Big Data, Congress, and the Rhetoric of Technology:

Or, How to Industrialize Cyberspace

Christopher Lee Adamczyk
State University of New York at Farmingdale
Farmingdale, NY

Abstract: As new and developing technologies impact public and private life, rhetoricians would be remiss to overlook the deliberative rhetorics that justify their development, implementation, use-value, and impact. Using the 2013 joint congressional hearing "Next Generation Computing and Big Data Analytics" as an example, I argue that justificatory rhetorics about technology intersect with rhetoric from technology, obscuring information vital to critical deliberation. I demonstrate that the expert witnesses at this hearing draw upon rhetoric traditionally associated with American industrialization. Doing so allows them to articulate Big Data as a resource situated upon a metaphorical, American landscape and thus encourages the public to treat it as a natural resource that must be exploited for the betterment of the nation. Ultimately, I argue the use of this rhetoric dissuades critical analysis of the worth of Big Data and investigation of its technical aspects. This raises troubling questions about the ability of rhetoric about technology to both veil and guides what the public accepts as ethical rhetoric from technology.

Keywords: big data, rhetoric of technology, Congress, middle landscape

Introduction

On April 24, 2013, the U.S. House of Representatives Committee on Science, Space, and Technology held a joint hearing titled Next Generation Computing and Big Data Analytics (hereafter referred to as NGC). The stated purpose of this hearing was to "examine how advancements in information technology and data analytics enable private and public-sector organizations to utilize mass volumes of data to provide greater value to their customers and citizens, spurring new product and service innovations" (NGC, 2013, p. 3). The unofficial but well-known purpose of this hearing, however, was to deliberate on federal funding of Big Data—at the time a

priority of the Obama administration (IEEE-USA Staff, 2013). Three expert witnesses were called upon by the subcommittee to justify federal spending on Big Data. These witnesses were asked to "describe private and public Big Data research and development efforts; applications of Big Data initiatives; and management challenges" (NGC, 2013, p. 7). Advocating for federal funding of Big Data, these witnesses addressed the subcommittee with rhetoric rich in narratives highlighting the virtuous, utopic, and mythic aura of data analytic technology.

As new and developing technologies impact public and private life, rhetoricians would be remiss to overlook the deliberative discourses that justify their development, implementation, use-value, and expected impact. Carolyn Miller suggests that the rhetoric of technology is comprised of three main discourses: 1) *rhetoric about technology*, which concerns representations of technology in public forums; 2) *rhetoric within technology*, which concerns "private, proprietary discourse by which technological work gets done"; and 3) *rhetoric from technology*, which concerns how technological thought patterns can come to pervade society (1998, p. 307). In this essay, I use NGC to inquire into the relationship between rhetoric *about* technology and rhetoric *from* technology. Miller describes this relationship as one of "push" and "pull": rhetoric and technology are pushed along by external factors while simultaneously pulling us along with them, asking us "to do certain things . . . in certain ways" (2010, p. ix–x). On one hand, rhetoric *about* technology pushes technological design via the demands created by public knowledge about technology and how public deliberations represent technology. On the other hand, rhetoric *from* technology emerges from the design of technological systems, constraining what we can reasonably expect from a technology by way of its affordances and encouraging us to mold our thoughts to its logic. At its core, then, the relationship between rhetoric *about* technology and rhetoric *from* technology is one marked by the tension that exists between the freedom of deliberative discourses about technology and what Jacques Ellul (1964) terms *la technique*—the force that "clarifies, rationalizes, and arranges" the human world to adapt it to the needs of technological systems (pp. 5–6).

