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Beyond Transparency: The Semantics of Rulemaking for an Open Internet

REZA RAJABIUN*

In trying to promote the development of an open Internet, the U.S. Federal Communications Commission (FCC) has primarily tried to encourage network providers to be transparent about their traffic management practices and quality of service prioritization policies. Dominant network operators have successfully challenged this minimalist approach to addressing end-user concerns about the rise of a two-tiered Internet, motivating the FCC to engage in yet another public consultation process to assess its future approach to the problem. This article maps the debate using Natural Language Processing (NLP) tools that allow us to build a systematic picture of the positions of the regulator and groups of private interests trying to shape its decisions. A quantitative linguistic analysis of the content of formal written submissions to the FCC by parties with divergent views helps document how the conceptual model of the regulator evolved during the rulemaking process leading to the FCC February 2015 network neutrality Order. Despite the adoption of a broader substantive basis by the FCC under Title II of the Communications Act, the rule-of-reason approach to substantive interpretation in the Order limits the capacity of the new regulatory framework to protect and promote an open Internet. The evidence suggests the public consultation process is likely to serve as a tool for legitimizing status quo institutional arrangements that allow operators to engage in discriminatory traffic prioritization strategies.

INTRODUCTION

In January 2014 the U.S. Court of Appeals for the D.C. Circuit further limited the authority of the Federal Communications Commission (FCC) to regulate discriminatory traffic management practices of broadband Internet providers by vacating key elements of the FCC's 2010 *Open Internet Order*.¹ Recognizing that

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¹ See *Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014), which vacated provisions against blocking and unreasonable discrimination of the FCC's 2010 order in the matter of Preserving the Open Internet, Broadband Industry Practices, *Report and Order*, FCC 10-201, 25 FCC Rcd. 17905 (2010), available at https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1_Rcd.pdf [hereinafter 2010 Open Internet Order]. In *Verizon*, the Court did uphold aspects of the 2010 Open Internet Order with respect to transparency and disclosure of traffic management practices of operators. For recent overviews of business and legal conflicts and range of options

¹ See *Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014), which vacated provisions against blocking and unreasonable discrimination of the FCC's 2010 order in the matter of Preserving the Open Internet, Broadband Industry Practices, *Report and Order*, FCC 10-201, 25 FCC Rcd. 17905 (2010), available at https://apps.fcc.gov/edocs_public/attachmatch/FCC-10-201A1_Rcd.pdf [hereinafter 2010 Open Internet Order]. In *Verizon*, the Court did uphold aspects of the 2010 Open Internet Order with respect to transparency and disclosure of traffic management

the Internet's open architecture is critical for the capacity of "innovators and consumers at the edges of the network 'to create and determine the success or failure of content, applications, services and devices,'" in May 2014 the Commission issued the FCC 14-61 Notice of Proposed Rulemaking (NPRM) asking "what is the right public policy to ensure that the Internet remains open?" and soliciting comments from the public about options for moving forward.² In response consumers and other stakeholders submitted around four million comments to the FCC.³ The high degree of public interest in the matter also led to growing calls by the executive and legislative branches on an ostensibly independent regulator to take action, one way or another.⁴ In February 2015 the FCC adopted an Order on remand, strengthening the substantive basis it has to act against practices such as blocking, throttling, and paid prioritization that it determined threaten the open Internet.⁵ Although little time has passed since the publication of the FCC Order, legal and legislative challenges to the regulatory compromise it constitutes are already underway.⁶

At least in part, the fact that narrow technical issues relating to traffic

practices of operators. For recent overviews of business and legal conflicts and range of options for promoting neutrality, see Tejas Narechania, *Network Nepotism and the Market for Content Delivery*, 67 STAN. L. REV. ONLINE 27 (2014). Barbara Van Schewick, *Network Neutrality and Quality of Service: What a Non-Discrimination Rule Should Look Like*, 67 STAN. L. REV. 1 (2015). For a discussion of technical and business aspects of discrimination and the potential desirability of its regulation, see KC Claffy & David D. Clark, *Platform Models for Sustainable Internet Regulation*, 4 J. INFO. POL'Y 463 (2014).

² Protecting and Promoting the Open Internet, GN Docket No. 14-28, FCC 14-61 (2014) [hereinafter FCC 14-61 Notice].

³ Gigi B. Sohn, *FCC Releases Open Internet Reply Comments to the Public*, OFFICIAL FCC BLOG (Oct. 22, 2014), <http://www.fcc.gov/blog/fcc-releases-open-internet-reply-comments-public>.

⁴ For example, see the statement by President Obama urging the FCC to create a new set of rules that comply with the decision by the Court of Appeals in *Verizon* by reclassifying "consumer broadband service under Title II of the Telecommunications Act—while at the same time forbearing from rate regulation and other provisions less relevant to broadband services. This is a basic acknowledgment of the services ISPs provide to American homes and businesses, and the straightforward obligations necessary to ensure the network works for everyone—not just one or two companies." See The White House, *Net Neutrality: President Obama's Plan For a Free and Open Internet*, <http://www.whitehouse.gov/net-neutrality>. In response, Senator Ted Cruz called network neutrality "Obamacare for the Internet" and Republican leadership in Congress tried to block Title II reclassification. See Colin Campbell, *Ted Cruz Says Network Neutrality is "Obamacare for the Internet"*, BUS. INSIDER (Nov. 10, 2014), <http://www.businessinsider.com/ted-cruz-net-neutrality-is-obamacare-for-the-internet-2014-11>. Tony Romm, *Net Neutrality to Dominate D.C.'s Tech Agenda*, POLITICO (Dec. 29, 2014, 5:35 AM), <http://www.politico.com/story/2014/12/fcc-open-internet-rules-republicans-113774.html#ixzz3NJSkK2kA>.

⁵ In the Matter of Protecting and Promoting the Open Internet, GN Docket No. 14-28, FCC 15-24 (2015), Chairman Wheeler and Commissioners Clyburn and Rosenworcel issuing separate statements; Commissioners Pai and O'Rielly dissenting and issuing separate statements.

⁶ See, e.g., Protective Petition to Review filed by United States Telecom Association with the U.S. Court of Appeals, D.C. Circuit, March 23, 2015. Case No. 15-1063. Reports suggest that some members of both parties in Congress are dissatisfied with the FCC's decision, but for different reasons. See, e.g., Jim Puzzanghera, *Potential for a Bipartisan Bill on Network Neutrality Emerges in Congress*, LA TIMES (March 25, 2015), <http://www.latimes.com/business/la-fi-net-neutrality-legislation-20150325-story.html>.

prioritization by network operators have become the source of broad public concern reflects increasing use of fixed and wireless broadband infrastructure by businesses, households, and individuals. What is particularly interesting about this debate is that politicians, operators, and end user groups all appear to agree that having an open Internet is a desirable objective for promoting access and innovation. However, they also tend to have contradictory perspectives on what policy strategies are likely to help protect or promote the Internet's purported openness. Understanding how the stakeholders conceptualize legal and economic aspects of the problem, as well as its potential remedies, represents a first step in reconciling opposing private interests into efficiency-enhancing regulations that may ultimately serve the public interest mandate of the agencies such as the FCC.⁷

This Article examines conceptual models of the problems embedded in the semantics of participants in the rulemaking process. These participants include operators that have successfully employed the courts to limit the authority of the FCC to regulate their traffic management practices and prefer status quo institutional arrangements to continue, and other groups trying to convince policymakers to adopt binding legal constraints against discriminatory traffic management practices by the operators. Further, this Article examines the FCC's position as stated in the 2014 Open Internet Notice of Proposed Rulemaking and the resulting 2015 FCC Order. Using quantitative content analysis software, the Article maps concepts and themes emphasized by the courts, the FCC, and subgroups of interveners in their formal submissions to the consultation process.⁸ The Article elaborates on a preliminary study of stakeholder feedback submitted to the FCC on this matter.⁹

Section I provides an overview of the debate by extracting and mapping the text of the FCC's 2014 Notice as well as key judicial decisions over the past decade that set the stage for the ongoing debates. Section II compares the variety and intensity of concepts emphasized in formal written submissions by a sample of stakeholders with contradictory interests and positions about what the FCC should do to serve the public interest. Section III provides an overview of the content of the FCC Order. To provide a more concrete picture of the evolution of the debate, Section IV analyzes quantitative indicators of semantic emphasis by the regulator and divergent groups that tried to influence its decision. Finally, Section V summarizes the analysis and draws inferences from the evidence about the likely impact of the regulatory framework that emerged from this public consultation process.

