REV. 231, 240–41 (2006); Some get the causality of this formula exactly backwards. *See*, *e.g.*, DENNIS L. WEISMAN, ON MARKET POWER AND THE POWER OF MARKETS: A SCHUMPETERIAN VIEW OF DYNAMIC INDUSTRIES 4 (2008), http://www.freestatefoundation.org/images/Power_of_Markets.pdf ("[H]igher market concentration (less competition) may give rise to higher levels of innovation.").

379 ORMEROD, *supra* note 284, at 232. Ormerod takes from the reality that monopolies

dynamic efficiency and "creative destruction" of certain capitalistic systems apply equally to broadband communications plant, with its high fixed costs and reliance on government resources.[380] However, while in principle it sounds reasonable to eschew static snapshots of market concentration—the "myopic calculus of 'market-share-equals-market-power,'"[381] as one analyst puts it—concentration in the broadband market has not changed appreciably in at least the last ten years.[382] Ironically, while these same commenters typically deride the use of market concentration snapshots, they fail to appreciate the longer view of when and how the concentration originates, and whether it is abiding.[383]

Another variable to consider in assessing the extent of market concentration is the relative reach of whatever competition might exist. Does it come from what could be called "shallow competition," based largely on prices and profit margins, or from "deep competition" grounded more on new technologies and business models? Schumpeter points to competition based on innovation as generating "creative destruction," possessing the ability to upend incumbent players.[384] Policymakers should tend to prefer the deeper type of market activity, which represents true transformative competition.[385]

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attained via innovation typically are short-term that, "[a]s long as the institutional rules under which the system operates encourage innovation, we should not worry about market power being exercised by individual firms, for eventually they will be undermined by the process of competition and innovation." *Id*.

380 *See* SCHUMPETER, *supra* note 378, at 83–84 ("[The] process of Creative Destruction is the essential fact about capitalism."); *see also* WEISMAN, *supra* note 378, at 4–5.

381 WEISMAN, *supra* note 378, at 3.

382 Herman, *supra* note 373, at 129 (noting that cable modem and DSL service control 94.5% of the broadband market in 1999).

383 *See* WEISMAN, *supra* note 378, at 3. Jonathan Nuechterlein makes the point that Web companies like Microsoft and Google have greater market share than the broadband companies, and then implies that they may deserve greater scrutiny. Jonathan E. Nuechterlein, Antitrust Oversight of an Antitrust Dispute 41 (Reg-Markets Center, Working Paper No. 08-07, 2008). This version of antitrust law is a facile one. Simply put, physics, economics, and history matter. The broadband market is different from the search market, which is different from the operating system market. The source of the market power, and how it is used, are the real issues to be examined, a nuance which Nuechterlein ignores.

384 WILLIAM J. BAUMOL, THE FREE-MARKET INNOVATION MACHINE 22 (2002). Baumol agrees with Schumpeter that innovation rather than price is the primary competitive dimension in a capitalist economy. *Id*. at 11. Joel Mokyr puts it well: "The concept of competition . . . is not so much the neoclassical concept of price competition of *firms* in the marketplace as it is Schumpeter's concept of competition between different *techniques* struggling to be adopted . . . ." JOEL MOKYR, THE GIFTS OF ATHENA: HISTORICAL ORIGINS OF THE KNOWLEDGE ECONOMY 220 (2002).

385 Michael Katz and Howard Shelanski have written an extensive paper suggesting a "dynamic merger policy" that attempts to resolve the potential tension between innovation and competition. *See* Michael Katz & Howard Shelanski, *Mergers and Innovation*, 74 ANTITRUST L.J. 1, 14–15 (2007). Without necessarily taking a position here on the efficacy of their specific approach, it is notable that the authors are attempting to update antitrust law to

A third variable to consider is whether the market generates network effects. In a network-based industry like communications, the value of the network to each user increases with the addition of other users.[386] What is the source of various network effects of different types, and with what impacts—positive and negative—in the market? Does the entity spring from the ideas economy where both monopolies and innovation pressures are expected, from the physical economy, or some blend of the two?

A company's external behavior is also a key consideration.[387] Dominant market share "is only a starting point for determining whether a competitor possesses monopoly power."[388] For example, is the firm ultimately using its position in a network to stifle creativity and slow the discovery of new ideas?

Finally, many scholars have written about the concept of path dependency, which describes how specific details of history govern the unfolding course of development.[389] Path dependency is a "dynamic process whose evolution is governed by its own history."[390] While some perceive path dependence as harboring the contention that markets fail—a perception that leads to dangerous economic policy prescriptions—the concept carries no such implication.[391] One actual lesson for economic policy is to "preserv[e] open options for a longer period than impatient market agents would wish."[392]

b. No obvious future competition

Since at least 1999, "wired access technologies such as fiber and broadband over power line . . . and wireless access technologies such as Wi-Fi, WiMax and satellite, have been promoted as would-be [broadband] competitors in the foreseeable future."[393] However, the U.S. consumer market "is still characterized by a dominant-fringe model" consisting of two dominant leaders in each

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accommodate the realities of the sources of usefulness of innovation.

386 *See* Regan, *supra* note 22, 477–78.

387 For example, monopoly itself is not a violation of the Sherman Act; bad acts also are required. *See* United States v. Aluminium Co. of Am., 148 F.2d 416, 429–31 (2nd Cir. 1945); *see also* 15 U.S.C. § 2 (2006).

388 U.S. DEP'T OF JUSTICE, COMPETITION AND MONOPOLY: SINGLE-FIRM CONDUCT UNDER SECTION 2 OF THE SHERMAN ACT viii, http://www.usdoj.gov/atr/public/reports/236681.pdf.

389 *See*, *e.g.*, Paul A. David, Path Dependence—A Foundational Concept for Historical Social Science 1 (Stanford Inst. for Econ. Policy Research, Working Paper No. 06–08, 2007), *available at* http://www-econ.stanford.edu/faculty/workp/swp06005.pdf.

390 *Id*.

391 *See id*. at 12–13.

392 *Id*. at 20.

393 Eun-A Park & Richard Taylor, Barriers to Entry Analysis of Broadband Multiple Platforms: Comparing the U.S. and South Korea 2 (2006), *available at* http://web.si.umich.edu/tprc/papers/2006/636/TPRC2006BarriersToEntry.pdf.

local market.[394] Near monopoly control manifests itself as relatively high pricing and lower quality in the United States compared to countries such as South Korea.[395] Other barriers to entry include scale economies, customer switching costs, tying, lobbying, and brand loyalty.[396] The economic realities of deploying broadband networks also affect competitors' ability effectively to contest new markets.

Even the Department of Justice under President Bush appears to have had some doubt about the likelihood of future broadband competition.[397] Satellite broadband and BPL provide good examples of the lack of new competition in the broadband market from different technologies. For instance, BPL has not achieved much success, with only thirty-five BPL deployments as of June 2007, twenty-seven of which were "pilot or trial deployments."[398] Satellite services are more expensive and offer lower speeds than wireline alternatives, and as of June 2007 "less than one percent of all broadband users subscribe to satellite service."[399] It is not obvious how today's mobile wireless services can compete with wireline competitors on price, quality, and delivery speeds.[400] In the Department of Justice's words: "It is unclear whether wireless broadband providers will have a substantial impact on the marketplace. New entrants may have a limited impact due to restraints on available spectrum, limitations of the technology, and the difficulty of competing against better-positioned incumbents that have first-mover and scale and scope advantages."[401]

Perhaps most significantly, the largest national wireless high speed Internet providers—and perhaps best-situated potential competitors—represent two incumbents from the wireline market and two longstanding telecommunications providers.[402] The appropriate way to add up the available consumer op-

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394 *Id*.

395 *See id*. at 3.

396 *Id*. at 7.

397 *See*, *e.g*., U.S. DEP'T OF JUSTICE, VOICE, VIDEO, AND BROADBAND: THE CHANGING COMPETITIVE LANDSCAPE AND ITS IMPACT ON CONSUMERS 1–2 (2008), http://www.usdoj.gov/atr/public/reports/239284.pdf.

398 *In re* Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, *Fifth Report*, 23 F.C.C.R. 9615, ¶ 23 (Mar. 19, 2008).

399 *Id*. at 26–28.

400 *Id*. at 21.

401 *Id*. at 88.

402 Verizon Wireless and AT&T Wireless grew out of the wireline market, while T-Mobile and Sprint have provided wireless service since 1994 and 1987 respectively. Verizon Corporate History, http://investor.verizon.com/profile/history/ (last visited Apr. 9, 2009); Milestones in AT&T, http://www.corp.att.com/history/milestones.html (last visited Apr. 9, 2009); T-Mobile Company Information, http://www.t-mobile.com/company/CompanyInfo.aspx?tp=Abt_Tab_CompanyOverview&tsp=Abt_Sub_His

tions is not by simply counting individual broadband technology platforms, but rather *independent* platforms. Thus, on its face, the potential for future competition from independent platforms is not considerable.

c. Contestability: The Daunting Economics of Infrastructure

Many economists believe that potential competitors effectively can constrain market power, making antitrust and regulatory attention largely unnecessary.[403] William Baumol advanced the theory of contestable markets in the early 1980s as a generalization of the theory of perfectly competitive markets.[404] Because contestable markets are competitive markets, he claimed, "a perfectly competitive market is also perfectly contestable."[405]

Baumol himself made clear that the results of the theory are of a "strictly static and equilibrium nature," based in large part on the possibility of rapid market entry and exit by would-be competitors.[406] As Baumol put it: "A contestable market is one in which entry is absolutely free, and exit is absolutely costless."[407] This analysis renders a market contestable if an entrant has access to all production techniques available to the incumbents, is not prohibited from wooing the incumbents' customers, and entry decisions can be reversed without cost.[408] Importantly, "[f]irms don't actually have to enter a contestable market to generate the classical natural price. Often, potential entry and credible threats of entry will force the incumbents to adjust [their pricing decisions]."[409] Conversely, if incumbents do not believe that entrants can realistically engage in rapid and reversible entry, "potential entry does not constrain the actions of the incumbents."[410] Further, the theory cannot apply properly to markets where economies of scale are important, or sunk costs are present.[411]

The broadband market does not appear to meet the fundamental criteria for contestability. As discussed by Mo Xiao and Peter Orazem,

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tory (last visited Apr. 9, 2009).

[403] William J. Baumol & Robert D. Willig, *Contestability: Developments Since the Book*, *in* STRATEGIC BEHAVIOUR AND INDUSTRIAL COMPETITION at 9, 22 (D.J. Morris et al. eds., 1986).

[404] *See* Stephen Martin, The Theory of Contestable Markets 5 (2000), *available at* http://www.mgmt.purdue.edu/faculty/smartin/aie2/contestbk.pdf.

[405] Michael E. Bradley, Adam Smith's System of Natural Liberty, Competition, Contestability and Market Process (Oct. 12, 2007), *available at* http://ssrn.com/abstract=1021305.

[406] Martin, *supra* note 404, at 9.

[407] *Id*. at 10; *see* Elizabeth E. Bailey & William J. Baumol, *Deregulation and the Theory of Contestable Markets*, 1 YALE J. ON REG. 111, 120 (1984).

[408] *See* Bailey & Baumol, *supra* note 407, at 120–21.

[409] Bradley, *supra* note 405, at 26–27.

[410] Martin, *supra* note 404, at 10.

[411] *See id*. at 24.

"[t]elecommunications networks can be characterized by high threshold levels of investment, which causes the existence of substantial sunk costs and a high fixed to variable cost ratio."[412] Broadband networks also exhibit significant economies of scale and scope, require access to patents, rights of way, and spectrum, and exhibit network externalities.[413] In particular, costs generated from installing networks, establishing billing and support systems, and acquiring customers constitute substantial barriers to entry.[414] Incumbents can control these cost-generating activities in various ways.[415]

The requirements of investing in the telecommunications industry are unique because "they are significant and to a large extent sunk or irreversible."[416] New entrants must make substantial investments in wireline or wireless infrastructure that may never be recovered.[417] Would-be new entrants in particular may face barriers "because of incumbents' pre-occupation over subscribers and first-mover advantages."[418]

Moreover, subsequent analysis suggests that once a market has one to three firms, the next entrant has little effect on competitive conduct.[419] As discussed above, Atkinson also provided important work on why it may not be economically viable for a third, fourth, or fifth broadband competitor to emerge.[420]

Taken together, these observations suggest that the market alone probably will not produce additional viable competitive broadband platforms. Nor is it clear that policymakers should try to spur investment where the economics dictate that multiple competing providers will undermine scale economies. Nonetheless, it cannot be ruled out that future spectrum-based competitors, operating at somewhat reduced costs and offering the lure of user mobility, could alter this picture and improve the prospects for facilities-based competition in the broadband market. Even if broadband markets become contestable, however, the likelihood of positive effects from competition is far from certain.

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412 Park & Taylor, *supra* note 393, at 9; *see* Mo Xiao & Peter Orazem, Do Entry Conditions Vary over Time? Entry and Competition in the Broadband Market: 1999–2003 3 (2005), *available at* http://ssrn.com/abstract=895177. In the broadband market, sunk costs are a main factor in determining whether entry occurs and how successful it can be. *Id*. at 3.

413 Park & Taylor, *supra* note 393, at 9.

414 *See id*. at 9–10.

415 *See id*.

416 Alleman & Rappoport, *supra* note 369, at 114.

417 *See generally* Park & Taylor, supra note 393, at 27 (discussing the various sunk costs involved in deploying a broadband network).

418 *Id*.

419 Xiao & Orazem, *supra* note 357, at 3.

420 ATKINSON, THE ROLE OF COMPETITION IN A NATIONAL BROADBAND POLICY, *supra* note 67, at 3–5 (discussing both the economists and engineers perspective on the viability of additional broadband competitors).

d. The Potential Inadequacy of Competition

Even assuming that broadband markets are contestable and competition eventually emerges, there are troubling signs that the addition of several other broadband competitors may not be sufficient to constrain undesirable business practices in a vertically-integrated market. According to some economic experts, competition may even *increase* the likelihood that existing broadband providers will exercise market power to exclude or discriminate against competitors in the complementary Internet services market.[421]

In the Internet context, the ability of broadband network providers to exclude competitors from complementary markets does not depend on a monopoly position in the primary market, but instead is enabled by network management technologies.[422] According to Barbara van Schewick, a variety of exceptions to the "one monopoly rent" rule apply in the high-speed Internet market.[423] These exceptions include the ability to generate "more outside revenue," and the desire to "preserv[e] competitive position in the primary market."[424] In the first exception, the broadband provider seeks to exclude or discourage access to complementary products in an effort to capture higher profits by selling directly to its consumers.[425] In the second exception, the broadband provider seeks to preserve a competitive position in the primary market by differentiating itself through exclusive content and applications, and by degrading or blocking competitive services that threaten to reduce the differentiation of the provider's applications.[426] The costs of exclusion actually are diminished considerably when the provider competes with at least one other network provider.[427]

Joe Farrell and Phil Weiser explored a related concept termed internalizing

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421 *See* van Schewick, *supra* note 105, at 371–75. A single monopolist may refrain from such tactics due to the so-called "one monopoly rent" rule. On the other hand, a highly competitive marketplace with dozens of competitors may well discourage such behavior, as with the initial online dial-up ISP market (bolstered by common carriage rules). Unfortunately, neither scenario applies in the context of today's broadband market. The presence of multiple competitors may be insufficient to discourage exclusion, discrimination, and other anticompetitive behavior. *See id*. at 334–35, 371–75.

422 *Id*. at 371–72.

423 *See id*. at 334–35, 378–82.

424 *Id*. at 357, 367, 373–75.

