

# THE INTERNET AND THE PROJECT OF COMMUNICATIONS LAW

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*The internet offers the potential for economic growth stemming from online human communications, but, as Professor Susan Crawford discusses in this article, recent industry and government actions have disfavored these possibilities by treating the internet like a content-delivery supply chain. She recommends that the internet be at the center of communications policy and that laws affecting internet access be evaluated in terms of whether they further U.S. economic growth by facilitating increased emergent online diversity. Professor Crawford criticizes the nearly exclusive focus of communications policy on the private economic success of infrastructure and “application” providers, and suggests that communications policy be focused on facilitating communications themselves.*

|  |    |
|--|----|
| I. The First Generation of Communications Law and Scholarship..... | 7  |
| A. The Internet Sweeps Aside Silos .....                           | 7  |
| B. The Incumbents Respond .....                                    | 12 |
| C. The Scholars Respond at the Application Layer .....             | 16 |
| D. The Incumbents Adopt the Scholars’ Layered Approach.....        | 18 |
| II. The Communications Conception of Communications law.....       | 22 |
| A. Economic Growth Theory.....                                     | 23 |
| 1. Nonrival ideas .....  | 26 |
| 2. Specialization and Scale .....                                  | 27 |
| 3. The U.S. and Economic Growth.....                               | 28 |
| B. Growth Theory and the Internet.....                             | 29 |
| III. Re-Theorizing the Current Debate.....                         | 33 |
| A. Telecom Scholars and the Internet.....                          | 33 |
| B. Implications for Policy: Universal Service .....                | 35 |
| C. Implications for Policy: Network Neutrality.....                | 38 |
| 1. Discrimination Defined .....                                    | 38 |
| 2. Market Concentration .....                                      | 41 |
| 3. What Happens to Human Online Communications?.....               | 46 |
| D. Implications for Policy: Divestiture .....                      | 48 |
| Conclusion .....   | 50 |

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Stephen Hawking: "I think the next century will be the century of complexity."<sup>1</sup>

Anyone with a substantial amount of internet experience thinks of the internet as a thriving conversation-pit, news source, and job resource, access to which is nearly as necessary as oxygen. The internet's value to people does not come from the nature of the connections we use to access it but, rather, from the human communications and relationships made possible by its universal interconnectivity and flexibility. Because no particular use of the internet is embedded in its design, new ideas and new forms of human relationships constantly emerge from its use. Both the Federal Communications Commission (FCC) and the companies that provide highspeed access to the internet in the U.S., however, assume that the internet is a content-delivery supply chain – much like a railroad – that is a souped-up version of earlier communications modalities.

The first generation of internet scholars made strong arguments about the importance of the “end to end” principle of the internet, set forth in a classic paper by Saltzer, Reed, and Clark.<sup>2</sup> That principle suggests that the transport functions of the internet should not be involved in fine-grained operations on messages because an intelligent network will impose costs that would be much more efficiently dealt with at the end-user edge.<sup>3</sup> In colloquial terms, the end to end argument is that the network should be stupid and its edges should be smart.<sup>4</sup> Larry Lessig, Mark Lemley, Yochai Benkler, Kevin Werbach, Tim Wu, Richard Whitt, Lawrence Solum, and many others have linked the end to end principle to future innovation, noting that transport non-discrimination allows new applications (like email or the World Wide Web) to be introduced by anyone without their having to ask permission.<sup>5</sup>

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<sup>1</sup> T. Irene Sanders & Judith A. McCabe, *The Use of Complexity Science: Report to the US Dept of Education 5* (2003), available at <http://www.hcs.ucla.edu/DoEreport.pdf>.

<sup>2</sup> Jerome H. Saltzer, David P. Reed & David D. Clark, *End-to-End Arguments in System Design*, 2 ACM TRANSACTIONS ON COMPUTER SYSTEMS 277-88 (Nov. 1984), available at <http://web.mit.edu/Saltzer/www/publications/>.

<sup>3</sup> See *infra* n. \_\_\_. The internet's layered architecture separates transport (the lowest layer) from the packetizing and addressing protocol (the TCP/IP suite or logical layer) used by computing devices. TCP/IP can work across (above) any form of transport and is, in turn, used by applications running *above* TCP/IP, such as the domain name system, email, and the World Wide Web. See *infra* Section \_\_\_.

<sup>4</sup> See David Isenberg, *The Rise of the Stupid Network*, available at <http://www.rageboy.com/stupidnet.html>.

<sup>5</sup> See, e.g., Kevin Werbach, *The Architecture of Internet 2.0*, RELEASE 1.0, Feb. 1999,

This focus on the application-layer view – celebrating the advent of Wikipedia, YouTube, eBay, Second Life, blogging software, and other new substitutes for the delivery-chain applications of the pre-internet era – provides an impoverished (or at least incomplete) perspective on communications. The landscape of the internet can usefully be perceived differently: Human online communications are best captured intellectually as a complex adaptive system that can generate economic growth. New forms of persistent social interaction (often crossing application boundaries) are quickly evolving in direct reaction to collective human attention, and these communications are creating opportunities for the development of new ideas and new ways of making a living. This has never happened before at the same rate, with the same directness, or with similarly persistent results.<sup>6</sup>

Although the application-focused view of the internet landscape prompts observers to see the internet as a content-delivery supply chain, communications online are much more than arranged chunks of remixed

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at 1, available at <http://www.edventure.com/release1/cable.html>; Tim Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163 (1999); Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000); LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 34-35 (2001); Mark Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 970 (2001) [hereinafter *End of End-to-End*]; Kevin Werbach, *A Layered Model for Internet Policy*, 1 J. OF TELECOMM. & HIGH-TECH L. 37 (2002) [hereinafter *Layered*]; Kevin Werbach, *Breaking the Ice: Rethinking Telecommunications Law for the Digital Age*, 4 J. ON TELECOMM. & HIGH TECH. L. 59, 95 (2005) [hereinafter *Breaking the Ice*]; Lawrence Solum & Minn Chung, *The Layers Principle: Internet Architecture and the Law*, 79 NOTRE DAME L. REV. 815 (2004); Mark Lemley & Brett Frischmann, *Spillovers*, 107 COLUM. L. REV. 257 (2007) [hereinafter *Spillovers*]; Richard S. Whitt, *A Horizontal Leap Forward: Formulating A New Public Policy Framework Based on the Network Layers Model*, 56 FED. COMM. L.J. 587 (2004) [hereinafter *Horizontal Leap*]; Philip J. Weiser, *Law and Information Platforms*, 1 J. ON TELECOMM & HIGH-TECH. L. 1, 4-5 (2002); Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. TELECOMM. & HIGH TECH. L. 141 (2003) [hereinafter *Broadband Discrimination*]; Tim Wu, *The Broadband Debate, A User's Guide*, 3 J. TELECOMM. & HIGH TECH. L. 69 (2004) [hereinafter *User's Guide*]; Letter from Tim Wu & Lawrence Lessig to Marlene H. Dortch, Secretary, FCC 5 (Aug. 22, 2003), available at [http://faculty.virginia.edu/timwu/wu\\_lessig\\_fcc.pdf](http://faculty.virginia.edu/timwu/wu_lessig_fcc.pdf) (“The Internet has long functioned as a figurative ‘platform’ for a fierce and highly innovative competition between applications.”)

<sup>6</sup> By contrast, telephone communications allow for quick one-to-one reactions, but the resulting patterns vanish as soon as the connection is ended. Broadcast is slightly more complex than telephony, but viewers’ reactions to what they see have a very attenuated relationship to what is eventually shown. See *infra* Section \_\_\_.

content or new category-destroying applications. Online communications coalesce into dynamic human relationships, made possible by a globally addressable network of computers, that evolve unpredictably in response to their environment. These relationships are sometimes rendered visible by particular applications (for example, MySpace and eBay show visually what group of actors is interested in a particular object or person), but more often are like the invisible human groupings made possible by a great city. These relationships, pulled together by interest and accident and characterized by shifting boundaries and unpredictable dynamics, are what is so attractive about the internet.<sup>7</sup> So although “innovation” is indeed supported when an inventor of a new form of telephony or television does not have to ask permission to introduce her new service online, and the application-layer perspective helpfully illuminates why this is so, new and innovative applications (or “services”) are not the key story of the internet. The central story is a deeply human one about unpredictably complex relationships.

Scholars and policymakers continue to be focused on the application-layer view. Many telecommunications law scholars have suggested that communications regulation should be tailored to the layered architecture of the internet (and thus should treat transport differently than applications), but their primary justification for such tailoring has been that it will “track[ ] the reality of convergence” – in other words, that regulation should recognize that former broadcast and telephony “services” are now being delivered online.<sup>8</sup> They see the interest of the internet in application-layer terms.<sup>9</sup> This same supply-chain, application-layer perspective is now

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<sup>7</sup> J.C.R. Licklider, who led the Advanced Research Projects Agency (ARPA, now DARPA, the Defense Advanced Research Projects Agency) and encouraged the networking that led to the internet, predicted this development in 1968: “What will on-line interactive communities be like? In most fields they will consist of geographically separated members, sometimes grouped in small clusters and sometimes working individually. They will be communities not of common location, but of *common interest*.” J.C.R. Licklider & Robert W. Taylor, *The Computer as a Communication Device*, SCIENCE AND TECHNOLOGY, April 1968, available at <http://scpd.stanford.edu/sonnet/player.aspx?GUID=6F704E8F-352F-42E0-BC58-3F9014EA1F81> (emphasis in original).

<sup>8</sup> See, e.g., Kevin Werbach, *Breaking the Ice*, *supra* note \_\_, at 59 (2005) (“By shifting regulatory structures from vertical silos based on network platform to horizontal layers, the layered approach tracks the reality of convergence.”)

<sup>9</sup> Tim Wu has often argued that what is important about the internet is the competition it allows among applications. Wu also assumes that distinguishing between different categories of online “services” (telephony-speak for “applications”) is appropriate: a strong claim that is only possible if one is firmly within the application-layer perspective. See, e.g., Tim Wu, *Broadband Discrimination*, *supra* note \_\_; Tim Wu, *Why Have a*

being adopted by *opponents* of end-to-end, “stupid network” connectivity, most famously Christopher Yoo, who has argued that negative effects of requiring nondiscrimination by internet access providers would include narrowing of “consumer choice” by disfavoring applications that require quality of service guarantees.<sup>10</sup> From the application-competition perspective, network operators can appeal to consumers’ intuitions that entities like Google providing online “services” should pay the carriers for the privilege of reaching carrier subscribers, and Google and others can argue that nascent applications will be stifled by this kind of discrimination.<sup>11</sup> These arguments present zero-sum games and are likely perceived by non-techies as abacus beads moving back and forth on a single wire of money-making zeal. From the complex systems perspective, something much more interesting than supply-chain delivery is occurring. Use of the internet is changing in unpredictable and complex ways as people discover increased degrees of freedom of human connection made possible online.

Network operators want to control and monetize highspeed access to the internet.<sup>12</sup> They believe that they can and should control this complex system by slowing down its evolution and keeping its adaptation attached to old “service” understandings; they believe that it is appropriate to dumb down users’ relationships to this complex system by, among other things, deliberately degrading upload speeds and keeping highspeed access for their

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*Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. TELECOMM. & HIGH TECH. L. 15 (2006). In an important early article, Larry Lessig and Mark Lemley suggested that the crucial differentiator of internet architecture was that it “enabl[ed] a wider variety of applications to connect and use the network.” Mark Lemley & Lawrence Lessig, *End of End-to-End*, *supra* note \_\_\_. Kevin Werbach has continued this approach. Kevin Werbach, *Layered*, *supra* note \_\_\_, at 38-40; Kevin Werbach, *Breaking the Ice*, *supra* note \_\_\_, at 95..

<sup>10</sup> Christopher S. Yoo, *Network Neutrality and the Economics of Congestion*, 94 GEO. L.J. 1847, 1907-08 (2006) [hereinafter *Economics of Congestion*]; Christopher S. Yoo, *Beyond Network Neutrality*, 19 HARV. J.L. & TECH. 1, 13-18 (2005) [hereinafter *Beyond*].

<sup>11</sup> AT&T CEO Edward Whitacre has said that Google and other companies “use my lines for free--and that's bull.” Spencer E. Ante & Roger O. Crockett, *Rewired and Ready for Combat: SBC and Verizon Are Spending Billions to Stay Competitive in the Broadband Era*, BUS. WK., Nov. 7, 2005, at 110. Vint Cerf, on behalf of Google, has testified that “[w]e care passionately about the future of the Net, not just for ourselves, but because of all the other potential Googles out there.” Network Neutrality: Hearing Before the U.S. Senate Committee on Commerce, Science, and Transportation, 109th Cong. (February 7, 2006) (statement of Vinton G. Cerf Vice President and Chief Internet Evangelist Google Inc.), available at <http://commerce.senate.gov/pdf/cerf-020706.pdf>.

<sup>12</sup> See *infra* Section \_\_.

own content.<sup>13</sup>

Other countries (most vividly Korea and Japan) have taken a hard look at their communications policy and have understood that communications and economic growth are tightly intertwined. Economists understand that economic growth is driven by new ideas creating ever-newer goods and services.<sup>14</sup> The human relations made possible by the internet are capable of producing enormously diverse ideas (ideas in the form of new niches, new roles, and new understandings of information) and allowing them to be disseminated on a large scale, thus triggering crucial economic growth that will benefit society as a whole. Conversely, the cost to the U.S. economy of adopting a taming, constraining approach to complex online communications by making them simple and predictable may be great. We are at risk of encouraging the development of a sclerotic, dumbed-down, cable television version of the internet for U.S. users.

This Article seeks to change the perspective from which we examine the landscape of the internet and the project of communications law. The internet should be at the center of communications policy in this country and the highest priority of communications policy should be to facilitate human online *communications* (and thus new ideas) rather than optimize conditions for particular private infrastructure providers. This facilitation will speed economic growth.<sup>15</sup>

Part I lays out the background for this project. The story of how the internet has unseated core assumptions about basic features of the communications landscape is a familiar one. Applications are secondary to the human communications and relationships that they facilitate, however. Part II begins to develop a theoretical grounding for a changed approach to communications law as a whole, focusing on the complexity of human communications online and the increasing returns associated with these communications. The economic growth-based theory is straightforward: the greatest possible diversity of new ideas that will support our country in the future will come from the online world, because of its special

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<sup>13</sup> See *infra* Section \_\_\_.

<sup>14</sup> See, e.g., Paul Romer, *Increasing Returns and New Developments in the Theory of Growth*, NBER WORKING PAPER NO. 3098 (Sept. 1989); Paul Romer, *Endogenous Technological Change*, NBER WORKING PAPER NO. 3210 (Dec. 1989) [hereinafter *Endogenous*]; DAVID WARSH, *KNOWLEDGE AND THE WEALTH OF NATIONS* (2006) [hereinafter *KNOWLEDGE*].

<sup>15</sup> See Julie E. Cohen, *Cyberspace As/And Space*, 107 COLUM. L. REV. 210 (2007) (“The production of networked space, including cyberspace, should proceed in ways that promote the well-being of the embodied, situated beings who inhabit it.”).

affordances of interactivity, interconnectivity, and unpredictable evolution. Communications law and policy should therefore have the internet at its center. Part III briefly explores current debates about universal access and network neutrality in light of this reconception of communications law. If, as I suggest, human online communications are a complex system that is creating value for human beings, then attempts by network operators to transform the internet into something resembling older broadcast and telephony models pose great risks to our collective future.

Current communications law has drifted very far from the experience of actual end-users. The time has come to explore new theories. We need to have a new understanding of “optimizing” and a new subject for “optimization”: communications themselves.

## I. THE FIRST GENERATION OF COMMUNICATIONS LAW AND SCHOLARSHIP

In the first generation of communications law, technical infrastructure and function were closely associated. This approach shaped the siloed Telecommunications Acts of 1934 and 1996, which feature separate titles for separate infrastructures -- broadcast, (later) cable, and telephony.<sup>16</sup> The first generation of internet scholars made clear that the commercial internet fundamentally undermined core assumptions about basic features of this communications landscape. This Part briefly describes the changes caused by the advent of the internet, outlines the incumbents’ responses to these changes, and reveals the scholars’ application-layer perspective on this sequence of events.