⁷ See James Buchanan, & Dwight Lee. *Private Interest Support for Efficiency Enhancing Antitrust Policies*, 30 *ECON. INQUIRY* 2, 218–24 (1992).

⁸ For an overview of developments and limitations of NLP technologies, see *HANDBOOK OF NATURAL LANGUAGE PROCESSING* (Nitin Indurkha & Fred Damerau eds., 2nd ed. 2010). There is a variety of open-source and commercial software available for extracting and analyzing unstructured human language (text and voice), a review of which is beyond the scope of this Article. For recent examples of the application of content analysis to Internet governance and broadband regulation, see Dmitry Epstein, Merrill C. Roth, & Eric Baumer, *It's the Definition, Stupid! Framing of Online Privacy in the Internet Governance Forum Debates*, 4 *J. INFO. POL'Y* 144 (2014); Reza Rajabiun & Catherine Middleton, *Public Interest in the Regulation of Competition: Evidence from Wholesale Internet Access Consultations in Canada*, 5 *J. INFO. POL'Y* 32 (2015).

⁹ See Reza Rajabiun, *Content Mapping of the FCC 14-61 Notice of Proposed Rulemaking and Formal Submissions by Stakeholders Using Natural Language Processing (NLP)*, (2014) <http://apps.fcc.gov/ecfs/comment/view?id=6019160552>.

I. OVERVIEW: LEGAL CONSTRAINTS AND POLITICAL SIGNALS

While the decision in *Verizon v. FCC* has restricted the ancillary authority of the FCC to compel broadband operators not to adopt discriminatory traffic management practices, the D.C. Circuit Court highlighted that if it so chooses, the FCC could redefine broadband providers as common carriers under Title II of the Communications Act of 1934.¹⁰ Such a designation would then provide the FCC with a broad statutory basis to adopt and enforce rules that it finds appropriate for addressing practices by operators that it determines to be against the public interest.¹¹ The mere suggestion in the FCC 14-61 Notice that the agency might be willing to consider reclassifying broadband access services under Title II generated significant political debate. For example, in a letter by the House Republican leadership to the FCC, the lawmakers urged the Commission “to halt” its “consideration of any plan to impose antiquated regulation on the Internet because Title II designation and network neutrality obligations would reduce investment incentives of broadband operators and not be in the interests of consumers.”¹² In contrast, a coalition of Democratic Senators expressed concern about the FCC’s commitment to network neutrality regulation in an environment where the “potential to profit from monopolistic, anticompetitive, anti-innovation, and anti-consumer practices has grown.”¹³

The apparent divide among lawmakers captures the main contours of the debate surrounding network neutrality. Proponents of the status quo regime—where the FCC has little legal authority to force operators to stop or amend discriminatory practices that it finds objectionable—tend to suggest the best way for maintaining an open Internet and investment in broadband networks is to continue to forebear from restricting the boundary of permissible conduct of the operators. To proponents of Title II authority and the adoption of legally binding rules against anticompetitive discrimination or blocking, reforms are necessary because such practices are adverse to consumers’ interests and will reduce the capacity of the open Internet to serve as an innovation-generating platform.

¹⁰ Or potentially under Section 706(a) of the 1996 Telecommunications Act (47 U.S.C. § 1302), which provides the FCC and state commissions with some discretionary authority to adopt policies that “remove barriers to infrastructure investment.” However, Section 706(b) stipulates that in order to rely on this authority the Commission must first “determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.” This statutory language sets a high burden of the proof for the Commission if it tries to avoid Title II reclassification and instead attempts to impose rules on the operators based on Section 706(a) authority. For a detailed assessment of legal strategies facing the FCC, see Tejas N. Narechania & Tim Wu, *Sender Side Transmission Rules for the Internet*, 66 FED. COMM. L.J. 467 (2014).

¹¹ An analysis of the range of legal and technical options for mitigating this problem is beyond the scope of this article; for detailed discussions, see Van Schewick, *supra* note 1. Narechania & Wu, *supra* note 10; Jan Krämer, Lukas Wiewiorra & Christof Weinhardt, *Net Neutrality: A Progress Report*, 37 TELECOMM. POL’Y 794 (2013).

¹² See Letter from John Boehner, Speaker of the House, et al. to the FCC (May 14, 2014), available at <http://www.speaker.gov/sites/speaker.house.gov/files/5-14-14-Net-Neutrality-Letter.pdf>.

¹³ See Letter from Ron Wyden, Oregon Senator, et al. to the FCC (May 9, 2014), available at <http://www.wyden.senate.gov/download/?id=54fa5f99-47c8-47be-93c1-46374e531e1a&download=1>.

Short letters by lawmakers signaling their positions are relatively easy to read and interpret by humans. As the size and complexity of relevant communications increases, it becomes more difficult to compare and contrast conceptual models and positions embedded in them, a problem that automated content extraction and analytics technologies can help address. Importantly in the context of this article, the short letters by lawmakers outlining their positions on the legal treatment of network operators also highlight a key problem in moving from manual reading to machine learning in an attempt to “understand” subtle legal and policy arguments. Namely in political discourse, entities with opposing interests and views often tend to emphasize very similar concepts for conveying their message, presumably because they suspect that certain concepts are more effective in convincing their audience to accept their position.

In the case of debates about the regulatory framework for prioritizing Internet traffic when demand for scarce network resources is high, promoting consumer interests, innovation, and an open Internet represent common objectives for groups with divergent perspectives on how these objectives should be achieved. Natural Language Processing (NLP) and textual analytics technologies available today can help extract and map the content of such documents, but are not yet sufficiently advanced to extract the “sentiments” among relevant concepts very well.¹⁴ Instead of looking for sentiments among concepts, this article explores what different groups of interveners in consultation process are trying to add to the debate by analyzing the variety and intensity of concepts they emphasize in their formal submissions to the FCC. To evaluate how these perspectives were mapped into a notion of public interest regulations by the FCC, we then compare quantitative indicators of semantics in the submissions and the FCC Notice with those extracted from the text of the 2015 FCC Order on remand. The methodology allows for a systematic mapping of the emergence of a public interest regulatory bargain shaped by private interests, which is likely to remain at the center of legal and policy conflicts about the operation of Internet access infrastructure in the U.S. for a long time.

High-level themes in the debate illustrated in the letters to the FCC by opposing groups of lawmakers provide a first view of core issues at hand, about which the Commission had to come to a decision one way or the other: (1) maintain the status quo where it has little power to compel operators to alter aspects of their management practices that appear anticompetitive and/or are not in the interest of the consumers; or (2) invoke its Title II authority and prohibit more objectionable business practices of broadband service providers in a manner that is more likely to withstand future judicial scrutiny. In a three-to-two vote divided along partisan lines, the FCC Order on remand followed the judicial guidance in *Verizon* by reclassifying broadband Internet access as a telecommunications service subject to regulation under the broader substantive authority provided under Title II.¹⁵

While this high-level decision about the substantive basis for regulation may appear to have enhanced the prospects for the emergence of binding legal constraints against practices that threaten an open Internet, the FCC Order exempts practices that can be argued to be “reasonable” and those relating to “specialized services.” The FCC’s specialized services exemption and the rule-of-reason approach (versus per se rules) to substantive interpretation limit the credibility of the regulatory framework as a constraint on discriminatory traffic management practices and service quality

¹⁴ See HANDBOOK OF NATURAL LANGUAGE PROCESSING, *supra* note 8.

