

The Digital Broadband Migration: The Dynamics of Disruptive Innovation

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Executive Summary

On February 13th and 14th, 2011, experts in business, technology, law and government convened for the eleventh annual Silicon Flatirons Digital Broadband Migration Conference on the dynamics of disruptive innovation to discuss the rapidly evolving nature of the Internet ecosystem, a source of enormous benefit to consumers and challenges to existing business models, policymakers and regulators. The conference was held at the University of Colorado at Boulder campus and was co-hosted by the Journal on Telecommunications and High Technology Law.

Discussion began with keynote addresses from Vinton Cerf, Vice President and Chief Internet Evangelist at Google, and Aneesh Chopra, Federal Chief Technology Officer. Following the keynotes a total of four panels addressed questions of business, law, government and technology related to the dynamics of disruptive innovation, and the conference concluded with a tribute to Alfred Kahn, a video address from FCC Chairman Julius Genachowski, and remarks from NTIA Assistant Secretary for Communications and Information Larry Strickling.

Introduction and Overview

The Internet ecosystem - consisting of network providers, application developers, content creators and end users - continues to be a source of disruptive innovation, with recent events like the revolution in Egypt and the Comcast-NBC merger highlighting the vast range of issues impacted by the question of net neutrality. The internet provides enormous benefit to consumers everywhere while continuing to present significant challenges to existing business models and to policymakers and regulators. Silicon Flatirons' 2011 Digital Broadband Migration Conference, entitled "The Dynamics of Disruptive Innovation," focused on the sources and nature of these disruptive advances, how they can be nurtured rather than stifled, and how any negative consequences for consumers can be minimized or averted.

The conference began with a tutorial overview of the evolution of the Internet, including recent disruptive developments. The first panel put these developments in perspective by addressing such questions as: (1) what creates the necessary conditions for innovation in networked industries; (2) how those conditions can be cultivated; and (3) what conditions tend to smother rather than encourage innovation? The second panel picked up this thread and addressed alternative governance structures and processes that can be used to create positive conditions for continued innovation while minimizing, for example, the need for counterproductive government intrusion in the market. The third panel concentrated on the particular challenges faced by the content-based sector and on possible business models that may allow that sector to flourish in a drastically changed environment. The fourth and final panel returned to the issue of governance by focusing on the role that existing, evolved, or new multi-stakeholder entities such as standards groups and self-regulatory bodies can play in meeting the twin goals of facilitating continued rapid innovation while providing efficient and effective consumer protection.



Keynote Speakers: Vinton Cerf and Aneesh Chopra

Google's Chief Internet Evangelist Vinton Cerf began the conference with a brief history of how the internet has evolved from the original ARPANET in 1969 to a system that today has about 2 million users plus another 5 billion mobile devices that are increasingly web-enabled, an old IPv4 system of addresses that has just been exhausted and will be increasingly replaced by the new IPv6 system, and domain names written in many other characters besides

the traditional Latin-based system. Despite network security issues such as authentication and routing, Cerf affirmed that creating a more secure system from the beginning would have inhibited innovation. In addition to security concerns, he also described some of the history of the infrastructure itself, ranging from a picture of New York City in 1889 with wires running everywhere above the streets to the story of how Google's attempt to provide wireless service to the city of San Francisco ran into political trouble when various districts began arguing over charges for access to the light poles. Following this historical summary, Cerf continued on to describe the next stage of future development, the internet of things, in which networked devices will be in constant communication with each other and everyone around them. As an example, he described how his wine cellar is networked to keep track of the temperature and humidity levels, sending him an instant message if the heat rises above 60 degrees Fahrenheit. Cerf quipped about how he was planning to implant an RFID chip on each bottle to improve his tracking system even further, until a friend pointed out that people could simply drink the wine in the cellar and leave the bottle there. Access to data on such home network systems, therefore, has enormous inferential privacy implications which should be considered.

Federal Chief Technology Officer Aneesh Chopra next presented on President Obama's national strategy for innovation, including a National Wireless Initiative that promotes voluntary incentive auctions of up to 500 MHz of spectrum, a \$5 billion investment to provide 98% of the country with 4G wireless coverage, \$10.7 billion to build a nationwide public safety broadband network, and a \$3 billion innovation fund for research and development. As examples of companies that embody the values of the national strategy for innovation, Chopra described how the Alfred brothers investigated government records of 401k management fees to expose inefficiencies for small businesses, as well as how a group of Stanford students developed SMARt Apps for doctors. Recognizing Brad Feld of the Foundry Group, Chopra praised the government's role as a convener in the development of an entrepreneurial ecosystem that will engage innovators as problem solvers in energy, transportation, education and healthcare.