### A. *The Internet Sweeps Aside Silos*

From the media theorist perspective, communications traditionally have been made up of three broadly different modalities: telephony/postal (one-to-one, often having to do with the daily events of human life); the press (one-to-many, often having to do with expert views as to trends

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<sup>16</sup> 47 U.S.C. tit. II, tit. III, and tit. VI (2003), Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996). Most, but not all sections of the 1996 Act amended the Communications Act of 1934, 47 U.S.C. § § 151-612 (1994). See Douglas C. Sicker, *Further Defining a Layered Model for Telecommunications Policy*, Paper Presented at the Telecommunications Policy Research Conference (“TPRC”) 4 (2002), available at <http://intel.si.umich.edu/tprc/papers/2002/95/LayeredTelecomPolicy.pdf> (explaining that in the U.S. silo model, each network and service is regulated separately from the other, and “the top defines the regulatory Title”).

revealed by the daily events of human life); and cinema/broadcasting (also one-to-many, often having to do with entertainment for its own sake, and including literary communication).<sup>17</sup> From the perspective of traditional telecommunications law, communications have been divided into two large categories: regulated radio/broadcast/telephony (dependent on radio or wired communications, and subject to “public trustee”<sup>18</sup> or common carriage<sup>19</sup> obligations) and largely-unregulated newspaper/cinema (the “print” model, not dependent on radio or wired communications) spheres.<sup>20</sup> Congress has delegated to the FCC statutory authority over telecommunications providers, wireless carriers, satellite and cable providers, and broadcasters.

For all of these actors, the nature of the “services” they provide has been tightly tied to the hardware or infrastructure on which they are based. Indeed, the first generation of communications law assumes that there is a necessary association between a particular form of infrastructure and a particular functional capacity. Each of the traditional modalities of communication has had its preferred use embedded in its design, and a key goal of current law is to produce the optimum level of investment in each of several independent types of infrastructure: broadcast, telephony, cable, and wireless. And from the perspective of past “users” of communications, all of these activities (radio, broadcast television, telephony, postal services, newspaper, cinema, cable) were until recently seen as separate.

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<sup>17</sup> See, e.g., PAUL STARR, CREATION OF THE MEDIA (2004).

<sup>18</sup> See Daniel Patrick Graham, *Public Interest Regulation in the Digital Age*, 11 COMM.LAW CONCEPTUS 97 (2003) (outlining public trustee obligations of broadcasters).

<sup>19</sup> Title II of the Telecommunications Act of 2006 defines common carriers (in a circular fashion) as companies “engaged as a common carrier for hire, in interstate or foreign communication by wire or radio in interstate or foreign radio transmission of energy.” 47 U.S.C. Sec. § 153(10). A common carrier is a company that “makes a public offering to provide [communications facilities] whereby all members of the public who choose such facilities may communicate or transmit intelligence of their own design and choosing.” *FCC v. Midwest Video Corp.*, 440 U.S. 689, 701 (1979). See 47 U.S.C. § 202 (2000) (prohibiting common carriers from engaging in unjust or unreasonable discrimination, including making or giving any undue or unreasonable preference, or imposing any undue or unreasonable prejudice or disadvantage, on any person, class or persons or locality).

<sup>20</sup> *Miami Herald Publishing Co. v. Tornillo*, 418 U.S. 241 (1974) (supporting value of editorial autonomy for print model); *Red Lion Broadcasting Co. v. FCC*, 395 U.S. 367 (1969) (finding that the government can intervene in licensed broadcasting to promote public values). See generally ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 2 (1984) (“The principles of common carriage and of the First Amendment have been applied to broadcasting in only atrophied form. For broadcasting, a politically managed system has been invented.”)

Now, given the advent of the internet, none of these categorization systems works. Connections to the internet provide access to online activities that are the functional equivalents of all of these former modalities and are not necessarily tied to the hardware used to reach them.<sup>21</sup> Use of old-style specialized communications mechanics is diminishing. For example, veteran internet users say they spend less time watching television than they used to.<sup>22</sup> The U.S. Postal Service has had to retrench by removing underused mailboxes from city streets.<sup>23</sup> Telephone companies are losing money quickly on their traditional wireline businesses – cable companies are threatening both their telephone revenues and internet access revenues.<sup>24</sup> Many mainstream internet companies are joining the VoIP marketplace (Microsoft, Google, Yahoo!, AOL all have their own VoIP applications) and VoIP is increasingly substituted for phone usage: As of

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<sup>21</sup> See generally YOCHAI BENKLER, *THE WEALTH OF NETWORKS* (2006).

<sup>22</sup> Anuk Jesdanum, *Parents More Worried About TV Time Than Internet Use*, Associated Press, Nov. 29, 2006 (reporting that 41% of veteran internet users say they spend less time watching television), available at <http://www.technewsworld.com/story/54472.html>; University of Southern California Center for the Digital Future, *2007 Digital Future Project Report* (Nov. 2006), available at <http://www.digitalcenter.org/pdf/2007-Digital-Future-Report-Press-Release-112906.pdf>. For demise of broadcasting, see Stuart Minor Benjamin, *Evaluating the Federal Communication Commission's National Television Ownership Cap: What's Bad for Broadcasting is Good for the Country*, 46 WM. & MARY L.REV. 439, 483 (2004) (noting decline in percentage of television market of broadcast content plus substitution of internet content for broadcast). See also John T. Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Telecommunications from the Bottom Up*, 1 J. TELECOMM. & HIGH TECH. L. 95, 96 (2002) (“Digital television, digital cable, internet telephony, and the internet itself all take a communication, convert it into a series of digital signals, transmit those digital signals between distant points, and then allow a computer at the distant point (whether a PC, TV, telephone, Personal Video Recorder or some other device) to reconstruct the digital bits into high quality copies of the original images, information or sounds.”).

<sup>23</sup> Katie Hafner, *Postal Service Finds a Friend in the Internet*, N.Y. TIMES, Aug. 2, 2006, at B-4 (“In 2005, revenue from first-class mail like cards and letters, which still made up more than half the Postal Service’s total sales of \$66.6 billion, dropped nearly 1 percent from 2004.”).

<sup>24</sup> E.g., “BellSouth ... said that its total access lines, including those for phone service and high-speed Internet access, declined 6.9 percent from [2005] to 19 million at the end of the third quarter [of 2006]. The company lost about 301,000 local phone lines.” Reuters, *Wireless Boosts Profits for Cingular’s Parents*, NEWS.COM, Oct. 4, 2006. “During 2005, for example, the number of fixed telephone lines operated by Verizon, America’s second-largest telecoms firm, declined by 8%.” Tom Standage, “*Convergence*” Is the Telecoms Industry’s New Mantra, THE ECONOMIST, Oct. 12, 2006. “Deutsche Telekom lost 1m fixed-line subscribers in the first half of the year, and of the 400,000 broadband lines it activated in the past 12 months, over 95% were for its rivals to resell.” *Swamp Things*, THE ECONOMIST, Sept. 21, 2006.

the preparation of this article, there has been a 153% increase in VoIP subscribers in 2006 over 2005, with almost seven million subscribers in the U.S.<sup>25</sup>

The internet's effect on mainstream press activities has been even more dramatic. According to The New York Times, the U.S. newspaper industry "appears to be in a free fall."<sup>26</sup> The last six months have seen an unequalled decline in circulation for U.S. papers.<sup>27</sup> Meanwhile, however, the readership of online newspapers sites in 2006 is nearly one-third higher than in 2005.<sup>28</sup> A recent Pew Internet & American Life Project study found that almost 20% of adult internet users were obtaining political news online.<sup>29</sup> After Katrina, half of all online users looked for news online about the event.<sup>30</sup> Now that broadband access to the internet is growing quickly, already more than half of online users in the U.S. are able to watch video online.<sup>31</sup> This is having a great effect on traditional one-to-many cinema and broadcasting communications modalities. The obvious example is YouTube, named Invention of the Year by Time Magazine for 2006 and recently purchased by Google for more than \$1.6 billion.<sup>32</sup> The access-equipped personal computer now makes it possible for anyone to be Benjamin Franklin in an era of digital video: providing access to the mails, printing newspapers, and broadcasting views. From the perspective of current users of the internet, the boundaries between these old modalities

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<sup>25</sup> Cable providers control sixty percent of that market, and Vonage serves about forty percent of it. *VoIP subscriber base grows 21% in second quarter – report*, AMERICAS NETWORK, Aug. 10, 2006. Devices are now being introduced that are more like PCs than phones, and allow developers to create their own applications (including, most obviously, VoIP applications) without the permission of the mobile carriers. See Charlie Demerjian, *A Truly Open Linux Phone with GPS Debuts: Openmoko Opens Up the Airwaves*, THE INQUIRER, Nov. 8, 2006.

<sup>26</sup> Andrew Ross Sorkin & Katharine Q. Seelye, *Ex-Chief of G.E. May Want Newspaper*, N.Y. TIMES, Oct. 26, 2006.

<sup>27</sup> Jeff Jarvis, *Newspapers In Free Fall*, THE GUARDIAN, Nov. 6, 2006.

<sup>28</sup> *Id.*

<sup>29</sup> Memorandum from John B. Horrigan, Associate Director, Pew Internet & American Life Project study, *Politics Online* (Aug. 2006), available at [http://www.pewinternet.org/pdfs/PIP\\_Politics%20Aug06\\_Memo.pdf](http://www.pewinternet.org/pdfs/PIP_Politics%20Aug06_Memo.pdf).

<sup>30</sup> Pew Internet & American Life Project study, *Major News Events*, Nov. 2005.

<sup>31</sup> Brian Morrissey, *Half of Internet Users Watch Video*, ADWEEK, Oct. 14, 2005, available at <http://www.multicastmedia.com/pressreleases/News20051014a.aspx>.

<sup>32</sup> "YouTube had tapped into something that appears on no business plan: the lonely, pressurized, pent-up video subconscious of America. Having started with a single video of a trip to the zoo in April of last year, YouTube now airs 100 million videos--and its users add 70,000 more--every day." *Best Inventions 2006*, TIME, available at <http://www.time.com/time/2006/techguide/bestinventions/inventions/youtube2.html>.

are disappearing, and these modalities are becoming indistinguishable bit-based activities online.

But more than mere substitution is going on. The important thing to users, the thing that is so attractive about the internet, is that it connects them to other people (and groups of other people) in dynamic ways.<sup>33</sup> The internet can do more than just transport bits and facilitate momentary person-to-person communications. It can also provide a substrate for new forms of social relationships, created by many different decisions to pay attention.<sup>34</sup> The internet, and the graphical networked screen, allows the formation of persistent human connections and relationships that fail or flourish depending on whether people pay attention to them. The identity of the particular pipes or wires used to access the internet means nothing to users—no more, at least, than the driver of a bus cares who poured the concrete used in building the road over which the bus travels.

In the first, and still dominant, generation of communications law, technical infrastructure and function were thought to be necessarily (and appropriately) associated. But the internet by disassociating infrastructure from function threatens incumbent network access providers (formerly known as cable, telephony, and wireless companies). Those that are threatened are fighting back because their economic stake in the first-generation approach is great.<sup>35</sup> The FCC, accustomed to the first generation

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<sup>33</sup> University of Southern California Center for the Digital Future, *2007 Digital Future Project Report* (Nov. 2006), available at <http://www.digitalcenter.org/pdf/2007-Digital-Future-Report-Press-Release-112906.pdf> (“Internet use is growing and evolving as an instrument for personal engagement – through blogs, personal Web sites, and online communities.”). Pew Internet and American Life Reports: The Internet as a Resource for News and Information about Science, Nov. 20, 2006 (fully 87% of online users have at one time used the internet to carry out research on a scientific topic or concept); Social Networking Websites and Teens, Jan. 7, 2007 (more than half of all online American youths ages 12-17 use online social networking sites); Tagging, Jan. 31, 2007 (almost a third of internet users have tagged or categorized content online such as photos, news stories or blog posts), available at <http://www.pewinternet.org/>.

<sup>34</sup> Early examples of such social groups include World of Warcraft guilds that meet outside the boundaries of the WoW application, Second Life businesses that provide a living in real world dollars, see Daniel Terdiman, *Business Consulting Comes to ‘Second Life,’* CNETNEWS.COM, Aug. 21, 2006, and innumerable online collaborating groups. See *Consider a Virtual Company To Get a Flexible Work Life*, Brazen Careerist, <http://blog.penelopetrunk.com/2006/10/01/consider-a-virtual-company-to-get-a-flexible-work-life/>, (Oct. 1, 2006); Michael J. Madison, *Social Software, Groups, and Governance*, 2006 MICH. ST. L. REV. 153; Beth Simone Noveck, *A Democracy of Groups*, 10 FIRST MONDAY 11, (November 2005), available at [http://firstmonday.org/issues/issue10\\_11/noveck/index.html](http://firstmonday.org/issues/issue10_11/noveck/index.html).

<sup>35</sup> This Article focuses on the defensive activities of incumbent network access

approach, is responding to the changes caused by the advent of the internet by protecting old-style communications modalities even as they become indistinguishable online bits.<sup>36</sup>

### B. The Incumbents Respond

The internet was introduced into a sphere of communications that was completely controlled by pre-divestiture AT&T and, later, the Bell telephone companies. The connectivity required to allow computers to send data to each other – the physical transport layer – was initially made up of phone lines.<sup>37</sup> The original engineers who designed the simple network protocols that created the layer independence that drove the development of the internet did not spend much time thinking about connectivity. They just tried to find it. Larry Roberts, the director of ARPA's (Advanced Research Projects Agency) networking project in the late 1960s, leased high-capacity phone lines from AT&T that linked the ARPA sites at all times.<sup>38</sup> Doug Engelbart, the Stanford Research Institute researcher who gave a world-changing demonstration of human-computer interaction in December 1968, leased telephone and video links to make interactive computing visible to

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providers. A complete discussion of all the incumbent-protective activity with respect to the internet is beyond the scope of this Article. See Susan P. Crawford, *The Biology of the Broadcast Flag*, 25 HASTINGS COMM. & ENT. L.J. 603, 635 (2003) (content industry strikes back); Susan P. Crawford, *The Ambulance, The Squad Car, and the Internet*, 21 BERKELEY TECH. L.J. 873 (2006) (law enforcement and telcos strike back, aided by third-party vendors of services to law enforcement and telcos – as well as the FCC); Susan P. Crawford, *Network Rules*, 70 LAW & CONTEMP. PROBS. (forthcoming 2007) (telcos and cablecos fight back by using the image of the Romantic Builder).

<sup>36</sup> The development of the FCC as an institution has arguably led to a path-dependent pattern of treating new technologies like revised versions of old ones; regulatory convenience and bureaucratic necessity both drive in this direction. See DOUGLASS NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE, AND ECONOMIC PERFORMANCE (POLITICAL ECONOMY OF INSTITUTIONS AND DECISIONS) (1990).

<sup>37</sup> The principle behind the logical architecture of the internet can be visualized as an hourglass standing flat on a table. The narrow neck itself is made up of the simple network protocols that represent precise agreements to do certain tasks in a certain way – to chunk information into packets of particular sizes, to label them in particular ways, and to send them along their (indeterminate) way towards globally unique addresses. Below the neck are physical transport links (copper telephone lines, coaxial cable television wires, fiber optic cable, satellite transmission channels), and above the neck are “applications,” or programs that structure information so as to make it useful for humans and machines.

<sup>38</sup> MITCHELL WALDROP, THE DREAM MACHINE 272 (2001).

his audience.<sup>39</sup> Connectivity was always an issue. Tim Berners-Lee, the inventor of the World Wide Web application, has written about going to a key conference in Texas (Hypertext '91) and trying to demonstrate the World Wide Web for the first time. He had to persuade a hotel manager to string a phone line into the hall outside the main meeting room, persuade a local university to give him dial-in service to the internet, and get his Swiss modem to work with the American electrical system by taking the modem apart, borrowing a soldering gun, and wiring the modem directly to a power adapter.<sup>40</sup>

These engineers were using telephone lines for connectivity but not for the lines' embedded architecture. At the outset of the ARPA networking project, Larry Roberts deliberately rejected the telephone system's circuit-switched method of routing, which leads messages straight to their destination. Instead, he adopted an "open-highway model" of routing, in which computers at each site would locally route messages that they received by reading the digital addresses on each packet.<sup>41</sup> It is this packet-switching method that defines the modern-day internet.<sup>42</sup> AT&T's engineers scoffed at the idea of packet switching when Paul Baran suggested it to them in 1964.<sup>43</sup> Baran remembers an engineer telling him "Son, this is how a telephone works," with heavy-handed patience.<sup>44</sup> AT&T wanted no part of the ARPA project and remained completely committed to circuit switching well into the 1980s.<sup>45</sup> Indeed, offered the chance to take over the ARPANET in the 1970s, AT&T formed a committee, studied the idea for months, and concluded (in Larry Robert's words) "that the packet technology was incompatible with the AT&T network."<sup>46</sup>

Exponential growth in internet use initially happened in the United States because the telephone companies were required by common-carriage regulation to provide flat-rate dial-up access via a host of internet service

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<sup>39</sup> *Id.* at 289. See Susan P. Crawford, *Internet Think*, 6 J. TELECOMM. & HIGH TECH L. (forthcoming 2007) for a description of this demonstration.