425 *Id*. at 373–74.

426 *See id*. at 356.

427 *See id*. at 375. Specifically, exclusionary conduct can serve to strengthen market power by driving competitors from the adjacent market; witness current battles over VoIP and other applications. It can also increase switching costs by making it difficult to migrate data and hardware from one platform to another. Most importantly, *discriminatory* practices rather than direct *blocking* can give the customer a falsely negative perception of the quality of a rival's offering. *Id*. at 375–77.

complementary efficiencies ("ICE").[428] ICE emphasizes that network providers typically benefit from an efficient complementary market.[429] In most concentrated markets, this reality would argue for laissez-faire vertical policies, because under ICE, the platform provider generally can be trusted to allow open access when it is efficient to do so. However, there are several important exceptions where incumbents are likely to act in an anticompetitive or inefficient fashion, several of which apply to some degree in the high-speed broadband market:

- Platform monopolists may practice price discrimination on both ends of this two-sided market. For example, a cable provider may block VoIP calls made by consumers in order to charge a premium on their own voice service.
- Incumbents may engage in exclusionary practices because their competitors in the secondary market threaten the primary monopoly. Such threats are by their nature speculative, meaning incumbents are likely to behave irrationally or inefficiently to exclude secondary market competitors.
- Bargaining problems can discourage innovation "if the platform provider threatens to withhold access to the platform unless the application inventor licenses its new application very cheaply."[430]
- Incumbents simply may not understand the financial benefits of ICE and behave irrationally for a variety of reasons. Weiser and Farrell argue that "the less we can count on a monopolist to be efficient even on its own terms, the more we should value platform-level competition, perhaps especially diverse competition."[431]

While non-ruinous competition brings significant benefits, the presence of these exceptions to ICE makes it unlikely that all harmful exclusionary practices will be discouraged successfully. Specifically, the ability and incentive to exclude rivals through discriminatory practices could have a significant impact on application-level innovation by Web companies, leading to an overall decrease in social welfare.[432] Application providers will have less confidence that they will be able to reach customers and efficiently access the market, while consumers will lose the network effects generated by an open Internet.[433]

Thus, it appears at least plausible that vertically integrated broadband companies, whether in a concentrated or a more competitive space, face market

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428 *See* Farrell & Weiser, *supra* note 225, at 89 (describing internalizing complementary efficiencies as the concept that "even a monopolist has incentives to provide access to its platform when it is efficient to do so, and to deny such access when access is inefficient").

429 *See id*. at 101.

430 *Id*. at 113.

431 *Id*. at 116.

432 van Schewick, *supra* note 105, at 382–89.

433 *See* Farrell & Weiser, *supra* note 225, at 116. Farrell and Weiser argue that while the presence of the platform provider in the applications market does act as a barrier to entry for competitive application providers, the existence of ICE should discourage the platform provider from entering the applications market. From an antitrust perspective, it is also difficult to justify exclusionary practices simply because firms claim that they are necessary in order to obtain more profit to build out their networks. *Id*. at 112–14, 119.

signals that may not lead them to embrace robust and open on-ramps to the Internet. So we are left with something of a mixed bag: concerns about the current and near-future state of competition, but some hope that the threat of eventuality of new entrants eventually may discipline the market behavior of the incumbent broadband providers. In short, since we cannot rule out completely such competition, institutional analysis should rule it in.

2. Public Callings

Most policymakers and scholars simply assume that scarcity—market concentration—is the sole rationale for regulating local telecommunications infrastructure, including broadband networks.[434] The long history of common carriage tells us that this is not necessarily the case. Aside from the private concentration concerns that are intertwined with traditional common carriage, other legal institutional theories may be more suitable to justify common carriage when applied in modern day scenarios. This includes the common law elements, here called "public callings," which go to the nature of the business, the use of public infrastructure resources and subsidies, and certain common law expectations.[435] Taken together, these alternative but related legal doctrines—which roughly correspond to the public utility/franchises history of common carriage—can constitute a completely independent justification for regulatory oversight and enforcement. Under this alternative rationale, a broadband provider can become subject to some form of government oversight, and even outright regulation, when the provider transports communications over its physical infrastructure, relies on public infrastructure inputs, and/or utilizes public subsidies.

First, as discussed, *the nature of the business* has been a traditional basis for subjecting an entity to common carriage duties.[436] Industries found to be "affected with the public interest . . . usually are related to physical transportation

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[434] As one notable example of this view, Daniel Spulber and Christopher Yoo describe the four possible rationales for regulation as natural monopoly, network economic effects (demand side economies of scale), vertical exclusion (leveraging into competitive markets), and ruinous/managed competition. Spulber & Yoo, *Toward a Unified Theory of Access to Local Telephone Networks*, *supra* note 219, at 57–77. While each of these elements warrants careful consideration, and as explained above do not inevitably warrant calls for government regulation, the other traditional common law elements of common carriage are conspicuously absent from the analysis.

[435] Tim Wu notes that "common-carriers were historically defined by their economic function: the carriage of goods or information, open to the public, without substantial transformation of those goods or information." Wu, *Why Have a Telecommunications Law?*, *supra* note 325, at 30.

[436] *See* Nachbar, *supra* note 64, at 106 n.261.

or communications networks."[437] The primary rationale for imposing common carriage obligations on these entities appears to be that this infrastructure is too important as a critical input to leave solely to the market. As Patricia Longstaff argues, "[c]ommunications assets always have been regarded as a critical resource for the economic, cultural, and military success of any nation."[438] To more modern ears, Tim Wu observes that these types of common carriers are by definition input industries, providing catalysts for other sectors.[439] The business of moving goods is in itself a social good, above and beyond any market power concerns.[440]

Importantly, the public interest in transportation and communications infrastructure appears not to have arisen and taken hold just because of limited market competition.[441] Even where markets have been relatively competitive, the "affected with the public interest" rationale still holds. Thomas Nachbar believes that market power is "neither a necessary nor a sufficient condition" for imposing nondiscriminatory access on an industry; rather, the inherently public nature of privately owned transportation and communications networks—their traditional publicness—has generally justified their regulation even without the benefit of economic reasoning.[442] Under one interesting interpretation, Susan Crawford finds that the critical input nature of network infrastructure constitutes potent political symbols of a stable and successful state, which she believes has led policymakers over the years to pay special attention to these industries.[443]

Regardless of the historical source, it seems clear that governments throughout history universally have applied certain policy goals to communications networks, typically in the guise of regulation.[444] Longstaff classifies these as universal access, diversity of senders and messages, competition, quality of service, consumer protection, economic efficiency, security, and government

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437 Crawford, *Transporting Communications*, *supra* note 52, at 14.

438 LONGSTAFF, *supra* note 88, at 187.

439 Wu, *Why Have a Telecommunications Law?*, *supra* note 325, at 16.

440 Kevin Werbach also observes that "network industries," such as telecommunications, electricity, and trucking, tend to be subject to significant regulation; he cites two reasons for this: network effects creating market trends towards monopolization, and the massive fixed-costs of infrastructure build-out, which give attributes of natural monopoly. Kevin Werbach, *Higher Standards: Regulation in the Network Age*, 22 HARV. J. L. & TECH. (forthcoming 2009) (manuscript at 8), *available at* http://papers.ssrn.com/5013/paper.cfm?abstract_id=1369962.

441 Nachbar, *supra* note 64, at 79–109; Crawford, *Transporting Communications*, *supra* note 52, at 13–14.

442 Nachbar, *supra* note 64, at 61, 97–99. Nachbar also claims that it is problematic to make the case for nondiscrimination based only on market power grounds. *Id*. at 115–117.

443 Crawford, *Transporting Communications*, *supra* note 52, at 16.

444 LONGSTAFF, *supra* note 88, at 214–21.

revenue.[445] From the discussion here, an additional public policy interest in communications infrastructure is maximizing the positive spillovers from use of the network, leading to—among other benefits—the creation and promulgation of More Good Ideas.[446] In particular, transportation and communications infrastructure, such as broadband networks, "are necessary to national competitiveness, generating spillovers that are not necessarily quantifiable."[447]

A second potential basis for imposing regulation on public callings relates to the general regulatory power to condition *the use of public resources*. The most obvious historic example is the railroads of the 19th century, where companies were granted authority over public and private property through eminent domain and other legal institutions.[448] In the context of modern day communications networks, providers rely on rights-of-way across public property, access to telephone poles and underground conduits, and access to spectrum held in the public trust.[449] These property rights are granted so that the larger society can benefit from the infrastructure that will utilize those resources. It is fair to say that modern communications networks could not exist absent access to these public resources.

Direct Government financial support—in the form of subsidies, tax and depreciation incentives, and other instruments— is a third potential basis for common carriage duties and has been used over the years to aid the deployment of infrastructure.[450] From this perspective, at least, no local communications network can be said to be completely "private" in nature. In any event,

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[445] *Id*.

[446] *See* Frischmann & van Schewick, *supra* note 129, at 423–25. Pool also finds an element of civil liberties protection in common carrier doctrine, observing that "the law of common carriage protects ordinary citizens in their right to communicate. . . . Though First Amendment precedents are largely disregarded in common carrier law, still this one element of civil liberties is central to that law." POOL, *supra* note 345, at 106.

[447] Crawford, *Transporting Communications*, *supra* note 52, at 16.

[448] *See generally*, Bruce Wyman, *The Law of the Public Callings as a Solution of the Trust Problem*, 17 HARV. L. REV. 156, 156–57, 168–69 (1903). One interesting question is to what extent these property rights actually derived from willing buyers and sellers in the marketplace, as opposed to property seized or made available by government fiat.

[449] Thomas W. Hazlett, *Cable TV Franchises as Barriers to Video Competition*, 12 VA. J.L. & TECH. 2, ¶¶ 41–43 (2007). As one example, in 1866 Congress included in the Post Roads Act the authority for telegraph companies to run their lines "freely along post roads and across public lands . . . [and] to fell trees for poles on public lands gratis. To be eligible for these privileges, the companies had to provide service like a common carrier, namely to all comers without discrimination." POOL, *supra* note 345, at 95.

[450] Longstaff points out that public resources historically have been devoted to transportaion, energy, and communications networks precisely because they are regarded as crucial to public welfare. LONGSTAFF, *supra* note 88, at 206. The most recent high profile example is the debate over the broadband components of the American Recovery and Reinvestment Act of 2009 ("ARRA"), and the resulting proceedings at the National Telecommunications and Information Administration ("NTIA"), the Rural Utilities Service ("RUS") of the Department of Agriculture, and the FCC, to disburse economic stimulus money.

the power to impose regulation depends on the state's ability to condition the use of public resources.[451]

A final potential basis for governmental authority over broadband communications networks comes from other areas of the common law. Jonathan Zittrain points out that the common law recognizes obligations where certain behavior is consistently practiced, including: the law of adverse possession, where open occupation of property eventually can lead to legal acquisition; the law of prescriptive easements, where rights-of-way across property can develop; and promissory estoppel, where reasonable reliance can result in a quasi-contract between parties.[452] Also, the common law provides torts—intentional harms to another—which could be interpreted to include intentional interference with the commercial relationship between the end-user and its chosen provider of Internet-based content or applications.[453]

3. Voluntary Bailment Duties

A third and often overlooked prong of common carriage—the doctrine of bailment—suggests yet another way to approach concerns about the market role of broadband providers. Bailment imposes certain obligations on entities that "hold themselves out" as a provider of service.[454] The word bailment comes for the "French word 'bailer' which means to deliver."[455] The concept dates back to Salic Law,[456] when bailments governed "the legal ownership and property provisions for cows wandering fields obtaining feed."[457] The notion of bailment is that of an implied contract and implied engagement, where the carrier of a third party's goods is treated as an insurer responsible for the goods he carries.[458] In the case of inns, once the innkeeper hangs his sign, the implied engagement applies. Carriers had an obligation to transport goods without "breaking bulk," or tampering with the cargo entrusted to them, or else face criminal liability.[459] Rather than deal with cows in fields or inns by the side of

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451 *See* WINDHAUSEN, *supra* note 196, at 16.

452 *See* ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 183–84.

453 *See id*. at 184–85.

454 The Communications Act of 1934, as amended, imposes various duties on "common carriers," defined in circular fashion as "any person engaged as a common carrier for hire." 47 U.S.C. § 153(10) (2000).

455 John J. O'Brien, The Bailment Subrogation Claim, http://www.subrogation.net/edu/edu4.doc (last visited Jan. 31, 2009).

456 MCGARTY, *supra* note 302, at 1 n.2. Salic Law is the codification of Frankish Law under direction of King Clovis I in the end of the fifth century or beginning of the sixth century. THE LAWS OF THE SALIAN FRANKS 5–8 (Katherine Fischer Drew trns., 1991).

457 MCGARTY, *supra* note 302, at 1 n.2.

458 Crawford, *Transporting Communications*, *supra* note 52, at 8–9.

459 David L. Sieradzki & Winston J. Maxwell, *The FCC's Network Neutrality Ruling in*

the road, bailment today could provide an important form of legal support for the concept of maintaining Internet access as a means of reaching and utilizing the generative platform of the Internet.

Under one analysis, carriers have an obligation to serve all, and to do so indifferently. A bailment-related concept would allow entities voluntarily to assume a bailee role, and then to undertake certain obligations, or meet certain expectations once that bailor-bailee relationship has been consummated.[460] These obligations imposed on the bailee include the duty to exercise due care when handling the bailor's property.[461] If there is a question as to the bailee executing his duties, "[t]he burden is on the bailee to show that he exercised the degree of care required by the nature of the bailment."[462] Furthermore, a presumption of negligence arises when a bailee fails to deliver goods "unless he satisfactorily explains the reason for such a failure or the loss, damage, or disappearance of the item."[463] On the other hand, "the duty to carry does not mean that a carrier cannot refuse service, such as in circumstances of potential damage, unreasonably high risk, or beyond a reasonable capacity."[464]

Rather than the more well-known common carriage duty of nondiscrimination, under bailment a broadband provider could have an obligation to meet its customer's legitimate expectations about safe delivery of the package or packets.[465] An exchange of goods can be equated to an e2e exchange of digital packets, or the analog "payload" of expressions, information, or ideas. The customers' expectations could be imposed unilaterally by a third party—such as a regulatory agency—or by mutual agreement based on the terms of service between the two contracting parties.

C. Antitrust Law: Necessary but not Sufficient

An inquiry into the appropriate institutional underpinnings to broadband infrastructure would be incomplete without considering antitrust law. Tradition-

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the Comcast *Case: Towards a Consensus with Europe?*, 72 COMMC'N STRATEGIES 73, 79 (2008).

460 The common law also recognizes the concept of a "quasi-bailment," where in the absence of an explicit agreement the existence of a mutual benefit is all that may be necessary to establish a bailment for hire relationship. O'Brien, *supra* note 455. Generally, "most bailments are for the mutual benefit of the parties." *Id*.

461 *See id*. This duty of care can apply, for example, to both the holding and the transport of Internet packets by broadband providers.

462 *Id*.

463 *Id*.

464 Noam, *Beyond Liberalization*, *supra* note 108, at 438.

465 Words like "goods" and "packages" perhaps play too much in the content world, and consequently overlook the social community role in broadband connectivity to the Net. But if the package is seen as the packet, which obviously can carry any and all forms of information, the analogy still can hold.

ally, competition law seeks to ensure that buyers and sellers can interact in a competitive market.[466] The law focuses on the existence of market power, and employs analyses to determine when and how the state or market actors should intervene with proactive legal measures.[467] Typical competition analysis carried out by the Department of Justice or Federal Trade Commission ("FTC") relies on specific market definitions, case-by-case assessments of what makes for anticompetitive business practice, and measurements of how much competition is sufficient.[468]

As Kingdon reminds us, categories matter, and define our way of looking at problems.[469] Some insist that the question of open broadband networks is not a communications policy matter, but instead an antitrust law matter. Certainly "[t]he question of who sets these powerful standards and on what basis is one of the most important public policy questions relating to the Internet."[470] Andrew Pollack adds that "the gears of the digital revolution [are] turning faster than the wheels of justice."[471] In some cases the delay may be an acceptable outcome as a matter of competition policy; in other cases, justice delayed is justice denied.