Panel I: Disruptive Innovation in Perspective

Moderator Phil Weiser, Senior Advisor for Technology and Innovation on the National Economic Council, began Panel I by introducing the concept of seed corn, an idea developed by Brad Feld on the importance of nurturing future innovation. Clarifying the word innovation, Feld pointed out that there are actually three kinds: research of the type performed at universities and



labs, applied innovation involving the commercialization of research, and user generated innovation that comes out of necessity or opportunity. Policy dynamics for each of these three types of innovation are very different, with the internet as it now exists representing the greatest example of user generated innovation ever, driving accelerated innovation in a way that research labs could never do. Michael Fricklas of Viacom agreed that the profit incentive of commercial enterprises online has driven enormous innovation.



After acknowledging the potential benefits of such innovation, Weiser then observed that the major challenge of such rapid change is that it destroys the job industries of the present, creating a high level of uncertainty and disruption in society. Although he recognized that this is true, Dan Reed of Microsoft asserted that this kind of disruption is still beneficial because the best ideas win. Using the accelerated rate of software development now possible because of open source code and real-time online testing as an example, Reed expressed concern that the real issue is not disruptive innovation in business, but

rather that social structures like government and education are failing to keep up with this rapid new pace of change. Feld agreed, citing the example of the Egyptian government as an institution that was entirely unprepared for the type of rapid change that recently occurred with the support of online tools. In order to avoid this kind of unexpected disruption, Feld claimed that it is necessary to attempt to predict what changes will occur in 20 years rather than focusing so much on current dynamics. While stipulating that it would be impossible to predict what changes will occur, Reed agreed that it is important to construct frameworks that allow for unexpected innovation to emerge.

Former FCC Chairman Michael Powell then observed that although disruptive innovation in technology has existed for centuries, it is the accelerated rate of change that makes the current era so unusual and causes particular concern for the stability of social institutions that people rely on in their daily lives. Weiser asked the panel to consider to what extent the government should promote innovation versus try to protect citizens from the disruptive effects, and Feld cited the ease with which he obtained two identically valid driver's licenses as an example of how government efforts to become more efficient online can sometimes have dangerous side effects. Powell explained that government is at a disadvantage in innovation because it was designed to be deliberative and representative, with a disproportionate number of lawyers trained in being incremental controlling most of the system. With a bigger diversity of disciplines represented in government, Powell affirmed that the government could be encouraged to become less incremental and conservative. Following up on the lawyer comment, Feld encouraged anyone who has a naturally hierarchical view of the world to befriend a technology entrepreneur, remarking that the diversity of members is one of the unique characteristics of the Silicon Flatirons Center. Finally, after several questions from the audience on patent reform, privacy, IPv6, and the value of wireless spectrum, Powell concluded the discussion by calling for immigration reform to allow for easier development of entrepreneurship in the country. Feld agreed, observing that fear of immigration is a part of the natural human desire to control everything and prevent change, which is what really threatens innovation.



Panel II: Governance Strategies for Innovation Policy

Moderator Michele Farquhar of Hogan Lovells led Panel II in a lively and spirited discussion. Mark Cooper, Director of Research for the Consumer Federation of America, presented remarks entitled “Crowd Sourcing Enforcement: Building a Platform for Participatory Regulation in the Digital Information Age.” Cooper stressed the need not to destroy the viral energy of the internet, and posited that “robust enforceable self-regulation” will not work because of market

failures. He expressed concern about the reduced role of journalism functioning as credible non-government oversight, and discussed participatory democracy and participatory enforcement. He considered regulation of the past, and described the future of regulation, i.e., Policy, Rulemaking and Enforcement, in terms of: interstitial intermediaries; a multi-stakeholder process; participatory enforcement, which he said enriches democracy; and a public civil society, including an expansion of the public sphere. Cooper stated that during the last four decades there has been a systematic effort to destroy or undermine the ability of government to oversee the economy. However, even if that were not the case, he said that the government cannot handle the communication space because, like journalism, government does not have adequate resources. Cooper posited that many people seem to hate regulation and government but, paradoxically, at the same time the data show that they want protection from government in certain areas. He stated that strong inertia in the center “is not all that bad,” and that “the 111th Congress was the most productive in 50 years.” Cooper opined that in the absence of a major market or regulatory failure there will not be much change in the near term. Later, in response to an audience question, Cooper noted that healthy social order depends on social participation. However, he stressed that violence cannot be accepted or tolerated and – via norms and law enforcement -- mob behavior must become unacceptable.