While rhetoric's potential as a counterbalance to technical logic is clear, in this essay I look toward rhetoric *from* technology's ability to appropriate rhetoric *about* technology, thereby impairing rhetoric *about* technology's capacity to keep technical logic in check. To illustrate this, I examine the rhetoric used by NGC's

expert witnesses to justify Big Data funding. I demonstrate that the expert witnesses' rhetoric *about* Big Data stymies inquiry into Big Data technology's technical dimensions by drawing upon a tradition of justificatory myths and narratives that recycle longstanding American cultural narratives and beliefs about technology. Specifically, I contend that the expert witnesses' rhetoric *about* Big Data descends from what Leo Marx (1964) terms the American "middle-landscape"—a system of beliefs that suggests that not wasting productive capability is a patriotic duty and a moral necessity (p. 87). Ultimately, I submit that, by alluding to this mythic landscape, proponents of Big Data technology impede deliberation that is pertinent to a strong democratic approach to technological development (Sclove, 1995, pp. 25–57). In doing so, they demonstrate how rhetoric *about* technology can be appropriated by rhetoric *from* technology, resonating with the logic of technical systems and veiling their unsavory affordances.

Why Next Generation Computing and Big Data Analytics?

NGC's timing and venue make it a remarkable example of the deliberative rhetorics that justify Big Data. The hearing itself was held amidst the Obama administration's Big Data Research and Development Initiative. Announced on March 29, 2012, slightly over a year before NGC, this initiative sought to improve the U.S.'s "ability to extract knowledge and insights from large and complex collections of digital data" in order "to help solve some of the nation's most pressing challenges" (The White House). To achieve these goals, the administration sought to develop infrastructure, use that infrastructure efficiently, train a knowledgeable workforce, and work with government agencies that have a vested interest in the development of Big Data (The White House, 2012). John P. Holden, director of the White House's Office of Science and Technology Policy during 2013, spoke on behalf of the initiative, claiming, "In the same way that past Federal investments in information-technology R&D led to dramatic advances in supercomputing and the creation of the Internet . . . [this initiative] promises to transform our ability to use Big Data for scientific discovery, environmental and biomedical research, education, and national security" (qtd. in Scola, 2013). Holden's unwavering support is indicative of the administration's general attitude toward Big Data during the early 2010s.

By the beginning of 2013, the Big Data Initiative was a year old. There was a felt need to justify its rapid consumption of public funds. On April 10, 2013, the Obama administration proposed a federal budget for the 2014 fiscal year that included $142.8 billion of R&D spending—a plan that increased research funding by 9.2% (Pinholster, 2013). When the budget passed, agencies with decidedly Big Data-friendly agendas received dramatic funding increases. For example, the National Institute of Health received $471 million in new funding. The National Science Foundation's lavish 9.2% budget increase included $155 million dedicated to developing cyberinfrastructure (Science News Staff, 2013). Budget increases for Big Data-related work were not, however, limited to the 2014 fiscal year. By April 15, 2015, *FCW*, an outlet that reports on federal technology policy, reported that government agencies were drastically overspending on Big Data research (Lutton, 2015). These funding increases strongly suggest the wild success of rhetoric used to justify and promote the Big Data Initiative.

Held on April 24, 2013, NGC represents a watershed moment for the Big Data Initiative when executive budget requests came under congressional review. NGC situated its participants at a rhetorical bottleneck where their suasory skill would necessarily and significantly impact the momentum of Big Data technology. Miller (1994) reminds us that *kairos*—the rhetorical idea of an opportune moment—is of the utmost importance when it comes to understanding the rhetoric of technology (p. 83). Because *kairos* in the rhetoric of technology is fundamentally about "creating opportunities for opportunity," it must take advantage of immediately available spatial and temporal imagery in order to convincingly forecast the future (Miller, 1994, pp. 83–84, 94). Building on Miller, J. Blake Scott suggests that a convincing construal of *kairos* by advocates of industry and technology allows for a measure of control over what are typically indeterminable risks. NGC's moment—two weeks after the 2013 budget was released, one year after the beginning of the Big Data Initiative, and on the heels of the decade when digital technology became ubiquitous—enabled its expert witnesses to craft successful narratives drawn from enthymematic assumptions unique to the moment and indicative of how Big Data technology is typically justified. Even NGC's use of the phrase "Next Generation" alludes to the kairotic felicity of the moment, as the notion of a generation suggests a "predictable trajectory of increasing technical capacities" and "the arrival of a qualitatively and decisively different moment" (Miller, 1994, p. 85). In this context, the rhetoric of NGC's expert witnesses easily resonated with the hearing's timing, emphasizing

chosen narratives about Big Data—particularly those that cast it as necessary and inevitable. Because NGC was a rhetorical bottleneck, these narratives elucidate the rhetorical strategies used by Big Data's apologists and underscore the importance of analyzing the hearing closely.