<sup>40</sup> TIM BERNERS-LEE, *WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB*, 51 (2000).

<sup>41</sup> Barry Leiner, *et al.*, *A Brief History of the Internet*, 40:2 Communications of the ACM 102-08 (Feb. 1997), available at <http://www.isoc.org/internet/history/brief.shtml>.

<sup>42</sup> See RFC 791 (Internet Protocol), <http://ds.internic.net/rfc/rfc791.txt>.

<sup>43</sup> WALDROP, *THE DREAM MACHINE*, *supra* note \_\_, at 277.

<sup>44</sup> *Id.*

<sup>45</sup> *Id.* at 425. See also KATIE HAFNER & MATTHEW LYON, *WHERE WIZARDS STAY UP LATE* 52 (1996).

<sup>46</sup> *WHERE WIZARDS STAY UP LATE* 232.

providers (ISPs) – and ISPs were exempt from access charges.<sup>47</sup> Those ISPs in turn made arrangements with backbone providers (also controlled by the telephone companies) who interconnect by means of “transit” and “peering” relationships with other network providers. People used modems to transmit digital data across ordinary analog copper voice lines at rates of (in the early days) 28.8 kilobytes per second (Kbps).<sup>48</sup> Without the authority to extract consumer surplus through charging for particular uses of their telephone networks, the telephone companies were relegated to the role of commodity bit-transport providers. And without the need to ask for permission from network providers to launch new services or connect humans in new ways, individuals and entrepreneurs went to work and internet use skyrocketed.

Both cable and telephony companies have become anxious to ensure that they have the ability to “monetize” their internet access networks by discriminating in favor of the voice and other applications they provide.<sup>49</sup> They do not want to be relegated to commodity transport status, and so they are fighting back against the internet on a number of fronts.<sup>50</sup> First, broadband DSL and cable modem internet access providers succeeded during 2005 in persuading the FCC (and the Supreme Court) that broadband access is not a Title II service subject to nondiscrimination and tariffing rules.<sup>51</sup> Second, network providers have been working for the past eight

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<sup>47</sup> 47 U.S.C. § 201(a). Jason Oxman, *The FCC and the Unregulation of the Internet*, FCC Office of Plans and Policy Working Paper No. 31 (July 1999) [hereinafter *Unregulation*], available at [http://www.fcc.gov/Bureaus/OPP/working\\_papers/oppwp31.pdf](http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf).

<sup>48</sup> As Kevin Werbach, Jason Oxman, and many other scholars have pointed out, attachment of modems to telephone networks was only possible because of FCC insistence that the network providers permit them. Kevin Werbach, *The Federal Computer Commission*, 84 N.C. L. REV. 1, 19-20 (2005) [hereinafter *Federal Computer Commission*] (describing key role of Part 68 regulation); Jason Oxman, *Unregulation*, *supra* note \_\_; Kevin Werbach, *Breaking the Ice*, *supra* note \_\_, at 84 (“The consumer Internet could not have happened if users didn't have the ability to attach devices to their telephone lines that transformed the phone network into a channel for data communications.”).

<sup>49</sup> See *infra* Section \_\_.

<sup>50</sup> See, e.g., John G. Waclawsky, *Where Do System Standards Go From Here*, BUSINESS COMMUNICATIONS REVIEW, Mar. 2005, at 40 [hereinafter *System Standards*] (“Commoditization is the biggest fear haunting both telcos and equipment vendors.”).

<sup>51</sup> See *National Cable & Telecommunications Ass'n v. Brand X Internet Services*, 125 S. Ct. 2688 (2005) *aff'g 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*, GN Docket No. 00-185 & CS Docket No. 02-52, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd 4798 (2002); see also *Appropriate Framework for Broadband Access to the*

years on standards that will enable them to preserve controls “over user signaling and usage-based billing, [and] also generate new revenue via deep packet inspection” of the packets passing through their routers.<sup>52</sup> Work on these standards is proceeding slowly, and so the telcos have lobbied for protective laws that would allow other proprietary forms of deep-packet inspection to be put in place for internet access that, in general, would protect their plans to offer broadband services that are *not* the “internet” as either engineers or social historians of the internet would describe it.<sup>53</sup>

This is standard incumbent behavior. As Paul Starr has noted, incumbents that dominate networks often try to stay ahead by exploiting their existing position rather than by innovating or adapting.<sup>54</sup> Telecommunications incumbents, in particular, tend to spend little money on research and development and instead “invest more in politics than in technology—indeed, they are downright frightened by innovation, whose ultimate effects they can’t control.”<sup>55</sup> Indeed, the goal of these industries is

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*Internet over Wireline Facilities*, CC Docket No. 02-33, Report and Order and Notice of Proposed Rulemaking, FCC 05-150, 2005 WL 2347773 (rel. Sep. 23, 2005), available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-05-150A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-150A1.doc) (reclassifying DSL from a common carrier provided telecommunications service to a largely unregulated information service). In March 2006, a Verizon petition requesting that high-capacity business broadband services be exempt from Title II common carriage regulations was granted through inaction on the part of the FCC. News Release, *Verizon Telephone Companies’ Petition for Forbearance from Title II and Computer Inquiry Rules with Respect to their Broadband Services is Granted by Operation of Law*, WC Docket No. 04-440 (Mar. 20, 2006).

<sup>52</sup> John G. Waclawsky, *IMS 101: What You Need to Know*, BUSINESS COMMUNICATIONS REVIEW, June 2005, at 18 [hereinafter *IMS 101*]. IMS stands for “IP (or Internet) Multimedia Subsystem.” *Id.*

<sup>53</sup> E.g., draft Barton-Dingell bill (Sept. 2005), available at [http://scrawford.net/courses/Draft\\_Barton-Dingell.pdf](http://scrawford.net/courses/Draft_Barton-Dingell.pdf) (defining “broadband internet transmission services” and providing that there will be no nondiscrimination requirements in the context special service plans, video services, protection of providers’ networks, and the need to provide quality of service guarantees). See also Susan P. Crawford, *Internet Think*, 6 J. TELECOMM. & HIGH TECH L. (forthcoming 2007) (describing mindsets of engineers, telcos, and netizens); Susan P. Crawford, *The Day the Internet Became Cable Television: Dec. 29, 2009*, (Dec. 29, 2006, 11:49 EST) (describing “AT&T Yahoo! Highspeed Internet U-Verse Enabled” service exempt from neutrality requirements), available at [http://scrawford.blogware.com/blog/\\_archives/2006/12/29/2604993.html](http://scrawford.blogware.com/blog/_archives/2006/12/29/2604993.html).

<sup>54</sup> PAUL STARR, *THE CREATION OF THE MEDIA* 193 (2005). As Doug Melamed has pointed out, participants in network industries have greater incentives to carry out predatory strategies that raise entry barriers. See A. Douglas Melamed, *Network Industries and Antitrust*, 23 HARV. J.L. & PUB. POL’Y 147, 149-52 (1999).

<sup>55</sup> Wade Roush, *Net Neutrality: Lessons from the Past*, MIT TECHNOLOGY REVIEW (Aug. 3, 2006), available at [http://www.technologyreview.com/read\\_article.aspx?ch=specialsections&sc=social&id=17](http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=social&id=17)

to *reinstantiate* the connection between infrastructure and the sharply-delimited “services” they provide, even as these “services” move into an online environment in which “services” are arbitrary distinctions between bits.<sup>56</sup>

### C. The Scholars Respond at the Application Layer

These incumbent activities have not gone unnoticed by the academy. Since 1999, many key law review articles and several books (including Larry Lessig’s *CODE AND FUTURE OF IDEAS*,<sup>57</sup> and Yochai Benkler’s *THE WEALTH OF NETWORKS*) have explored the incumbent access provider-internet conflict. Internet scholars have been quick to reveal the monopolistic tendencies of the carriers and have pointed out that the internet’s entrepreneurial energy is greatly facilitated by the end-to-end principle.<sup>58</sup> Mark Lemley and Larry Lessig have noted that the end-to-end principle was central to the internet’s success because “e2e expands the competitive horizon, by enabling a wider variety of applications to connect and use the network.”<sup>59</sup> Tim Wu has argued that internet “Openists” embrace the end-to-end principle because it “puts as many players in the contest as possible to ensure the true champion emerges.”<sup>60</sup> Kevin Werbach has pointed out that the end-to-end principle allows a “new service [to] be deployed simply by connecting two client devices capable of talking to one another, without requiring any approval or technical configuration inside the network.”<sup>61</sup> All of these writers have strenuously argued that innovation

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245) See also John Waclawsky, *System Standards*, *supra* note \_\_\_, at 41 (“The truth is that the incumbents are struggling to maintain their legacy, monopoly-based telephony business model, while they reinvent themselves as wireless, data and TV services providers under the umbrella of monopoly protection. It’s obvious: They want to own it all!”).

<sup>56</sup> See *infra* note \_\_ (concerning “quadruple play” bundles).

<sup>57</sup> See LAWRENCE LESSIG, *THE FUTURE OF IDEAS* 46-48, 155-76, 246-49 (2001).

<sup>58</sup> See, e.g., Tim Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. (1999); Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000); LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* 34-35 (2001); Mark Lemley & Lawrence Lessig, *End of End-to-End*, *supra* note \_\_\_, at 970.

<sup>59</sup> Mark Lemley & Lawrence Lessig, *End of End-to-End*, *supra* note \_\_\_, at 970; David P. Reed, Jerome H. Saltzer & David D. Clark, *Comment on Active Networking and End-to-End Arguments*, IEEE NETWORK 12, 3, May/June 1998, at 69-71.

<sup>60</sup> Tim Wu, *User’s Guide*, *supra* note \_\_.

<sup>61</sup> Kevin Werbach, *Layered*, *supra* note \_\_.

at the application layer will be facilitated by continuing to support the end-to-end principle.

This focus on the end-to-end principle has led to discussions of tailoring internet regulation to the various layers of the internet protocol stack – so that, for example, transport (arguably insufficiently competitive and requiring continued common-carriage treatment) could be treated differently from applications (arguably wildly competitive) by regulators.<sup>62</sup> A central paper prepared by Richard Whitt in 2003-04 advocated regulatory intervention at the physical layer.<sup>63</sup> Whitt's paper provides a useful distillation of the application-layer perspective. He points out that the silo approach of regulation does not map to what is going on online, and that the resulting clash is creating regulatory gridlock.<sup>64</sup> He states that "By tracking the architectural model of the Internet--with IP at the center--we can develop a powerful analytical tool providing granular market analysis within each layer, which in turn puts public policy on a more sure empirical footing."<sup>65</sup> He approvingly recites the history of the development of the TCP/IP protocol, and notes that "The resulting explosion of innovative applications on the Internet likely would never have happened but for the incorporation of the end-to-end design into the network."<sup>66</sup>

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<sup>62</sup>Douglas Sicker, now an assistant professor in computer science and telecommunications at the University of Colorado at Boulder, has noted that he originated the discussion of layered approaches to policy in an unpublished paper written in 1999 with Joshua Mindel and Cameron Cooper when Sicker was at the FCC. Douglas C. Sicker & Lisa Blumensaadt, *Misunderstanding the Layered Model(s)*, 4 J. TELECOMM & HIGH TECH. L. 299 (2006), *citing* Douglas C. Sicker, *et al.*, *The Internet Connection Conundrum* (unpublished FCC Office of Plans and Policy, Working Paper, 1999). Sicker's "goal was to move toward technical neutrality and therefore, consistent treatment. This could be achieved through regulation based on the service, rather than of the network infrastructure that carries the service. An additional objective was to define a model where the application layer could continue to innovate by avoiding unintentional regulation." Sicker's unpublished paper appears to have been the original application-layer academic's perspective. Many more academics have followed in his footsteps. *See supra* note \_\_\_\_\_. Arguably, the Commission started off the entire layer-regulatory discussion by treating "telecommunications services" and "information services" differently in the Computer Inquiries and later in the 1996 Act. Richard S. Whitt, *Horizontal Leap*, *supra* note \_\_\_\_\_, at 600..

<sup>63</sup> Richard S. Whitt, *Horizontal Leap*, *supra* note \_\_\_\_\_, at 592 ("the [MCI] Network Layers Model targets the lower network layers for discrete regulation based on the existence of significant market power, rather than legacy service or industry labels. This framework concomitantly fosters maximum innovation by leaving otherwise competitive content and applications markets unfettered by regulation.").

<sup>64</sup> *Id.* at 590-91.

<sup>65</sup> *Id.* at 591.

<sup>66</sup> *Id.* at 606.

Whitt's fundamental claim is that the applications (and "content") marketplaces are competitive and can be left unregulated.<sup>67</sup> He was unquestionably right, and his seminal paper (along with work by Werbach and Wu and others) was cited and discussed widely.<sup>68</sup> But the economic and cultural justifications that he provided for the "layers" approach were limited to two: (1) the explosive innovation that competition among applications would produce and (2) the mapping between the "actual" architecture of the internet and the regulatory approach to be taken to it.<sup>69</sup> Both of these justifications have proven to be easy targets for anti-openness and anti-neutrality advocates, and may not reflect the true human value of the internet's architecture.

#### *D. The Incumbents Adopt the Scholars' Layered Approach*

The scholars' particular version of a layered approach to internet regulation has been co-opted by the carriers, who have been quick to depict their industry detractors as well-funded providers of "services" that free-ride on the carriers' networks. One man's explosive innovation is another man's missed opportunity, and the incumbent network providers have complained that it is unfair for rich companies like Google (and, implicitly, less-rich providers of applications) to be riding on their pipes providing "services" without paying. Indeed, they have transformed the argument that competition among applications will lead to innovation into one about fairness and equity: if they have done all the work to invest in their networks, why should others be allowed to take advantage of this

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<sup>67</sup> *Id.*

<sup>68</sup> A group called the New Millennium Research Council sponsored an entire collection of essays criticizing Whitt's paper. Wayne T. Brough, *et al.*, *Free Ride: Deficiencies of the MCI 'Layers' Policy Model and the Need For Principles that Encourage Competition in the New IP World* (New Millennium Research Council Paper, July 2004), available at [http://newmillenniumresearch.org/news/071304\\_report.pdf](http://newmillenniumresearch.org/news/071304_report.pdf). Other layered approaches include Douglas C. Sicker and Joshua L. Mindel, *Refinements of a Layered Model for Telecommunications Policy*, 1 J. TELECOMM. & HIGH TECH. L. 69 (2002) and Tim Wu, *Application-Centered Internet Analysis*, 85 VA. L. REV. 1163 (1999).

<sup>69</sup> *Horizontal Leap*, *supra* note \_\_\_\_\_. Many other writers have made this same applications "innovation" argument. See, e.g., PATRICIA L. BELLIA, PAUL SCHIFF BERMAN & DAVID G. POST, *CYBERLAW: PROBLEMS OF POLICY AND JURISPRUDENCE IN THE INFORMATION AGE 19* (3d Ed. 2006) ("End-to-end design has profound implications for the Internet's growth and utilization. It grants the maximum possible autonomy to applications running 'on top' of the basic network protocols themselves, giving application-writers the freedom to achieve their goals in whatever manner they see fit, and to innovate whenever and however they like. . . . Innovation comes in the form of new applications...").

investment without ensuring the network owner some share of their revenues? In the words of Ivan Seidenberg, CEO of Verizon, the Bells “have to make sure that [application providers] don’t sit on our network and chew up bandwidth. We need to pay for the pipe.”<sup>70</sup> Similarly, Verizon deputy general counsel John Thorne has said that Google is “enjoying a free lunch that should, by any rational account, be the lunch of the facilities providers.”<sup>71</sup>

Network neutrality<sup>72</sup> supporters and detractors are both using the same application-layer perspective. For example, Tim Wu (a well-known supporter of neutrality) makes the point that “the attractiveness of broadband service is a function of the applications it offers the consumer.”<sup>73</sup> In two recent articles, he has presented his view that the goal of regulation of internet access should be to promote the availability of the best products or applications for end-user use.<sup>74</sup> His assumptions along these lines – internet as content-delivery mechanism – are strikingly similar to those of Christopher Yoo (a well-known opponent of neutrality), who has focused on facilitating the development of vertically integrated networks.<sup>75</sup>

Negative effects of network neutrality, for Yoo, would include narrowing of “consumer choice” and disfavoring applications that require quality of service guarantees.<sup>76</sup> Yoo sees broadband access providers as the “retail” stage in a chain of distribution – taking “content” manufactured by companies and getting it to consumers.<sup>77</sup> He suggests that a vertical chain

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<sup>70</sup> Paul Kapustka, *Verizon Says Google, Microsoft Should Pay for Internet Apps*, INFO. WEEK, Jan. 5, 2006. See also Dionne Searcey & Amy Schatz, *Phone Companies Set Off a Battle Over Internet Fees*, WALL ST. J., Jan. 6, 2006 (slightly different version of Seidenberg remarks).