¹⁵ See FCC 15-24, *supra* n. 5.

differentiation. The rest of this article employs NLP and quantitative content analysis software to decompose and analyze these high-level legal and policy issues into lower-level concepts emphasized by the FCC, the courts, and interest groups that tried to influence the outcome of this rulemaking process.

A. Content Map of the FCC Notice of Proposed Rulemaking

To understand what the stakeholders were trying to convey in their comments to the FCC, our approach is to compare the concepts they emphasize with that of a relevant analytical benchmark. The logical first choice for a benchmark in this case is the text of FCC 14-61 Notice of Proposed Rulemaking, the written statement of the regulators' perspective on the problem at the start of the public consultations. The text of the FCC Notice is approximately 100 pages long and includes references to legal, procedural, and policy considerations in the design of regulations for protecting and promoting an open Internet. A two-stage process is employed to analyze the content of the Notice as well as corpuses of past legal decisions and stakeholder comments to this proceeding:¹⁶

Quantitative analysis: First we extract the text of the document and generate quantitative indicators of frequencies by which the words co-occur. This allows us to identify "concepts" as words that tend to appear relatively more frequently in the context of other words in the corpus.¹⁷

Relational analysis: In the second stage we explore underlying relationships among concepts discovered based on quantitative indicators of their relevance in the first stage, using iterative clustering algorithms designed for identifying groupings of concepts (i.e. themes) based on their co-occurrence frequencies and mapping connections among them.¹⁸

Figure 1 provides a visual summary of the FCC Notice's content, as well as how some of the key concepts are connected to each other.¹⁹ The Appendix also presents a comprehensive list of emergent concepts extracted from the FCC Notice, written submissions by opposing interests, and the subsequent FCC Order.

¹⁶ There are a variety of commercial and open source software packages available that can be employed for the type of analysis that follows, a review of which is beyond the scope of this Article. Here, we use the general-purpose textual analysis platform from Leximancer.

¹⁷ That is, in their "context," not simple keywords.

¹⁸ For details of the underlying methodology, see Andrew E. Smith & Michael S. Humphreys, *Evaluation of Unsupervised Semantic Mapping of Natural Language with Leximancer Concept Mapping*, 38 BEHAV. RES. METHODS 262 (2006).

¹⁹ This and other figures are "heat mapped," with the most relevant concept clusters appearing in red, then orange, yellow, blue, green, and so on. The proximity and links among individual concepts in the figure are determined using a stochastic clustering model for exploring interconnectedness of semantic elements in the text that tend to co-occur. For statistical indicators of the relevance of concepts in the Notice, please see the Appendix. In the discussion that follows, "concepts" are defined quantitatively as the most frequent word in collections of words that travel together in the text (i.e. in context; not simple keywords in the usual sense or as represented in traditional word clouds). Themes are higher-level groupings of concepts that tend to travel together, defined or named as the most frequent concept in a concept cluster. For further details on underlying methodology see *id.*

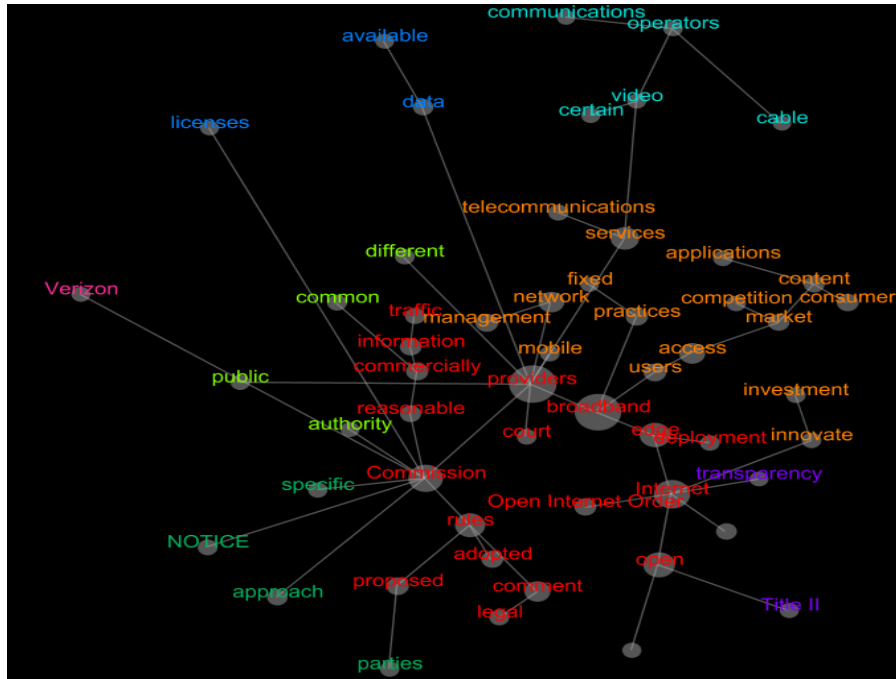


Figure 1. Content Map of The FCC Notice of Proposed Rulemaking

This visual summary provides an overview of core issues in the debate and illustrates the value of quantitative content analysis for simplifying complex documents into their central elements with little human supervision: Starting from the left side of the picture, the relevance of the challenge posed by the *Verizon* decision to the authority of the Commission (which has prompted this FCC process) are highlighted. At the core of the ideas presented in the Notice (in red) are the more overarching questions about the boundary of commercially reasonable traffic management practices by broadband providers. Economic considerations such as innovation, investment, and competition in the market for content (in orange on the right side) are also prominent and tend to co-occur relatively frequently. The legal issue of Title II authority is closely associated with the concept of transparency, indicative of the emphasis of the agency on improving the transparency of traffic management practices of operators. At the top of the figure, the content map captures conflicts associated with growing demand for video content via the Internet and the treatment of third-party content and applications by cable broadband operators.

B. Legal Direction and Context

Attempts by the FCC to compel dominant operators to adjust some of their more problematic traffic management, throttling, and blocking policies and/or to disclose such policies to their customers have faced significant resistance by the operators and the judiciary. To better understand the legal context that guides and motivated this rulemaking process, we select the text of three prominent decisions by the

judiciary on the scope of FCC's authority to regulate the market for Internet access services—appellate decisions in *Verizon v. FCC*²⁰ and *Comcast Corp. v. FCC*²¹ and the Supreme Court decision in *NCTA v. Brand X*.²² We employ semantic mapping techniques that allow us to evaluate concepts emphasized in particular text corpora relative to each other. Figure 2 summarizes the content of the FCC Notice in relation to the three key legal decisions that constrain the agency's statutory authority. The file names on the visualizations are situated closer to concepts that are relatively more prominent in them.