Under old school economics, competition is the end state of the market's "hidden hand" process, but without an ongoing process of rivalrous, dynamic behavior.[472] By contrast, emergence economics sees competition as an "evolutionary hand" process in real-time, involving technological innovations used by firms as major tools to try to gain a competitive advantage.[473] Moreover,

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466 David P. Cluchey, *Competition in Global Markets: Who Will Police the Giants?*, 21 TEMP. INT'L & COMP. L.J. 59, 86 (2007) ("[I]t is widely accepted that bestowing benefit on consumers by ensuring prices tending toward the marginal cost of production and by preventing excessive transfers of wealth from consumers to enterprises are both important objectives of [competition law].").

467 *See* 15 U.S.C. §1 (2006).

468 *See* Deborah Platt Majoras, Chairman, Fed. Trade Comm'n, Opening Remarks at the AEI/Brookings Joint Center Workshop on the Role of Competition Analysis in Regulatory Decisions (May 15, 2007), *available at* http://www.ftc.gov/speeches/majoras/070515uel.pdf.

469 JOHN KINGDON, AGENDAS, ALTERNATIVES, AND PUBLIC POLICIES 111 (2003).

470 Whitt, *A Horizontal Leap Forward*, *supra* note 34, at 632 (citing Craig McTaggert, *A Layered Approach to Internet Legal Analysis*, 48 MCGILL L.J. 571, 586 (2003), *available at* http://lawjournal.mcgill.ca/documents/McTaggart.pdf.

471 Andrew Pollack, *Debate Grows Over the Role an Operating System Plays*, N.Y. TIMES, July 20, 1998, at D1 ("[T]he current pace of change could leave the legal system performing surgery on a beast that evolves from one species to another on the operating table.").

472 *See* Robert D. Cooter, *Decentralized Law for a Complex Economy: The Structural Approach to Adjudicating the New Law Merchant*, 144 U. PA. L. REV. 1643, 1694 (1996).

473 *See* RICHARD G. LIPSEY, KENNETH I. CARLAW & CLIFFORD T. BEKAR, ECONOMIC TRANSFORMATIONS 37 (2005).

competition constitutes a means to an end: maximizing consumer welfare.[474]

Competition policy, in the form of antitrust litigation, played a central role in opening the United States telecommunication market, beginning with antitrust suits brought in the late 1940s and culminating in the breakup of AT&T in the early 1980s.[475] However, these days the application of antitrust laws to regulated markets arguably has become more legally suspect.[476] Moreover, antitrust laws were written in an era when scarcity determined economic value. In the modern networked technology world, often it is ubiquity, not scarcity, that sets value. Laws based on traditional economic assumptions seem to work less well when applied to new technologies.[477] As a result, Paul Ormerod claims that some conventional economists would choose to undermine market power even if it arises from successful innovation.[478] These economists would continue to seek to create a world approaching perfect competition, as traditional theory instructs them to do.[479]

Regulation and antitrust are complementary methods for controlling power, and not complete substitutes.[480] Even former FTC Chairman Tim Muris noted

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474 *See* Cluchey, *supra* note 466, at 86.

475 *See generally* United States v. Am Tel. & Tel. Co., 552 F. Supp. 131, 231–32 (D.C. Cir. 1982).

476 The Supreme Court made clear in the *Trinko* decision that even monopolies are under no general duty to deal with others, much less deal on a non-discriminatory basis. In general terms, FCC jurisdiction trumps antitrust actions. Verizon v. Trinko, 540 U.S. 398, 415–16 (2004); *see* Credit Suisse v. Glen Billings, 551 U.S. 264 (2007). The "essential facilities" doctrine, whereby monopolists have a duty to make their facilities available to third parties, also remains an uncertain tenet of antitrust law. *See Trinko*, 540 U.S. at 410–11 ("We have never recognized such a doctrine . . . and we find no need to either recognize it or to repudiate it here."). The recent *Linkline* decision casts additional doubt on "price squeeze" claims by competitors, even where "a vertically integrated firm's wholesale price happens to be greater than or equal to its retail price." Pacific Bell v. linkLINE Commc'ns, 555 No. 07–512, slip op. at 6 (Feb. 25, 2009).

477 Frischmann & van Schewick, *supra* note 129, at 389–90. As one example, Frischmann and van Schewick discount Christopher Yoo's claim that the central goal of broadband policy is to improve the competitiveness of the last mile. *Id*. at 427. While laudable, this view appears inconsistent with the broadband market's apparent lack of potential competitors, lack of contestability, and potential economic wastefulness of any subsequent investments by new entrants.

478 ORMEROD, *supra* note 284, at 232. There is a larger empirical point here as well: intruding into the market with an antitrust enforcement mandate often can interrupt the "normal" course of evolution. In the context of merger reviews, for example, it may be too much to expect policymakers to be able to determine correctly which mergers should go forward to best serve the market and which should be compelled to fail. In rare instances, clear and compelling evidence of harm to innovation and economic growth may lead appropriately to policymaker action. Otherwise, agents on all sides should be left to make their own mistakes, and learn their own lessons.

479 *Id*.

480 *See* Timothy J. Brennan, *Essential Facilities and Trinko: Should Antitrust and Regulation Be Combined?*, 61 FED. COMM. L.J. 133, 135 (2009).

the limits of modern day antitrust law to remedy pertinent market power concerns.[481] Muris explains that antitrust law, if correctly used, should utilize the New Institutional Economics ("NIE") approach, including "a careful, fact-based economic analysis grounded in a thorough understanding of the relevant institutions."[482] As Muris framed the problem: "Economics tells us that monopolies can be 'bad,' but that is the 'easy' part. How do we know when we have a monopoly? How do we know which conduct by a monopolist is 'bad?' Even when we know it is 'bad,' what can we do about it?"[483] Further, "modern imperfect competition theory that fails to take [transaction cost economics] principles into account is likely to lead to poor legal rules and remedies."[484] As Muris reasoned, "there is a substantial risk of errors by courts deciding antitrust issues.[485]

Moreover, despite calls to transform all communications policy into competition law,[486] it is not clear that antitrust law alone can achieve certain social goals outside of overall consumer welfare. Nor is it the case that network neutrality is at bottom an antitrust debate only about market power and vertical leveraging.[487] Because it only focuses on harm to consumers, James DeLong argues, "antitrust law is fairly useless" when it comes to protecting intermediate dependent producers, such as applications companies, from harm from platform companies, such as broadband providers.[488] Whether one agrees or not with that characterization, it should be clear by now that antitrust law does not adequately address the vital role of broadband as supportive infrastructure, nor

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481 Timothy J. Muris, Chairman, Fed. Trade Comm'n, Improving the Economic Foundations of Competition Policy, Remarks at the George Mason University Law Review's Winter Antitrust Symposium (Jan. 15, 2003), *available at* http://www.ftc.gov/speeches/muris/improveconfoundatio.shtm.

482 *Id*.

483 *Id*.

484 Paul L. Joskow, *Transaction Cost Economics, Antitrust Rules, and Remedies*, 18 J.L. ECON. & ORG. 95 (2002).

485 Muris, *supra* note 481.

486 *See* Jonathan E. Nuechterlein & Philip J. Weiser, *First Principles for an Effective Rewrite of the Telecommunications Act of 1996* 3 (AEI-Brookings Joint Center for Regulatory Studies, Working Paper No. 05-03, 2005), *available at* http://papers.ssrn.com.sol3/papers. cfm?abstract_id=707124 ("[W]e argue that, when it sets about to rewrite telecommunications Law, Congress should require the FCC to adhere more closely to . . . basic antitrust principles in developing the substance of its competition policy.").

487 *See* Jonathan E. Nuechterlein, *Antitrust Oversight of an Antitrust Dispute: An Institutional Perspective on the Net Neutrality Debate* 24 (AEI-Brookings Joint Reg-Markets Center, Working Paper 08-07, 2008), *available at* http://www.reg-markets.org/publications/abstract.php?pid=1257&printversion=1.

488 James V. DeLong, *Avoiding a Tech Train Wreck*, THE AMERICAN, May/June 2008, at 72, 77. Barbara Cherry agrees that current network neutrality discussions over-rely on antitrust to address network access problems. Cherry, *Analyzing the Network Neutrality Debate Through Awareness of Agenda Denial*, *supra* note 210, at 590.

the generative, emergent benefits it generates. In particular, antitrust law does not account for the personal, social, and democratic spillover benefits of communications infrastructure like broadband networks.

Indeed, no less an authority than J. Thomas Rosch, Republican commissioner at the FTC, has cautioned that Internet access invokes broader public policy goals than economic efficiency, which is the touchstone of antitrust law.[489] More to the point: "Speaking as an antitrust litigator, I doubt that antitrust can address many, if any, of the problems cited by the network neutrality proponents."[490] Rosch's keen observation is that antitrust statutes arguably do not operate to prevent or control single firm conduct, do not address questions of network access, and do not accommodate broader policy concerns like content diversity.[491]

As we have seen, the emergent aspect of networks can create substantial real benefits—even including transient monopolies—but only to the extent that they take place in an open system that facilitates growth.[492] This suggests the need for a more thoughtful approach to the public interest in setting the policy goal of More Good Ideas, and the objective of optimal broadband platforms. That objective does not appear to be compatible with, or at least represented adequately in, a pure antitrust regime.[493]

VIII. EVOLVING AND APPLYING ADAPTIVE POLICY SOLUTIONS TO ACHIEVE OPTIMAL BROADBAND PLATFORMS

From the preceding discussion there are at least three distinct rationales for government oversight regarding the commercial providers of broadband networks: private concentration, public callings, and voluntary bailment. Each strand may lead in different directions in terms of the policy projects to be considered and the statutory underpinnings for common carriage under Title I.[494]

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[489] J. Thomas Rosch, Commissioner, Fed. Trade Comm'n, Broadband Access Policy: The Role of Antitrust, Remarks at Broadband Policy Summit IV: Navigating the Digital Revolution 2, *available at* http://www.ftc.gov/speeches/rosch/080613broadbandaccess.pdf.

[490] *Id*. at 6.

[491] *Id*. at 6–10. Additionally, there are also legitimate questions whether the antitrust laws are even available when the industry already is subject to federal regulation. *See id*. at 10.

[492] *See supra* Part III.A.1–2.

[493] I do not discuss here the relative roles of the FCC and FTC in assessing and implementing competition law, except to note that each agency has its own institutional strengths and weaknesses.

[494] Interestingly, we also have three components of the optimal broadband platform: broadband infrastructure availability, Net carriage sufficiency, and Net access integrity. A fruitful future treatment could examine whether, for example, infrastructure availability concerns should be matched with the private concentration prong, Net carriage concerns with public callings obligations, and Net integrity concerns with the bailment prong.

We have also reviewed a number of plausible reasons why broadband providers, left to their own devices, would resist providing broadband as an optimal Intetrnet platform, based on pecuniary incentives related to ruinous competition, Internet-derived economic spillovers, prioritizing Internet traffic, and providing managed networks. The question now becomes what, if anything, policymakers should do at this crucial juncture to utilize a mix of legal institutions and policy projects to try to ensure BAOIP—and ultimately, More Good Ideas—as the ultimate market outcome.

As with almost any policy-related situation, a straightforward silver bullet solution does not exist to help achieve the chief objective of BAOIP. Acknowledging that reality, however, simply opens the door to a variety of policy options—ranging from the prescriptive to the adaptive—that in various ways can lead to more optimal broadband networks. Public policy should not be presumed as a binary world of "to regulate or not to regulate." In this final part, I will explore the range of possible policy approaches, recognizing that a careful mix of options likely is best within the context of well-understood market conditions.

A. Rummaging Around in the Toolkit: Institutional Overlays

At this point, two obvious questions arise: what are the various regulatory mechanisms available for intervention to ensure optimal broadband Internet platforms, and how do we weigh their relative merits? While one's policy goals and objectives can be the same, the adaptive toolkit described earlier can yield a very different set of proposed remedies. A toolkit does not supply answers; it helps you to build or fix things.[495] As I suggested in *Adaptive Policymaking*, policymakers should aim to adopt a broader view that utilizes a blend of governmental, quasi-governmental, and private actors, employing a broad spectrum of policy options, operating under the express or implied authority of the government.[496] Institutions can be thought of as the conduits through which public policy content flows.[497] The key challenge is to blend the right proportions of formality, coercion, and accountability with flexibility, adaptability, and trust.[498]

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[495] LONGSTAFF, supra note 88, at 231.

[496] Whitt, *Adaptive Policymaking*, *supra* note 3, at 9.

[497] William Kovacic, Acting Chairman, Fed. Trade Comm'n, Presentation at Silicon Flatirons Conference, Boulder, CO (Feb. 8, 2009); *see*, *e.g.*, Lucas v. Forty-Fourth Gen. Assembly of Colo., 377 U.S. 713, 749 (1964) (Stewart, J., dissenting) (explaining that the government establishes institutions that assist in creating public policy).

[498] *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 26. I will not address here the many important issues concerning the right organizational structures to help carry out our chosen policy projects. It is worth noting, however, that the FCC is well-equiped to handle

For example, policymakers deferring to market forces in a particular situation versus formal, legally binding requirements still carry the imprimatur of government in achieving a particular policy objective. Not just laws and regulations, but other formal and informal instrumentalities, and not just government, but third party groups—gradations and degrees of institutions and organizations—collectively can produce something called "public policy." Some examples follow of the institutional overlays that can be applied to the specific policy projects to be suggested in the final section. These overlays involve choosing between government and other regulation, rules and principals, and common carriage strands like public callings and bailment, and utilizing the bully pulpit and social norms. When determining the extent of its reach under Title I of the Communications Act, the Commission should consider the full panoply of institutional overlays.

If an open Internet environment is the optimal outcome, the critical task is to determine the appropriate legal, regulatory, and market mechanisms to achieve that result; the means to the ends. The issue comes down to whether and how broadband connectivity providers should be subject to incentives that effectively steer those providers to adopt Internet-friendly business practices.

1. Government Regulation Versus Other Regulation

The most fundamental institutional and organizational overlay goes to the appropriate role of the State, versus market or industry-centered bodies. Although either co-regulation or self-regulation can be a more efficient and flexible way to manage public policy concerns, such forms also risk the appearance or actuality of industry players avoiding government compliance and enforcement.[499] Of course, the question remains whether broadband providers can or should be constrained by either regulatory model.

The stronger version of the two is co-regulation, where the government and the private sector each carve out a specific role for themselves. By contrast, self-regulation involves industry doing one or more of the government's tradi-

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the industries that held sway before the age of digital convergence—broadcasters, telephone companies, cable companies—but, conversely, is poorly equipped to take on the more modular market environment spawned by the Internet. One suggested approach is to eliminate the existing industry silos represented by the Wireline Competition Bureau, the Wireless Bureau, and the Media Bureau, and replace them with a more layered organizational scheme that employs monikers like the Bureau of Communications Infrastructure for lower layer activities, the Bureau of Network Connectivity for wholesale activities, and the Bureau of User Empowerment for retail activities. I have suggested elsewhere several other ways for the FCC to structure itself to elevate pro-innovation policies. *Id*. at 51–52.