<sup>71</sup> Arshad Mohammed, *Verizon Executive Calls for End to Google’s “Free Lunch,”* WASH. POST, Feb. 7, 2006.

<sup>72</sup> “Network neutrality,” a term coined by Tim Wu (see Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. TELECOMM. & HIGH TECH L. (2003), generally means nondiscrimination by network providers against (or in favor of) the transport of particular packets. See *infra* Section \_\_\_\_.

<sup>73</sup> *Broadband Discrimination*, *supra* note \_\_\_\_, at 154.

<sup>74</sup> *Broadband Discrimination*, *supra* note \_\_; *User’s Guide*, *supra* note \_\_.

<sup>75</sup> *Beyond*, *supra* note \_\_\_\_, at 34. (“standardization on protocols is an equilibrium only if the utility created by network economic effects exceeds the utility created by network diversity for both groups.”)

<sup>76</sup> *Id.*

<sup>77</sup> Yoo’s devotion to the “chain of production” model runs through *Beyond*, *supra* note \_\_\_\_\_. His suggestion is that when products are differentiated, consumers can “obtain goods that fit better with their ideal preferences.” Standardization (as with the TCP/IP protocol suite) cuts against differentiation, and may cause consumer welfare loss. His idea is that a differentiated firm can create new equilibria if it is allowed to compete by “tailoring its

of production will only be “efficient if every link is competitive.”<sup>78</sup> Yoo’s underlying assumption is that the internet is like a newspaper or a magazine over which centralized publishers should have control -- he says that “The fact that telecommunications networks now serve as the conduit for mass communications and not just person-to-person communications greatly expands the justification for allowing them to exercise editorial control over the information they convey.”<sup>79</sup> Common carriage precedents, therefore, are in Yoo’s view completely inapposite – he thinks the internet is “conveying media content.”<sup>80</sup> Yoo’s fundamental assumption is that end-users of the internet are purchasing a product from the end of a chain of distribution.<sup>81</sup>

Both Tim Wu, with his narrow focus on application innovation, and Christopher Yoo, with his absorption with the perquisites of network managers and the management of supply chains,<sup>82</sup> largely ignore human communications. Both of them could be writing about train networks into which it is possible to introduce new models of cars. For Wu, cutting off innovation in car design would be a negative economic step; for Yoo, allowing track or bridge owners to vertically integrate and control the design of cars would be a positive move that would deliver customers safely to their doorsteps. Or these writers could be discussing broadcast networks on which it is possible to introduce new shows without the permission of the network owner. Wu, again, would want Darwinian competition among new shows to flourish, while Yoo would want the network providers to be able to control content so as to encourage competition among networks.

Yoo and Wu take different approaches to the regulation of internet access. Yoo claims that there is “congestion” that will only be resolved by lifting all regulatory requirements from potentially competing network

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network towards services that a subsegment of the market values particularly highly.” *Id.* at 29. The result is “an equilibrium in which multiple players co-exist despite the presence of unexhausted economies of scale.” *Id.* at 30. Yoo believes that allowing the use of nonstandard protocols and exclusive deals would facilitate competition in the last mile.

<sup>78</sup> *Id.* at 15.

<sup>79</sup> *Id.* at 46, 48.

<sup>80</sup> In his words, “[w]hen content is involved, policymakers have long recognized the importance of giving the conduit editorial control over the information being conveyed.” *Id.* at 45, citing Howard A. Shelanski, *The Bending Line Between Conventional “Broadcast and Wireless “Carriage”*, 97 COLUM. L. REV. 1048 (1997) (tracing the origins of the regulatory distinction between broadcasting and common carriage).

<sup>81</sup> *Id.* at 38. Yoo suggests that these end-users, like purchasers of any product, should expect “periodic changes in terms under which they are able to obtain access to the network.” *Id.*

<sup>82</sup> *Beyond, supra note* \_\_\_, and *Economics of Congestion, supra note* \_\_\_.

providers, while Wu wants a non-discrimination rule to be put in place that would allow discrimination between different “services” but would not allow discrimination between providers of the same “service”.<sup>83</sup> Both of them, however, see the human communications layer of the internet as merely substituting for old models of communications products that were necessarily intertwined with their infrastructures – providing “content delivery” and other “services.”

The application-layer perspective has troubling implications. The assumption that online activities can be neatly categorized into simply-defined “services” leads easily (given the network providers’ claims that it is unfair to let applications from other providers “ride on their pipes”) to a world that reposes great discretion in the incumbent network providers and allows them to discriminate against uses that they dislike for their own business reasons – including P2P, BitTorrent, and other new forms of distributed file sharing as well as yet-to-be invented forms of interactions.<sup>84</sup> Arguments that application-layer competition is the chief social good to be achieved by network neutrality thus can easily be morphed into arguments that support the network providers’ worldview.

Also helpful to the network providers is the faith of some scholars in the original, almost-religiously-important initial architecture of the internet, and the appropriate neatness of mapping regulation to its structure. On this

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<sup>83</sup> See Tim Wu, *Why Have A Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. ON TELECOMM. & HIGH TECH. L. 15 (2006) (suggesting that “the discrimination undertaken must be related to the content in question, and not the source of the information. For example, an internet carrier might decide to speed up the delivery of all video packets on the network, a difference in treatment driven by the differences in the underlying information type. But what the carrier may not do under this approach is to choose favorites, to treat similarly situated packets differently.”); see also Posting of Tim Wu comments to Save the Internet, <http://www.savetheinternet.com/=wu>, supporting the language of the recent AT&T/BellSouth merger (“Interestingly, the agreement does not prevent AT&T from treating different media carried on the Internet differently, so long as the carrier does not discriminate between who is providing the content. AT&T, under this agreement, may speed all the Internet video traffic on its network (to compete, for example, with cable). But it cannot pick and choose whose video traffic to speed up. In short, AT&T must treat like traffic alike--that is the essence of the agreement. “Like-treatment” is not a pure ban on bit-discrimination, and the theory behind the “like-treatment” approach merits discussion. It is, on the one hand, meant to preserve a basic parity and meritocracy as between competing Internet application and content providers. For example, the video providers Yahoo-video and YouTube must be accorded like treatment.”), available at <http://www.savetheinternet.com/=wu>. This is a clear statement of the application-layer perspective.

<sup>84</sup> For a list of ISPs around the world that constrain BitTorrent and other peer-to-peer traffic around the world, see [http://www.azureuswiki.com/index.php/Bad\\_ISPs](http://www.azureuswiki.com/index.php/Bad_ISPs).

view, we should regulate transport differently from other internet layers *because* that is the way the internet has traditionally worked.

The architecture of the internet could always change; there is an is-ought fallacy, as Lessig has noted, in assuming that its pure state will stay in place.<sup>85</sup> For this reason, claims that regulation should be mapped to this structure are easy to knock down. Academic supporters of the network providers' views have pointed out that unchanging internet network architecture, if frozen into place, may discriminate against network providers' applications in the future.<sup>86</sup> Past internet visionaries have argued that the internet is broken and that we must start again.<sup>87</sup> It is true that the explosive growth of the internet can be attributed to the way it now works, but there need to be better reasons for a particular form of regulation of the internet than merely the existing internet's past success.

Most centrally, however, the application-layer perspective misses what is most important about online communications: complex human relationships.

## II. THE COMMUNICATIONS CONCEPTION OF COMMUNICATIONS LAW

At the moment, federal telecommunications policy seems to have no coherent set of goals. We have complex, separate, and wildly out of date regulatory structures covering telephony, broadcasting, cable television and satellites.<sup>88</sup> Although there is arguably no express delegation by Congress to the FCC to regulate the internet,<sup>89</sup> the FCC sometimes imposes heavy-handed rules (E911 and CALEA for VoIP)<sup>90</sup> and sometimes claims that its

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<sup>85</sup> LAWRENCE LESSIG, *CODE: AND OTHER LAWS OF CYBERSPACE* (1999).

<sup>86</sup> See, e.g., Adam D. Thierer, *Net Neutrality: Digital Discrimination or Regulatory Gamesmanship in Cyberspace*, 507 CATO INST. POL'Y ANALYSIS 1 (2004), available at <http://www.cato.org/pubs/pas/pa507.pdf> (advocating for vertical integration). *Beyond*, *supra* note \_\_, at 1 (advocating for vertical integration; claiming that TCP/IP "is poorly suited to applications that are less tolerant of variations in throughput rates, such as streaming media and VoIP.").

<sup>87</sup> Robert Kahn, co-inventor of TCP/IP, has argued against net neutrality. Andrew Orlovski, *Father of Internet Warns Against Net Neutrality*, THE REGISTER, Jan. 18, 2007. David Talbot, *The Internet Is Broken*, MIT TECH. REV., Dec. 19, 2005 (interview with Dave Clark, "Internet elder statesman and onetime chief protocol architect").

<sup>88</sup> See, e.g., *Horizontal Leap*, *supra* note \_\_; Philip J. Weiser, *Law and Information Platforms*, 1 J. TELECOMM. & HIGH TECH L. 1, 4-5 (2002).

<sup>89</sup> See James B. Speta, *Deregulating Telecommunications in Internet Time*, 61 WASH. & LEE L. REV. 1063 (2004); Susan P. Crawford, *Shortness of Vision: Regulatory Ambition in the Digital Age*, 74 FORDHAM L. REV. 695 (2005).

<sup>90</sup> Susan P. Crawford, *The Ambulance, the Squad Car, and the Internet* 21 BERKELEY

chief goal is to be deregulatory.<sup>91</sup> The various policy aims identified by FCC-watchers are sometimes in conflict.<sup>92</sup> Congress spasmodically takes up indecent speech, gambling, spam, spyware, and privacy, among other online topics – without, it seems, an underlying theory that would help prioritize or rationalize internet regulation. Even without a clear goal, these regulatory actions affect outcomes and create controversies about which economic and social benefits should be preferred or can be attained. We are stumbling forward, tinkering blindly with the greatest value-creation system we have ever seen.

An accurate description of the reality of the internet is generally absent from current communications law theory. The application-layer perspective I have described in Part I does not capture what is valuable about the internet to humans. As users of the internet, we know that the internet's transformative effect on economic and cultural life in this country cannot fully be explained by competition among different applications. If we adopt a changed perspective on the internet that takes as central the evolution of human connections and relationships online, economic growth theory can assist in explaining the impact of the internet and can help us create an optimal regulatory structure for the future.

#### *A. Economic Growth Theory*

Traditional economics assumes implicitly that the economy as a whole is a closed system that will eventually reach equilibrium. It predefines the configuration space by assuming perfect competition, constant returns, and rational behavior. On this view, the most efficient allocation of resources is the best (“optimal”) one because it will maximize overall wealth for society. Markets can regulate themselves, led by an

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TECH. L.J. 873 (2006).

<sup>91</sup> *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, CC Docket No. 02-33, Report and Order and Notice of Proposed Rulemaking, FCC 05-150, 2005 WL 2347773 (rel. Sep. 23, 2005), available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-05-150A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-150A1.doc) (reclassifying DSL from a common carrier provided telecommunications service to a largely unregulated information service).

<sup>92</sup> See, e.g., John T. Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Communications Regulation from the Ground Up*, 1 J. TELECOMM. & HIGH TECH. L. 95 (2002) (identifying five policy aims: (1) limiting market power; (2) protect consumers from abusive practices; (3) promote a multiplicity of speakers; (4) universal service; (5) miscellaneous societal objectives (like wiretap capability, 911 service, disabilities access)).

“invisible hand” to price commodities at their natural price. “[W]hatever may be the obstacles which hinder [the prices of all commodities] in settling in this center of repose and continuance, they are constantly tending towards it.”<sup>93</sup> (This is a description of negative, thermostat-like feedback, dampening attempts of any one manufacturer to raise his prices above the “natural” level.)<sup>94</sup> Given increasing population growth and limited resources of land, labor, and capital, mankind will always be running up against limits.<sup>95</sup> These diminishing returns ensure that firms cannot grow excessively large, which permits the invisible hand to do its work in a competitive marketplace. Accordingly, the steady state is the optimal goal – just sufficient to survive efficiently in an environment of scarcity and diminishing returns.<sup>96</sup>

To cope with the arrival of monopoly industries charging prices above the “natural” price, economists invented the idea of “externalities,” or “spillovers” that benefit (or harm) others without money changing hands.<sup>97</sup> These externalities would, somehow, loosen the control of monopolists – their competitors would find out their secrets, or come up with neighboring ideas, because ideas were seen as completely nonexcludable – and all would sink towards equilibrium and perfect competition again. On the view of an equilibrium economist, ideas are exogenous. To cope with the arrival of depressions, neoclassical economists invented the idea that markets could not always be counted on to operate perfectly and might need stimulation by government, creating artificial demand or supply to smooth out business

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<sup>93</sup> KNOWLEDGE, *supra* note \_\_, at 44.

<sup>94</sup> See description of “feedback” at n. \_\_, *infra*.

<sup>95</sup> “In the classical model of Malthus and Ricardo, growth is constrained by an inelastic supply of natural resources.” Vernon W. Ruttan, *Can Economic Growth Be Sustained? A Post-Malthusian Perspective*, 28 POPULATION AND DEVELOPMENT REVIEW 1 (Mar. 2002).

<sup>96</sup> In perhaps the clearest expression of this competition-obsessed view of economic growth, Robert Solow asserted in 1956 that “changes in the savings rate have no lasting effect on the rate of growth of output per worker.” Paul Romer, *Increasing Returns and New Developments in the Theory of Growth*, National Bureau of Economic Research Working Paper No. 3098 (1989), citing Robert Solow, *A Contribution to the Theory of Economic Growth*, QUARTERLY JOURNAL OF ECONOMICS 70, 94 (1956). Solow’s work implied that private firms and other actors simply did not devote resources to research and development and that, even if they did, economics would be unchanged if these actors had incentives to do so. *Id.*

<sup>97</sup> Frischmann and Lemley note that the term “externalities” has been a “contested concept in economics for many years.” Brett Frischmann & Mark Lemley, *Spillovers*, *supra* note \_\_, at 267. They define externalities as “benefits (costs) realized by one person as a result of another person’s activity without payment (compensation).” *Id.*

cycle disruptions and move towards a steady state.<sup>98</sup> They developed abstractions and mathematical demonstrations to fill out their assertion that innovation by (or investments by) autonomous economic agents did not really matter.

Economists have noticed for a long time that the rate of economic growth has been accelerating in industrial nations, not slowing down as the law of diminishing returns might predict.<sup>99</sup> Robert Solow's breakthrough work fifty years ago showed that "technological progress" allows economies to add to their outputs without the addition of more labor and capital.<sup>100</sup> But Solow called this key technological-change element responsible for eighty percent or more of economic growth the "residual," and dealt with it as an unexplained exogenous influence.<sup>101</sup>

Beginning in the mid-1980s Paul Romer seized the challenge of transforming the "residual" of technological change into an endogenous element of his model explaining economic growth.<sup>102</sup> Since then, Romer has pointed out in a series of papers that (1) nonrival but (2) partially excludable ideas can prompt increasing returns when they are (3) exploited on a large scale.<sup>103</sup> We are beginning to understand that the growth in social wealth per capita in terms of real income per person over the last millennia is deeply related to the increase in the diversity of new ideas that has occurred over the same time.<sup>104</sup>

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<sup>98</sup> David Warsh tells the story of John Maynard Keynes's impact in KNOWLEDGE AND THE WEALTH OF NATIONS 88-89.