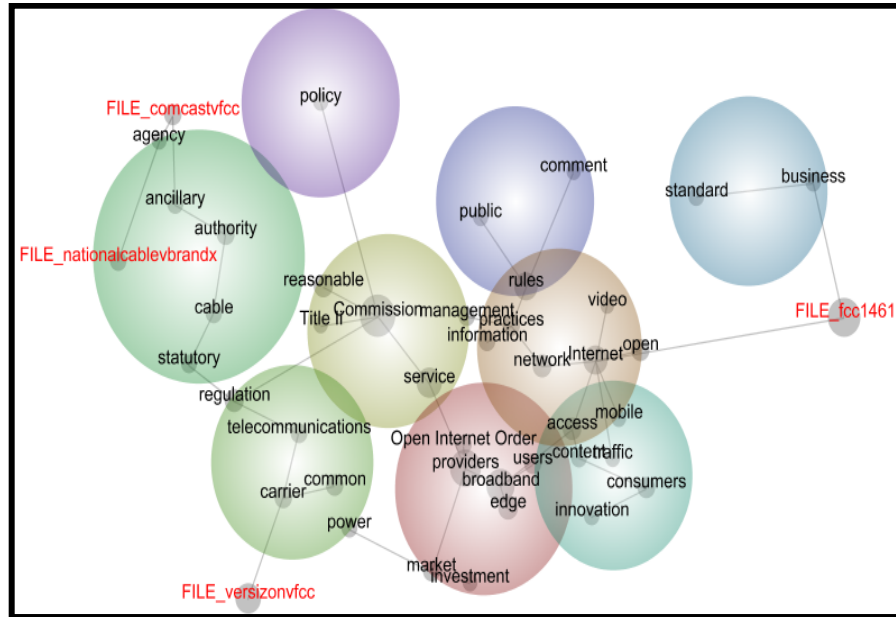


Figure 2. Evolution of Legal Concepts Guiding FCC 14-61

This visual depiction can be interpreted in chronological terms as a measure of how key aspects of the debate have evolved over time (by moving from left to right). Over the past decade the courts have emphasized limitations to FCC's authority to regulate business conduct of broadband carriers, an issue that remains central to the appellate decision in *Verizon v. FCC* and the need to invoke Title II authority. Both the Verizon decision and the FCC Notice differ from earlier judicial decisions in terms of their semantic emphasis as they appear to pay relatively more attention to economic and technological aspects of discriminatory traffic management practices by dominant network operators (e.g., concepts in lower right hand of the map—market, investment, innovation, consumers, traffic, content, video). The FCC Notice extended the debate by asking if these considerations warrant adopting standards for network management practice on the edge of fixed and mobile networks.

²⁰ *Verizon v. FCC*, 740 F.3d 623, 659 (D.C. Cir. 2014).

²¹ 600 F.3d 642, 661 (D.C. Cir. 2010).

²² *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 1002–03 (2005).

II. CONTENT ANALYSIS OF NETWORK NEUTRALITY SUBMISSIONS

The FCC 14-61 Notice allowed the public to submit relatively short comments (a few paragraphs), as well as more substantive formal interventions via the usual procedural mechanisms the agency employs in its rulemaking processes. Although it is not clear if and how the FCC managed to “review” every comment that it has received as it had promised, some preliminary assessments of the shorter comments using NLP techniques have appeared in the media.²³ These reports suggest that a large proportion of the short-form comments were duplicates based on standardized templates,²⁴ such as those that might be submitted via a public petition or variants of the same template sent by a spam robot working for a particular interest. Furthermore, previous assessments indicated the vast majority of the content of short-form submissions to the FCC was comprised of pro-neutrality concepts and themes; indeed it appears to be very difficult to detect anti-neutrality keywords and concepts.²⁵ These results are consistent with the hypothesis noted above in the context of short letters from lawmakers to the regulator: Everybody appears to agree that having an open Internet is the ultimate policy objective, but there are competing perspectives on the type of rules and institutions that are required for achieving this objective.

Instead of focusing on short-form comments, this Article analyzes the content of a sample of around fifteen relatively substantive formal comments (more than a few pages). Formal comments included in our sample are selected in order to reflect a diversity of interests and positions about what the FCC should do to serve the public interest, including submissions from dominant operators, Internet content and technology companies, consumer and business advocacy groups, investors in new media industries, and representatives of people with disabilities and ethnic minority groups.²⁶ Consequently, the objective here is not to generalize from the sample to the population, which would require random stratification of the comments. Instead the stratified, purposeful sampling of the submissions adopted here is intended to highlight the variety of concepts and differences in semantic emphasis by organizations with distinct economic interests and positions in this matter.²⁷

Figure 3 provides a visual summary of stakeholder feedback to the FCC from the corpus of all formal submissions in our sample. The range of concepts that emerge from the corpus of stakeholder submissions appears to be broader than that of the FCC Notice discussed above. This difference is not surprising since the corpus of the submissions is much longer than the FCC Notice and our sample is drawn from a wide variety of interested parties who are likely to emphasize aspects of the problem that are more important to their interests. Nevertheless, the basic visual representations of concepts in the FCC Notice in Figure 1 and the corpus of

²³ See Elise Hu, *A Fascinating Look Inside Those 1.1 Million Open-Internet Comments*, NPR (Aug. 12, 2014), <http://www.npr.org/blogs/alltechconsidered/2014/08/12/339710293/a-fascinating-look-inside-those-1-1-million-open-internet-comments>.

²⁴ *Id.*

²⁵ *Id.*

²⁶ A list of organizations and abbreviations of their names used in the visualizations is provided in Table 3 of the Appendix.

²⁷ See DONNA M. MERTENS & AMY T. WILSON, PROGRAM EVALUATION THEORY AND PRACTICE: A COMPREHENSIVE GUIDE 418–25 (2012).

comments in Figure 3 appear to centralize very similar clusters of concepts and themes.

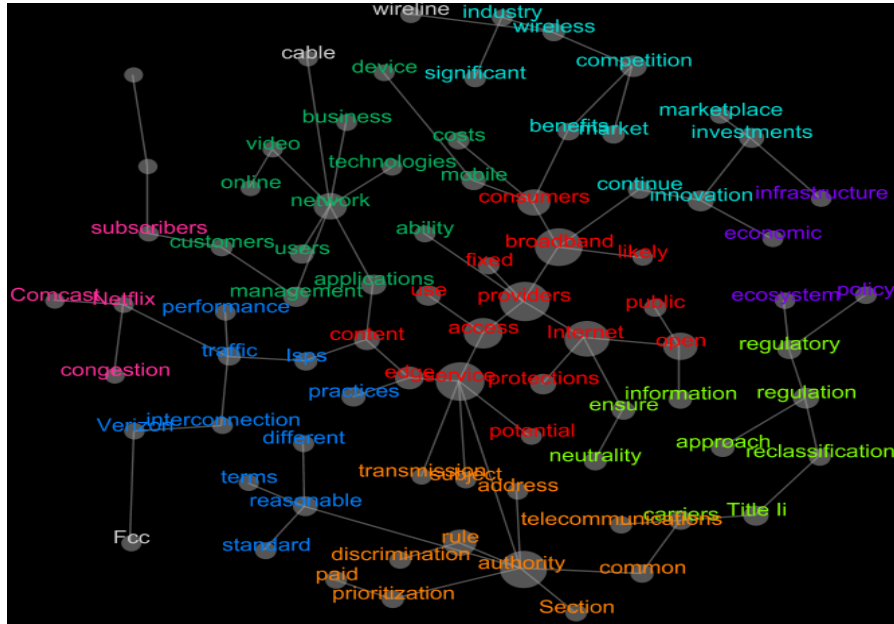


Figure 3. Content Map of Stakeholder's Formal Submissions to FCC 14-61

Moving from left to right of the figure, we observe the importance of questions about congestion, traffic management practices, and conflicts among vertically integrated cable operators and Internet content providers (e.g., Comcast versus Netflix). Concept clusters associated with conflicts over terms and quality of interconnection (in blue clusters), as well as the relevance of neutrality for video and advanced applications are also apparent (in green clusters). According to this analysis, the core question (in red) raised by the stakeholders is access to content on the edge of the broadband ecosystem. The authority of the FCC to regulate paid prioritization (in orange) and the potential for Title II reclassification (yellow) also emerge as prominent themes in the corpus of submissions.

In addition to decomposing the submission into their technological, economic, and legal elements, the linkages among the concepts depicted in Figure 3 are instructive and further illustrate the capacity of the underlying NLP techniques to generate intuitive insights in a relatively autonomous manner. Again moving from left to right, observe how the connections move from very specific concepts that capture business and economic conflicts motivating this proceeding (such as Comcast, Netflix, video, and congestion), to more general concepts at the center of the regulatory debate, including traffic management practices of broadband operators and their implications for the ability of end users to access Internet content and application services. Analogously, moving from right to left, linkages among the core legal issues relating to Title II reclassification, openness of the Internet, and the public demand on the FCC to “ensure” “neutrality” in “access” to the “Internet” are apparent (on the edge of red and yellow clusters).