Cardozo School of Law Professor Susan Crawford presented remarks entitled “Governance of the Looming Cable Monopoly.” Based on her analysis of up-front cost considerations, steeply declining cost curves in the last mile, and “crushing” economies of scale and scope, Crawford posited flatly that “cable has won.” She concluded that wireless, which itself has natural monopoly characteristics, will not be a substitute for wired access. And she stated that “good enough” wireless (i.e., where there are no cable/coax alternatives) in some parts of the country has implications for social equity and national competitiveness. Crawford noted that, in about 60% of the United States, cable providers do not compete with each other. All of this leads to the question of what to do about this from a governance perspective. Crawford replied that “there is no happy ending.” She analogized this situation to a railway station, noting that trains are both an economic activity and an essential public good. She noted also that competition won’t work for trains, but that competition will work for private economic endeavors associated with the trains, such as newsstands.

The next presenter was Sharon Gillett, Chief of the FCC’s Wireline Competition Bureau. Gillett discussed the Connect America Fund & Intercarrier Compensation Reform Notice of Proposed Rulemaking that was issued on February 8, 2011. She reported that the Universal Service Fund (“USF”) (\$7.9 Billion in 2010) has four uses: (1) high cost fund for rural and insular areas; (2) low income consumers; (3) schools and libraries; and (4) rural health care. Gillett focused most of her remarks on the high cost fund (which in 2010 used \$4.3 Billion of the total USF), including a discussion of problems associated with that fund and the role of intercarrier compensation (“ICC”). She noted that these

problems result from a foundation based on outdated 20th century technology. Gillett reported that up to 24 million Americans currently have no access to broadband, relying instead on dialup access. This results in a rural/urban divide and a variety of illogical results such as some households having access to broadband while nearby neighbors do not, and various attempts to game the ICC system. Current programs are inefficient and sometimes wasteful. Today, for example, the fund pays more than \$2,000 a month for some households to have telephone services, and provides support for multiple competitors in the same geographic areas. The FCC issued a strong statement that the USF and ICC should be comprehensively reformed. In place of the current system, a Connect America Fund has been proposed around four pillars of reform: (1) reform USF and ICC to focus on modern networks; (2) fiscal responsibility; (3) demand accountability for recipients and government; and (4) market-driven and incentive-based policies. The proposed transition to the “future state” Connect America Fund would consist of two phases. Gillett asked an important and difficult question, namely: “How do you simulate a competitive market via a regulatory structure?” She indicated that three possible directions are possible: (1) auction the entire country; (2) auction the entire country, but give incumbents a right of first refusal; and (3) establish different rules in different parts of the country. Gillett encouraged input via the proposed rulemaking’s public comment period that extends through the spring.

Robert Quinn of AT&T expressed skepticism about Professor Crawford’s concern about a cable monopoly, and questioned whether fiber to the home is the only way. His belief is that other technologies will develop and that, with resources, wireless eventually may develop sufficiently. He stated that AT&T and Comcast are not the only companies that can step in and provide necessary services. Quinn objected strongly to any possible government ownership or monopoly of the cable network, as an essential public service or otherwise. Quinn expressed caution about any “traditional” government involvement that would disincite the development and delivery of new technologies. Finally, Quinn noted that the current FCC regulatory model is not working well, reporting that 786 FCC dockets were or have been open for more than five years.