<sup>99</sup> Americans today are many times richer than they were in 1900. J. Bradford DeLong, *Cornucopia: The Pace of Economic Growth in the Twentieth Century*, NBER Working Paper No. W7602 (2000), available at [http://econ161.berkeley.edu/TCEH/2000/TCEH\\_2.html](http://econ161.berkeley.edu/TCEH/2000/TCEH_2.html) [hereinafter *Cornucopia*].

<sup>100</sup> Robert Solow, *Technical Change and the Aggregate Production Function*, REVIEW OF ECONOMICS AND STATISTICS 39 (1957).

<sup>101</sup> KNOWLEDGE, *supra* note \_\_, at 146.

<sup>102</sup> *Id.*

<sup>103</sup> See Paul Romer, *Endogenous Technological Change*, NBER Working Paper 3210 (1990), at 1 ("Technological change. . . lies at the heart of economic growth...Technological change provides the incentive for continued capital accumulation, and together, capital accumulation and technological change account for much of the increase in output per hour worked.").

<sup>104</sup> Paul Romer, *Why, Indeed, in America?: Theory, History, and the Origins of Modern Economic Growth*, NBER Working Paper 5443 (1996); ERIC D. BEINHOCKER, *THE ORIGIN OF WEALTH: EVOLUTION, COMPLEXITY, AND THE RADICAL REMAKING OF ECONOMICS* 215 (2006). This makes sense in a deep way: in the beginning the universe was simple, and now it is vastly complex and full of novel structures. STUART KAUFMANN, *INVESTIGATIONS* 143 (2000) ("The diversity of species in the biosphere has increased over the last 4.8 billion years, while the diversity of ways of making a living has increased over

## 1. Nonrival ideas

Economic growth happens whenever people are able to take resources or inputs and arrange them in ways that are more valuable. New ways of doing things are, in a sense, new “recipes” for these arrangements. In the words of Paul Romer, “Economic growth arises from the discovery of new recipes [ideas] and the transformation of things from low to high-value configurations.”<sup>105</sup> In the last 200 years or so, technological progress and concomitant economic growth have been particularly dramatic.<sup>106</sup> Romer and others suggest that this may be happening because more people and more (and better) institutions are out looking for new ideas and new technologies.<sup>107</sup> The freedom to look for these ideas is fundamental to economic growth.<sup>108</sup> Bad ideas really do lead to good ideas, in that the diversity of ideas as a whole allows exploration to discover what is useful.<sup>109</sup> Ideas, or the stock of knowledge, can grow without bound on a

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the past 3 million years.”); cf Joseph Schumpeter, CAPITALISM, SOCIALISM, AND DEMOCRACY chap. 7 (1975) (orig. pub. 1942) (listing mechanisms that trigger economic growth). Some have criticized new growth theory for being nothing more than a market imperfections theory of technological change. See Ben Fine, *Endogenous Growth Theory: A Critical Assessment*, 24 CAMBRIDGE JOURNAL OF ECONOMICS 245, 249 (2000) (“This is a simple result of the externalities or socially increasing returns to scale involved. Generally, it follows that the competitive outcome induces a level of saving that is below the optimum, since private agents take no account of the knock-on effects of corresponding levels of investment. Once there is an endogenous growth mechanism in place, however, attention can focus on any market imperfection that affects the saving rate and, hence, long-run prospects.”)

<sup>105</sup> Paul Romer, *Endogenous Technological Change*, NBER Working Paper 3210 (1990).

<sup>106</sup> *Cornucopia*, supra note 109.

<sup>107</sup> Ronald Bailey, *Post-Scarcity Prophet: Economist Paul Romer on Growth, Technological Change, and an Unlimited Human Future*, reason.com, Dec. 2001, available at <http://www.reason.com/news/show/28243.html>.

<sup>108</sup> *Id.* Economic growth theory was inspired, in part, by Joseph A. Schumpeter’s insistence that “creative destruction” is “[t]he fundamental impulse that sets and keeps the capitalist engine in motion.” Joseph A. Schumpeter, *The Process of Creative Destruction*, in CAPITALISM, SOCIALISM AND DEMOCRACY (New York: Harper, 1975) (orig. pub. 1942), at 82-85. See also CLAYTON M. CHRISTENSEN, THE INNOVATOR’S DILEMMA (2001).

<sup>109</sup> “To speed up growth, it is not enough to increase *spending* on research and development. Instead, an economy must increase the total quantity of inputs that go into the process of research and development.” Paul Romer, *Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?* NBER Working Paper 7723 (2000) [hereinafter *Government Subsidize*], at 14. The “diversity” argued for in this Article is different from the FCC’s version of “diversity.” See 1998 *Biennial Regulatory Review*, 133 FCC Rcd. 11,276 para 4 (1998) (“[F]or more than a half century, the Commission’s

per-person basis, and can prompt a better quality of life for everyone.

Thus, economic growth comes from better recipes – better new ideas for dealing with finite resources. New ideas are “nonrival” in that they can be used by anyone without diminishing their value. And new nonrival ideas that lead to goods and services being introduced on a broad scale trigger increasing returns (lower costs, higher profits based on the use of finite resources) and push economies onward.<sup>110</sup> In Paul Romer’s words, “it is ideas, not objects, that poor countries lack.”<sup>111</sup>

## 2. Specialization and Scale

The United States experienced explosive economic growth in the 19th century because it had abundant resources, a national transportation system, *and* a large population.<sup>112</sup> Market size increases incentives for invention by supporting the provision of many specialized inputs, and cheap transportation helps inventors make their new ideas available. With technological convergence pushing towards use of standard machines to

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regulation of broadcast service has been guided by the goals of promoting competition and diversity.”); *Metro Broadcasting, Inc. v. FCC*, 497 U.S. 547 (1990), citing *Red Lion Broadcasting Co. v. FCC*, 395 U.S. 367, 390 (1969) (“[B]ecause of the scarcity of [electromagnetic frequencies, the Government is permitted to put restraints on licensees in favor of others whose views should be expressed on this unique medium.”) The kind of diversity suggested in this Article is not affirmative content-based diversity – “the fostering of programming that reflects minority viewpoints or appeals to minority tastes.” *Lutheran Church-Missouri Synod v. FCC*, 141 F.3d 344 (D.C. Cir. 1998) (rejecting as unconstitutional FCC equal employment opportunity regulations because not serving a “compelling” interest and therefore not capable of surviving strict scrutiny review). Rather, the diversity encouraged by this Article is the difference that comes from ensuring that people with diverse experiences, training, perspectives, predictive models, interpretations, and tools are online. This kind of diversity – cognitive diversity -- can be facilitated by simply ensuring that the most people possible have internet access. *See infra* Section \_\_\_\_\_. For a fascinating exploration of diversity, see SCOTT E. PAGE, *THE DIFFERENCE: HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES* 13 (2006) (“Diverse perspectives and tools enable collections of people to find more and better solutions and contribute to overall productivity.”).

<sup>110</sup> In Paul Romer’s words, “it is ideas, not objects, that poor countries lack.” Paul Romer, *Economic Growth*, from *The Concise Encyclopedia of Economics*, David R. Henderson, ed. (2007). Much of the value to society of any given new idea is not captured by its individual inventor. Lemley & Frischmann, *Spillovers*; Romer *Endogenous Technological Growth*, at 22.

<sup>111</sup> Paul Romer, *Economic Growth*, in *THE CONCISE ENCYCLOPEDIA OF ECONOMICS*, (David R. Henderson, ed. 2007) [hereinafter *Economic Growth*]. Much of the value to society of any given new idea is not captured by its individual inventor. *Spillovers*, *supra* note 5; ENDOGENOUS, *supra* note 6, at 22.

<sup>112</sup> KNOWLEDGE, *supra* note \_\_\_, at 37.

produce many kinds of goods, an integrated market, and a large group of people to sell to, the U.S. took the technological lead over the rest of the world, and held it through much of the twentieth century.<sup>113</sup> Technological change and new ideas introduced in the U.S. caused this country to surge ahead of Britain in terms of economic growth.<sup>114</sup>

Market size increases incentives for invention by supporting the provision of many specialized inputs, and cheap transportation helps inventors make their new ideas available. The new growth theorists put scale in the foreground as a fundamental aspect of modern economic understanding, because larger markets induce the creation of more new ideas and hence faster growth.<sup>115</sup> The human communications made possible by the internet have the greatest scale of any communications modality we have known thus far.

### 3. The U.S. and Economic Growth

Nations have different economic growth rates. From 1950 to 2000, growth in income per person in the U.S. was about 2.3% per year, but the growth rate in China was almost six percent per year – meaning that income per capita in China was doubling every 12 years.<sup>116</sup> India, meanwhile, is quickly becoming a third pillar of the world economy with China and the U.S., and its economy has been growing at an average of 5.7% yearly since 1979.<sup>117</sup> Some sources predict that India’s economy will continue to grow at the same rate for the next fifteen years.<sup>118</sup> This year, the growth rate in Europe is estimated to be 2.6%, and the U.S. is said to be experiencing a “soft landing” in 2007 – less economic growth.<sup>119</sup> No nation remains truly

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<sup>113</sup> Richard Nelson & Gavin Wright, *The Rise and Fall of American Technological Leadership: The Postwar Era in Historical Perspective*, JOURNAL OF ECONOMIC LITERATURE, Dec. 1992, at 1931-64.

<sup>114</sup> Paul Romer estimates that U.S. income per capita grew at a rate of 1.8% per year from 1870-1992; in Britain, it grew at a rate of 1.3% per year. Paul Romer, *Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?* NBER Working Paper 7723 (2000). Income per capita grew in Sweden at a rate of 3% per year until 1970, and then the growth rate slowed. *Id.* at 11-12.

<sup>115</sup> *Endogenous*, *supra* note \_\_, at 2.

<sup>116</sup> *Economic Growth*, *supra* note \_\_\_\_.

<sup>117</sup> Economywatch.com, *India Economy Overview*, available at <http://www.economywatch.com/indianeconomy/indian-economy-overview.html>.

<sup>118</sup> *Foresight2020 report*, The Economist Intelligence Unit, Mar. 2006, available at [http://www.eiu.com/site\\_info.asp?info\\_name=eiu\\_Cisco\\_Foresight\\_2020](http://www.eiu.com/site_info.asp?info_name=eiu_Cisco_Foresight_2020).

<sup>119</sup> Morgan Stanley, *Global Economic Forum: Re-rating Euroland*, Nov. 24, 2006, available at <http://www.morganstanley.com/views/gef/>.

innovative for very long, and the torch of technological process and economic growth may have been passed to Asia.

The average rate of economic growth (growth in value, not growth in the number of objects or people) is extremely important for an economy, and encouraging income to increase more quickly in a shorter amount of time is the central economic policy task of any nation. If the rate of economic growth in the U.S. over the next forty-five years or so were to increase by 0.5% per year, it could “resolve all of the budget difficulties associated with the aging of the Baby Boom generation, and still leave ample resources for dealing with any number of other pressing social problems.”<sup>120</sup> Better growth policy could have implications for the standard of living of all Americans that are so enormous that they are hard to understand.

The problem for the U.S. is that it will not be able to stay ahead in terms of its economic growth rate by importing ideas from elsewhere – given its technological history, the U.S. is still a place from which new ideas come. (Until recently, by contrast, India’s and China’s economic growth stemmed from simply opening themselves up to new ideas from other countries.)<sup>121</sup> This means that the U.S. must strongly support discovering new ideas within its own borders. Paul Romer’s work, in particular, supports investments in infrastructure that is likely to produce new ideas: graduate education, research subsidies, and engagement with other economies.<sup>122</sup> As a country, we are in urgent need of meta-ideas about the generation of new ideas.<sup>123</sup>

### B. Growth Theory and the Internet

Thus, in recent years, traditional economics has had to open its

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<sup>120</sup> *Government Subsidize*, *supra* note \_\_, at 11-12.

<sup>121</sup> *Economic Growth*, *supra* note \_\_\_\_.

<sup>122</sup> *Government Subsidize*, *supra* note \_\_; *The Growth of Growth Theory*, ECONOMIST, May 18, 2006. See also Thomas L. Friedman, *Learning to Keep Learning*, N.Y. TIMES, Dec. 13, 2006 (supporting report “titled ‘Tough Choices or Tough Times,’ which proposes a radical overhaul of the U.S. education system, with one goal in mind: producing more workers -- from the U.P.S. driver to the software engineer -- who can think creatively.”)

<sup>123</sup> “[I]n the advanced countries of the world, progress in macroeconomic stabilization policy has reduced the threat of a paralyzing economic collapse and even reduced the frequency of mild recessions. In this environment, the lure of better growth policy is compelling. If an economy can increase its trend rate of growth by even a small amount, the cumulative effect on standards of living is too big to ignore.” *Government Subsidize*, *supra* note \_\_, at 4..

doors to work that rigorously examines the sources of increased productivity and focuses on the centrality of new ideas to economic growth.<sup>124</sup> This research has transformed economics from a “dismal science” preoccupied with the scarcity of land, labor, and capital (and concerned about the diminishing returns these resources will generate as markets perfect themselves) into a field that spends much of its time focusing on abundance, increasing returns, and the power of new ideas.

The work of growth theorists reveals that choices made by government to stimulate the production of new ideas can have a significant effect on economic growth.<sup>125</sup> Compared to a country with restraints on idea-generation diversity, a country supporting free trade in ideas should tend to have a greater amount of resources devoted to idea-generation and thus a higher rate of economic growth.<sup>126</sup>

The internet provides a particularly fertile environment for the development of these diverse new thoughts that will drive growth. It supports the development of groups and other forms of online communication that are potentially highly responsive to the feedback of human beings and highly likely (given the enormous scale and connectivity of the internet) to trigger exponential development of unpredictably diverse new ideas that are nonrivalrous.<sup>127</sup> Indeed, the internet makes it possible for

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<sup>124</sup> Within ten years of the publication of Paul Romer’s 1990 paper, *Endogenous Technological Change*, “the number of articles explicitly drawing upon endogenous growth theory almost certainly border[ed] on a thousand . . . spread over 50 or more economics journals” and including textbooks, surveys, and special issues. Ben Fine, *Endogenous Growth Theory: A Critical Assessment*, Cambridge Journal of Economics 2000, 24, 245-265 (2000).

<sup>125</sup> Development economists in 1990 came up with the Washington Consensus, which suggested that “growth was a matter of getting national policies right.” Roberto Zaghera, Gobind Nankani, & Indermit Gill, 43 IMF QUARTERLY MAGAZINE, Mar. 2006.

<sup>126</sup> Paul Romer, *Increasing Returns and New Developments in the Theory of Growth*, National Bureau of Economic Research Working Paper No. 3098 (1989), at 28, 30. This is undoubtedly a gross simplification of economic growth theory, but Romer’s popularizing language makes such a simplification and application to pending policy questions inevitable. Indeed, diversity of new ideas (which leads to diversity of economic goods and services) does not just generate fodder for selection; the differences provided by diversity generate further diversity. INVESTIGATIONS, *supra* note \_\_, at 85. The diversity of the economy increases consistently because “the more objects there are in the economy, the more complement and substitute relation exist among those objects, as well as potential new objects in the adjacent possible....Thus, as the diversity of the objects in the web increases, the diversity of prospective niches for new goods and services increases even more rapidly! The very diversity of the economic web is autocatalytic.” INVESTIGATIONS, *supra* note \_\_, at 226.

<sup>127</sup> “[E]conomic returns to telecommunications infrastructure investment are much greater than the returns on just the telecommunication investment itself.” Lars-Hendrik

humans to enter into forms of relationships that were systematically constrained before 1995: potentially persistent, potentially visible, asynchronous niche arrangements across great distances that are based on interest and attention. Emerging from this freedom of human connection are dynamic forms of human affiliation (groups, teams, collaborations of all kinds) that create opportunities for exponential growth in value. These affiliations are a form of self-generated order, and these human online communications are themselves a complex system (or system of complex systems).<sup>128</sup> The possibility space (“the adjacent possible” in Stuart Kauffman’s terms)<sup>129</sup> for the most diverse developments is being created by human communications online, and, in particular, in those areas where collective interactivity is facilitated and can be selected through the feedback loop of our own attention.