   NGC is also worth investigating because of its venue: a Congressional subcommittee. Here, we must consider that very little substantive debate takes place on the floor of Congress (Fitzpatrick, 1941, pp. 251–2). Instead, "Proposals are more thoroughly investigated and debated within specialized committees, and the recommendations of those committees often determine the character and outcome of floor deliberations" (Kauffman, 1994, p. 93). Cynthia Cooper (1996) notes that, since their inception, "subcommittee meetings have been an important tool for information gathering essential to informed decision making" (p. 11). Because of this circumstance, rhetorical strategies advocating policy within a subcommittee have far-reaching influence, impacting the nature of debate on the floor of Congress, and, in turn, the tone of public debate throughout the nation. In many cases, the discursive tendencies of subcommittee debates eventually become "codified into law" (Gring-Pemble, 2001, p. 342). Relatedly, T. P. Hughes (1987) contends that "legislative artifacts, such as regulatory laws, can also be part of technological systems," suggesting that the tone of debate in subcommittee hearings about technology influences how a technological system comes to operate (p. 51). If we accept that technological systems have political dimensions—a notion advanced by Lewis Mumford, Jacques Ellul, Herbert Marcuse, Langdon Winner, and others—then we must also accept that the success or failure of rhetorical strategies used within legislative artifacts connects directly with the quality and character of public life.

   Importantly, I am not here concerned with how the rhetoric of technology within legislative artifacts like NGC corresponds directly with the function and use of particular technologies. This conception of the rhetoric of technology, heavily influenced by Social Construction of Technology (SCOT) theorists and useful in its own right, tends to see rhetoric and technology locked in productive circulation where "there is dialectic between rhetoric and material design" (Bazerman, 1998, p. 385). Instead, I am interested in how a technology's rhetorical depiction does not necessarily have to be truthful to or influential on that technology's affordances—what it "offers" or "furnishes" its users (Gibson, 1977, p. 127). I envision this sort of rhetoric *about* technology as part of

what Arnold Pacey (1983) terms "technology-practice"—a collection of cultural, organizational, and technical practices that comprise a technology's role in society (p. 6). Pacey draws a distinction between the *technical*, which he takes to be knowledge and skill that relate directly to tools and machines, and the *technological*, which he takes to be the technical so defined plus cultural and organizational beliefs and practices, the existence of which undergirds technology-practice (p. 7). This distinction draws attention to aspects of technology that are often overlooked, as well as provides a home for rhetoric within the technological milieu. While rhetorics *about, within,* and *from* technology are not necessarily technical, they *are* firmly technological. Miller (1998) contends that taking a "broad view of technology," like that espoused by Pacey, grants "a better understanding of the rhetorical situations in which technological rhetoric occurs" and of "the rhetorical exigences that elicit it, the audiences and constraints that shape and potentiate it, as well as the rhetors and their motives that initiate it" (p. 289).

   As a component of technology-practice, rhetoric *about* technology must contend with a range of experiences and values that are often not compatible (Pacey, 1983, p. 122). These experiences and values circulate around technical objects, simultaneously promoting, destroying, or drawing attention to or from various nodes of meaning. Among these nodes of meaning are purely scientific and technical understandings of technology that possess the greatest comprehension of a technology's full range of affordances. It follows, then, that select, non-technical beliefs about a technology's affordances can be appropriated by those affordances to provide them a measure of ambiguity—eventually becoming incorporated in rhetoric *about* technology itself. From this view, NGC's rhetoric *about* Big Data, when understood as part of Big Data technology-practice, provides insight into how public rhetoric *about* Big Data can come to occlude Big Data's technical aspects.