Howard Shelanski, the FTC’s Deputy Director of Antitrust, Bureau of Economics, responded to the other panelists in several interesting respects. Shelanski stated that the economic aspects of the rulemaking proposal described by Gillett are positive. Shelanski asked Cooper how his views differ from what exists currently, and Shelanski observed that platforms for viewpoints lead to fractionation (like journalism). With respect to Crawford’s views, Shelanski expressed skepticism – and far less worry -- that cable will dominate or that monopoly effects will result. Shelanski challenged Crawford’s assumptions about costs and technical aspects. He stated that differentiated products can be effective even if cable were a monopoly. Shelanski noted that in a high cost, low margin business, losses of subscribers hurt the providers. Moreover, he stated that some share of customers will shift to lower cost, lower speed alternatives, and that repositioning by telephone companies can impact cable and upset possible monopoly pricing structures. However, Shelanski stated that efforts by cable operators to vertically integrate could be worrisome.

D.C. Circuit Judge Stephen Williams stated strongly that it would not be a good idea to “go back to an era of overregulation,” and took issue with Cooper’s views. He stated that public participation is not mutually exclusive with the current regulatory scheme, and expressed his view that individual involvement is not particularly helpful in regulatory enforcement or regulatory rulemaking. Williams asked Cooper how his proposal is different from what exists now. Overall, the panel’s discussion was interesting and provocative, especially because of the panelists’ willingness to “mix it up” intelligently and collegially.



Panel III: Content and Innovation

In a panel moderated by Professor Paul Ohm, Silicon Flatirons Fellow Gigi Sohn began with an appeal for reasonable debate, citing examples of over-the-top rhetoric on copyright such as colleague Preston Padden's remark that the thing he loves about Boulder is that "at 10,000 feet, everything Gigi Sohn says makes sense." With potential issues for disagreement on copyright including the scope, length and formalities involved, many of those in the industry are simply looking for cooperation, not perfection.

Everyone can agree that balance is fundamental, finding rights holders should be easy, content creators should be compensated, and copyright infringement is wrong both legally and morally. Sohn then went on to identify several concrete examples of possible collaborative projects including reforming the copyright registry, a DMCA Takedown Notice Generator system that allows for fair use responses, and unlimited digital music licensing programs.

Following Sohn's opening remarks, Chief of the FCC's Office of Strategic Planning Paul de Sa gave a presentation on the disruptions that are currently challenging content business models, including dematerialization, defocusing, and disaggregation. Although dematerialization implies lower invested capital as objects turn to bits, there is also a lower willingness to pay for something intangible, which in the extreme case can result in piracy. The most notable exception in this case is that many consumers are more willing to pay for video content despite a lack of tangible product because video has always been more about the experience. While defocusing and disaggregation both threaten integrated content business models such as cable, other businesses models are enabled such as multi-platform and cloud-based software, a la carte and user generated niche programming, and capital-light platform businesses such as iTunes and Netflix. Susan Fox with Disney followed up on this presentation with concrete examples of how companies like ABC are trying to exploit these new technologies by experimenting as much as possible with solutions such as iPad apps, partnerships with Hulu, shows on iTunes, and agreements with Netflix and YouTube. One clear conclusion that Disney has reached as a result of such experimentation is that content is not a commodity, meaning that one prime time show will not perform the same as another with similar ratings across all platforms because some shows resonate with early adopters of new technologies while others do not. Most importantly, Disney's overall goal is the best consumer experience, including how children's shows are presented, what the content is next to, and consideration of finance and copyright protection.

Finally, President and CEO of the Entertainment Software Association Michael Gallagher presented on how content innovation is especially vibrant in the video game industry, with digital sales of computer and video games reaching over \$5 billion in revenue for 2010, social gaming taking off, and game streaming services like OnLive allowing people to access an enormous library of games online in a similar system to the unlimited music license proposed at the outset by Sohn. In contrast to the video game industry, the music business is suffering severely, with album sales down 20% and concerts down 13% last year. Books and movies show more mixed results, with hardback sales down but ebook sales exploding, and both movie attendance and DVD sales in decline but revenue actually up due to the popularity of 3D theaters and Blue Ray players. Online theft across all content businesses continues to evolve, however, with Italy leading the way significantly in total number of illegal downloads detected, followed by China, Spain, Brazil and France. The discussion that ensued after the presentations focused on how the competitive content market is a great example of the innovation that Obama promotes.