Thus, there is something new about the internet that separates online communications from all former communications modalities. Traditional broadcast does not have actors providing feedback who are also providing the content, and does not make it possible for interesting new species and new ways to make a living to emerge (without permission from the broadcast operator). Broadcast does not provide a social “place” – it is not persistent, and it does not have attributes that allow humans to play roles

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Roller & Leonard Waverman, *Telecommunications Infrastructure and Economic Development, A Simultaneous Approach* (finding “significant positive causal link” between telecommunications developments and economic growth) at 909-10. These returns are similar to the tremendous returns to public infrastructure investment such as transportation, sewer systems, water, electricity, etc. See David Alan Aschauer, *Is Public Expenditure Productive?*, JOURNAL OF MONETARY ECONOMICS, March 1989 23(2), 177-200 (finding return to infrastructure can be as high as seventy percent per year). Aschauer also suggests a strong relationship between U.S. productivity slowdown and the decline in the growth rate of public capital stock. *Id.*

<sup>128</sup> “Complex” does not mean “complicated.” Rather, the science of complex adaptive systems tells us that complex systems feature autonomous agents whose micro-level interactions result in unpredictable yet persistent patterns of “fit” order – reflecting the desires of agents and their reactions (“feedback”) to their local environment. M. MITCHELL WALDROP, COMPLEXITY: THE EMERGING SCIENCE AT THE EDGE OF ORDER AND CHAOS (1992) is a useful introduction to the study of complex systems. See also JAMES GLEICK, CHAOS: MAKING A NEW SCIENCE (1988); STUART KAUFFMAN, AT HOME IN THE UNIVERSE: THE SEARCH FOR THE LAWS OF SELF-ORGANIZATION AND COMPLEXITY (1995) [hereinafter AT HOME IN THE UNIVERSE]. In a complex system, the whole is continually greater than the sum of its parts because agents are able to positively feed back their reactions in light of the environment of the system. This positive feedback can amplify and nudge a system to change in system-level, unpredictable ways. AT HOME IN THE UNIVERSE 23. The science of complex systems provides us with new tools for understanding and facilitating online communications, and sheds new light on what people value about the internet.

<sup>129</sup> INVESTIGATIONS, *supra* note \_\_.

and thus create diverse new ideas of various kinds. Telephony provides one-to-one communications, but no persisting diversity of entities is directly facilitated by telephony against which some selection algorithm can operate. The internet can do more than just transport bits and facilitate momentary person-to-person communications. It can also provide a substrate that enables new ideas and new forms of social organisms to emerge, created by many different decisions to pay attention. As David Reed has made clear, the great value of the internet is not so much that it connects more people and devices (and allows more applications to flourish), but that it supports the construction of communicating groups.<sup>130</sup>

The complexity of online communications is capable of producing an enormous diversity of human relationships. And investment of our attention in these collaborative efforts has a greater payoff than investment of attention in either the one-to-many transactions made possible by broadcast or the one to one (peer) transactions made possible by telephony.<sup>131</sup> It is true that the complex perspective, taken alone, has little normative direction and gives us as individual actors little to do. Each of us can only hope to contribute to increased complexity through our personal engagement, and we cannot say either that our efforts will make any predictable difference or that increased complexity will necessarily help the

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<sup>130</sup> David P. Reed, *That Sneaky Exponential – Beyond Metcalfe’s Law to the Power of Community Building*, CONTEXT, Spring 1999, available at <http://www.reed.com/Papers/GFN/reedslaw.html> (“[Group Forming Networks] create a new kind of connectivity value that scales exponentially with N [where N = the number of subscribers]. Briefly, the number of non-trivial subsets that can be formed from a set of N members is  $2^N - 1$ , which grows as  $2N$ . Thus, a network that supports easy group communication has a potential number of groups that can form that grows exponentially with N.”)

<sup>131</sup> *Id.* at 2 (“Once N [the number of subscribers to a network] grows sufficiently large, GFN (group forming network) transactions create more value per unit of network investment than do broadcast transactions. So what tends to happen is that as networks grow, peer transactions out-compete broadcast content in the arena of attention and return on investment. And remarkably, once N gets sufficiently large, GFN transactions will out-compete both of the other categories.”) This notion is distinguishable from, although related to, the idea of “peer production” about which Yochai Benkler has written. It is not so much that complex interactions online are producing particular forms of visible entertainment or advances in technology but that the complex relationships experienced online are themselves valuable to humans. Benkler is unquestionably correct that peer production is replacing former employer-driven modalities of development. But his is fundamentally an “application-layer” perspective; he asks how the internet enables new ways of producing particular forms of output. My suggestion is that complex online relationships and self-generated order are providing innovation in social relationships at a system level, and that this social innovation is not adequately captured by the “peer production” idea, as transformative as it has been.

world in an identifiable way. But economic growth theory, with its emphasis on new ideas, diversity, and scale producing increasing returns, combines with our newfound understanding of communications complexity in a fruitful way. Our national economic policy, which looks for opportunities for increased economic growth, should be closely tied to communications policy that facilitates the interactive, group-forming attributes of the internet.

### III. RE-THEORIZING THE CURRENT DEBATE

Many telecom scholars are focused on the economic efficiency (or not) of a particular legal regime for broadband network management from a traditional economics, non-systemic point of view. Several fundamentally view the internet as a broadcast, supply-chain medium. As a result, the debate over the future of the internet in the telecommunications literature has been defined in terms of control over content delivery – with skirmishes over who should be able to charge whom for access to particular pipes through which this content will be pumped. Reconceiving communications law to put the internet at the center and to focus on facilitating human communications themselves will have important implications for U.S. policy.

#### *A. Telecom Scholars and the Internet*

The exceptional nature of online human communications, and their capacity to foster economic growth, has not been adequately addressed in the telecommunications literature. Although Daniel Spulber and Christopher Yoo have written about complexity theory in assessing network congestion, their work assumes a closed network managed by a traditional telephone company.<sup>132</sup> Kevin Werbach and Richard Whitt have done pathbreaking work on understanding the layers of the internet and mapping regulation to these layers.<sup>133</sup> But they generally describe the social layer of the internet as the “content” layer, without grappling with its complex nature or its potential for the encouragement of economic growth.<sup>134</sup> Joseph

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<sup>132</sup> Daniel Spulber & Christopher Yoo, *On the Regulation of Networks as Complex Systems: A Graph Theory Approach*, 99 NW. U. L. REV. 1687 (2005).

<sup>133</sup> *Federal Computer Commission*, *supra* note \_\_; *Horizontal Leap*, *supra* note \_\_, at 590-92.

<sup>134</sup> Indeed, the very common use of the word “content” signals that there will be authoritative “content deliverers” as in a static broadcast system; no feedback loops

Farrell and Philip Weiser have written about the conflict between Chicago School views of vertical integration and the internet model of modularity.<sup>135</sup> James Speta has focused on facilitating intermodal competition for access networks.<sup>136</sup> These contributions, significant as they are, are largely concerned with how to regulate telecommunications network providers in a presumably closed equilibrium economic world. No one is focused on the role of positive human feedback in the communications layer of the internet, the capacity of the internet's communications layer to foster diverse new forms of relationships that can lead to new ideas, or the importance of new ideas to increasing returns and overall economic growth.

Other scholars take a broader view of online communications but have trouble assigning any particular value to them. For example, Brett Frischmann and Barbara van Schewick argue that both innovation and valuable uses of the internet will be cut off in the absence of a "network neutrality" mandate but become (understandably) vague when it comes to comparing those outputs to the benefits to network providers that would accrue if a neutrality mandate did not exist.<sup>137</sup> Frischmann's independent study of lakes and roads as infrastructures comes the closest to appreciating the systemic value of the internet,<sup>138</sup> but even he has difficulty asserting that one approach to internet access regulation will create any greater value than another.

Online communications are not just like any other form of economic activity. Ideas are not like goods; they are potentially far more valuable. The online world enables the creation of new relationships and thus new ideas that are key to our future economic growth. Communications law can no longer afford to ignore this central fact and its radical implications for policy.

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implied.

<sup>135</sup> 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 (2003) (discussing the pros and cons of internalizing complementary efficiencies (or "ICE")).

<sup>136</sup> James B. Speta, *Deregulating Telecommunications in Internet Time*, 61 Wash. & Lee L. Rev. 1063 (2004).

<sup>137</sup> Brett Frischmann & Barbara van Schewick, *Yoo's Frame and What it Ignores: Network Neutrality and the Economics of an Information Superhighway* (2006) (manuscript, on file with author).

<sup>138</sup> Brett Frischmann, *An Economic Theory of Infrastructure and Commons Management*, 89 MINN. L. REV. 917 (2005).

*B. Implications for Policy: Universal Service*

The key organizing principle for communications law must be to support the emergence of diverse new ideas online because that is where economic growth for society as a whole will come from. This form of diversity support is not the same as the kind of quota-driven artificial “diversity” that has been used to force broadcast content regulation to reflect minority viewpoints.<sup>139</sup> Rather, this kind of online diversity stems from allowing the end-to-end, content-neutral, layer-independent functions of the internet to flourish and allowing groups and human attention to pick and choose from among the bad ideas presented online, enabling good ideas to persist and replicate.

This principle for future communications regulation – encourage diversity – has immediate practical implications. We have not made access to the internet’s system of human communications sufficiently universal. The FCC requires traditional dial-up wireline telecommunications carriers, wireless carriers (and, now, providers of “interconnected VoIP,” but not providers of high-speed DSL or cable modem internet access services) to subsidize high-cost local telephone service and basic “lifeline” telephone service for a wide variety of people and entities, under the general category of “universal service.”<sup>140</sup> In 2005, universal service cost these companies and their subscribers \$6.5 billion.<sup>141</sup> The basic idea behind universal service is to subsidize the costs of some basic telephony services to serve particular (and sometimes differing) policy ends.<sup>142</sup> Although there are a

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<sup>139</sup> See *supra* note \_\_\_\_ (discussing “diversity”). Having the FCC support the diversity in generation of new ideas that the internet makes possible is akin to the FCC’s role in radio formats, see *FCC v. WNCN Listeners Guild*, 450 U.S. 582 (1981), in which the Commission relies on the market to serve the public interest in diversity. See SCOTT E. PAGE, *THE DIFFERENCE: HOW THE POWER OF DIVERSITY CREATES BETTER GROUPS, FIRMS, SCHOOLS, AND SOCIETIES* xix (“[D]iverse groups of problem solvers – groups of people with diverse tools – consistently outperformed groups of the best and the brightest.”) Diversity trumps ability.

<sup>140</sup> See, e.g., Rob Frieden, *Killing with Kindness: Fatal Flaws in the \$6.5 Billion Universal Service Funding Mission and What Should Be Done to Narrow the Digital Divide*, 24 *CARDOZO ARTS AND ENT. LAW J.* 447 (2006) [hereinafter *Killing with Kindness*]; Federal–State Joint Board on Universal Service; IP-Enabled Services, 71 Fed. Reg. 38781, 38782 (July 10, 2006), at 19, para 34 (extending universal service obligations to “interconnected VoIP”).

<sup>141</sup> *Id.*

<sup>142</sup> For a brief outline of universal service history, see STUART MINOR BENJAMIN, DOUGLAS GARY LICHTMAN, HOWARD SHELANSKI, & PHILIP J. WEISER,

number of different universal service programs, none is focused on facilitating highspeed access to the internet per se.<sup>143</sup>

The universal service program has been widely acknowledged to be both baffling and broken. The contributions required of carriers (and now interconnected VoIP providers) are steep, amounting to more than 10% of long distance revenues.<sup>144</sup> The many different programs and cross-subsidies that make up the universal service package may not be helping the people they were designed to help, while they may be helping other people that do not need assistance; this may be particularly true of the high cost subsidies for rural areas, which flow directly to carriers. “Square-state” rural Senators support universal service subsidies that companies within their states receive. There are routine allegations of fraud and abuse, particularly in connection with the school and library program services. Because the programs assume that basic telephone service is the end goal, there is no support given for training in the use of the internet.<sup>145</sup> The programs seem designed to freeze a basic-telephony model in place, without adequately taking account of the ways in which the world of communications has changed.

Universal access policy should be closely linked with this country’s general economic policy. The questions of who should pay for universal service, what services should be subsidized, and how the system should be reformed have dogged policy discussion for years. Reform is essential, but principles will likely give way to the desires of the many carriers, vendors, and Senators who benefit directly and indirectly from the status quo. Given the importance to economic growth of the facilitation of new ideas via new technologies, universal access to the internet should be at the center of

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TELECOMMUNICATIONS LAW AND POLICY, 763-65 (2d Ed. 2006).

<sup>143</sup> The Lifeline program reduces telephony costs for low-income households; Federal Linkup reduces initial hookup charges for telephone service for low income households; both the FCC and the states have high-cost fund subsidy programs that support companies that provide services “in areas where the cost of providing service exceeds a national or state average by at least 115 to 135%.” *Killing with Kindness*, *supra* note, at 459. Except for schools, libraries, and rural medical facilities, universal service support is not provided for highspeed internet access.

<sup>144</sup> FCC Contribution Factors and Quarterly Filings (2006), available at [http://www.fcc.gov/wcb/universal\\_service/quarter.html](http://www.fcc.gov/wcb/universal_service/quarter.html). Inclusion of software based VoIP providers is a dramatic step, designed in part to raise barriers to entry for services that challenge the existing wireline telephony revenue stream for the existing carriers. *Killing with Kindness*, *supra* note \_\_\_\_.

<sup>145</sup> *Killing with Kindness*, *supra* note \_\_, at 460 notes that the “FCC expressly deems ineligible for e-rate funding ‘training in the use of the Internet,’ ‘costs for training provided via the Internet,’ and ‘services that go beyond basic conduit access to the Internet.’”

communications policy. The more people are online, the more likely it is that we will find the new ideas that will spur economic growth – just as it is likely true that the more science and technology graduate students we support, the more likely that economic growth will be spurred. Traditional voice telephone services are quickly being taken over by much less expensive internet services, so it makes little sense to continue funding the former as a national policy matter. The goal of universal service, after all, is to make communications technologies available to every citizen, and the relevant technology at the moment is highspeed access.<sup>146</sup> There is a strong correlation between highspeed internet access penetration (the number of highspeed subscribers per a set group of inhabitants) and per capita gross domestic product – the benchmark against which economic growth is measured.<sup>147</sup>

Diverse new ideas whose development is made easier by the advent of the internet and its special characteristics are likely to emerge at a greater pace once highspeed access is widely available in this country. Participating in this ecology is becoming more important to the economic and cultural success of Americans and the overall economic growth of this country. We should tie universal service programs to the principle that funding highspeed access to the internet for all should be a top social priority.<sup>148</sup>

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<sup>146</sup> Milton Mueller, *Universal Service in Telephone History: A Reconstruction*, 17 TELECOMM. POL'Y 352, 356 (1993).

<sup>147</sup> See OECD June 2006 chart, OECD Broadband Penetration and GDP per Capita (showing correlation of 0.62), available at [www.oecd.org/sti/ict/broadband](http://www.oecd.org/sti/ict/broadband). To carry out this national priority, the funding mechanism for universal access should be through general tax revenue rather than the imposition of fees on nascent VoIP services. I am not the first to suggest a common fund mechanism for universal service. Using general taxation as a funding mechanism would prompt recognition that providing universal service is a social good that benefits everyone. In addition, funding universal service through actual taxation would provide helpful auditing incentives that would keep the fund in check and clarify its mission. What is new in this Article is the suggestion that the continued economic growth of this country is likely tied to far-seeing communications policy, and the notion that we can use the universal service system as a vessel for articulating and implementing this policy on a nationwide scale. Other countries, including South Korea and Japan, have taken this approach. See Broadband IT, Korea Vision (2007); see also [http://telephonyonline.com/ar/telecom\\_access\\_wisdom\\_east](http://telephonyonline.com/ar/telecom_access_wisdom_east); Takanori Ida, *Broadband, Information Society, and the National System in Japan*, in GLOBAL BROADBAND BATTLES 68-69 (2005).