   As a part of technology-practice, I argue that rhetoric can alter public perception of what technics do and can occlude or misrepresent the other dimensions of technology-practice. Rhetoric, when understood as a part of technology-practice, must increase the urgency and attentiveness with which we observe legislative artifacts like NGC. If the lines of subcommittee debate can become "codified into law" and legislative artifacts themselves can be part of a technological system, then legislative actions can alter the public's perception of a technology—potentially to the public's detriment. In other words, rhetoric *about* technology can

become an extension of rhetoric *from* technology (Miller, 1998, p. 307). In light of both this and the growing status of Big Data, NGC merits attention.

Narrative Paradigms, Myth, and Technology

Within a subcommittee meeting and other deliberative settings, then, by what means does rhetoric *about* technology resonate with rhetoric *from* technology? Within subcommittee debates, the use of narrative is the most pervasive rhetorical tool. About this, Lisa Gring-Pemble (2001) argues that once policy advocates grasp the political practices that envelop policy making, they "create compelling narratives and depictions that influence policy" (p. 361). The relationship between narrative and rhetoric was identified, for rhetorical studies at least, by Walter Fisher in 1984 when he argued that logic in rhetoric does not solely derive from a rational world paradigm, and instead proposed that a narrative paradigm is necessary to understand "life in all of its social dimensions" (p. 3). This realization brings with it a noteworthy epistemological implication. Within the rational world paradigm—a system typically seen as biased toward "subject matter knowledge" and "argumentative ability"—expertise and factual support of claims are the main source of rhetorical *ethos*, but within the narrative paradigm fidelity with already widely-accepted narrative structures takes on greater importance than strict logic. In short, a good story can trump both logic and expertise.

When considering narratives about technology, it is important to note that the era of high technology—characterized by rapid development, intense spending, and complex technics— impacts what we perceive as sound *ethos*. Miller (1978) suggests that as technical systems become ensconced within society, growing rigid in their interactions with those who use them, it "becomes easier to conceptually change reality than it is to rebuild the technical system" and that "we abdicate our understanding of reality to the terms of the technical system" (p. 233). Carrying this forward, she supposes that by becoming a lens through which we understand the world, pervasive technics effectively force us to equate their modes of reasoning with human rhetoric, thus becoming a "form of consciousness" and diminishing our chances to construct genuine *ethos* (p. 236). Thus, from this point of view, practices like talking about the human brain as if it were a computer or understanding a landscape purely in terms of natural resources carry added ethical

force because they reflect the logic of the technical systems through which we have come to perceive reality.

While I find Miller's suggestion that life in a high technology society ransoms our narrative abilities to the logic of technical systems somewhat deterministic, I agree with her suggestion that the rhetoric resulting from technical systems becomes important to our ways of thinking. If we accept, as I argue, that rhetoric itself is part of technology-practice, then it is more likely that technology molds *ethos* in favor of its rhetorical justifications rather than the logic of its technical system. That is, we come to understand the technological world in the terms of stories used to justify technology instead of via the technics themselves. This reevaluation of technical logic places the rhetorical force of technology firmly within the province of narrativity without stripping away its impact on our reasoning. Felicitous *ethos* escapes the gravity of technical logic but still orbits closely around technology-practice. Capitalizing on a similar understanding, James Herrick (2017) writes that mythic narratives espoused by technofuturists 1) appeal to the public's desire for order; 2) have corporate value and make possible cohesive social identities; 3) make transcendent visions about the future appear believable; 4) reveal their rhetorical force in their ability to bring transcendent visions to fruition; and 5) shape our rationality (pp. 21–22). By using beliefs expressed through myth and narrative as a strategy "deployed to envision for an audience a comprehensive order" (Herrick, 2017, p. 22), rhetorics of technology alter the public's perception of ethical deliberation about technology-practice, making opaque the technical realities within that practice. Indeed, it is through myth and narrative that technology most impacts our view of the world.