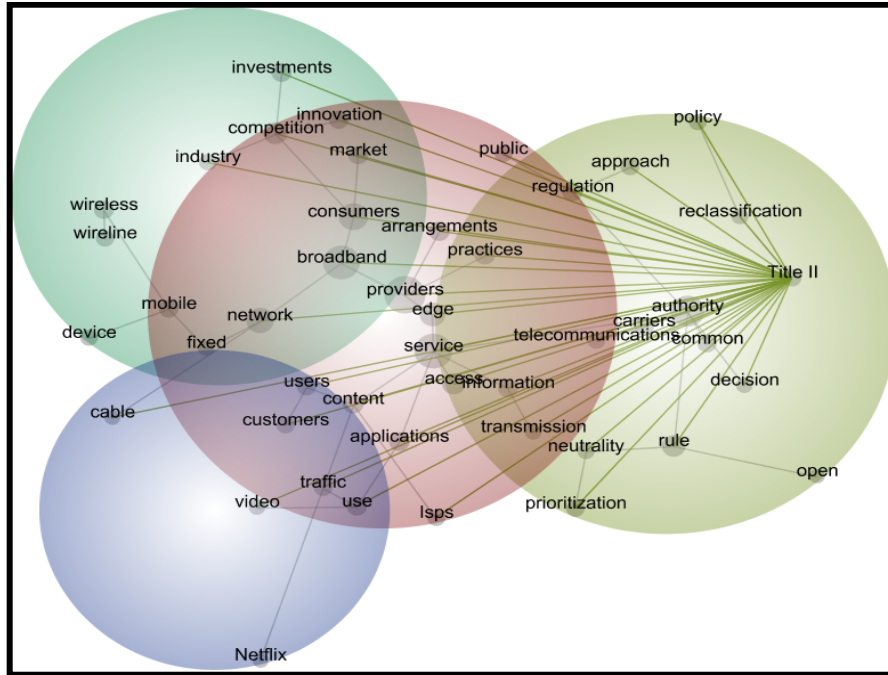


Figure 4. High-Level Themes in Comments to the FCC

Figure 4 offers a complementary depiction of the same corpus of submissions by aggregating lower level concepts identified in Figure 3 into four larger clusters of main themes. Furthermore, Figure 4 documents the links between the core legal problem of Title II authority and other relatively overarching concepts extracted from the submissions. Moving from left to right, the visualization captures the growing use of wireless devices. The top left hand cluster documents concepts associated with implications of this process for market competition, innovation, and investment. Rapidly growing demand for network resources associated with the popularity of third-party Internet content services, and the well known example of traffic management practices of Comcast with respect to Netflix traffic, also emerge as concepts closely associated with the idea of Title II reclassification (in the lower left hand cluster). The core theme (in red) at the center of Figure 4 focuses on the implications of traffic management practices of broadband operators on consumers and edge/content network providers.²⁸ The right hand cluster illustrates the central legal dilemma that faced the FCC in the process regarding Title II reclassification of broadband Internet access services.

III. CONTENT ANALYSIS OF THE FCC ORDER

The decision by FCC to invoke Title II authority has already been the subject of significant criticisms for a variety of reasons noted by the two Commissioners who

²⁸ Such as Content Delivery Networks (CDNs) operated by large and resourceful entities like Google, Amazon, and Akamai.

opposed its adoption in the Order.²⁹ Beyond this headline decision to recognize broadband Internet as a telecommunications platform (versus information service), the Commission also reiterated its commitment to enhanced transparency and binding legal rules for defining the boundary of permissible conduct by operators (e.g., blocking, throttling, and paid prioritization). Figure 5 provides a visual summary of key concepts emphasized in the FCC Order, a document that is about 400 pages long and includes detailed discussions of various legal and policy aspects of the revised regulatory framework.

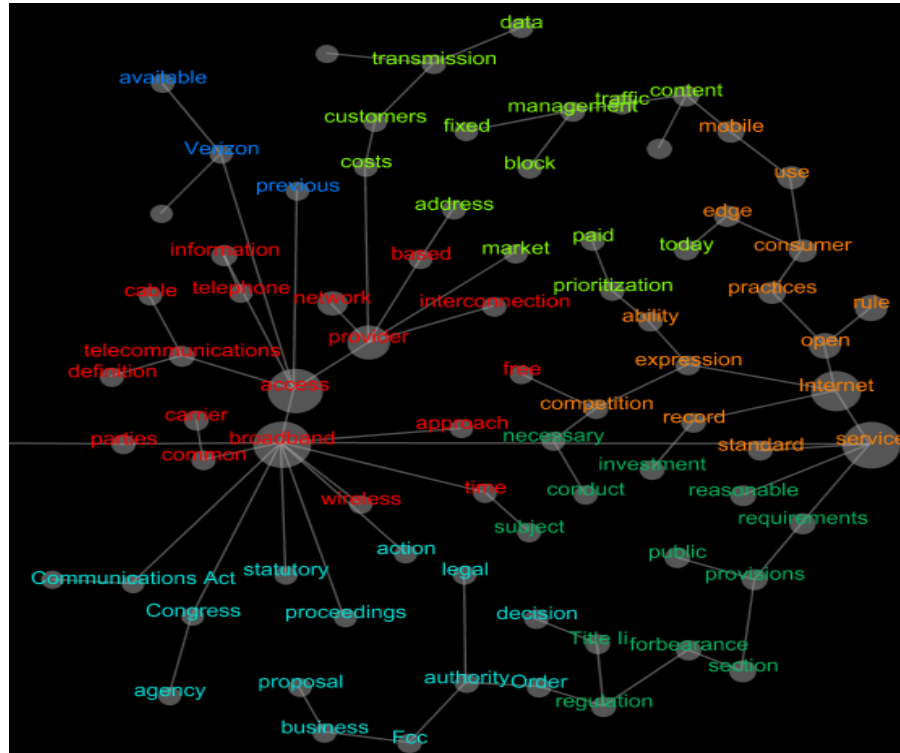


Figure 5. Content Map of 2015 FCC Open Internet Order

Moving from left to right of the Figure 5, the FCC emphasizes the statutory basis that Congress grants the agency in the Communications Act and the input from the proceedings (in light blue) to justify a change in the definition of broadband access from an information service (in red). Judicial guidance in *Verizon* limiting the substantive basis available to the FCC for imposing binding legal obligations on operators engaged in undesirable conduct (in dark blue) is closely connected with the decision to reclassify broadband access (in red). Traffic management practices such as blocking and paid prioritization (in yellow), as well as the need to apply the rules to mobile Internet access, are documented in the upper right of the figure. The Order places significant emphasis on the concept of “free expression,” linking it closely to economic ideas such as “competition” and

²⁹ See FCC 14-61 Notice (Pai, dissenting, available at <https://www.fcc.gov/article/doc-332260a5>; O’Rielly, dissenting, available at <https://www.fcc.gov/article/doc-332260a6>).

“investment” in explaining why its approach to the problem is in the public interest (on the edge of red, orange, and green clusters at the center).

IV. COMPARATIVE SEMANTICS: STAKEHOLDERS VERSUS THE FCC

Visualizations of core concepts and themes extracted from written statements by the courts, the regulator, and interveners offer a general picture of technological drivers, legal options, and economic implications of discriminatory traffic management practices. To provide a more concrete assessment of the evolution of the debate during the most recent public consultation process, the rest of this Article moves away from visual presentations of the results and focuses on quantitative differences in the variety and intensity of concepts emphasized by the regulators and two subgroups of stakeholders that tried to shape the FCC’s decisions in this matter. We separate our sample of formal submissions to the FCC into two parts, one consisting of the operators and the second of everybody else, including a wide array of consumer groups, content and application providers, investors in emerging content and application services, and other advocacy organizations (hereinafter, “the others”).³⁰

Quantitative measures of the relevance of particular concepts in the FCC Notice and from the two groups of stakeholders provide a basis for characterizing the emergence of the regulatory bargain by the Commission in the Order that tries to balance competing private interests and translate them into public interest regulations. The “relevance” metric discussed below represents an index³¹ of the proportion of context blocks³² which are related to particular concepts, relative to the most frequent concept.³³

There are a number of emerging concepts across the four corpuses that are relatively common, including name-like concepts (proper names with capital first letters) such as the names of dominant operators in the market, the FCC, the Internet, Netflix, and the Commission.³⁴ Word-like concepts that are relatively common across the texts include those such as broadband, providers, access, and services. Table 1 presents indicators of semantic emphasis placed on name-like technological and legal concepts at the center of this proceeding: Openness of the “Internet” and the reclassification of broadband access networks under “Title II” authority.