<sup>148</sup> Americans are willing to fund public infrastructure if (1) it has a visible effect and (2) the money is going directly into funding that visible effect. For the Tennessee Valley Authority, the visible effect was electricity and an improved quality of life. Tennessee Valley Authority, *From the New Deal to a New Century*, available at

### *C. Implications for Policy: Network Neutrality*

Once we get involved in public funding of highspeed access, we will need to turn to the social policies that should be embodied in that access. The highspeed wires in our homes are just transport to the internet. We put packets of data onto those wires and they get to their global destinations through the use of IP addresses processed by various network interfaces. But network providers in this country – the actors who provide this transport to the internet – would like to ensure that they can “monetize” these connections by discriminating against particular packets. The network providers’ desires are deeply troubling. They must think that they can take this system of complex systems and dumb it down to their own advantage. This simplifying approach is more than short-sighted; if it is enacted into law, it is destructive of our economic future.<sup>149</sup>

#### 1. Discrimination Defined

By “discrimination,” I mean allowing network access providers to treat some traffic or some users differently. The protocols designed to make end-to-end universal connectivity work online call for information to be chunked into standardized packets. Those packets, in turn, are made up of headers (addressing information) and payload (content). The header information allows the packets to be separately forwarded by routers along “best effort” paths (without any guarantee that they will be delivered) and re-assembled by a destination computer. The header information for each packet may include information about the sender and recipient (their address on the network), as well as the length of the packet (which may reveal something about what kind of application is being used), the port used by the source and destination computers (which also may reveal

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<http://www.tva.gov/abouttva/history.htm>. A similar, national, strong program may be needed to fund highspeed internet access in this country. See FCC Commr. Michael Copps, *America’s Internet Disconnect*, WASH. POST, Nov. 8, 2006 (“The solution to our broadband crisis must ultimately involve public-private initiatives like those that built the railroad, highway and telephone systems. Combined with an overhaul of our universal service system to make sure it is focusing on the needs of broadband, this represents our best chance at recapturing our leadership position.”)

<sup>149</sup> See generally REED HUNDT, IN CHINA’S SHADOW: THE CRISIS OF AMERICAN ENTREPRENEURSHIP (2006) (arguing that U.S. needs to reform its legal, technological, and leadership architecture in order to renew American cultural commitment to entrepreneurship).

something about the application being used), and the address of the source and destination (which may reveal the manufacturer of the device).<sup>150</sup> The payload information will include an indication of what application is being used and chunks of content.

A non-discriminatory network provider will send each packet on its way using the header addressing information, without prioritizing any packet and without inspecting or using the rest of the information in the header or in the payload of the packet. Packets are treated by their routers on a first-in, first-out basis. This “best efforts,” non-discriminatory approach has worked very well so far. Although a telco provider may feel that the internet is “broken” because it cannot guarantee particular levels of service, there is excess capacity on the internet and packets, by and large, are not dropped.<sup>151</sup> And even if they were, for most uses and most users a few dropped packets would not appreciably diminish the internet experience – and with increasing bandwidth all packets will travel faster through last-mile networks.<sup>152</sup>

New technologies have emerged that make it possible for network providers to use this header information as well as information inside packets (“deep packet inspection”) to selectively prioritize packets and thus charge different prices for different kinds of information being routed through their networks. For example, Cisco Systems, one of the world’s largest manufacturer of routers, is selling services that assist network providers in deep packet inspection and content-inspection.<sup>153</sup> This service will allow network providers to know what applications (e.g., VoIP) are

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<sup>150</sup> See generally Jon M. Peha, *The Benefits and Risks of Mandating Network Neutrality, and the Quest for a Balanced Policy*, TPRC 2006, at 4 [hereinafter *Balanced Policy*].

<sup>151</sup> J. Prufer & E. Jahn, *Dark Clouds over the Internet?*, Mimeo, Goethe University of Frankfurt (2006).

<sup>152</sup> Note that no one network provider can control quality of service across multiple networks unless there is a commitment by all network providers to treat particular packets in a particular way. There are deep debates over whether “quality of service” guarantees are worth the expense of installing them. See, e.g., Ben Teitelbaum, *Internet2 QoS: Is Less More?*, Oct. 29, 2001, available at <http://people.internet2.edu/~ben/talks/columbiaSeminar-10.01.pdf>; see also <http://qos.internet2.edu/wg/documents-informational/20020503-premium-problems-non-architectural.html>.

<sup>153</sup> Cisco Systems, *Deploying Premium Services Using Cisco Service Control Technology*, 2005, available at [www.cisco.com/application/pdf/en/us/guest/products/ps6150/c1031/cdcont\\_0900aecd8025258e.pdf](http://www.cisco.com/application/pdf/en/us/guest/products/ps6150/c1031/cdcont_0900aecd8025258e.pdf), Cisco Systems, *Core Elements of the Cisco Self-Defending Network Strategy* (2005 White Paper, at 8).

being used by end-users, and which end-users are using their routers (e.g., an IP address of a competitor). Information gleaned from this service can then be used in combination with “traffic shaping” commands to dictate, for example, that packets stemming from particular applications or particular users always be placed in the back of the queue for forwarding – or dropped entirely.<sup>154</sup> Prioritization can occur through logical and physical routing techniques that allocate particular types of communications to different “channels” (some more congested than others).<sup>155</sup> Alternatively, network providers can use their deep-packet-inspection powers to detect “unauthorized” video and other applications and charge for their use.<sup>156</sup> This is the origin of the network neutrality debate in the U.S.: whether telcos and cablecos should be permitted to charge fees for preferred handling of internet traffic.<sup>157</sup>

Network providers have ample reasons to discriminate in this way in favor of their own applications.<sup>158</sup> They are often providers of traditional telephony services, are trying to introduce their own VoIP services, or

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<sup>154</sup> See generally Edward W. Felten, *Nuts and Bolts of Network Neutrality* (July 6, 2006).

<sup>155</sup> *Balanced Policy*, supra note \_\_, at 6.

<sup>156</sup> *Balanced Policy*, supra note \_\_, at 9, citing Sandvine, *Sandvine Network Demographic Management*, available at [www.sandvine.com/general/getfile.asp?FILEID=15](http://www.sandvine.com/general/getfile.asp?FILEID=15).

<sup>157</sup> See, e.g., John G. Waclawsky, *IMS: A Critique of the Grand Plan*, BUS. COMM. REV., 54 (Oct. 2005). As Ed Whitacre of AT&T famously said: “Now what [Google, MSN, Vonage and others] would like to do is use my pipes for free, but I ain’t going to let them do that because we have spent this capital and we have to have a return on it. So there’s going to have to be some mechanism for these people who use these pipes to pay for the portion they’re using.” Online Extra: *At SBC, It’s all About “Scale and Scope,”* available at [http://www.businessweek.com/@n34h\\*IUQu7KtOwgA/magazine/content/05\\_45/b3958092.htm](http://www.businessweek.com/@n34h*IUQu7KtOwgA/magazine/content/05_45/b3958092.htm). See also *Nondiscrimination in the Distribution of Interactive Television Services Over Cable*, Comments of The National Cable Television Association 50 (Mar. 19, 2001) (arguing that mandatory nondiscriminatory access policy is unconstitutional), available at [http://ncta.com/pdf\\_files/CS\\_Dock\\_01-7Comments.PDF](http://ncta.com/pdf_files/CS_Dock_01-7Comments.PDF). There are different flavors of neutrality; Tim Wu, for example, appears to believe that network providers should be permitted to discriminate in favor of particular categories of applications, such as video. Tim Wu, *Why Have a Telecommunications Law? Anti-Discrimination Norms in Communications*, 5 J. TELECOMM. & HIGH TECH. L. 15 (2006). Wu’s could be categorized as a weak form of network neutrality. The strong form of network neutrality suggests that network providers should not be allowed to discriminate against (or in favor of) any packets for other than security-related reasons.

<sup>158</sup> See Barbara van Schewick, *Towards an Economic Framework for Network Neutrality Regulation*, TPRC 2005, available at <http://web.si.umich.edu/tprc/papers/2005/483/van%20Schewick%20Network%20Neutrality%20TPRC%202005.pdf>.

simply want to ensure that they get a cut in the revenue of any applications riding on “their” network. As Edward Felten has pointed out, causing delay for particular applications such as non-provider VoIP applications “could be an effective tactic for an ISP that wants to drive customers away from independent Internet telephone services.”<sup>159</sup> Even de-prioritization of packets that does no more than to cause them to experience delay in transit can have substantial effects on user experience (“jitter”). Using un-prioritized “services” online could become a miserable pastime if there were constant delay.

These simple network-discrimination abilities of network providers are part of a larger approach to extend cellphone standards to the internet through a grand collection of processes labeled IMS, for IP (or Internet) Multimedia Subsystem.<sup>160</sup> The idea behind this longstanding standards-creation effort (in process since 1998) is to wrap IP packets into a centralized signalling system that mimics traditional telephony approaches to networking and allows for fine-grained billing for particular uses of the network.<sup>161</sup> In essence, online communications would be labeled as particular “services” and would be billed for accordingly. The IMS billing vision is in turn part of the United Nation’s International Telecommunication Union’s Next Generation Network (NGN) efforts, which seek to internationalize and standardize internet governance practices generally.<sup>162</sup>

## 2. Market Concentration

These network discrimination practices and plans would be irrelevant to our national economic policy if there were ample competition in the market for broadband access in the U.S. But such competition does not exist. Although President Bush has made speeches about the importance of competitive broadband access in the U.S. (declaring that

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<sup>159</sup> *Id.*

<sup>160</sup> *IMS 101*, *supra* note \_\_.

<sup>161</sup> *Id.* See also Cisco Systems, *Cisco Service Control: A Guide to Sustained Broadband Profitability*, available at [www.democraticmedia.org/PDFs/CiscoBroadbandProfit.pdf](http://www.democraticmedia.org/PDFs/CiscoBroadbandProfit.pdf); *System Standards*, *supra* note \_\_ (IMS-like approaches “slowing grinding out a series of elaborate, mostly stillborn solutions to the participants’ rather than the end-users’ problems”).

<sup>162</sup> See International Telecommunication Union page describing Next Generation Network standardization efforts, available at <http://www.itu.int/ITU-T/ngn/index.phtml>.

universal access to broadband should be achieved by 2007, for example),<sup>163</sup> the marketplace is controlled by regional cable/telco duopolies.<sup>164</sup> More than ninety-eight percent of home broadband users obtain internet access from either a telephone company's DSL service or a cable company's cable modem service.<sup>165</sup> The top ten broadband access providers, each of which has a monopoly on network access provision in its own region, control over eighty-three percent of the market for broadband access in the U.S. (and the top two cable companies and the top two DSL companies together control more than fifty percent of that market).<sup>166</sup> Over forty percent of homes in the U.S. have access to no more than one provider of broadband (either cable or DSL).<sup>167</sup> In essence, broadband access in the U.S. is controlled by regional duopolists, despite FCC Chairman Kevin Martin's statements characterizing this market as fiercely competitive.<sup>168</sup>

This regional duopoly structure has led to a complete lack of price

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<sup>163</sup> "We ought to have a universal, affordable access for broadband technology by the year 2007, and then we ought to make sure as soon as possible thereafter, consumers have got plenty of choices when it comes to purchasing the broadband carrier. See, the more choices there are, the more the price will go down. And the more the price goes down, the more users there will be. And the more users there will be, the more likely it is America will stay on the competitive edge of world trade." Remarks by President George W. Bush, March 26, 2004, Albuquerque, N.M., available at <http://www.whitehouse.gov/news/releases/2004/03/20040326-9.html>.

<sup>164</sup> S. Derek Turner, *Broadband Reality Check II: The Truth Behind America's Digital Decline*, Aug. 2006, available at <http://www.freepress.net/docs/bbrc2-final.pdf> [hereinafter *Reality Check*] (describing regional duopolies controlled by cable and telephone providers).

<sup>165</sup> FCC, *High-Speed Services for Internet Access, Status as of Dec. 2005*, available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-266596A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-266596A1.pdf) [hereinafter *2005 Broadband Report*].

<sup>166</sup> *Reality Check*, *supra* note \_\_, citing Leichtman Research Group May 2006 report. The top five broadband providers in the U.S. are Comcast, AT&T, Verizon, Time Warner, and Cox. *Id.*

<sup>167</sup> *2005 Broadband Report*, *supra* note \_\_.

<sup>168</sup> *Reality Check*, *supra* note \_\_, citing Chairman Kevin Martin ("Broadband platforms are engaged in fierce competition. ... In addition to telephone and cable providers, broadband access is increasingly being delivered to consumers via satellite, wireless, and fiber or powerline providers...This competition is leading to broadband providers offering customers faster and faster connections at lower and lower prices.") In fact, the Government Accountability Office (GAO) has found that access is provided by regional duopolies of cable and DSL providers. GAO Report, *Broadband Deployment is Extensive Throughout the United States, But It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas*, GAO-06-426, May 2006. Prices for broadband access are going up, rather than down, and wireless, powerline, and satellite together account for less than two percent of broadband access services in America.

competition for standalone broadband access.<sup>169</sup> It has also led to a complete lack of desire on either cable or DSL providers' parts to provide access to their competitors – either access to competitive ISPs who might use their wholesale lines to sell retail services to others or access to their new perceived competitors in the online “content delivery” marketplace. None of the large network providers in the U.S. arguably is under any competitive or regulatory pressure to open up. All of these actors appear to be focused on vertical integration, monetization, and discrimination.<sup>170</sup>

At the same time, the telephony and cable players in the U.S. are consolidating. The old AT&T monopoly of the pre-divestiture 1970s is reforming.<sup>171</sup> In 2005, SBC Communications acquired AT&T and decided to

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<sup>169</sup> See, e.g., Kagan Research report, Jul. 6, 2006, available at <http://www.kagan.com/ContentDetail.aspx?group=5&id=216>. Kagan did a national survey of the five top cable operators and four telephone companies for the first quarter of 2006. The average price for cable modem service was \$39.45 per month. For DSL, it was \$35.38. Verizon was the lowest, averaging \$31.62 per month, while BellSouth was the highest, with a monthly rate of \$42.25. Prices for standalone broadband access “show little sign of price competition.” *Id.*

<sup>170</sup> In the past ten years, telecommunications, broadcasting and cable companies have spent more than half a billion dollars on lobbying efforts. See Common Cause report, Mar. 2006 report, available at <http://www.commoncause.org/atf/cf/%7BFB3C17E2-CDD1-4DF6-92BE-BD4429893665%7D/TELECOM-LOBBYING-DATA.PDF>. See, e.g., Apr. 3, 2006; BellSouth statement on network neutrality: “Broadband network providers should be able to offer different plans that feature enhanced levels of service or that promote their own brand names and products or the services of selected vendors. For example, BellSouth should be able to enter into arrangements with content providers by which the content provider pays for special treatment, such as preferential listing or faster downloads from that provider’s website or receiving higher quality of service.” Dionne Searcy and Amy Schatz, *Phone Companies Set Off a Battle Over Internet Fees*, WALL ST. J., Jan. 6, 2006 (quoting Verizon’s Ivan Seidenberg: “We have to make sure they [content providers] don’t sit on our network and chew up our capacity. We need to pay for the pipe.”), available at <http://www.freepress.net/news/13218>; Vince Vittore, *Cable flying under net neutrality radar*, TELEPHONY ONLINE, Mar. 6, 2006, available at [http://telephonyonline.com/mag/telecom\\_cable\\_flying\\_net/](http://telephonyonline.com/mag/telecom_cable_flying_net/) (noting introduction of products that will allow cable network managers to prioritize their own content while relegating other material to “best efforts” status). Joseph Waz, *Keynote Remarks*, Broadband Policy Summit, Washington, D.C., May 10, 2006 (calling for freedom for “network builders”); Dan Brenner, NCTA, April 25, 2006 NPR remarks, available at <http://www.npr.org/templates/story/story.php?storyId=5362403>: “Companies that have spent money and have not been rewarded by Wall Street....[like cable] allow[] companies like Google to thrive.. . Let’s say someone wanted to get a broadband delivery of a wedding. Companies should be able to charge for this.”