499 Angela J. Campbell, *Self-Regulation and the Media*, 51 FED. COMM. L.J. 711, 715–20 (1999).

tional functions—legislation, enforcement, or adjudication.[500] Phil Weiser, for example, argues that the industry should organize a self-regulating organization ("SRO") to handle broadband network management issues.[501] Existing self-regulation models in the communications field include amateur radio service and spectrum frequency coordinator.[502] For example, Ofcom, the British telecommunications regulator, recently undertook a comprehensive survey of when and how to employ co-regulation.[503] Just as the Network Reliability and Interoperability Council ("NRIC") serves as an advisory council to the FCC, the Broadband Stakeholder Group was created as a third-party enforcement mechanism in the UK.[504] Independent third-party regulators created and executed by companies themselves can be a powerful co-regulation mechanism—in this case to set up broadband industry standards, designed by companies themselves, which encourage the industry to aspire to certain policy objectives.

In the right context, self-regulation can be an effective tool. The claimed benefits include greater efficiency, flexibility, incentives to comply, and cost savings; as compared to government regulation.[505] Conversely, claimed costs include industry subversion of the process, inadequate enforcement and sanctions, lack of compliance, and anti-competitive conduct by bad actors.[506] The success of self-regulation depends on industry incentives and expertise, the ability to audit activities, objective standards, a fair process, and public participation.[507]

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[500] *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 23.

[501] Weiser, *The Next Frontier for Network Neutrality*, *supra* note 240, at 298 (an SRO should be charged with interpreting and enforcing "reasonable network management" standard); *see* Weiser, Exploring Self Regulatory Strategies, *supra* note 280, at 33.

[502] Weiser, *Self Regulatory Strategies*, *supra* note 280, at 4.

[503] OFFICE OF COMMC'NS (OFCOM), CONSULTATION, INITIAL ASSESSMENTS OF WHEN TO ADOPT SELF- OR CO-REGULATION ¶¶ 1.1–1.9 (Mar. 27, 2008), *available at* http://www.ofcom.org.uk/consult/condocs/coregulation/condoc.pdf.

[504] NETWORK RELIABILITY AND INTEROPERABILITY COUNCIL, CHARTER OF THE NETWORK RELIABILITY AND INTEROPERABILITY COUNCIL (2004), http://www.nric.org/charter_vii/NRICVII_Charter_FINAL_Amended_2004_3_12_04.pdf; Broadband Stakeholder Group, What is the BSG?, http://www.broadbanduk.org/content/view/236/7/ (last visited Mar. 22, 2008).

[505] *See* Campbell, *supra* note 499, at 715–17.

[506] *Id*. at 717–19.

[507] *Id*. at 757–61. Similarly Kyle Dixon and Ray Gifford discuss the "private trust systems," which include ongoing industry consortia, standard-setting organizations, and other entities designed to build trust among typically antagonistic parties for their mutual benefit, and to create a framework to channel business tensions productively and predictably, even as compared to public regulation. Kyle Dixon & Ray Gifford, *Complementing Advocacy with Private Trust Systems and Other Long-Term Collaboration*, CONVERGENCE COMPASS, at 1–2 (Kamlet Shepherd & Reichert, LLP, 2008), http://www.convergencelaw.com/filings_pubs/pdf/SelfRegulation%20Compass%20Newsletter%5B1%5D.pdf.

2. Rules Versus Principles

The next fundamental dichotomy is between a legislative (rules) approach and an adjudicatory (principles) approach. In a traditional rules-based system, lawmakers and regulators seek to prescribe in varying degrees of detail what individuals and entities must or must not do to meet certain obligations.[508] Many politicians and regulators appear to prefer relying on what Phil Weiser terms "the call of the categorical rule,"[509] because often it is deemed simpler to make and to enforce prescriptive regulations.

By contrast, in a principles-based system, regulators worry less about defining the specifics in advance and instead evaluate entities' behavior according to broader, less rigorously defined standards of conduct.[510] A principles-based system provides companies more leeway in devising and implementing business plans, and also grants regulators more leeway in judging whether, for example, a company is acting in the best interests of shareholders and consumers. Because of the greater degree of flexibility in the application of principles, incumbent companies generally prefer them to rules since they can adapt more readily to the business on a case-by-case basis without state interference.

However, coercion can be difficult to exercise without regulation to back it up. While more flexible than ex post regulations, principles may not carry the same coercive effect. For example, in August 2008, the FCC decided that Comcast's traffic-shaping techniques violated net neutrality principles.[511] However, Comcast disputes that the FCC has the requisite legal authority to take enforcement action pursuant to the principles. The enforceability of the FCC's principles is an open legal question that should be decided on appeal.

The temporal distinction between ex ante and ex post regulation is a further decision point. Many commenters suggest that a principles-based approach would match up well with an adjudicatory process, premised on a case-by-case analysis of the relevant facts. Interestingly, this approach largely mirrors the common law process of deciding controversies.[512] Rather than a single standard set by a policymaker for an indefinite period of time, judges in the common law process render decisions which form governing precedent in an accretive, organic fashion. Perhaps this joining of relevant common law principles and common law processes can provide the best institutional approach in a dy-

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[508] *See* INTERIM REPORT OF THE COMM. ON CAPITAL MARKETS REGULATION 64 (2006) [hereinafter INTERIM REPORT], *available at* http://www.capmktsreg.org/pdfs/11.30Committee_Interim_ReportREV2.pdf.

[509] Weiser, *The Next Frontier for Network Neutrality*, *supra* note 240, at 311.

[510] *See* INTERIM REPORT, *supra* note 508, at 8.

[511] *Comcast Order*, *supra* note 205, at ¶ 1.

[512] *See*, *e.g.*, Jonathan Sallet, "New Product At Every Stage"—The Application of Common-Law Reasoning in an Age of Innovation 1–3 (Jan. 5, 2009) (unpublished manuscript), *available at* http://fcc-reform.org/sites/fcc-reform.org/files/sallet-20090105.pdf.

namic and unpredictable market space.

3. Public Callings and Bailment

As previously established, private concentration constitutes one of the traditional prongs in the common carriage test.[513] Where it is not entirely clear that concerns about market power alone should be the basis for government oversight and regulation, policymakers have the option of looking to the alternative prongs of what I have termed public callings and voluntary bailment as potential institutional overlays. In other words, even where broadband is not particularly scarce, it is still vitally important infrastructure reliant on public resources—a public calling. The deliberate physical movement of atoms (transportation) and electrons (communications) is crucial to all aspects of human life, including but certainly not limited to commerce. Broadband shows every sign of occupying a similar central place in our society.

Similarly, once a company takes it upon itself to provide best efforts Internet access to consumers, one can argue that it has entered into a quasi-bailment relationship with both the end user customer and the content or application provider. Under common law, that relationship triggers an obligation to deliver the goods—here, Internet packets—without harming the contents.[514] Indeed, "[i]f you want to put a computer—or a cell phone or a refrigerator—on the network, you have to agree to the agreement that is the Internet."[515] This could be seen as an Internet carriage obligation. Bailment is one example of using a different institutional form to provide the legal underpinning for policy towards broadband providers; it offers a more flexible common law standard that relies not on nondiscrimination, but a certain duty of care for voluntarily providing Internet access. Preserving e2e, rather than preserving nondiscrimination, also can be a more precise technical concept for policymakers to understand.

Of course, one potential downside under an e2e bailment approach is that broadband providers simply decide not to carry Internet traffic. Policymakers' calculated bet would be that the Internet now has grown too popular for the carriers to cease providing Internet access. This may or may not be the case. There are signs that some carriers are devising a new form of Internet, with

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513 *See supra* Part VII.B.1.

514 Private carriers can be distinguished from common carriers by owning and controlling the infrastructure platform, as well as owning the traffic that carries through it. Providers of natural gas are one example of a private carrier. LONGSTAFF, supra note 88, at 75.

515 Doc Searls & David Weinberger, World of Ends: What the Internet Is and How to Stop Mistaking It for Something Else, http://www.worldofends.com (last visited Jan. 29, 2009) (explaining that the Internet is an agreement, which is derived from the Internet Protocol: "A protocol is an agreement about how things work together").

built-in privacy, security, and monetization schemes.[516] Other new features being added to so-called next generation IP networks, like Integrated Multimedia Subsystem ("IMS"), also would allow for a more differentiated Internet experience.[517] One can imagine a scenario where over time at least some carriers may choose to provide access to their own, non-open version of the Internet. Nonetheless, this common law bailment prong, along with the public callings option, seems promising enough to warrant further consideration as institutional overlays for achieving an optimal broadband platform.

4. Bully Pulpits

Policymakers often shape public opinion merely by speaking out. Typically this is accomplished through speaking engagements, but can also include interviews, studies, workshops, hearings, consultations, and white papers—any public forum for informally communicating a preferred market outcome. Sometimes what a policymaker says can influence the eventual norm adopted by the market, without actually involving the more coercive tools of government.[518] The regulatory threat implicit behind the bully pulpit can serve as a kind of signaling function to the market.[519]

In 2004, then-FCC Chairman Michael Powell announced what he called the "Internet Four Freedoms."[520] In his stated view, these freedoms need not be actual, enforceable regulations, but instead salutary principles that the industry would respect.[521] Subsequently, the FCC secured a consent decree from a small local exchange carrier, Madison River, for blocking access to Vonage, a VoIP provider.[522] The Commission then adopted its *Internet Policy Statement* in Sep-

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[516] For example, the IP Internetworking Alliance, which includes leading incumbents like AT&T, BT, and telefonica, is developing a global IP network based on a new "IPX" standard that will ensure quality of service and security of VoIP, video over IP, and other IP-enabled services. *See*, *e.g.*, GSMA, IP INTERWORKING: UNLOCKING THE VALUE OF IP SERVICES (2007), http://www.gsmworld.com/documents/ipi_brochure.pdf (discussing the IPX).

[517] *See supra* section VI.D; *see also* Werbach, *Only Connect*, *supra* note 247, at 1292–93. IMS developers seek to make the Internet more like a private network, with improved monetization, security, and privacy features. *Id*.

[518] *See*, *e.g.*, Jonathan E. Nuechterlein, *Video Games: The Oddly Familiar Terms of Debate About Telco Entry into the Video Services Market*, 5 J. ON TELECOMM. & HIGH TECH L. 1, 9–10 (2006) (discussing an article by former FCC Chairman Michael Powell regarding network neutrality and its effect on market participants).

[519] Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. ON TELECOMM. & HIGH TECH. L. 69, 87–88 (2004).

[520] Michael K. Powell, *Preserving Internet Freedom: Guiding Principles for the Industry*, 3 J. ON TELECOMM. & HIGH TECH. L. 5, 11–12 (2004).

[521] *See id*. (calling the principles a challenge for the industry to seek to achieve).

[522] *In re* Madison River Communications, LLC and affliated companies, *Consent Decree*, 20 F.C.C.R 4296, ¶ 3–5 (Mar. 3, 2005). Madison River was investigated for allegedly

tember 2005, which largely mirrored Chairman Powell's Internet freedoms.[523] Interestingly, at the time the Policy Statement was announced, the agency indicated it was an unenforceable and non-binding document.[524] Aside from a dispute involving the question of Comcast's "reasonable network management," to date there have been no major concerted attempts by wireline broadband providers to breach the *Internet Policy Statement*.

One can view the subsequent network neutrality debates from 2005 through 2008 in much the same way. In the face of the threat of legislation or regulation, the incumbent broadband providers may have believed themselves constrained in their activities, including possible third party prioritization deals or unreasonable network management practices. The raised eyebrow—in concert with pending legislative and regulatory vehicles—may have been sufficient at least to this point to discipline the market behavior of the broadband providers.

5. Norms and Standards

Social control often can be achieved through social norms—informal, decentralized systems of consensus and cooperation—rather than through law.[525] Indeed, laws can inform norms, and vice versa.[526] One scholar even argues that "there is no sharp difference between social norms and law; rather, all rules begin as norms of some sort, and as complexity grows some norms become enforced as laws."[527] Nonetheless, the very real difference between a norm and a rule is the presence of a formalized sanction enforced by the State: the "or else" condition.[528] The force of informal constraints is derived from the beliefs

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"blocking ports used for VoIP applications, thereby affecting customers' ability to use VoIP through one or more VoIP service providers." *Id*. at ¶ 3.

523 *Internet Policy Statement*, *supra* note 357, ¶¶ 4–5.

524 At the time of the Statement's adoption, then-FCC Chairman Kevin Martin explained that its principles "do not establish rules nor are they enforceable documents." Press Release, Chairman Kevin J. Martin Comments on Commission Policy Statement (Aug. 5, 2005); *see* Tech Law Journal, FCC Adopts a Policy Statement Regarding Network Neutrality, http://www.techlawjouranl.com/topstories/2005/20050805.asp (last visited Apr. 18, 2009) (Tom Navin, Chief of the Wireline Competition Bureau, responded to questions at a post-meeting news conference by explaining that the policy statement includes only "principles" and "they are not enforceable").

525 Paul G. Mahoney & Chris W. Sanchirico, *Competing Norms and Social Evolution: Is the Fittest Norm Efficient?*, 149 U. PA. L. REV. 2027, 2030 (2001).

526 *See* Cherry, *Institutional Governance for Essential Industries Under Complexity*, *supra* note 86, at 13.

527 Paul H. Rubin, *The State of Nature and the Evolution of Political Preferences*, 3 AM. L. & ECON. REV. 50, 73 (2001).

528 *See* David Schwab & Elinor Oshrom, *The Vital Role of Norms and Rules in Maintaining Open Public and Private Economies*, *in* MORAL MARKETS: THE CRITICAL ROLE OF VALUES IN THE ECONOMY 204, 214 (Paul J. Zak ed., 2008).

of the citizens of the State.[529] Guilt and shame can become norm enforcement, and in turn leaders can use those emotions to enforce norms.

As David Nye points out, the Net may be gaining its own "technological momentum," so that at least some users are beginning to understand and expect its basic architectural components.[530] Susan Crawford argues that users of Internet access services believe that broadband providers fundamentally are in the transport business in order to carry all traffic without discrimination; thus, "the existence of a powerful, populist countervailing force" may be able to resist the FCC's non equal-access policies.[531] Timothy Lee similarly notes that the "vigilance and technical skill of the online community" is enough to thwart efforts to transform the Internet into a proprietary network, even in the absence of government regulation.[532]

This seems loigical; after all, the Net's infrastructural elements rest upon social norms embodied in those standards.[533] Obviously those norms, and those standards, are subject to change.[534] In particular, the principle of end-to-end connectivity over the "network of networks" arose in the academic communities of the 1960s and 1970s. That particular norm only managed to take hold when the U.S. government compelled adoption of the TCP/IP protocols, mandated a regulated separation of conduit and content, and granted nondiscriminatory network access to computer device manufacturers and dial-up online companies. These authoritative "nudges" by the state pushed the market to embrace a novel way of looking at networks, albeit one mirrored in earlier regulated infrastructure such as tollbooths and telephones. It remains to be seen whether the norm of e2e-powered openness can live on, and even flourish, absent government compulsion, in future industry-driven standards develop-

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[529] *See* DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE 40 (1990) (describing informal constraints as "socially sanctioned forms of behaviour" and "internally enforced standards of conduct").

[530] DAVID E. NYE, TECHNOLOGY MATTERS: QUESTIONS TO LIVE WITH 210–11 (2006) (explaining that technological momentum "acknowledges that once a system such as a railroad or electrical grid has been designed to certain specifications and put in place it has a rigidity and direction that can seem deterministic to those who use them").

[531] Crawford, *Transporting Communications*, *supra* note 52, at 3.