Panel IV: Institutional Coordination: Towards Order from Chaos

Jonathan Sallet of O'Melveny & Myers moderated this final panel on Monday morning. In his opening remarks, Sallet drew upon the previous panels and noted, among other things, that "order" and "chaos" are loaded terms. He harkened back to the 2008 Silicon Flatirons conference at which self-regulatory organizations were discussed, including a discussion of the characteristics of a successful self-regulatory organization. Along the same lines, Sallet

inquired about possible metrics for the success of what many participants in the conference have called a "multi-stakeholder organization." Sallet drew a comparison/analogy to Europe as an example of "multi-stakeholder-ism," in particular with respect to the issues of privacy and open internet. He inquired also about possible roles for Congress in this discussion and debate.

Marc Berejka, Senior Policy Advisor, Office of the Secretary, Department of Commerce, presented remarks concerning innovation policy and "Multi-Stakeholder-ism: Making it Fly." He asked how we can get from theory to practice/reality, and inquired about what process(es) can accomplish results. Berejka poked some light-hearted fun at prior discussions in the conference concerning complexity and chaos theory, noting for example that hidden order can emerge unexpectedly. Berejka described an "Innovation Agenda," depicted by a pyramid with three levels. The bottom, widest level to the pyramid is labeled "invest in the building blocks of American innovation," the middle level to the pyramid is labeled "promote competitive markets" and the top level to the pyramid is labeled "catalyzing national priorities." Berejka described the innovation agenda at the Department of Commerce as designed to establish policymaking principles for the internet era. He compared and contrasted the 20th Century and 21st Century origins of wealth and conscious creation of order as: 20th Century, novel products & lines of production with the notion that more is better; and 21st Century, assemblages of information and information processing, which consists of an infusion of knowledge and information into 20th Century products. Berejka stated that the 21st Century notions he described are the country's sustainable competitive advantage, but that the United States can lose that advantage if it is not careful. After noting that there is no "topping out" for critical thinking/analytic skills he asked, how does the United States sustain its infocentric competitive advantage? Berejka stated that policymaking is affected by Challenges and Ideals. The Challenges (which can be impediments resulting from 20th Century policymaking) are: time scales that are out of sync; a prescriptive mentality; a balkanized geographic scope; and a fundamental inability to cope with rapid speciation. The Ideals are: accelerate norm development (not rules); promote best practices (good behavior); foster interoperability; and value flexibility. Berejka described Multi-Stakeholder-ism as a Policymaking Model in four ways: First, accelerate norm development via delegation. The government identifies principles and, as necessary, convenes and cajoles multi-stakeholder groups to address emergence of novel issues. He said that it takes too long for government to write regulations, and that for the internet space norm development should be accelerated. Second, multi-stakeholder groups should identify minimum performance standards and best practices. In this process: focus is on ends and less than means; multiple approaches are possible; and self-regulation is coupled with a governmental enforcement backstop. Third, multi-geographic interoperability is fostered by seeking consensus. Finally, count "nudges" forward as successes, recognizing that flexible policymaking is warranted. Berejka stated that all interested players need to step up and form a critical mass. He noted also that baseline or backstop legislation may be essential in the privacy space, at least at a high level.

Doug Sicker, the FTC's Chief Technologist, addressed "New Models of Governance – the Roles of Federal Agencies, Advisory Committees, Advisory Groups, Standards Bodies and More." He stated that new models are needed for reasons of timeliness, expertise and correctness, among others. Sicker prefers the term "cooperative regulation" rather than the term "self-regulation." He discussed considerations regarding open internet and network neutrality, and noted that many different players are involved including: Federal Agencies; Advisory Counsels; Advisory Groups; Standards Bodies; User Groups; and Others. He observed that a Federal Advisory Committee has an accompanying set of legal conditions including membership and mission. Sicker described the effective work of the "BiTag," the Broadband Internet Technical Advisory Group, and the Technical Working Group ("TWG"). In conclusion, he noted that the objective and opportunity are to get timely, consensus driven expert advice in an experiment in new models of internet governance. Sicker noted that standards boards should not be taken over by any particular interest group(s), and that "there are many rooms" in which parties can participate and from which input can originate. He stated that multi-stakeholder-ism requires thinking about multiple tables and multiple games.