³⁰ See Appendix for details. The methodology adopted here can be employed in the future to explore more variations within these groups based on a larger sample of formal submissions and short form comments.

³¹ Between 0 and 1 (multiply by 100 for percentage coverage in the corpus).

³² Defined here as two sentence blocks.

³³ The most overarching concept is set to 1, or 100%, and the relevance of all other concepts is below this maximum. Consequently, the relevance metric is a normalized index of semantic intensity of particular concepts that is comparable across corpuses of varying size.

³⁴ Or variants of these words. We generally combine very similar words and concepts in the analysis with a word-stemming algorithm that tries to merge word variants, although this approach is not perfect.

Table 1. Relevance of Key Legal and Technological Concepts

	FCC Notice	Providers	Others	FCC Order
Internet	51%	77%	100%	65%
Title II	4%	17%	22%	7%

The Internet represents a concept with a relatively wide coverage in the stated positions from all parties. However, it emerges as the most relevant concept in submissions by parties that urged the FCC to adopt a more active role in protecting and promoting an open Internet.³⁵ Similarly, Title II authority represents a relatively more important concept in submissions by the pro-neutrality group than either the FCC Notice or the operators. Notably, the magnitude of emphasis on Title II authority in the submissions from both operators and the other interveners was substantially larger than the FCC Notice (between four and five times larger). Although there might be other reasons for this observation, interests with opposing views on the matter devoted substantially more attention to explaining their contradictory positions about Title II reclassification than the agency did in its Notice to initiate this proceeding. The relatively lower emphasis in the FCC Notice on Title II might reflect an attempt to avoid this difficult issue. This interpretation of the semantic data seems consistent with the FCC's stated position in the Notice.³⁶

As the ultimate decision by the FCC to adopt Title II authority suggests, the agency was not able to achieve this objective. Although indicators of conceptual emphasis do not allow us to predict the FCC's ultimate decision about adopting Title II authority and the parties' sentiment towards the issue, it is evident that Title II authority is a substantially more integral part of the final Order than of the initial Notice. The relatively higher emphasis that stakeholders placed on the importance of this core legal issue appears to have made it harder for the agency to avoid the challenge presented to it by the courts in *Verizon*.

For interested readers, Table 2 in the Appendix provides a comprehensive list of word-like concepts extracted from the four corpuses. Below we summarize a few notable results that document some of the primary signals that conflicting private interests conveyed to the FCC in their submissions and how the Commission mapped private interest semantics into a regulatory bargain intended to serve the public interests:³⁷

³⁵ The term "broadband" is the most relevant concept in the FCC Notice and submissions by operators. See below for further discussion of the potential relevance of emphasis on "broadband" versus the "Internet."

³⁶ See *supra* note 2, para. 4:

The goal of this proceeding is to find the best approach to protecting and promoting Internet openness. Per the blueprint offered by the D.C. Circuit in its decision in *Verizon v. FCC*, the Commission proposes to rely on section 706 of the Telecommunications Act of 1996. At the same time, the Commission will seriously consider the use of Title II of the Communications Act as the basis for legal authority ... the Commission seeks comment on the best ways to define, prevent and punish the practices that threaten an open Internet.

³⁷ Concepts discussed here are highlighted in bold format in Table 2 of the Appendix.

Central problem: The most overarching concepts emphasized by the FCC, operators, and the others tend to be very similar and include ideas such as broadband, providers, services, access, and rules.³⁸

Semantic divergence: Once we move beyond the first five to ten more overarching concepts on top of the lists in Table 2, the language of the parties begins to diverge both in terms of the concepts they are employing to characterize the problem and emphasis placed on common concepts as measured by their relevance metric.

General vs. specific framing of the subject matter: The terms broadband and providers represent the most relevant concepts in the FCC Notice and submissions by the operators, while the Internet emerges as the most connected concept in the comments by the others. This difference indicates that the entities seeking an enhanced role for the FCC to regulate potentially discriminatory practices placed a relatively higher emphasis on broader implications of broadband providers' traffic management practices for the operation of the Internet. Given that broadband is only a platform for accessing all the wonders of the Internet, this broader framing by the pro-neutrality group stands in contrast to the narrower, more technical concept of broadband centralized in the texts of the FCC Notice and submissions by the operators. This can be interpreted as a signal to the FCC to look beyond sector-specific considerations and enhance the regulators' awareness about more general implications of its broadband infrastructure related decisions for the Internet as a whole. The text of the FCC Order places substantially more emphasis on the general idea of the Internet than the initial Notice, indicating that the public proceedings may have helped the Commission better evaluate the implications of its decision about broadband regulation for the ability of consumers to access the Internet.

Openness and neutrality: The concept "open" appears relatively frequently in all four corpuses, indicative of the fact that everybody appears to agree that having an open Internet is a worthy objective. However, the emphasis placed on the concept by the FCC and in the submissions by the operators is substantially lower than the pro-neutrality subsample (between two and three times lower). Differences in semantic emphasis with respect to this common concept are particularly informative as they illustrate the opposing directions in which the two groups of submissions are trying to push the FCC. Between the FCC Notice and final Order, the relevance of openness actually declined. Not surprisingly, the idea of neutrality arises relatively frequently in the submissions by the non-operator/pro-neutrality group and much less so in the case of operators. It is notable that the FCC appears to avoid using this term, indicative of a potentially wide gap between the regulator and interveners that tried to convince it to adopt rules that promote Internet openness and neutrality. The semantic evidence indicates the proceedings were not necessarily about imposing rules that support network neutrality, but more an attempt to legalize service quality differentiation policies that are already relatively commonplace in fixed and mobile broadband network management (i.e. bifurcation of the Internet into fast and slow lanes).³⁹

³⁸ Similarities of most relevant concepts extracted from the corpuses illustrate the capacity of quantitative NLP techniques employed here to summarize core issues in large and complex bodies of textual evidence in a relatively automated and consistent manner.

³⁹ A wide range of internal and third party technologies are deployed by operators that allow them to differentiate service quality based on criteria they find profitable. *See, e.g.,*

Beyond transparency: FCC's 2010 *Open Internet Order* did not include very strong prohibitions against discriminatory traffic management practices and instead had tried to encourage providers to disclose their policies to their customers.⁴⁰ The need to enhance transparency continued to appear as a relatively prominent concept in framing the problem in the FCC Notice, which suggests some continuity in FCC's intended approach to the problem. In contrast to the FCC Notice, transparency does not emerge as a relevant concept in the submissions by either group of stakeholders or in the FCC Order. While the Order "reaffirms the importance of ensuring transparency" and adopts certain enhanced disclosure requirements on operators,⁴¹ the FCC's declining emphasis on the idea suggests a growing recognition by the policymakers that simply promoting market transparency may not be sufficient to constrain the type of anticompetitive traffic management practices raising concern. The decision by the Commission to adopt Title II as a substantive basis can enhance the ability of the agency to impose stronger requirements on operators to disclose their traffic management practices in retail contracts with end users.