In subcommittee debates about technology policy, narrative logic is mobilized when issues of regulation, risk, funding, resource-management, or development emerge. While many outcomes can result from subcommittee deliberation about technology policy, Patrick Hamlett (1983) argues that all outcomes contain two basic dimensions: *policy discontinuity* and *technological integration* (p. 33). Policy discontinuity refers to "the degree of deviation from established practices and policies in the area under consideration" (Hamlett, 1983, p. 33). Decisions with high policy discontinuity deviate from what might be expected as a result of the past character of technology-practice. Thus, for example, if an administrative body in the U.S. adopts policy that encourages citizens to generate their own electricity and to remove themselves from the power grid, the recommendation would be highly

discontinuous with previous policy on the matter. Technological integration, on the other hand, "assesses the relative degree of concentration or decentralization in the network of social, economic, and political institutions and relationships surrounding a technology"—in other words, infrastructure (Hamlett, 1983, p. 34). Assessment of this dimension of technology policy determines how favorable a policy is to extant actors within technology-practice. Returning to the example about energy, we can note that a policy that places the onus of energy production on citizens might be viewed as having low integration depending on who precisely distributes the new machinery with which citizens create their energy. Typically, policies that are highly integrated and low in discontinuity are unpopular with the public as they drastically reduce the number of individuals who have input into technological development as well as encourage practices that benefit solely the established infrastructure (Hamlett, 1983, p. 39).

   Because narrative plays a significant role in the tone and outcome of subcommittee deliberations, it is reasonable to suspect that the rhetoric deployed in debates about technology policy impacts how discontinuous and integrated we perceive a new technology to be. Using rhetoric *about* technology to depict a new technic as innovative, for example, might draw attention away from how its technical dimensions are highly integrated and not discontinuous. Here, rhetoric *about* technology occludes the technical aspects of technology-practice by skirting discussion of them entirely. Typically, this is achieved by using narrative to forecast a technic's possibilities or to award it a transformative depiction or function or effect —in either case, however, the rhetoric deters "our asking crucial questions" (Turkle, 2004, p. 21).

   In reference to the power of such depictions, David Nye (2004) provides a useful typology of public narratives about technology, sorting them into utopian and dystopian categories and drawing our attention to the wide range of narratives that circulate around technology-practice. On one hand, utopian narratives can be 1) *natural*, where technology is seen as naturally emerging from society, 2) *ameliorative*, where technology is seen as necessarily improving society, and 3) *transformative*, where technology reshapes society for the better. On the other hand, dystopian narratives can be seen as 1) *hegemonic*, where technology is used to gain power, 2) *apocalyptic*, where new technologies bring unwanted destruction to society, and 3) *satiric*, where new technologies affect society in unforeseen ways (p. 171). These narrative types are powerful tools for provoking action and

influencing attitudes within and about technology-practice, ensuring that the most favorable design does not always gain traction and that symbolic meaning obstructs sustained inquiry (Nye, 2004, pp. 161–170). As examples of rhetoric *about* technology, they characterize new technologies and policies about those technologies as either discontinuous and integrated or not. Ultimately, as a component of technology-practice, these narratives stand in the way of the public's perception of rhetoric *from* technology by hearkening to the narrative *ethos* of a given technology and thus may perpetuate politics and power structures therein.