Peter Swire, a Law Professor at Ohio State University, spoke about "Privacy Institutions in the Federal Government." He stated that there is a role for mandatory legal rules in three areas: criminal; fraud; and minimum technical standards. Swire stated that one factor makes self-regulation work: a credible threat that if stakeholders don't get it together, something will happen (i.e., hold feet to the fire). He cited the example of the recent housing crisis in the United States that was based on the notion that innovative products will result in economic growth. However, no or ineffective regulation resulted in huge problems in that sector. Swire's view is that a background of law enforcement and minimum standards are required. As for potential roles for government, Swire noted that the FCC currently is involved with privacy matters, but he asked also whether other federal institutions also should be charged to handle privacy matters. He posited that the Department of Commerce has (and/or should have) an important complementary role with the FCC, and that the executive branch also should have a role. As the Federal Privacy Agency, the FTC currently has the following roles: enforcement; rulemaking; convener; institutional Expertise; and bully pulpit (e.g., force privacy choices on internet browsers). Complementary Roles for Commerce include: clearance; maintaining and advocating international positions of the United States Government; and convening multi-stakeholders. Swire noted that there are both risks and benefits of some duplication vis a vis the FTC. For example, would having a second forum be problematic or inconsistent? Would Commerce favor commerce over consumer protection? How do the factors of nimbleness vs. a relative lack of multiple perspectives weigh in these considerations? He noted that Commerce acts faster than the FTC, and Commerce may be less threatening to industry than the FTC. Swire stated that every Cabinet Agency has privacy issues, but wondered where a federal privacy office should be housed. Swire concluded that the President/executive branch should have a capability on privacy policy, and that there are good reasons for the federal government to develop privacy expertise beyond the FTC.

James Assey, Executive Vice President of the National Cable & Telecommunications Association, stated that the government has a role for crime and fraud, and also for promotion of competition. He wondered, however, whether the old government mode is "right" for the internet today (i.e., can order for the internet be created by regulation), and stressed that internet dynamism should be encouraged and promoted. Regarding multi-stakeholder-ism, Assey endorsed promotion of "dynamism through diplomacy." He noted that there are substantial economic and societal benefits from dynamism in business and elsewhere. Assey seemed to favor the notion of a privacy office in the Executive Branch, to the extent that it promotes consistency and dynamism. He is hopeful and encouraged about the cooperative dialog that has been exhibited during this conference.

Kathryn Brown of Verizon noted that this conference has been a multi-stakeholder event for years, and that various discussions during this year's conference have resulted in some consensus. She has no quarrel that criminality on the internet should be dealt with by government. However, Brown stated that economic regulation is more difficult. She noted that there has been a revolution in this industry, with fast, accelerated change. Brown stated that the government, at present, is not equipped to handle such change. She agreed with the notion of self-regulation, and stated that multi-stakeholder-ism requires thinking about multiple tables and multiple games. Also, Brown favors technical cooperation.

Leslie Harris, President and Chief Executive Officer of the Center for Democracy and Technology, expressed some concern about abdication of government role(s), and stated that some outsourcing should not happen. Harris stated that just calling it "multi-stakeholder" or talking about "norms" is not enough. She wondered "who sets the table" and inquired about "equal access to facts." Harris believes that there is no "magic feather."

Jack Waters, Chief Technology Officer and President of Global Network Services, Level 3, stated that multi-stakeholder-ism can work, and has worked for years. He noted that it is hard to translate 20th Century rulemaking into the 21st Century. Waters favors the idea of multi-stakeholder-ism, but pointed out that it is difficult to implement well. Particular problems include foot dragging by incumbents and those participants with different agendas. He noted that the net neutrality rules process was helpful, and provides some hope for similar positive results in other areas.



Conclusion

The conference concluded with a video tribute to Alfred Kahn, a recorded video address from FCC Chairman Julius Genachowski, and closing remarks from Larry Strickling. Remarking on Alfred Kahn's contributions to the industry, Ray Gifford of Wilkinson Barker and Knauer LLP explained that Kahn "made you feel like you were his colleague even if you felt barely intellectually able to be in the same room. He is a model that we all should

aspire to, never feeling that he had the right answer but always willing to go forward boldly in pursuit of the answer with intellectual rigor." In Genachowski's video address, he described how the federal government is working to expand access to broadband not only for mobile services through voluntary incentive spectrum auctions, but also through transforming the universal service fund to deliver broadband service rather than telephone. Finally, Strickling reflected on the tension between stability and innovation that was discussed in the first panel, concluding that on an international level it is important to avoid the complete subjugation of the internet to national sovereignty, a situation which could result in such events as the Egyptian government denying online access to citizens during the recent revolution.