Scope of the rules: In its previous attempts to legally constrain operators from engaging in certain traffic management practices, the FCC had focused the scope of its efforts on fixed broadband networks. In the Order that resulted from this proceeding the Commission also included mobile services in the regulatory framework. While the FCC Notice and submissions by the operators placed relatively little emphasis on mobile connectivity, discriminatory traffic management practices by mobile operators were a prominent theme in the submissions by the others. The FCC Order places a substantially higher emphasis on mobile connectivity than the Notice, indicating that stakeholder submissions may have helped the regulator better understand the growing importance of mobile Internet services to consumers and to broaden the scope of regulatory obligations it plans to implement.⁴²

Design of the rules: At least since the early 1970s, U.S. Courts have become inhospitable to imposing per se prohibitions on discriminatory market behavior exercised by dominant operators,⁴³ a perspective reiterated in the *Verizon* decision with respect to the future design of open Internet regulations. The FCC Notice placed significant emphasis on the "commercially" "reasonable" nature of network management practices at the center of the debate. In contrast, those seeking the adoption of bidding rules highlighted the impact of "blocking" and "discrimination" for the ability of "consumers" to deploy "content" and

products from Sandvine or AT&T Mobility's patented approach to "Prevention of Bandwidth Abuse of a Communications System" (U.S. Patent No. 20140010082 A1 (filed Sept. 12, 2013)).

⁴⁰ In addition to enhancing transparency in retail contracts, the 2010 Order prohibited blocking and unreasonable discrimination to protect Internet access. *Verizon v. FCC*, 740 F.3d 623, 646 (D.C. Cir. 2014) (showing that these prohibitions were struck down).

⁴¹ *Supra* note 5, para. 24.

⁴² While the Order extends the obligations to mobile operators, it "expressly recognizes that evaluation of network management practices will take into account the additional challenges involved in the management of mobile networks, including the dynamic conditions under which they operate." *See supra* note 5, para. 34.

⁴³ For a historical analysis of increasing aversion by the courts to per se rules and the transition to the rule-of-reason approach to substantive interpretation in antitrust enforcement, see Reza Rajabiun, *Private Enforcement and Judicial Discretion in the Evolution of Antitrust in the United States*, 8 J. COMPETITION L. & ECON. 187 (2012).

“application” “services.” Discrimination and blocking do not emerge as statistically relevant concepts in the texts by the FCC Notice or the operators. While this is not surprising in the case of the operator, the gap in the language for describing practices of concern between the FCC and the pro-neutrality camp appears much wider than between the FCC and the operators. The degree of semantic emphasis the FCC placed on reasonableness of concerning practices declined in the Order relative to the Notice. Nevertheless, the FCC Order retains the “reasonable network management” exception in constructing the rules that it plans to implement and enforce.⁴⁴

Economic and legal justifications: As noted above in the discussion of letters by lawmakers to the FCC in this matter, economic interests of consumers and the desire to have an open Internet are prominent in the semantics employed by those with contradictory positions about how the agency should proceed. A similar approach to justifying private interest policy positions in terms of what is good for the consumers can also be detected in our quantitative indicators of stakeholder semantics. Discussions relating to “consumers” appeared relatively more frequently in comments by the operators than the other stakeholders or the FCC. The high degree of emphasis on consumers by the operators is complemented with a relatively strong emphasis on “regulation” (25%), “competition” (35%), and “investment” (25%).⁴⁵ Competition is a particularly prevalent concept in the semantics of the operators relative to both the FCC and submissions from the others.⁴⁶

The pro-neutrality comments focus more on the economic implications of

⁴⁴ The reasonable network management exception applies to all the rules outlined in the Order, except the prohibition on paid prioritization: “A network management practice is reasonable if it is primarily used for and tailored to achieving a legitimate network management purpose, taking into account the particular network architecture and technology of the broadband Internet access service.” See *supra* note 5, para. 32. This construction provides significant discretion for operators to engage in discriminatory traffic management practices while justifying their actions as a technical necessity. It also provides the regulatory agency with significant discretion to determine what type of practices are reasonable, which can be a challenging task in complex and rapidly evolving broadband Internet access markets.

⁴⁵ These concepts represent the key elements of the traditional economic model employed in framing telecommunications policy debates in which policymakers try to balance competition and investment incentives of operators in order to maximize some measure of public interest and consumer welfare. For an review of the literature see Johannes M. Bauer, *Regulation, Public Policy, and Investment in Communications Infrastructure*, 34 TELECOMM. POL’Y 65 (2010). Given the high degree of structural dominance in telecommunications, the threat by operators to reduce their investments (if policymakers choose to adopt or not adopt particular regulations) might appear credible to policymakers and influence their decisions.

⁴⁶ A typical argument by operators is that there is sufficient competition and therefore regulation is unnecessary as unhappy customers can switch if they do not like the services they are receiving. In reality, monopolistic or duopolistic market structures in fixed Internet access are the norm (outside of some densely populated urban areas where installing multiple competing broadband network platforms can be economically justifiable). Furthermore, competition among service providers does not necessarily serve as a substitute to network neutrality regulation, and the impact of such rules on investment incentives of providers is ambiguous. See Joshua S. Gans, *Weak Versus Strong Net Neutrality*, 47 J. REGULATORY ECON. 183 (2015).

discrimination and blocking for the ability of consumers to access and use advanced Internet “content” (33%) and “applications” (20%) relative to either the FCC or the operators. Although both groups of stakeholders are signaling the importance of consumer interests, they appear to be looking at the economic problem at hand in very different terms. In contrast to both stakeholder groups, who frame economic justifications for their policy stance in terms of benefits for consumers, the FCC Notice placed significantly more emphasis on the concept of “edge” (42%) networks relative to consumers or users (at around 15% relevance each). While the Commission’s semantic emphasis on consumers and use remains broadly similar between the Notice and the Order, there is a substantial decline in emphasis on the implications of the regulations for so-called “edge” providers in the Order. The public consultation process appears to have helped direct the agency to justify its decision in terms of consumer protection, rather than as an attempt to solve commercial disputes among large content providers and dominant broadband network operators.⁴⁷ The emphasis both groups of interveners placed on “innovation” was substantially higher than that of the FCC Notice or the Order, indicative of efforts by the opposing groups of stakeholders to convince the regulator to consider the implications of its policies on the future of the Internet as an innovation-generating platform.⁴⁸ These efforts do not appear to have been especially successful in centralizing innovation in the conceptual model the agency employs to justify its final decision. Besides the usual economic justifications for public regulation common across the texts, “free” and “expression” emerge as relevant concepts in the FCC Order. This emerging element in the language of the regulator captures its attempt to introduce an additional legal justification for restricting the boundary of permissible conduct by gatekeepers of access to the Internet.⁴⁹

V. SUMMARY

The ongoing debate about the role public policy can play in mitigating the costs of potentially anticompetitive traffic management practices by vertically integrated broadband operators provides an interesting basis to explore the utility of textual analytics technologies to evaluate the content of large bodies of relatively subtle legal and policy documents. The quantitative methodology adopted here provides a

⁴⁷ This interpretation of the semantic evidence is consistent with the text of the 2015 Order to the extent that the Commission excludes interconnection from the scope of the Order. *Supra* note 5, para. 30. Nevertheless, the FCC retains some discretion to review disputes between edge providers and operators “where disputes are primarily over commercial terms and that involve some very large corporations, including companies like transit providers and Content Delivery Networks (CDNs), that act on behalf of smaller edge providers.” *Supra* note 5, para. 193.

⁴⁸ For a discussion of challenges in balancing multiple policy objectives of stakeholders in the broadband ecosystem in the context of network neutrality debates see Johannes Bauer & Jonathan Obar, *Reconciling Political and Economic Goals in the Net Neutrality Debate*, 30 THE INFO. SOC’Y 1 (2014).

⁴⁹ This interpretation of the semantic evidence is consistent with the decision by the Commission to justify adopting a “no unreasonable interference/disadvantage” as an attempt to protect free expression, “thus fulfilling the Congressional policy that ‘the Internet offer[s] a forum for a true diversity of political discourse, unique opportunities for cultural development, and myriad avenues for intellectual activity.’” *Supra* note 5, para. 137.

relatively intuitive picture of technological, economic, and legal elements of debates about network neutrality regulation. Furthermore, by comparing the conceptual variety and intensity in texts by the FCC, operators, and other stakeholders, the article characterized how they tried to shape legal and policy choices in the FCC rulemaking process and how successful they were at doing so.