When the merits of technological innovations are being debated, as during NGC, the use of or allusion to narratives linked to the justificatory rhetoric of a technology have dramatic effects on the results of deliberation. James Kauffmann (1994) provides a poignant example of this in his work about how the Kennedy administration justified the Apollo Program. He demonstrates that the Kennedy administration offered "political, scientific, military and economic justifications for sending a man to the moon" that were integrated into the frontier narrative (p. 5). Frontier rhetoric itself constitutes one of the nation's "most enduring and characteristic" myths and plays heavily on conflict and harmony between individuals and communities (Hocker Rushing, 1983, p. 15). Because this narrative is ingrained deeply within the American psyche, using it to justify the Apollo Program "produced a compelling case for funding manned space flight that could not easily be refuted by . . . a more 'rationalistic' worldview" (Kauffman, 1994, p. 5). In this vein, John Jordan (2003) contends that Kennedy's justification of the Apollo program used a transcendent rhetoric to draw the public's attention away from "the technological complexity of the Apollo program" and toward the public's narrative role in the adventure, influencing both how the public behaved and their interactions with technology-practices related to the Apollo program (p. 226). The use of frontier rhetoric not only fashioned a program that was, at times, widely popular, but also helped to dismiss criticism by placing detractors in a position of opposition to a culturally significant belief. In due course, the result of this narrative's use were subcommittee debates that "superficially . . . engaged in thorough investigation of the Kennedy administration's space proposals" without seriously questioning their need (Kauffman, 1994, p. 94). Situating the new technology within a well-trod, transformative, and utopian narrative afforded the program's apologists the ability to draw attention away from how integrated into the industrial complex the program was and to

convince the public that the program was radically *discontinuous* with the industrial complex and thus worthy of support.

Kennedy's frontier rhetoric demonstrates how narratives and myths *about* technology often make use of stories and beliefs that are already embedded into American life. Many "adapt themes that have been in place for more than a century" (Herrick, 2017, p. 25). The use of extant narratives can lubricate the public's acceptance or rejection of a technology by situating it within a narrative paradigm that is already pervasive. For example, in the early twentieth century, Theodore Roosevelt earned Congress's approval to construct the Great White Fleet by situating the fleet within the myth of a "wonderous now" that catered to the public's perception of the United States as a "technologically advanced peace keeping force" (Dorsey, 1997, p. 450). Situating the Great White Fleet within this already developed narrative cultivated beliefs about the ships not as warships or tools of empire, but instead as manifestations of peace. This characterization enabled Americans to overlook the apocalyptic rhetoric *from* the ships' technical design as tools of destruction in favor of the ameliorative rhetoric *about* them.

Here, we must note that the use of narrative myth by proponents of a technology is not a *carte blanche* to claim anything about that technology. Authoritative claims about a technology are necessarily constrained by its material components and claims of what a technology can do cannot drastically exceed what the public might reasonably expect. This is a poignant observation when considering technologies that already exist or those that are being developed from extant technologies, as the public already has a familiarity with the technology-practice with which proponents must reckon. "Looming over any technological spectacle," Charles Griffin (2013) writes, "is the possibility that a targeted public will draw the wrong lessons from it . . . The audience may construe the material and symbolic elements of the operation as incompatible, or they may pay too much attention to one at the expense of the other" (p. 522). Griffin's observation is important when considered in light of Big Data technologies. At the time of NGC, these were relatively new, meaning that members of the subcommittee would have had little to no direct experience with them. This problem is amplified by the nature of Big Data itself, which is fundamentally a "hermeneutic technology"—one through which we come to interpret reality (Ihde, 1990, pp. 80–86). Because Big Data infrastructure usually is not physically interacted with and its output is accepted as ontologically valid (or, perhaps, even as being ontological in itself), Big Data technologies are easily attached to myth and narrative as they can

be construed as providing the justification for the existence of a myth to begin with. In other words, when we allow ourselves to view Big Data as fully representative of the world, it is easily used to justify myth the long predates it.

The American Middle-Landscape

In the U.S., perhaps the most invoked narratives about technology relate to what is known as the middle-landscape. Articulated by Leo Marx (1964), the myth of the middle-landscape portrays the U.S. as a place where the excesses of industrialism are balanced with the redeeming power of nature (pp. 5, 32, 114–115). In its simplest form it is "a new, distinctively American, post-Romantic, industrial version of the pastoral design" (Marx, 1964, p. 32).