[532] Timothy B. Lee, The Durable Internet: Preserving Network Neutrality Without Regulation 2–3, 35–36 (Cato Institute Policy Analysis, No. 626, Nov. 12, 2008). Lee notes that "network owners' efforts to manipulate users' online activities are far more likely to generate ill will and spur the development of workaraounds than they are to foster docile acceptance and higher profits." *Id*. at 14.

[533] *See*, *e.g.*, Stephen D. Crocker, *How the Internet Got Its Rules*, N.Y. TIMES, April 7, 2009, at A29 (a "culture of open processes" led to the development of standards and protocols that became building blocks for the Internet).

[534] Frischmann, *An Economic Theory of Infrastructure and Commons Management*, *supra* note 237, at 1007. Frischmann believes pressure to change the Net's architecture should be resisted to protect it as an information commons. *Id*. at 1008.

ment.[535] With these possible institutional overlays established, the specific decision points between an adaptive and prescriptive framework now can be examined.

B. Two Possible Stances: The Prescriptive and the Adaptive

1. Silver Bullets and "Hodge-Podge Solutions"

Without perfect answers, or even perfect questions, policymakers, consumers, and market participants must live in Jonathan Zittrain's world of "hodge-podge solutions."[536] As Zittrain puts it, "silver bullets belong to the realm of the appliance."[537] The familiar toolkits for handling problems are not particularly well suited to maintaining generativity, as most regulatory interventions are either under- or over-inclusive.[538] The challenge is to generate market incentives for the three dimensions of BAOIP. Is putting the government in a regulating posture necessary in those instances, or can some other mix of institutions and organizations achieve a better end result?

In *Adaptive Policymaking*, it was accepted for purposes of argument that line drawing between tampering and tinkering in the communications sector generally is appropriate, primarily because the overall market arguably can be susceptible to competitive forces of varying reach and effectiveness.[539] The paper also accepted as given the path dependency in the United States that has led us to private ownership of broadband pipes to the home.[540] These earlier concessions aside, the evidence to date seems to support the view that last-mile broadband networks operate in a relatively concentrated market, lack significant contestability, and rely on infrastructure that is economically inefficient and even harmful to replicate. Nonetheless, in this last part the range of possible tampering options—such as structural separation, large-scale subsidy systems, and blanket, detailed nondiscrimination mandates—will be set aside for now, in favor of a more searching examination of some salutary tinkering alternatives.

I have argued that, on balance, some form of robust or sufficient Net car-

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535 Kevin Werbach has argued persuasively that the FCC should rely less on traditional regulations in favor of industry standards, derived (in the example of broadband network management) through a certified industry body that meets threshold procedural criteria. Werbach, *Higher Standards*, *supra* note 535, at 49.

536 ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 152.

537 *Id*.

538 *Id*. at 150 (using "banning the creation or distribution of harmful code" as an example of under- or over-inclusiveness).

539 *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 31.

540 *Id*. at 65, 67.

riage and open or integral Net access are appropriate dimensions for government to seek to protect in the broadband space. The basis for state involvement rests in part on the market concentration concerns articulated above, but also for the unique public calling of communications infrastructure, for the use of public resources, and for the voluntary agreement to carry Internet traffic for one's customers. However, these weighty considerations should be balanced against the desire not to tamper unnecessarily with market-based solutions, and the need for greater availability of broadband infrastructure platforms and innovative business models. The challenge, then, is to properly align the economic and non-economic incentives on both sides, so that all important interests can be served.

2. Adapting Over Prescribing

In *Adaptive Policymaking*, projects were defined as the proposed specific policy remedies, which in turn become market inputs, whether direct or indirect.[541] Generally speaking, there are two ways that policymakers can devise and implement policy projects: the prescriptive and the adaptive.[542] These categories naturally are not absolutes; they tend to bleed one into the other. Nonetheless, for purposes of a rough analysis, they will do.

What I call here the "prescriptive stance" would use direct government intervention in the broadband market, premised on a certain theory of market failure and a certain faith in government's effectiveness. By contrast, the "adaptive stance" seeks to explore a range of options, including indirect economic incentives, which fall short of direct regulation of broadband providers' behavior. The end goal is the same—disciplining the market behavior of broadband providers—but the means can be markedly different, depending on both the policy project itself and the institutional overlay employed.

The prescriptive stance to optimal broadband Internet platforms could lead to several different policy prescriptions. One assumption is that substantial structural mandates or subsidy flows are necessary to constrain or enhance various forms of market behavior. Examples include structural separation,[543] and government outlays for all-fiber networks.[544]

For example, Susan Crawford has called for structural separation of the

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[541] *Id*. at 77–78.

[542] *See supra* Part VI.

[543] *See* Joseph Farrell & Phillip J. Weiser, *Molecularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulations in the Internet Age*, 17 HARV. J. L. & TECH. 85, 122 (2003).

[544] Discussion of various prescriptive and adaptive policy proposals related to using spectrum as way to create or bolster wireless broadband networks deserve its own detailed analysis that is beyond the scope of this Article.

broadband providers by unbundling last-mile facilities for nondiscriminatory use by third parties.[545] Under this proposal, the transport network would be physically separate from the services and carried content.[546] Crawford concludes that "[t]he risks of letting private regional monopolies control access to the idea-generation facilities of the human communications layer of the Internet are far greater than the risks of getting government involved in ensuring divestiture."[547] Indeed, based on the British Telecom ("BT") experience,[548] there is some evidence to suggest that structural separation not only benefits competing carriers and ISPs, but also provides greater return to shareholders than a unified broadband platform.[549]

EDUCAUSE, a non-profit group seeking to advance higher education through technology,[550] sees the same market failure, but provides a different remedy. Its plan would rely on large-scale subsidy systems to build fiber facilities to every home in America.[551] Using a new universal broadband fund, this plan would foster consumer fiber connectivity of 100 Mbps, at a total cost of some $97 billion.[552] The EDUCAUSE proposal assumes that the market is insufficient to provide universal connectivity.[553]

Whether based on significant structural changes or significant subsidy flows, these two approaches assume the worst about the current broadband market, and rely instead on optimistic assumptions about the efficacy of the coercive power of government. The thinking underlying both proposals ultimately may be correct about the failure of the market to deliver optimal broadband Internet platforms. The question for now is whether the proposals are premature. On the market analysis side, assumptions about the inability of potential competition to take hold and discipline the incumbents' market behavior may not be

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545 Crawford, *Transporting Communications*, *supra* note 52, at 61–62; *see* Crawford, *The Internet and the Project of Communications Law*, *supra* note 119, 407 (stating that government should "act decisively to separate control over transport from control over provision from communications").

546 Crawford, *Transporting Communications*, *supra* note 52, at 67.

547 Crawford, *The Internet and the Project of Communications Law*, *supra* note 119, at 406.

548 *See* Press Release, Ofcom Accepts Undertakings from Board of BT Group Plc on Operational Separation, 1 (Sept. 22, 2005), *available at* http://www.ofcom.org.uk/media/news/2005/09/nr_20050922 (announcing the structural separation scheme agreed to by BT and Ofcom whereby BT may only offer wholesale services through a structurally separate entity called Openreach).

549 *See*, *e.g.*, David Braue, *Weighing the Price of Separation*, ZDNET AUSTRALIA, Sept. 28, 2008, http://m.zdnet.com.au/339292277.htm (analyzing BT's steady pattern of growth since separation).

550 *See* About EDUCAUSE, http://www.educause.edu/about/16006 (last visited Jan. 29, 2009).

551 WINDHAUSEN, *supra* note 196, at 69–76.

552 *Id*. at 73.

553 *See id*. at 66–67.

accurate. In particular, spectrum-based broadband from independent platforms such as Clearwire, or new wireless ventures utilizing the TV "white spaces," may pose enough of a potential competitive threat that it may be prudent to defer the assumption that consumer broadband is a natural monopoly. This means, among other things, declining to act based only on the scarcity prong of common carriage.

As explained previously, government officials must take considerable care in fashioning policy, given the realities of a complex and dynamic market, and the inevitable cognitive constraints of even the best-intentioned policymaker.[554] In this particular case, I see four specific risks in proceeding with prescriptive policy projects—such as structural separation mandates, or massive subsidy schemes—intended to protect and promote the physical broadband dimension of avalaibility of infrastructure, and the virtual broadband dimensions of sufficiency of Net carriage and integrity of Net access. Each of these concerns is premised on the FCC's current organizational and institutional challenges.

First, there is the risk of over-regulating the broadband providers. Paul Budde warns for example that some potential forms of network neutrality legislation "would cripple ISPs' ability to manage their costs, customize their offerings, and deal with usage that violates their terms of service."[555] Most structural remedies, for example, will require government involvement in separating wholesale and retail functions, setting wholesale rates, and establishing network interfaces—activities normally left to the market.

Second, there is the opposite risk of under-regulating the broadband providers. Simply put, there is no plausible way to account ahead of time for all desirable and undesirable behavior by incumbent broadband providers.[556] From the necessity to draw lines, the FCC may end up with a less effective regulatory solution. Paul Kouroupas insists, for example, that having extensive rules in place for the FCC to consider Comcast's treatment of BitTorrent actually would have required a lengthier process, and real risks of regulatory capture by the incumbent, as opposed to the final outcome.[557]

Third, there is the risk of mission creep, where those at the FCC and other

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[554] Whitt, *Adaptive Policymaking*, *supra* note 3, at 18–19.

[555] PAUL BUDDE, BIG-THINK STRATEGIES: OPEN ACCESS 11 (2009), http://www.buddle.com.au/presentations/content/2009_Big_Think_-_OAP_-_Public_Copy.pdf.

[556] Kevin Werbach observes that any anti-discrimination rule inevitably will involve behavioral determinations and engineering tradeoffs that are nearly impossible for policymakers and others to assess correctly in the current technological and market environment. Werbach, *Only Connect*, *supra* note 247, at 1277–78.

[557] Paul Kouroupas, Vice President, Global Crossing Ltd., Process over Substance: Why Regulatory Process Is More Important than Substantive Regulatory Decisions, Presented to the International Telecommunications Society, 17th Biennial Conference 16–17 (June 25, 2008), http://www.imaginer.org/its2008/28.pdf.

regulatory bodies may have the irresistible temptation to expand their jurisdiction over Internet activities. As Lee states: "once the FCC has gotten comfortable in its role as Internet neutrality cop, it might seek expanded authority to regulate the 'neutrality' of search engines, operating systems, middleware platforms, e-commerce services, and the like."[558] As just one example, the FCC's recent *Comcast Order* includes a raft of legislative provisions which the agency claims grants it the authority to regulate the network management practices of ISPs such as Comcast.[559] Some of those same provisions could be cited (wrongly, in my view) as the basis to assert jurisdiction over purely Internet-based activities, and providers of Internet content and applications. Already we have seen this story play out in the VoIP context. Of course the Commission created this very situation by rejecting Title II regulation of broadband networks, and relying instead on the legally tenuous, yet temptingly blank slate nature, of Title I.

Finally, and underlying it all, we lack sufficient knowledge at the present time to move confidently in any certain direction. Our policy apparatus to date has not provided us solid data about broadband deployment and uptake, or sound analysis of market conditions, or good theories about broadband as unique physical infrastructure. While attractive on the surface, the massive subsidy approach would assume that only government-directed fiber builds will help us achieve BAOIP. That may well be true, but the price of being wrong is substantial. The concept of path dependency tells us that initial choices in establishing and enforcing public policy matter enormously. The major gaps in our present understanding point to regulatory caution, and thus away from the prescriptive stance.[560]

One obvious problem is that we must take the market and policy realms as they exist today, warts and all. Tempting as it might be simply to roll back the hands of time and re-establish the prior regulatory regime, we should resist that temptation. Recent history has bequeathed us a legacy we cannot simply erase.[561] Instead, we should use this opportunity carefully to sort through what

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[558] Timothy Lee, The Durable Internet: Preserving Network Neutrality Witout Regulation 31 (2008), http://www.cato.org/pubs/pas/pa-626.pdf.

[559] *Comcast Order*, *supra* note 205, at ¶¶ 12, 13, 15–21.

[560] Interestingly, each of these regulation risks correlates to the network layers model, and the danger of crafting, implementing, and enforcing rules that are not well tailored to deal with the offending practice. Professor Lawrence Solum suggested an approach based on "respect[ing] the integrity of the layers, which calls on policymakers not to adopt legal regulations . . . that violate the integrity of the [layered nature of Internet architecture], absent a compelling regulatory interest and consideration of layer-respecting alternatives." Whitt, *A Horizontal Leap Forward*, *supra* note 34, at 625.

[561] Using the fitness landscape metaphor, we are "locked in" at a certain fitness level, and can find no uphill path from our current location. *See* Volker Schneider & Johannes M. Bauer, Governance: Prospects of Complexity Theory in Revisiting System Theory, Pre-

is useful and what is not to achieve our objective of BAOIP. One can be fully in favor of that objective, and yet be cautious and even skeptical about relying on full-blown structural mandates to achieve that policy objective.

For now, and for purposes of this analysis, I will accept the notion that these risks outweigh the benefits of moving immediately to a prescriptive stance for the broadband market. As a result, we should hesitate to adopt full structural or subsidy solutions via the prescriptive stance, and instead look for still-useful Adaptive stance options that work within the structure of the existing marketplace,[562] at least unless and until the benefits can be demonstrated to clearly outweigh the costs. Perhaps this concedes too much to the "way things are," but one must be realistic about political markets as well as economic ones. The inevitable risk of under-regulation or over-regulation, the likelihood of mission creep, and the paucity of relevant data, all should weigh heavily in that balance.[563] Moreover, it makes sense to try the less prescriptive first, before resorting to more dictating measures.

Some might argue that another example of a prescriptive approach is codifying a straightforward ban—sweeping in breadth, specific in detail—on all non-neutral handling of customer online traffic by broadband providers. The upside to such an approach is that it would spell out clearly the acceptable and unacceptable behavior by broadband providers, giving a useful degree of up-front certainty to all players. The downside is that this solution almost inevitably will be both over- and under-inclusive in its reach, depending on the particular regulatory element. In particular, the role of politics—the political market—cannot be minimized. Congress develops and adopts statutory language, the FCC interprets, implements, and enforces the language, and the courts review it.[564] At any point in this process, the mix of organizations will produce compromise, some on better terms than others, depending on one's viewpoint.[565] Moreover, because it is likely that incentives will not be aligned properly, some parties invariably will resist the legal requirements. Policymakers should

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sented at the Annual Meeting of the Midwest Political Science Association 27 (Apr. 14, 2007) (specific landscape topologies imply a "dead end" in the evolutionary process, but path dependency limits our available options).

562 Importantly, though, spectrum-based competition is not about different platforms, but rather different owners and operators of platforms. To say that you can have either AT&T U-Verse or AT&T Wireless 3G service is not to say that you have two competitive alternatives. Both broadband platforms more or less answer to the same commercial master, and presumably would not intentionally cannibalize each other in the marketplace.

563 Nachbar, *supra* note 64, at 129–30.

564 *See*, *e.g.*, Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 986–87 (2005) (reviewing the FCC's interpretation of the Communications Act with regard to definitional issues).