The semantic evidence shows that in initiating this proceeding the FCC emphasized the importance of enhancing transparency of what it considers to be, more or less, reasonable traffic management practices by operators. The public consultation process provided the opportunity for millions of consumers and businesses that rely on Internet access to express their concerns about blocking, service quality differentiation, and bifurcation of the Internet into fast and slow lanes. Operators maintained that market competition will solve the problem while the adoption of new regulatory obligations by the FCC might force them to reduce their investment in network infrastructure.⁵⁰

In contrast, submissions from pro-neutrality interests signaled that binding prohibitions against certain blocking and discriminatory practices might be required for protecting and promoting an open Internet. These signals helped the Commission justify its decision to follow guidance from the courts in *Verizon* regarding the necessity of Title II reclassification and the legality of per se/bright line rules against vertical discrimination. Public input also highlighted growing reliance on mobile Internet access services, providing the Commission with a rationale to extend the scope of regulatory obligations to include both fixed and mobile network operators. While the FCC appears to have incorporated signals from stakeholders regarding the importance of its choices about Title II reclassification, scope of open access rules, and the pitfalls of paid prioritization, the rule-of-reason approach to substantive interpretation and special services exceptions limit the capacity of the new regulatory framework to constrain anticompetitive traffic management practices of dominant network operators.⁵¹

Beyond the case of rulemaking for an open Internet in the U.S., the quantitative linguistic methodology used here highlights that content extraction and text analytics technologies can be valuable for reducing complex and subtle legal documents into their essential elements in an automated and relatively unbiased

⁵⁰ It is precisely this argument that makes it doubtful that rules adopted under Section 706 authority (versus Title II authority) would withstand future litigation by the operators. Section 706(a)'s mandate is very narrow and authorizes only policies intended to "remove barriers to infrastructure investment." See 47 U.S.C. § 1302 (2015).

⁵¹ This view of the design of the new regulatory framework helps explain why the adoption of the FCC Order does not appear to have had an impact on the share price of large operators such as Comcast and Verizon, or content and application delivery companies such as Google, Amazon, and Akamai. Financial market signals confirm the hypothesis that the new rules were not designed to alter status quo institutional arrangements and essentially function to legitimize various forms of traffic management practices consumers and emerging competitors consider anticompetitive. Nevertheless, it is important to note that the FCC decision occurred before a substantive decline in the share prices of some operators such as AT&T and content providers such as Netflix. See generally YAHOO FINANCE, <http://finance.yahoo.com/> (share price data). While it is not easy to decompose long- and short-term trends in equity prices, distinct effects of the FCC rules on the valuations of different types of firms in the broadband ecosystem represents an interesting avenue for future research.

manner. Although expert human supervision and future advances in NLP technologies remain imperative, automation has the potential to significantly reduce the costs of “understanding” what individuals and groups of participants in large multi-stakeholder processes are trying to convey to policymakers charged with serving the public interest. For parties involved in such processes, these technologies can be employed to monitor the position of other parties, identify potential opponents and allies, and adjust their own strategies accordingly. In their capacity to reduce the costs of participation, adoption of such technologies would be particularly relevant for organizations and interests with relatively limited resources to effectively engage in rulemaking contests against large and resourceful opponents seeking policies that serve their private interests.

APPENDIX

Table 2. Comparative Semantics of Network Neutrality

FCC Notice		Operators		Others		FCC Order	
providers	1	providers	1	broadband	0.8	service	1
broadband	0.95	broadband	0.97	access	0.75	broadband	0.96
rules	0.52	service	0.87	open	0.59	access	0.82
edge	0.42	access	0.53	service	0.56	provider	0.43
services	0.35	network	0.5	providers	0.54	rule	0.23
open	0.34	consumers	0.49	network	0.53	open	0.2
comment	0.31	offer	0.36	services	0.51	network	0.17
access	0.29	competition	0.34	mobile	0.48	use	0.13
Rule	0.29	rules	0.34	rules	0.46	consumer	0.12
network	0.21	available	0.27	consumers	0.39	mobile	0.11
commercially	0.19	investment	0.26	content	0.33	information	0.1
reasonable	0.18	regulation	0.26	fixed	0.31	practices	0.09
proposed	0.18	use	0.23	networks	0.26	Telecommu- nications	0.09
practices	0.17	information	0.22	available	0.24	public	0.08
transparency	0.15	wireless	0.22	data	0.23	content	0.08
consumer	0.14	users	0.22	authority	0.22	reasonable	0.08
adopted	0.13	speeds	0.21	use	0.22	provisions	0.08
users	0.13	innovation	0.21	protections	0.22	edge	0.07
management	0.12	content	0.2	public	0.22	regulation	0.07
information	0.11	customers	0.2	applications	0.21	forbearance	0.07
Data	0.11	approach	0.2	users	0.2	standard	0.06
approach	0.11	open	0.19	reasonable	0.19	user	0.06
content	0.09	arrangements	0.19	rule	0.19	data	0.06
level	0.08	traffic	0.19	consumer	0.19	carrier	0.06
applications	0.08	edge	0.18	neutrality	0.19	record	0.06
common	0.08	mobile	0.18	blocking	0.18	business	0.06
mobile	0.08	applications	0.17	practices	0.18	traffic	0.06
market	0.08	including	0.16	regulatory	0.18	investment	0.06
licenses	0.07	data	0.16	information	0.17	management	0.06
specific	0.07	practices	0.14	common	0.17	parties	0.06
public	0.07	Telecommu- nications	0.14	discrimination	0.15	decision	0.05
traffic	0.07	market	0.13	innovation	0.15	transmission	0.05
subject	0.06	regulatory	0.13	market	0.15	authority	0.05
legal	0.06	devices	0.12	prioritization	0.15	interconnection	0.05
court	0.06	wireline	0.12	competition	0.15	common	0.05
different	0.06	policy	0.12	video	0.14	definition	0.05
ability	0.06	percent	0.11	traffic	0.14	market	0.05
competition	0.06	prioritization	0.11	wireless	0.13	expression	0.04
Best	0.06	industry	0.11	regulation	0.12	prioritization	0.04
fixed	0.05	significant	0.1	carriers	0.12	competition	0.04
parties	0.05	transmission	0.1	devices	0.12	paid	0.04

Table 2 continued

FCC Notice		Operators		Others		FCC Order	
Telecommunications	0.04	common	0.1	ability	0.12	conduct	0.04
available	0.04	reclassification	0.1	companies	0.12	block	0.04
certain	0.04	marketplace	0.09	likely	0.11	fixed	0.03
investment	0.04	public	0.09	time	0.11	costs	0.03
video	0.03	paid	0.09	costs	0.11	free	0.03
deployment	0.03	standard	0.09	policy	0.11	cable	0.03
innovate	0.03	video	0.07	digital	0.09	wireless	0.03
authority	0.03	neutrality	0.05	decision	0.09	necessary	0.02
cable	0.02	net	0.05	cable	0.08	video	0.01

Table 3. Sample of Formal Comments by the Stakeholders to the FCC

Organization	Abbreviation
AT & T Services	Att
Consumer Federation of America	Cfa
Chamber of Commerce	Chamcom
Comcast Corporation	Comcas
Consumers Union	consU
Telecommunications for the Deaf and Hard of Hearing et al.	Deafam
Electronic Frontier Foundation	Efrontf
Internet Association	Intass
Open Media and Information Companies Initiative	Invstmic
Media Alliance	Mediaalliance
Minority Media	Minmedia
Netflix Inc.	Netflix
New America Foundation	Newamf
NTCA-The Rural Broadband Association	Ntcarural
Verizon and Verizon Wireless	Verizon