   Despite its name, the middle-landscape is less a physical location than a system of beliefs expressed throughout American history in popular stories, national myths, economic policy, material design, and a variety of other contexts. The origins of this myth trace back to the colonial era and interweave with the earliest manifestations of industry, demonstrating optimism about Americans' "ability to stem the industrial and technological tide" without abandoning it (Rowe, 1991, p. 236). Unlike in Europe, whose industrial adventure impacted the population in pronounced and ill-begotten ways, industry in early North America was sparse and spread out. Because industries tended to be far-flung, their impact on what was perceived by European colonists as a pristine environment was limited. The material aspects of industry comingled with a cultivated, pastoral landscape without seeming out of place. The term "middle-landscape" itself refers both to the early American proclivity to live a lifestyle that was not too industrial and not too rural, as well as the location of the early U.S. on the map—situated between industrialized Europe and the "unsettled" American west (Marx, 1964, p. 125).

   The classic image of the middle-landscape used by Marx and others is George Inness's 1856 painting titled *The Lackawanna Valley*. A detour to consider this image will be fruitful for my analysis of middle-landscape narratives at NGC. In Inness's painting, a steam locomotive moves gracefully through the pastoral countryside and steadily away from a town. The countryside is cultivated—stumps of trees are visible—yet still recognizably close to the wilderness. Both the locomotive and the town are nestled into the scene in a manner that allows them to fade into it. The

steam from the locomotive and smoke from the town effortlessly blend with the early morning haze, and the town itself appears to grow from the forest. There is little to indicate that industry intrudes upon the landscape—in fact, it may even be interpreted as improving it aesthetically, as the scene itself is entirely pleasant (Marx, 1964, p. 221). As a visual rhetoric *about* technology, *The Lackawanna Valley* does little to distinguish industry from cultivated nature.

George Inness, *The Lackawanna Valley*. Courtesy of the National Gallery of Art.

   The middle-landscape and its depiction in *The Lackawanna Valley* and other similar media highlights a peculiar relationship between technology and nature in the U.S. At least up until the contemporary environmental movement, popular discourses have often depicted technology and nature as not necessarily opposed to one another (Nye, 1994, p. 23). Instead, tension is typically located between the pastoral ideal and industrialization—between the right amount of industry and too much industry. Technology, especially industrial technology, is generally viewed as improving nature by bringing wasted resources into fruitful production. While middle-landscape narratives view an overabundance of industry as detrimental, little about industrial technology in itself is questioned. On the other hand, nature is believed to temper the centralizing tendencies of industry. Overexposure to nature, however, turns citizens into "savages" who live in the wilderness too far away to be rescued by either civilization or technology. In short, the middle-landscape, and the industry therein, is accepted either

explicitly or implicitly as a moralizing milieu within which civilizing technology produces good citizens.

   In the U.S., an underlying acceptance of beliefs associated with the middle-landscape has been immensely influential during the past 200 years. Belief in it and in narratives descended from it have been components of a variety of technology-practices and instrumental to the acceptance of the idea of technological progress. As a rhetoric *about* technology, it has made opaque rhetorics *from* many different technologies, becoming an integral factor in the growth of industrial capitalism. Importantly, the power of beliefs related to the middle-landscape persists in the U.S. even as pastoral environments evaporate and modern, suburban environments grow. In this vein, Torben Huus Larsen (2010) contends that "the middle landscape narrative allowed the pastoral ideal to survive the industrial revolution, albeit in a modern version," and that, "by the twentieth century the pastoral ideal still permeated American society" despite the fact that most Americans now reside in urban areas (p. 14). The versatility of the middle-landscape is a function of its core concern with finding balance between two extremes—a characteristic that enables it to be rhetorically "indeterminate" and "to form where needed" (Cavanaugh, 2007, p. 34). For Larsen, the middle-landscape lives on most strongly in simulations and reproductions of pastoral settings in decidedly non-pastoral locations, such as museums and other tourist attractions. Other locations that embody the middle-landscape ideal in the modern U.S. are designed to do so, demonstrating the enduring power of the myth and the core beliefs it articulates even today. As Peter Rowe (1991) argues, in the U.S. "the modern technical temperament with its technological optimism . . . is engaged with complementary attitudes of individual self-reliance, traditional small-town values, and dwelling close to nature," resulting in the persistence of a mindset that still desires for emerging technologies to be tempered by nature (p. 290).