<sup>171</sup> As of January 1, 1984, AT&T’s local operations were split into seven independent Regional Bell Operating Companies known as “Baby Bells.” The resulting Baby Bells were originally Ameritech (now part of AT&T), Bell Atlantic (now part of Verizon), BellSouth (Merging with AT&T pending regulatory approval), NYNEX (now part of

use the AT&T name for the combined company.<sup>172</sup> In response, Verizon acquired MCI, which in the past was AT&T's competitor for long-distance services.<sup>173</sup> Now the new AT&T and Bell South have merged, bringing control of wireless carrier Cingular within a single company.<sup>174</sup> Comcast, the largest cable operator in the U.S., and Time Warner, the second largest operator, jointly acquired Adelphia (the fifth largest operator) in 2006.<sup>175</sup> In general, internet access infrastructure is dominated in the west by AT&T and in the east by Verizon, with cable companies Comcast and Time Warner operating nationally. The internet access services market is unquestionably highly concentrated.<sup>176</sup>

As part of their campaign to fight back against the undermining influences of human online communications, telephony and cable incumbents would like to reconstitute their prior services online. “[T]hey

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Verizon), Pacific Telesis Group (now part of AT&T), Southwestern Bell Corporation (now part of AT&T) and US West (now part of Qwest). This separation of competitive long distance services from monopoly local exchange services was driven by "skepticism that regulatory authorities could otherwise stop an integrated monopoly from engaging in predatory conduct (such as discriminatory interconnection) in adjacent markets." 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 (2003). Because there has been fierce litigation over what rates an incumbent should be able to charge for use of its equipment, the interconnection/unbundling regime prescribed by the 1996 Act has failed. Meanwhile, competitive (non-incumbent) local exchange telephone companies are going out of business, as are internet service providers, and the Bell Operating Companies are re-combining. According to Wikipedia, "Of the 24 Bell Operating Companies which AT&T owned or in which it held a minority interest prior to the 1984 federally mandated split of the company, 12 will be a part of the new AT&T Inc. upon the completion of their proposed acquisition of BellSouth announced on March 5, 2006." Wikipedia entry, available at [http://en.wikipedia.org/wiki/AT&T#Creation\\_of\\_AT.26T.2CInc](http://en.wikipedia.org/wiki/AT&T#Creation_of_AT.26T.2CInc).

<sup>172</sup> SBC Communications Inc. and AT&T Corp., *Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, 20 FCC Rcd 18290 (2005).

<sup>173</sup> Verizon Communications Inc. and MCI, Inc., *Applications for Approval of Transfer of Control*, Memorandum Opinion and Order, 200 FCC Rcd 18433 (2005).

<sup>174</sup> *Applications for Consent to Transfer of Control of Licenses and Section 214 Authorizations from BellSouth Corporation, Transferor, to AT&T Inc., Transferee*, WC Dkt. No. 06-74 (filed Mar. 31, 2006).

<sup>175</sup> *Applications for Consent to the Assignment and/or Transfer of Control of Licenses, Adelphia Communications Corp., Assignors, to Time Warner Cable Inc., Assignees; Adelphia communications Corporation, Transferor, to Time Warner Inc., Transferee; Time Warner Inc., Transferor, to Comcast Corporation, Transferee*, Memorandum Opinion and Order, MB Docket no. 05-192 (rel. July 21, 2006); erratum, MB Docket No. 05-192 (rel. July 27, 2006).

<sup>176</sup> Marguerite Reardon, *AT&T and BellSouth: Why You Should Care*, NEWS.COM, Nov. 7, 2006. AT&T now controls half the telephone and internet access lines in the U.S. – half the access infrastructure in this country, as well as all of Cingular Wireless. *Id.*

are combining services—fixed and mobile telephony, broadband internet access and television—to sell as a single ‘converged’ bundle.”<sup>177</sup> This is the “triple-play” (or, sometimes, “quadruple-play”) so enamored of Wall Street and telecommunications executives.<sup>178</sup> These network providers claim that they will have no incentive to improve the penetration of broadband services in the United States if they are not given the power to control their networks and sell separately-prioritized, guaranteed services.<sup>179</sup> But because the transport layer for internet access is not competitive, deregulation of that layer is inappropriate.<sup>180</sup>

In particular, newly-renewed behemoth AT&T has been active in at least three ways with regard to its desire to dumb down and monetize online human interactions. First, AT&T CEO Ed Whitacre’s remarks began the network neutrality uproar, and provide evidence that AT&T intends to discriminate.<sup>181</sup> Second, AT&T has been careful to ensure that upload

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<sup>177</sup> *Here We Go Again, Sort Of*, ECONOMIST, Oct. 12, 2006.

<sup>178</sup> But not perhaps a consumer’s favorite option. See Yuki Noguchi, *No Bundle of Joy*, WASH. POST, Mar. 22, 2006. The telephone incumbents are pleasing Wall Street through their bundling plans. See Verizon briefing session with analysts, Sept. 27, 2006 (“We have a lot of things going on to win the hearts and minds of our customers . . . including convergence, which we don’t actually think is easily replicated by some of our competitors. We are building the network. We are offering differentiated products at competitive prices with good returns...”) at 25 of transcript. During this same briefing, Verizon representatives discussed the revenue opportunities associated with interactive advertising embedded in IP-enabled television shows. Transcript at 8. This kind of IP-enabled transactional relationship requires deep control over and information about who is watching what.

<sup>179</sup> The United States ranks 16th in the world in terms of its broadband penetration. International Telecommunications Union (ITU), *available at* [http://www.itu.int/ITU-D/ict/statistics/at\\_glance/top20\\_broad\\_2005.html](http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2005.html). (Dec. 2005 figures). For an example of a network provider’s assertion that without guaranteed control it will not improve broadband penetration in this country, see Tom Tauke, Verizon EVP, *Remarks at Media Institute Luncheon*, Jul. 11, 2006, at 10-11 (“Improving the Internet will require the investment of substantial amounts of risk capital. If government policies reduce the opportunity to earn a return on that investment, network operators simply won’t be able to deploy them.”), *available at* [http://www.mediainstitute.org/Speeches/Tauke\\_07112006.pdf](http://www.mediainstitute.org/Speeches/Tauke_07112006.pdf).

<sup>180</sup> See United States Trade Representative, *Results of the 2006 Section 1377 Review of Telecommunications Trade Agreements*, at 10 (commenting on Deutsche Telekom request for a “regulatory holiday”): “While the United States strongly supports deregulation as an important element of promoting facilities-based competition, the promotion of deregulation before competitive conditions warrant such steps may undermine the development of an efficient and competitive market.” *Id.*

<sup>181</sup> See *supra* note \_\_. AT&T CEO Edward Whitacre has said that Google and other companies “use my lines for free--and that's bull.” Spencer E. Ante & Roger O. Crockett, *Rewired and Ready for Combat: SBC and Verizon Are Spending Billions to Stay Competitive in the Broadband Era*, BUS. WK., Nov. 7, 2005, at 110. Whitacre states “I ain’t

speeds (access speeds that allow humans to add to the complex system of human communications) are far slower than download – even though there is no technical reason for this asymmetry.<sup>182</sup> And third, in a recent AT&T/BellSouth merger agreement, AT&T was careful to exclude from any network neutrality argument its highspeed fiber access networks – the connections that will define internet access into the future.<sup>183</sup>

### 3. What Happens to Human Online Communications?

The internet of the present day is characterized (as far as we know)<sup>184</sup> by nondiscriminatory transport of packets by routers that are indifferent to the application being used, the source or destination of the packet, or the content of the communication. If this set of practices changes in favor of network-provider-run discrimination, much less replacement of the internet by wholly proprietary IP broadband networks, we will see a dramatic change in the communication patterns of the last ten years. It is not just that application or content providers will need to pay a toll for prioritized routing – it is also that all non-prioritized communications will

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going to let them do that.... [T]here's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using." *At SBC, It's All About "Scale and Scope,"* BUS. WK. ONLINE, Nov. 7, 2005, available at [http://www.businessweek.com/magazine/content/05\\_45/b3958092.htm](http://www.businessweek.com/magazine/content/05_45/b3958092.htm).

<sup>182</sup> AT&T is not alone in this. All highspeed internet access providers in the U.S. provide slow upload speeds. These networks were designed on the assumption that people would be downloading, not uploading. In particular, cablecos and telcos want to have enough bandwidth to sell their own movies. The last was cited by Cisco's chief cable architect as the reason DOCSIS 3.0 is designed for 1 gig down, 100 meg up, where the technical constraints are irrelevant - the cablecos make money on various downloaded services (e.g., Video On Demand) but not on anything consumers upload. Because the backhaul (the internet backbones) are symmetric and more traffic goes downstream, the additional cost of giving every customer greater upload speeds is negligible. So every customer could get symmetric service at no cost except the opportunity cost of the customer not upgrading to the more expensive service. Verizon currently charges \$19.95 for 768K/128K and AT&T charges a similar amount. For the same operational cost, they could provide 768K symmetric. See email David Burstein to Susan Crawford, Jan. 15, 2007 (on file with author).

<sup>183</sup> See Susan P. Crawford, *The Day the Internet Became Cable Television: Dec. 29, 2007*, blog post, available at [http://scrawford.blogware.com/blog/\\_archives/2006/12/29/2604993.html](http://scrawford.blogware.com/blog/_archives/2006/12/29/2604993.html).

<sup>184</sup> We have no data about what is actually happening inside incumbent network providers' networks, because they are privately run. See Cooperative Association for Internet Data Analysis, *COMMONS Workshop Final Report*, Feb. 7, 2007, available at [http://www.caida.org/workshops/commons/0612/final\\_report.xml](http://www.caida.org/workshops/commons/0612/final_report.xml) (noting internet "data acquisition crisis which has deeply stunted the field of network science").

become instantly second-rate and undesirable because of their slow speed and doubtful transmission.

To generations accustomed to centrally-controlled entertainment modalities like television and cable, this limitation to “channels” provided by network providers may not seem important. Surely there will be vast amounts of digitized material to absorb online. Why should it matter whether some of it is prioritized? The reason this prioritization matters is that we do not know what new forms of group-oriented collaborative interactions (social, commercial, or cultural), or what kinds of new ideas, will emerge from this network of networks. Prioritization will make a difference because that network providers will cease to be commodity transport-providers and will instead become gatekeepers, pickers-of-winners, and controllers-of-experiences on a massive scale. The diversity of online experiences, and thus the range of freedom of human connection, human relationships, and the diverse generation of new ideas will diminish.<sup>185</sup> Neutrality of symmetric highspeed access is important for a host of reasons: it will enable diverse new applications to emerge that are not controlled by network providers; it will cause new forms of interaction to grow, even apart from the introduction of applications; and it will enable diversity in various real-time communications that otherwise will be controlled and monetized by the network providers. All of this diversity has great potential to be positively associated with economic growth.

One frequent argument against network neutrality is that users want simplicity. Verizon representatives talk animatedly about the need for an interface for online broadcasts that can be controlled in the dark with one hand – because the other hand will be busy holding a beer.<sup>186</sup> But this conception of user behavior shows a lack of imagination. People do want to relax and be entertained, and Americans have great strengths in this domain, but network neutrality is not incompatible with either simplicity or high entertainment value. The key question is who will be in a position to control access to simple and highly-entertaining activities and engagements provided online. If network providers act as gatekeepers, deciding which new ideas will fail and which will succeed, then they will be artificially amplifying particular ideas. Instead of the internet, we will have a broadcast television network, in which success is decided on “from above” rather than

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<sup>185</sup> See HUNDT, IN CHINA’S SHADOW 58 (“In the face of incumbent power, the United States should emphasize change, experimentation, high tolerance for failure, and rapidity of capital turnover as the key characteristics of its economy.”)

<sup>186</sup> See *Verizon transcript*, *supra* note \_\_.

emerging from the interactions of agents.

*D. Implications for Policy: Divestiture*

Because the incumbent telcos have obtained from the states the video franchise relief that drove them to seek legislative help in 2006, network neutrality will need to be a federal-level, standalone effort.<sup>187</sup> We need to treat highspeed access to the internet as a utility – connectivity as basic infrastructure -- so that users can choose what they want to do with the access they are provided. We are one of very few countries whose communications infrastructure is privately owned, and therefore to us the idea of treating these pipes and wires as a utility like electricity or gas service seems radical. But because our future economic growth could be so greatly affected by the policies we apply to this pipe, we should take the long view. We have no greater opportunity to increase our nation's economic growth rate than by encouraging the emergence of new ideas via the human communications layer of the internet.

For nearly eighty years, between 1900 and 1980, AT&T successfully fended off interconnection with its facilities by its competitors and prevented the attachment to its networks of devices made by independent manufacturers. AT&T was a collection of fully-integrated functions and services: the Bell Operating Companies provided local telephone service, Western Electric made all the equipment, AT&T provided long distance service, and Bell Labs designed equipment. People were confident that having a single integrated system was simply efficient; local and long distance service were viewed as natural monopolies.<sup>188</sup> AT&T, then the world's largest corporation, claimed that competitors' "cream skimming" would threaten AT&T's ability to provide universal service, result in higher prices for local telephone service, and harm consumers. During the 1960s and 1970s, the Federal Communications Commission seemed unable to control AT&T's behavior in markets for long distance service and telecommunications products, and the AT&T name began to stand for abusive monopolistic behavior – high-priced,

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<sup>187</sup> *Id.* at 35: "Q: What are the regulatory assumptions underlying all of this? . . . A: We have Virginia, we have Texas, we have Florida, we have California, we have New Jersey. We have almost all of Maryland, because they are very big counties, and so what we don't have is teeny. . . I feel that the franchising is not holding us back. . . I really don't see that as a necessity to have a nationwide relief on that."

<sup>188</sup> Lawrence A. Sullivan & Ellen Hertz, *The AT&T Antitrust Consent Decree: Should Congress Change the Rules?*, 5 HIGH TECH. L.J. 233, 235 (1990).

insufficient service and avoidance of competition -- assisted by government action.<sup>189</sup> Courts, the Commission, and legislators went along, unconvinced that competition was in the public interest when it came to the “natural monopoly” of telecommunications.

Just as AT&T is now being re-created through merger, Ma Bell’s pre-divestiture views as to how best to serve the public good are enjoying a renaissance in the highspeed internet access era. The key arguments made long ago by Theodore Vail – that universal service, local access abilities, and overall consumer welfare would best be served by unconstrained and vertically integrated providers – are reappearing. Given the political power, great wealth, and market position of the current network owners, nothing short of quarantine – or divestiture<sup>190</sup> – will protect us from either predictably predatory actions by the operators or endless efforts by them to undermine through litigation whatever lesser rules are put in place.<sup>191</sup>

The risks involved in 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, network neutrality, and universal access. These monopoly access providers arguably have much greater incentives to stifle the generation of new ideas than our government does, and whatever flurry of “internet regulation” is prompted by government involvement in access provision (a subject that is beyond the scope of this Article) will be extremely difficult to enforce. It is likely that the network architecture is already in place that is capable of making highspeed access possible.<sup>192</sup>

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<sup>189</sup> Here is Lily Tomlin, as Ernestine the phone operator in 1976: “We handle eighty-four billion calls a year. Serving everyone from presidents and kings to the scum of the earth. We realize that every so often you can't get an operator, for no apparent reason your phone goes out of order, or perhaps you get charged for a call you didn't make. We don't care. Watch this.. [ she hits buttons maniacally ] ..just lost Peoria.” [voiceover: We don't care. We don't have to. We're the Phone Company.]

<sup>190</sup> See Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications under Judge Greene*, 50 HASTINGS L.J. 1395, 1403 (1999) (“The MFJ’s lasting lesson for public policy is that, at least in the antitrust context, reliance on a structural consent decree that is premised on an articulable economic theory and is administered by a court committed to that theory can be a defensible judicial enterprise.”)

<sup>191</sup> For a description of the various strategies available to legislators and regulators faced with vertically-integrated, concentrated infrastructure industries, 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, 120-21 (2003) (discussing mandated unbundling, structural separation, and divestiture).

<sup>192</sup> Teletruth.org, *The \$200 Billion Broadband Scandal*, available at

That transport needs to be separated from all decisions about which particular packets to favor.

#### CONCLUSION

Scholars and industry spokespeople arguing against network neutrality present their claims in support of vertical integration as the logical outputs of neutral, mathematical algorithms. On a closer look, however, the arguments they are making are neither neutral nor persuasive. They are based on a supply-chain view of communications that dictates optimizing infrastructure for a particular kind of use – and that takes the systemic, human reality of communications as exogenous. Stripped of unrealistic economic justifications, their acceptance of duopoly control over highspeed access in this country is nothing less than a signal that Ma Bell has indeed been reconstituted. This approach is sharply undermined by the arrival of the internet, which teaches us that infrastructure need not be inextricably intertwined with communication, and by new developments in economic growth theory. It is high time we recognized the importance of new ideas to economic growth in our approach to communications law.

My central point is that, given that economic growth is created by the emergence of new ideas, the proper role of government should be to support the diversity of complex social interactions online. Scholars who argue about the wealth effects on telecommunications providers of particular regimes are focused on a small subset of the story. It is the large and diverse online world of interactions and ideas out there that matters, and simplifying (de-complexifying) that ecosystem is a step toward economic peril.

Congress now has the opportunity to adopt a coherent approach to the internet that takes proper account of the importance of the diversity of the communications carried across it – in part by acting decisively to separate control over transport from control over provision of communications. We need to reframe all of communications law to support what matters. What matters are communications themselves and the increasingly diverse and valuable ideas they produce.