565 *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 35–36 (describing the "political market" where corporations and policymakers vie for power and leverage).

strive instead for policies that are sustainable, as Barbara Cherry uses the term, meaning those that are adoptable as a matter of politics, and achievable in terms of the underlying objectives.[566]

One cannot know in advance whether policies based on an adaptive stance will succeed or otherwise negate the need for a more prescriptive approach. For example, if the Internet is indeed a "Black Swan," a wholly unexpected event of massive impact born and raised outside the traditional commercial markets,[567] perhaps it is folly to seek to rely on traditional economic incentives to ensure its continuing viability and success. Perhaps the broadband providers—with a mindset of fearing "dumb pipe" status and ceding economic value to the edges—simply will be unable to see the Internet as being in their best long-term interest. If that indeed is the case, policymakers have several possible responses. One is to compel certain new obligations on them, which may well end badly for both sides. Another is to find ways to harness the providers' natural financial incentives to want to enable the Net. In other words, our policy options of persuasion span a wide range, from coercion—hard power—to incentivizing—soft power—to a watchful eye.

Down the road the Prescriptive stance—in this instance, entailing projects like structural separation mandates, massive subsidy schemes, or comprehendsive and detailed nondiscrimination regulations—may be necessary, and even inevitable. Sometimes adaptive policy means adapting to the realities of a failing marketplace without robust, Schumpterian-style competition.[568] For the limited purposes of this Article, though, it is assumed that the Prescriptive stance is not called for at this moment in time. Prescriptive proposals depend on a certain theory of market failure, which may or may not be true, as well as optimism about the ability to forge and implement a supportive political consensus. Instead, we should move forward to consider policy projects based on a more adaptive posture.

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[566] *See* Cherry, *Institutional Governance for Essential Industries Complexity*, *supra* note 86, at 2. In the words of J.B. Ruhl, the "radical middle" in environmental policy seeks sustainable development, against both the "tree huggers" and the "bean counters." J.B. Ruhl, *A Manifesto for the Radical Middle*, 38 IDAHO L. REV. 385, 385–86 (2002). Ruhl's proposal includes greater transparency in the process, "bounded discretion" by the government agencies, and judicial review limited to the process. *Id*. at 404–06.

[567] NASSIM NICHOLAS TALEB, THE BLACK SWAN: THE IMPACT OF THE HIGHLY IMPROBABLE 135 (2007) (observing that the Internet was "unplanned, unpredicted, and unappreciated upon its discovery, and well after").

[568] *See* Whitt, *Adaptive Policymaking*, *supra* note 3, at 7 (discussing Schumpeter's belief that capitalism is an evolutionary process of creative destruction).

C. Exploring Potential Adaptive Projects

So what are some tangible alternatives to the prescriptive stance, more in keeping with the preceding discussion? In this subpart, I propose some possible solutions premised on an adaptive stance. These projects are the concrete outputs of the public policy design space described earlier. To be clear, I am not necessarily endorsing each and every one of these proposals; some serve as alternatives to each other, or invite further analysis, or require more in-depth analysis of the appropriate institutional overlays, these proposals appear to have sufficient merit to warrant consideration—and perhaps adoption—by policymakers in Congress, a regulatory agency, or even industry players on their own.

The adaptive stance assumes that reliance on nonstructural and incentives-based solutions may be sufficient in some instances to constrain market behavior. This approach draws upon the four tinkering mechanisms described earlier: feeding the evolutionary algorithm by adding market inputs, fostering agent connectivity by harnessing infrastructure, shaping the fitness landscape by utilizing market incentives, and enhancing feedback by creating transparency and accountability.[569] Elements of each of these four mechanisms are found in the project proposals that follow. Moreover, as described above, there are various institutional and organizational overlays that can be used to moderate or emphasize certain prescriptive or adaptive elements in each of the proposed fixes.

Admittedly many of the projects described below are not new. Rather, the novelty lies in the holistic approach that is being suggested, imagining each project as part of a policy-making continuum from more to less prescriptive, in concert with suitable institutional overlays.

It is also the case that the tinkering inputs are not absolute goods in themselves. They are not optimal for all times and places—or in maximum amounts—but instead are relative to the pertinent conditions of the market.[570] Indeed, too much choice can be confusing, too much connectivity can be destabilizing, and too much information can be paralyzing. The point is that these four categories of policy inputs seem to match up well to those common market situations where one or more of the corresponding institutional elements tend to be insufficient. The context between market realities and policy implements is crucial.[571]

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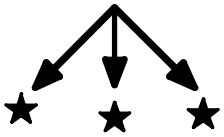
[569] *See supra* Part II.B.2.

[570] In fitness landscape parlance, there is no single successful strategy of adaptation; normal topographies with multiple peaks imply that there is a whole series of local optima. Schneider & Bauer, *supra* note 561, at 27. In other words, everything is contextual.

[571] *See* Bauer & Wildman, *supra* note 208, at 434. ("As public policy and private ordering have their respective costs, the appropriate normative question is to find the mix of (imperfect) collective policy arrangements and (imperfect) private ordering that yield the high-

Moreover, where the line is drawn between tinkering and tampering likely varies over time and from market to market. As mentioned above, we also must be realistic about the initial conditions that brought us to a particular moment in the story of communications markets. That said, markets with little to no real competition and a lack of contestability might require some form of dictating by government. Further, where there are persistent structural problems with a particular market sector, direct intervention that amounts to dictating particular business practices or outcomes may be inevitable. However, the general rule should be to tamper only where other, less intrusive options are unlikely to have the intended beneficial effect.

1. Feeding the Algorithm



The policymaker first can feed the algorithm of evolution by adding additional inputs to the process. These inputs include Business Plans, Physical Technologies, and Social Technologies. In some ways, feeding the algorithm puts the government metaphorically in the role of a lab technician, providing different plans and technologies for agents to experiment with in the market. This approach arguably comes closest to taking a Prescriptive stance, although the institutional and organizational overlays can make a significant difference in terms of the market impact.

In the context of the discussion here, the policymaker has a variety of ways to seed the market with business models that further the concept of BAOIP. Using the modular model as a conceptual tool, for example, policymakers can focus on the interfaces between broadband network layers as potential points of policy intervention to rectify issues and strengthen the optimal Internet access outcome.[572]

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est aggregate welfare, given the overall vision for the sector.").

[572] Network layers can be used as the conceptual prism for looking at broadband-related policy issues. *See generally* Whitt, *A Horizontal Leap Forward*, *supra* note 34, 624, 654–62; Whitt, *Adaptive Policymaking*, *supra* note 3, at 56–59. As one example, Faulhaber cautions appropriately in the context of a network access regime that successful regulation requires that the interface between the incumbent's business and the entrant's businesss must be simply and easily monitored for compliance. Gerald R. Faulhaber, *Will Access Regulation Work?*, 61 FED. COMM. L.J. 37, 40 (2008). The FCC's institutional competence (or lack thereof) to monitor the progress of different projects, and shift course accordingly, also is vital to a successful program of "feeding the algorithm."

a. The Nondiscrimination Internet Business Model

Many network neutrality advocates have argued for a so-called fifth principle to be added to the current four principles in the FCC's *Internet Policy Statement*.[573] This fifth principle would require that the broadband providers employ practices that are nondiscriminatory toward end-user customers as well as content and applications providers.[574] As discussed previously, the distinction between regulations and principles appears to be one largely of the degree of detail, and perhaps whether the obligation is enforced solely in ex post adjudications.[575]

There are two different forms of nondiscrimination that proponents of network neutrality have advocated. Under the FCC's traditional Title II standard that allows "just and reasonable discrimination," broadband providers likely could engage in some transactions with third parties for the preferential treatment of Internet traffic, so long as the deal is offered on an equivalent basis to similarly situated entities.[576] Professor Lawrence Lessig apparently favors this formulation.[577] This of course would allow the paid prioritization practices that raise concerns about providers' economic incentives not to provide sufficient Net capacity, or integral Net access.

Under a more stringent nondiscrimination standard, there is no reasonableness component, and hence no ability for broadband providers to engage in any paid prioritization transactions. The original net neutrality legislation introduced in 2006 by Senators Olympia Snowe and Byron Dorgan adopted this stricter standard.[578]

One possible approach at the FCC is to combine an explicit nondiscrimination standard—a legislated-in-advance principle—with a common law-like adjudication process. The Commission could create a general requirement for broadband providers not to discriminate in their carriage of Internet traffic, and then flesh out and enforce the standard via adjudication on a case-by-case basis. Over time the decisions collectively would form an evolving body of opinion defining the meaning and reach of the standard, in keeping with ongoing

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573 *See*, *e.g.*, *In re* Broadband Industry Practices, *Notice of Inquiry*, 22 F.C.C.R. 7894, ¶ 10 (Mar. 22, 2007) (raising the issue of whether a fifth principle of "non-discrimination" should be added to the *Internet Policy Statement*).

574 *See id*.

575 *See supra* Part VIII.A.1.

576 *See* Werbach, *Only Connect*, *supra* note 247, at 1273–74.

577 *See generally* Lawrence Lessig, Testimony to the FCC En Banc Hearing at Stanford University: Neutral Network (Apr. 17, 2008), *available at* http://www.lessig.org/blog/2008/04/testifying-fcc-stanford.html (play embedded video).

578 Internet Freedom Preservation Act, S. 2917, 109th Cong. § 2 (2006); *see* Robert E. Litan & Hal J. Singer, *Unintended Consequences of Net Neutrality Regulation*, 5 J. TELECOMM. & HIGH TECH. L. 533, 564 (2007).

market and technology changes. This approach would combine the authority and simplicity of a single standard, with the organic, dynamic processes of the common law. Some might argue that the lack of specificity up front would create an uncertain environment for financial investments by broadband providers and content and applications providers alike; to others, the incremental, forward-looking nature of the adjudication processes would offer an acceptable tradeoff.

b. The Open Access Model

The Supreme Court's *Brand X* decision freed cable operators from any possible common carrier requirements, and the concomitant mandate to share their broadband infrastructure with third party ISPs.[579] The FCC's *Wireline Broadband Order* did the same thing with regard to incumbent LECs.[580] Without these requirements, broadband providers currently are able to avoid ISP open access obligations.

A potential market input is to resurrect the Open Access model, with its regulatory distinction between basic telecommunications services (Layer 2 and below in OSI parlance) and enhanced information services (Layer 3 and above), and the separate regulatory frameworks that govern each.[581] Broadband providers would be required to lease at least a portion of their reclassified basic service pipes to third party carriers or ISPs on a wholesale basis.[582] The tradeoff is that the broadband providers' own retail ISP information service operations would be deemed off-limits to any network neutrality-style regulation.

One benefit of this model is that it limits potential regulation to the Layer 2/Layer 3 wholesale interface, leaving the broadband provider free to adopt any business plans for ISP retail service of its choice. Arguably this would be preferable to a more general nondiscrimination requirement applicable to the broadband providers' retail service plans. On the other hand, this model could create a fragmented Net experience for users, and broadband providers' market power could translate into ISP market power based on factors like network effects. Despite the serious legal and practical drawbacks in the FCC's current Title I regime for broadband, it also is not clear that U.S. policymakers will be

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[579] *See* Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 996–97 (2005).

[580] *Wireline Broadband Order*, *supra* note 357, ¶ 1.

[581] *See supra* Part VII.A.3 (discussing the regulatory regime whereby different services have different regulatory frameworks imposed upon them).

[582] *See* Werbach, *Only Connect*, *supra* note 247, at 1275–76. Under one variant, Congress or the FCC could adopt a broad forbearance order to govern while deciding which specific common carriage-style duties should be adopted for the broadband networks. *See* Whitt & Schultze, *supra* note 2, 63 n.380.

inclined to roll back this aspect of today's deregulated broadband regime.

One version of this operational separation model was recently adopted in the UK, with an Ofcom and British Telecom agreement that opened up BT's wholesale infrastructure to competitiors.[583] The new Openreach entity provides wholesale access to loop transport ("Layer 1"), Ethernet access ("Layer 2"), and "IPstream" ("Layer 3") bitstream access.[584] Each offering constitutes its own separate approach to a network access model.[585] Recent figures indicate there are now over five million unbundled lines in the UK, with millions of homes and small businesses switching to providers other than BT.[586] It is claimed that the increased competition has led to a wider range of services and lower prices for consumers.[587] Nonetheless, most forms of network unbundling will require establishing access points and interfaces, setting wholesale rates, and creating an effective enforcement regime, all of which are challenging tasks for even the most conscientious policy agency.

c. Computer IV*: The Operational Split Model*

A variant to the open access business model is an operational split model that essentially draws the regulatory line between types of services in a different place. Under a proposed *Computer IV*-style analysis, policymakers would create or incent a split between the lower layered broadband network and ISP component (OSI Layers 3 and below), and the upper-layered content, applications, and devices layers (Layers 4 and above).[588] In essence, the basic/enhanced service line would be moved further up the protocol stack.[589] One

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583 *See* WINDHAUSEN, *supra* note 196, at 57.

584 NETWORK STRATEGIES: INVESTIGATION OF THE BT SEPARATION MODEL, Rep. No. 26018, at 1–8 (2006), http://www.med.govt.nz/upload/45602/network-strategies-bt.pdf.

585 Within the loop unbundling regime, for example, Ofcom has discussed two types of wholesale products to support competition: active (infrastructure plus electronics) and passive (infrastructure only). OFCOM, DELIVERY SUPER-FAST BROADBAND IN THE UK 3–6 (2008), http://www2.ofcom.org.uk/consult/condocs/nga_future_broadband/main.pdf.

586 Rod Smith, Off. of the Telecomm. Adjudicator, OTA2 Update for Dec. 2008, http://www.ofcom.org.uk/updates/otaupdate20090109.htm.

587 *See* Press Release, Ofcom Accepts Undertakings from Board of BT Group PLC on Operational Separation, *supra* note 548. Other countries are looking at this model as well, including New Zealand and its Chorus program. *See*, *e.g.*, Chorus, About Us, http://chorus.co.nz/how-we-work (last visited Jan. 11, 2009). This should not be surprising, as various forms of unbundling open up new revenue streams (and perhaps deter competitive entry). It may well be that the mindset to avoid becoming a dumb pipe as a regulatory matter is deterring many broadband providers from voluntarily pursuing healthy wholesale relationships as a business matter.

588 BT's Openreach, for example, offers a "bitstream" access service that combines the functionality of Layers 1 through 3. NETWORK STRATEGIES: INVESTIGATION OF THE BT SEPARATION MODEL, *supra* note 584, at 1–5.

589 Scott Jordan has suggested this layered approach to network neutrality, which sepa-

implication is that Internet access would be redefined as a communications service—at least when provided by a facilities-based broadband provider—and thus labeled something like "Internet carriage."[590]

The virtue of this operational split approach over ISP open access is that it recognizes today's almost complete melding of broadband networks and Internet access functionality that the FCC has sanctioned. After all, IP is not magic pixie dust that transforms the regulated into the unregulated; it is a transmission protocol, pure and simple. The downside of this approach is that without additional regulation of wholesale interfaces, the operational split model would continue to consign independent ISPs like Earthlink to a world without guaranteed access to broadband networks.

d. The Proportional Capacity Model

One fundamental flaw in the traditional network neutrality position is that it fails to address the carriers' presumed incentives over time to invest in their private networks, and to carry proprietary content—presumably largely voice and video—at the expense of best efforts Internet connectivity. Once the Net community has conceded that it is acceptable for broadband providers to supply IPTV and other proprietary network services, there appears to be little to prevent broadband providers eventually from crowding out the Net, or eliminating it altogether. This result obviously would undermine the preferred broadband platform dimension of sufficiency of Net capacity.

One approach that could deal with this gap would have broadband providers allocate a certain fixed percentage of their total broadband capacity for basic access to the public Internet; that portion would be free of any prioritization deals. The broadband provider then could provide any proprietary content and applications, under any charging arrangements, over the remaining percentage of capacity.[591] The incentives structure derives from the reality that if the total network capacity is grown to feed additional bandwidth for the managed portion, the unmanaged portion also grows proportionately.[592] This approach could

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rates network infrastructure (OSI Layers 1-3) from applications (Layers 4-7). He argues that infrastructure typically has high barriers to entry and must be implemented in every part of the network, while applications have low barriers of entry and can be implemented at any part of the network, but preferably in the end devices. Scott Jordan, *A Layered Approach to Network Neutrality*, 2007 INT'L J. COMM. 427, 443 (2007).

590 Next generation networks ("NGNs") move the dividing line yet further up the protocol stack, separating Transport (Layers 1-4) from Services (Layers 5-7). *See id*.

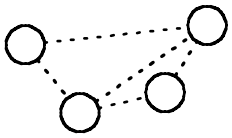
591 This can be seen as akin to a PEG channel on a cable system, or a "Net easement" across the broadband provider's private property by allowing end users to reach the publicly shared resource of the Net.

592 Under an alternative approach, any given managed service could not be allocated more bandwidth than is available for public Internet access. A third variation would place a

better align the broadband provider's own incentives for more capacity for its proprietary use, with society's interest in the spillover of more capacity dedicated to Internet use.[593]

Of course, this proportional capacity model fairly could be labeled prescriptive, because it imposes an obligation on the broadband providers' networks, and may be premised on a somewhat arbitrary percentage figure. Some also are bound to argue that the proposal conflicts with the public policy interest in maximizing the availability of broadband infrastructure. Further, different broadband networks can handle—or in some cases fail to handle—such a definitive split in usage, in different ways, as wireless capacity tends to be shared between different service offerings. Nonetheless this model would address the very real concerns about harnessing financial incentives to build sufficient broadband capacity to and from the Internet. Here, as elsewhere, the institutional overlays are all-important, as mandating such a virtual separation of capacity is different from offering regulatory inducements in exchange, or arriving at it through voluntary negotiations, or applying it in an industry standards body.

2. Fostering Connectivity



The policymaker can foster forms of connectivity and networking between various agents in the market. This can be done, for example, by strengthening or adding links (lines of communication) between nodes (agents). In the case of broadband, of course, policymakers can seek to eliminate obstacles (such as access to rights of way and other "Layer 0" inputs) and clarify obligations (such as interconnection with IP-enabled network facilities) so that multiple providers can deploy optimal broadband networks, where economically viable.

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cap (say, 500% of total Net access capacity) on the total amount of bandwidth that all managed services combined could be allocated. This last option could deal more flexibly with different types of broadband networks.

[593] Atkinson and Weiser acknowledge the concern about shrinking broadband capacity allocated for Internet access and discuss a similar proposal, which would leave it to the FCC to define a specific amount of bandwidth for best efforts Internet access. ATKINSON & WEISER, *supra* note 190, at 11–12. Ironically this could lead to a political environment, where the broadband provider has reason to resist the concept and the fixed amount of the set-aside. Moreover, in a dynamic market, the FCC would be a poor institutional choice to attempt to define and delimit the parameters of this ever-changing obligation. Under the suggested proportional capacity approach, by contrast, financial incentives would be harnessed to automatically yield a more acceptable outcome.

a. Network Interconnection

Scholars such as Kevin Werbach and Jim Speta argue that interconnection—how and when two networks should exchange traffic intended for the other network—should be the real focus of the network neutrality debate, rather than discrimination—whether or how networks should favor some traffic over other.[594] Werbach points out that "[t]he defining characteristic of the Net is not the absence of discrimination, but a relentless commitment to interconnection."[595] Speta concurs, noting that the Internet's utility "largely depends on the principle of universal interconnectivity . . . both as a technical and as an economic matter."[596] Paul David observes that "[o]ver the long run, the technical rules of the game affecting physical interconnection are likely to be more consequential than pricing formulae in their effects on growth and distribution of available bandwidth, competition in the ISP market, and the rate of innovation in applications on the Internet."[597] Some even argue that the United States would have been better off had policymakers imposed a blanket interconnection requirement on the Bell System, rather than pursued its breakup.[598]

Spulber and Yoo explain convincingly that "networks are complex systems that can be best understood by taking into account the relationships between each component, as well as the projected traffic flows."[599] The authors go on to argue that access mandates disrupt the firm's natural boundaries by forcing the network to externalize functions that it otherwise would perform internally. Even if true—and interconnection does involve often messy decisions about issues like defining the quality of interconnection, measuring costs, establishing interfaces, and addressing discriminatory conduct—this should not necessarily foreclose attempts to create, or incent, interconnection regimes where incumbent providers otherwise refuse to embrace them voluntarily.[600]

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[594] *See* Werbach, *Only Connect*, *supra* note 247, 1234–35; James B. Speta, *FCC Authority to Regulate the Internet: Creating It and Limiting It*, 35 LOY. U. CHIC. L.J. 15, 17 (2003).

[595] Werbach, *supra* note 247, at 1236.

[596] Speta, *supra* note 594, at 31.

[597] David, *Economics Policy Analysis and the Internet*, *supra* note 226, at 165.

[598] *See* Richard A. Epstein, *The AT&T Consent Decree: In Praise of Interconnection Only*, 61 FED. COMM. L.J. 149, 161–165 (2008). Richard Epstein believes the United States should have rejected the ambitious MFJ decision, with its strong separation between local and long distance networks, in favour of a broad requirement to interconnect with all telecom carriers on just and nondiscriminatoiry terms. *Id*.

[599] Spulber & Yoo, *Toward a Unified Theory of Access to Local Telephone Networks*, *supra* note 219, at 80.

[600] Spulber and Yoo assert that network economic effects provide powerful pro-interconnection incentives, but then acknowledge that this holds only where the market contains "a sufficient number of equally-sized players." *Id*. at 93. This observation would not appear to extend to the current broadband market, although as suggested above spectrum-based competition eventually might change that equation. Larger networks typically have economic incentives to delay or deny interconnection to smaller networks. BUDDE,

Interconnection may already be part of the network neutrality debate, albeit in stealth mode. While the FCC's four Internet principles deal with discriminatory practices with regard to consumers, concerns about access tiering arguably address an interconnection practice.[601] Thomas Nachbar agrees that "[n]etwork concentration is a problem best solved by imposing a duty to interconnect on network providers."[602] In this view, facilitating market forces that physically route around potential instances of network degradation makes more sense than policing market behavior that may or may not encompass such degradation.[603]

b. User-Owned Connectivity

Today, investments in consumer broadband depend on a small handful of companies under a centralized investment model. But what would happen if individual consumers owned arguably the most essential element of connectivity—the last mile? As Tim Wu and Derek Slater pointed out in their *Homes with Tails* paper, there is potential in a model where consumers purchase and own fiber connections that run from their homes to service providers of their choice.[604] These providers include modern Internet, television, and voice providers, but also video-conferencing and other information services that might exist in the future.[605] As Wu and Slater indicate, "[c]onsumers would have the opportunity not only to obtain a fast broadband connection but also to benefit from [increased choice], competition, and lower prices in the retail service market."[606]

These customer-owned, fiber "tails" are cropping up in several places, including tests in Ottawa, Canada run by Bill St. Arnaud, a researcher at CA-

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supra note 201, at 4. History proves this out, as the Bell System "systematically denied interconnection to subscribers of non-Bell companies, putting the rivals at a competitive disadvantage." Scherer, *supra* note 325, at 10. All this suggests that the government should find ways to incent, or even require, broadband networks to interconnect with other networks.

601 *See* Werbach, *Only Connect*, *supra* note 247, 1272–73. Werbach defines access tiering as "charging content and application providers additional fees for preferential access." *Id*. at 1272.

602 Nachbar, *supra* note 64, at 101.

603 *See id*.; Werbach, *Only Connect*, *supra* note 247, at 1286, 1286 n.244 (an interconnection approach appropriately would focus on whether broadband providers are actually degrading baseline "best efforts" Internet access); Speta, *FCC Authority to Regulate the Internet*, *supra* note 594, at 31–34 (Congress should adopt a statutory default rule requiring Internet carriers to transport or transit IP-compliant traffic among themselves and with retail customers, with the FCC supervising interconnection arrangements).

604 Slater & Wu, *supra* note 250, at 1.

605 *Id*.

606 *Id*.

NARIE.[607] While a promising way to lower service costs for competing ISPs—and perhaps moot many debates about network neutrality—the homes with tails model faces potential obstacles like incumbent carrier opposition, little current ISP competition, and an estimated cost of about $3,000 per house.[608]

c. User-Operated Networks

Another connectivity model involves governments and other users building and/or operating their own broadband infrastructure. Municipal broadband networks are one such notable example; governments providing their own communications service primarily as anchor tenants is another. Cooperative access sharing—"Communities with Tails"—is yet another way for end users to ensure connectivity.[609] Sharing high-speed lines could enable users in small neighborhood clusters to better control their own Internet experiences, and in many cases at greater speeds than otherwise would be available to individual consumers.[610] By sharing their Internet connections with their own residents,[611] communities would be able to establish "technology hubs" and perhaps central nodes in last-mile wireless networks. Some have suggested, for example, connecting the nation's 16,000 public libraries with fiber-based Internet access, at an estimated cost of $20,000 per facility.[612] However, some broadband providers would prefer restricting or limiting competing municipal broadband networks, or the sharing of individual network access points,[613] which could make the viability of such arrangements problematic.

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[607] Timothy B. Lee, Does Your House Need a Tail? Sizing Up Customer-Owned Fiber, Ars Technica, July 30, 2008, http://arstechnica.com/articles/culture/customer-owned-fiber.ars (last visited Jan. 29, 2009). CANARIE is "a government-funded research organization that focuses on advanced networking technologies." *Id*.

[608] *Id*.; s*ee* Posting of Derek Slater, What If You Could Own Your Internet Connection?, Google Public Policy Blog, http://googlepublicpolicy.blogspot.com/2008/07/what-if-you-could-own-your-internet.html (July 30, 2008, 14:18 CT).

[609] *See* William H. Lehr, Sharon E. Gillet, Marvin A. Sirbu & Jon M. Peha, *Scenarios for the Network Neutrality Arms Race*, 1 INT'L J. COMM. 607, 616 (2007) ("[A]ccess sharing . . . mean[s] groups of end-users who band together and, in effect, share commercially provided broadband access among themselves.").

[610] John Markoff, *Sharing Broadband to Increase Speed*, N.Y. TIMES, Jan. 16, 2006, at C6.

[611] ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 179.

[612] One example is the Fiber to the Library program instituted by the Community TeleStructure Initiative, with the national goal of connecting every public library in the country to broadband by 2010. Community TeleStructure Initiative, http://www.telestructure.com (last visited Jan. 27, 2009).

[613] ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 180.

d. User-Defined Broadband

The first generation of online services essentially was delivered by best-effort, flat rate connectivity, based on the capabilities of the end-users' modem.[614] Another connectivity-based model would allow the end user customer to shape the nature of its broadband service, with providers tailoring their service offerings to suit the customer's needs. Essentially, broadband customers would have the ability to utilize whatever amount of broadband capacity they want for Internet access, for both upstream and downstream uses.

This approach would encompass an open-ended array of user-defined preferences. For seamless connectivity, a business user may choose to maximize the capacity allocated for a virtual private network linked to her office. On the other hand, a teenager might be happy to sacrifice the quality of a voice or video connection in exchange for greater throughput for an interactive gaming service. By maximizing user control, this model can result in greater customer loyalty and reduced churn.

There are some potential downsides to this model. While the user theoretically would define broadband allocation, different users within the same household may have different preferences. Further, this model does not address pricing discrimination concerns, where the provider charges more for its competitors than itself, or sets a higher price for the raw pipe than the pipe bundled with additional services offered by the provider. Finally, current cable and wireless architecture make it difficult for consumers to define their individual uses of those broadband networks.

3. Shaping the Fitness Landscape

Tinkering also includes the option of shaping the fitness environment via market incentives. The first economic principle is that incentives matter.[615] As a result, policymakers should tap into market and non-market forces that influence what agents do. The policymaker can serve as a fitness function shaper, which amounts to acting so that the evolutionary processes of the market can be better shaped to serve society's needs. Because incentives provide useful signals to all agents in a market, the best way to use the fitness landscape to achieve policy objectives is to employ market-based incentives. By shaping the metaphoric landscape in which agents operate—providing incentives to scale particular mountains, or

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[614] *See* Susan P. Crawford, *The Radio and the Internet*, 23 BERKELEY TECH. L.J. 933, 949 (2008).

[615] Whitt & Schultze, *supra* note 2, at 12.

supporting the discovery and sharing of path shortcuts—policymakers encourage the attainment of policy objectives without interfering with the core activity of evolution. This role of fitness function shaper could find the policymaker adopting projects such as reversible deregulation, Internet truth in labeling, universal broadband funding, tax credits, or other inducements.

a. Reversible Deregulation

To some, communications networks by definition convey their traffic indiscriminately.[616] Broadband providers currently benefit from the carrier designation for purposes of certain material advantages over other entities, including access to rights of way, poles and conduits, gaining interconnection rights, and tapping subsidy funds.[617] These benefits collectively constitute another governmental lever to incent the proper market behavior.

The broadband providers won their Title I status, and its much-reduced regulatory overhang, because they succeeded in convincing the FCC and the Supreme Court that the provisioning of Internet access and broadband connectivity essentially were one and the same.[618] One fitness shaping project involves compelling the broadband providers to live with the precise terms of their victory. Should the broadband providers fail to provide unimpeded access to the Internet, the FCC would step in to reinstitute some or all aspects of traditional Title II common carrier regulation for their broadband operations.

b. Internet Access Truth in Labeling

The Internet famously is a network of networks, where each provider volunteers to adopt the TCP/IP protocol and join the Internet community.[619] Entities can come and go from that virtual fraternity at any time, for any reason. Thus broadband providers tomorrow could decide to decline offering Internet access service, or assign it minimal capacity on their networks. As mentioned above, they could even start their own quasi-Internet, and shape it to their own designs. Few are saying that the broadband providers should be prohibited from operating these less open—or even walled garden—online models. However, if broadband providers want to remain voluntarily in the business of providing Internet access, the provider must offer full, unfettered access to the Net.

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616 *See* Nachbar, *supra* note 64, at 68.

617 Barbara A. Cherry, *Utilizing "Essentiality of Access" Analyses to Mitigate Risky, Costly and Untimely Government Interventions in Converging Telecommunications Technologies and Markets*, 11 COMMLAW CONSPECTUS 251, 268 (2003).

618 *See* National Cable and Telecomm. Ass'n v. Brand X Internet Serv., 545 U.S. 967, 973–74 (2005).

619 Whitt & Schultze, *supra* note 2, at 2.

Thus, another possible policy project is to adopt a truth in advertising approach. Broadband providers could only promote and sell access to an Internet that met certain parameters, including being provided along the optimal dimensions of robustness and integrity.[620] The parameters could be set by the FCC or FTC, a public-private body, or a standards group. The upside is that this solution relies in part on market feedback for the question of what constitutes the Internet. The downside is that ultimately someone would need to define access to the Net. Moreover, the broadband providers could simply offer to provide "broadband" without any reference to the Internet.[621]

c. Universal Broadband Funding Mechanism

The Telecommunications Act of 1996 established a funding mechanism intended to defray the costs of communications services for various constituencies, including those who live in rural, high-cost regions of the country, low income consumers, and schools and libraries.[622] To date the fund has not applied to broadband networks, although some groups have proposed just that.[623]

In a previous paper I suggested that any direct subsidy for broadband should restrict both contributors and recipients on a technology-neutral basis to the network infrastructure, and not to the applications or services that use the infrastructure.[624] In other words, universal access should be about building out networks where economic realities otherwise will not allow it, and relying on funding for those efforts from other networks through a connections-based contribution methodology.[625] Moreover, the overarching concept should be universal access—encompassing concepts like connectivity, ubiquity, and symmetry—rather than universal service. We no longer live in a world rooted in predefined, fixed, centralized, discrete voice offerings tied to a single provider and a single network. Policymakers should rely on that fact to engender access to broadband functionality and then let the consumer configure it for

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620 ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 180.

621 *See id*. Atkinson and Weiser argue that broadband providers who fail to provide a basic tier of unmanaged Internet access should be prohibited from calling any of their services broadband. ATKINSON & WEISER, *supra* note 190, at 11–12. Because broadband is a more generic networking term, I would prefer conditioning the use of the term "Internet," since that is the very offering not being provided to consumers on an adequate basis. Of course, if broadband gains currency as shorthand for the Internet, that option also should be explored. Alternatively, broadband providers could be required to define and promote their service based on certain operational parameters, such as capacity and latency.

622 47 U.S.C. § 254 (2000).

623 *See Joint Board Recommended Decision*, *supra* note 62, ¶¶ 11–15 (advocating adoption of a "Broadband Fund").

624 Whitt, *A Horizontal Leap Forward*, *supra* note 34, at 668–69.

625 *See id*.

whatever low-cost, or even free, applications, content, and services they desire.[626]

Consistent with the government's role in collecting and dispersing subsidies, one also can imagine a number of ways to incent behavior from broadband providers. For example, use of the funds could be conditioned on providers accepting some version of the three dimensions of BAOIP.

d. Spillover Offset Inducements

It is particularly appropriate for policymakers to use their authority to attempt to offset the presence of positive externalities in broadband networks, essentially allowing the broadband provider to internalize some of the spillover benefits. In addition to direct subsidies such as outright grants, nations such as Japan, South Korea, and Sweden have used a mix of indirect subsidies to spur the deployment of faster broadband networks.[627] Atkinson and Weiser point out that such a public policy response can combine tax incentives in the case of positive externalities, and taxes in the case of negative externalities.[628] The tailored use of tax credits, accelerated depreciation expensing, federal broadband bonds, and other financial tools can help promote capital investment in broadband infrastructure.[629] These inducements would function as a cost reducing mechanism to help incentivize the availability of infrastructure build-out and upgrades. Under one variant, these spillover offsets could be conditioned on establishing networks that provide sufficient Net capacity, or integrity of Net access.

Some coalitions have proposed federal broadband tax credit legislation for building out fiber or other high-speed infrastructure.[630] According to an estimate cited by ITI, "a one-year credit would generate between $2 and $4 billion in broadband investment, and a five-year credit would generate between $10

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626 *See id*.

627 EZELL ET AL., *supra* note 115, at 30.

628 ATKINSON & WEISER, *supra* note 190, at 14.

629 ROBERT D. ATKINSON, AN INNOVATION ECONOMICS AGENDA FOR THE NEXT ADMINISTRATION 3, 4 (2008), *available at* http://www.itif.org/index.php?id=180; *see* JONATHAN RINTELS, USING TECHNOLOGY AND INNOVATION TO ADDRESS OUR NATION'S CRITICAL CHALLENGES 2, 3 (2008), *available at* http://www.benton.org/sites/benton.org/files/Benton_Foundation _Action_Plan.pdf (proposing a national plan that includes depreciation of broadband equipment, tax credits, and broadband bonds).

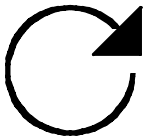
630 Information Technology Industry Council & the Computer Systems Policy Project: 10-Point Plan to Bring Broadband to More Americans, http://www.cspp.org/documents/ITI-CSPP_10-Point_BBND_Plan.pdf (last visited Apr. 15, 2008); *see*, *e.g.*, JEFFREY A. EISENACH ET AL., ECONOMIC EFFECTS OF TAX INCENTIVES FOR BROADBAND INFRASTRUCTURE DEVELOPMENT i–ii (2009) (arguing that tax incentives are an efficient mechanism to increase deployment of broadband).

and $20 billion in broadband investment."[631] For example, Idaho provides a Broadband Tax Credit of 3% for Idaho taxpayers,[632] which allows entities to install broadband equipment of a certain capacity.

Another proposal would modify depreciation schedules for broadband related equipment.[633] Because telecommunications companies are some of the largest capital investors in the world, a more favorable depreciation period is likely to increase capital expenditures in broadband infrastructure.[634] Local governments could also create tax incentives that encourage new and upgraded housing developments to include next-generation broadband facilities.[635]

Instead of a supply-driven tax credit system, some groups have pushed for a demand-based system that encourages broadband adoption, and thus indirectly encourages further broadband supply. For example, a moratorium on the Internet tax that has been the topic of some legislative discussions would maintain the lucrative, innovation-driving aspects of the Internet, and thus avoid stifling Internet growth and adoption.[636]

4. Enhancing Feedback Mechanisms



A final form of tinkering involves creating or enhancing market feedback mechanisms, essentially filling in various information or transparency gaps in the market. This means providing agents with more and better information—and perhaps enhanced decision-making tools as well—so they can make informed decisions. Ultimately more information also involves holding agents—public and private alike—accountable for their actions. Accountability and transparency also can be achieved through dispute resolutions, and consumer self-help techniques such as detecting tools or countermeasures.

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631 *Id*.

632 M9 Systems, Existing Programs to Promote Broadband, http://www.m9systems.com/broad_dep_7.html (last visited Jan. 11, 2009). Other states offering tax credits include Montana, which "offers a 20% tax credit to telecommunication providers who invest in advanced telecommunications infrastructure improvements in the state;" and Maine, which "offers a number of research and development and technology tax credit incentive programs, including the 'High Technology Investment Tax Credit'"). *Id*.

633 Information Technology Industry Council and the Computer Systems Policy Project, *supra* note 630.

634 *Id*.

635 For examples of government programs that could incent broadband deployment, see WINDHAUSEN, *supra* note 196 (discussing tax incentives a broadband fund, among other initiatives). *See also* One Economy Corporation, http://www.one-economy.com (last visited Apr. 18, 2009) (championing the need for tax credits to promote broadband connectivity in new housing developments for low-income residents).

636 *See* K.C. Jones, *President Bush Signs Internet Tax Freedom Act*, INFO.WEEK, Nov. 1, 2007, http://www.informationweek.com/news/showArticle. jhtml?articleID=202801131.

a. Transparency Policies

Agents in the market need to have access to adequate information to make informed decisions because "[w]henever there's a lack of transparency, then speculation and suspicion is inevitable."[637] In short, transparency increases both information and trust by moving information into the public domain. Users of broadband technologies also can benefit from possessing such information, and where possible altering their actions accordingly. While the least prescriptive of the four tinkering inputs, enhancing feedback mechanisms still can have a significant impact on the market behavior of broadband providers.

Unfortunately, the FCC has further complicated the absence of real competition by abdicating its responsibility to collect, publish, and base its decisions on relevant information about the state of the broadband market.[638] Until recently, the Commission's broadband deployment data collection and reporting methodology inherently overestimated high-speed Internet availability and competition.[639] For example, prior to recent changes, the FCC considered an entire five-digit zip code served by broadband even if only one resident or business is served within that zip code.[640] The Commission also has defined high-speed service as requiring only 200 Kbps in at least one direction, which many experts argue fails to set a high enough bar to accommodate the use of many common Internet services.[641] Atkinson has discussed creating user-generated mapping interfaces to track broadband deployment.[642]

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637 Rosch, *supra* note 489, at 4.

638 Philip J. Weiser, *Institutional Design, FCC Reform, and the Hidden Side of the Administrative State* 38–39 (Colo. Law Sch. Working Paper Legal Series 09-01, 2009), *available at* papers.ssrn.com/sol3/papers.cfm?abstract_id=1336820. *See also* Kimberly Claffey, *Ten Things Lawyers Should Know About the Internet* 9 (2008), http://www.caida.org/publications/papers/2008/lawyers_top_ten/lawyers_top_ten.pdf ("The FCC has no empirical basis in fact nor apparent authority in a conversation about [broadband and Internet] traffic, structure, pricing, or vulnerabilities on the network since it has no access to data from Internet infrastructure beyond what providers volunteer to provide.").

639 For a thorough assessment of the FCC's ineffective data collection efforts to date, see generally Frieden, *Lies, Damn Lies, and Statistics*, *supra* note 169.

640 U.S. GOV'T ACCOUNTABILITY OFFICE, BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS 14 (2006). When comparing more fine-grained data collected in the ConnectKentucky project to the FCC's data, for example, GAO found that the FCC methodology over-counted by some 19%. *Id*. at 17.

641 *In re* Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership, *Notice of Proposed Rulemaking*, 22 F.C.C.R. 7760, ¶ 5 (Feb. 26, 2007); *see* Connect the Nation Act, S. 1190, 110th Cong. (2007); Broadband Census of America Act of 2007, H.R. 3919, 110th Cong. (2007); Broadband Data Improvement Act, S. 1492, 110th Cong. (2007).

642 Atkinson, *Framing a National Broadband Policy*, *supra* note 84, at 168. Various

Further, until recently, broadband providers were not held accountable for the lack of information provided to would-be customers about their service. In its recent *Comcast Order*, the FCC cited a lack of transparency as a key problem with the cable company's approach to network management.[643] The FCC imposed a number of prospective obligations to ensure that Comcast disclosed all relevant information about its practices going forward.[644] Phil Weiser and Rob Atkinson similarly lean on user transparency as a key remedy to the network neutrality conundrum.[645] Among other things, they call on the FCC to adopt a "notice and monitoring regime," which would require the broadband providers to announce details about their provision of service to consumers and then adhere to those policies.[646] More information also can help promote self-help; after all, even if a small fraction of end users are more aware of the policies and limitations on service, they can use software and hardware tools to engage in their own efforts to monitor their broadband connections and, if possible, act accordingly.

On the other hand, it is unclear whether disclosure by itself can be meaningful enough to most end users.[647] In particular, the relative lack of broadband competition and increased reliance on bundling practices greatly limits the ability of end users to move seamlessly from one provider to another. For that reason alone, transparency by itself should not be seen as a panacea.

b. Dispute Resolution Processes

End users also could benefit from the timely and low-cost resolution of disputes with broadband providers. Paul Kouroupas points out that where there is unequal bargaining power between two parties, the best solution is to equalize the bargaining power through process support, rather than policy support.[648] This proposal especially makes sense where accounting ahead of time for all undesired behavior is difficult.[649] An expedited complaint process facilitated by the FCC—one where the burden of persuasion shifted to the broadband provider after a prima facie showing of a violation—would be a positive start. Kouroupas also points to the recent *Comcast Order* as evidence that the lack of

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advocacy groups have taken up this call for better deployment and uptake data. *See*, *e.g.*, ALLIANCE FOR PUBLIC TECHNOLOGY, ACHIEVING UNIVERSAL BROADBAND: POLICIES FOR STIMULATING DEPLOYMENT AND DEMAND 6–7 (2007), http://www.apt.org/publications/reports-studies/Final-Report-Feb2007.pdf.

643 *Comcast Order*, *supra* note 205, at ¶¶ 52–55.

644 *Id*. at ¶¶ 54–55.

645 Atkinson & Weiser, *supra* note 190, at 10.

646 *Id*. at 10, 11.

647 Crawford, *Transporting Communications*, *supra* 52, at 50.

648 Kouroupas, *supra* note 557, at 14–15.

649 *See id*. at 16.

established rules allowed the dispute to be resolved relatively quickly, with policymakers compelled to operate outside the formal regulatory process and exert political pressure on Comcast to alter its practices.[650]

c. User Detection Tools

Jonathan Zittrain notes that preventing the advent of a non-generative digital world will require policymakers to "create and demonstrate the tools and practices by which relevant people and institutions can help secure the Net themselves."[651] Another type of feedback mechanism is to allow end users to employ software that monitors broadband connectivity and detects and reports on anomalies. Google and several academics recently have unveiled "Measurement Lab," a program designed to develop user tools to test their broadband connections.[652] The FCC could use its authority to clarify that broadband providers are not able to interfere with the utilization of such detection tools.

d. User Countermeasures

Users also can take matters into their own hands by employing actual technical countermeasures, including end-to-end encryption, VPNs, and "routing anonymizers."[653] Some believe these software-based techniques can be successful, particularly as broadband providers are unlikely to go the expensive route of banning the software.[654] Others see the countermeasures as insufficient in themselves, but still find the ultimate outcome uncertain given the dynamic nature of the Internet.[655] Further, a market arms race escalation may be insufficient to deter bad conduct by the broadband providers.[656]

IX. CONCLUSION

This paper seeks to bring to light some new ways of looking at broadband policy in the United States. The approach is intended to be consistent with the view expressed by Paul David as he surveyed the ways that public policy grapples with the converging communications world:

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650 *See id*. at 16–17.

651 ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 152.

652 *See* Vint Cerf & Stephen Stuart, Introductory Measurement Lab, google-blog.blogspot.com/2009/01/introducing-measurement-lab (last visited Apr. 8, 2009).

653 *Id*. at 627–28.

654 *See* ZITTRAIN, THE FUTURE OF THE INTERNET AND HOW TO STOP IT, *supra* note 100, at 181.

655 *See* Lehr et al., *supra* note 609, at 608.

656 *Id*. at 608.

> [T]he relevant policy questions ought not to be construed in terms of making either–or choices. It is important to resist the rhetoric of much contemporary discussion of economic policy, which tends to offer only extreme alternatives. . . . [P]erhaps the most important general lesson to be drawn for the future of Internet policy analysis is for economists to start thinking about the ways in which the structure of the existing markets, and the uneven and uncoordinated regime of regulation and nonregulation, can induce research and technological innovation to take some directions, while discouraging it from proceeding in others.[657]

With the advent of the various economic schools of thought brought together under the heading of emergence economics, public policy can begin to find the proper analytical and empirical grounding. Traditional economics alone is not close to being the full story, and monetary outputs alone do not convey the richness of human values. With Adaptive Policymaking, there is a more methodical way to approach policy public issues, with the means and ends cleanly delineated. Through the use of policy design spaces, new policy options can be discovered, particularly in terms of a range of institutions and organizations, conceptual tools, and tinkering inputs.

This Article attempts to show how broadband must be considered critical communications infrastructure, a conveyer of More Good Ideas, and an optimal Internet platform in the three interrelated dimensions of availability, robustness, and integrity. An examination of economic motivators reveals how broadband providers—and thus policymakers—face some tough decisions regarding the potential of ruinous competition, the existence of significant positive externalities, the desire to manage and prioritize network traffic, and conflicting mindsets. The Article also demonstrates how the path dependency of U.S. history has brought about private ownership of communications networks, and, much more recently, a common carriage doctrine stripped down solely—and as it turns out erroneously—to a sterile preoccupation with market concentration. It may well prove more fruitful to look instead to the relatively neglected yet pertinent prongs of public callings, which is focused on the importance of the communications carrier, and bailment, which is focused on the importance of the cargo. Institutional overlays also provide much-needed flexibility by adding some viable policy options to the mix.

Finally, the Article urges that policymakers resist the easy temptation to adopt prescriptive remedies to deal with possible failings in BAOIP. While such remedies eventually may need to be considered, an adaptive stance for now will allow nuanced explorations of equally effective, yet often more flexible, alternatives. These would include policy projects that feed the market with different business models, foster connectivity between players, shape the fitness landscape through incentives, and enhance feedback with transparency and accountability mechanisms. Only in this way can we hope to match our

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[657] David, *Economics Policy Analysis and the Internet*, *supra* note 226, at 163, 165.

public policy-making aspirations to the emergent, human, networked, evolving, growth economy that increasingly is being enabled by broadband infrastructure.