   Because of the middle-landscape's versatility and its resonance with situations with which it is not commonly associated, implicit belief in the myth's basic premises remains strong even today, even when it is not explicitly invoked. Myth and narrative need not be imported wholesale to retain their power, and portions of narratives or the rhetorical devices that they make use of are often enough to evoke the full force of a narrative paradigm (Herrick, 2017, p. 25). Today, premises predicated on the middle-landscape bubble up in a variety of rhetoric. For example, the belief that

technology makes us better citizens is alive and well in dialogues about social media and educational technologies. Natural resources are still considered to be wasted if not brought into production—industrial or otherwise. People leave dense cities and rural countryside for the suburbs or some other mix of development and wilderness. The assumptions of the middle-landscape have become so embedded in American culture that it no longer requires pastoral imagery to bring them to mind. Yet, piece together the allusions found in the justification of new technologies and one inevitably finds a metaphorical modern-day pasture with industry safely in the distance—as Howard Segal (1977) argues, middle-landscape allusions have become "a cheap rhetorical device masking a very different reality" (p. 139).

   While policy discourses about Big Data might appear to be unsuitable places to find allusions to the middle-landscape, one of my main contentions in the remainder this essay will be that much of the rhetoric *about* Big Data descends from early American industrial rhetorics. Marx himself argues that the middle-landscape "was continually redefined to meet new circumstances" (Segal, 1977, p. 140). In this spirit, I argue that the middle-landscape lurks within the justificatory rhetoric of Big Data, allowing what is ostensibly a new and innovative technology to draw from older rhetorical traditions that continue to permeate modern industries.

Eric Goldstein, *Untitled*, Retrieved from GE.com/digital.

   Perhaps the most powerful example of the persistence of the middle landscape is an image produced by Eric Goldstein as an advertisement for GE—part of "A trade campaign . . . showcasing the industrial internet and the potential for data to create huge efficiencies" (Goldstein, 2018). Captioned with the text "A locomotive so advanced, it's got data coming out of the caboose" (Goldstein, 2018), this image depicts a modern locomotive built of analytic technologies pulling boxcars made of data. In the background, the source of this data—mountains that are

represented by the peaks and troughs of line graphs—stands tall and awaits to be processed. Intentionally or not, this image clearly echoes Inness's *The Lackawanna Valley*, demonstrating the enduring influence of the middle-landscape even in digital and highly mediated contexts. In the following section, I show that this metaphorical, digital middle-landscape is at the heart of NGC. In this capacity, middle-landscape allusions are an aspect of the technology-practice of Big Data. They situate data, which is an ethereal and nebulous object, within a tangible and easily understandable narrative. These allusions are vital to how the policy discontinuity and technological integration of Big Data are perceived both by lawmakers and the public. Not only do they help shroud rhetoric *from* Big Data in a moralizing and utopian aura, they also provide a conceptual framework through which Big Data is understood—a reality that ultimately conditions how we believe it should be used.

Middle-Landscape Allusions at "Next Generation Computing and Big Data Analytics"

The rhetoric used by expert witnesses at NGC is an example of how the middle-landscape myth pervades policy deliberation about Big Data as rhetoric *about* technology. Because NGC occurred at a confluence of events vital to the growth of Big Data in the U.S. and took place within a subcommittee, it showcases justificatory rhetoric commonly used to advocate for Big Data and highlights how this rhetoric becomes interwoven with the act of legislation. Moreover, it also demonstrates how rhetoric *from* technology, in the form of its technical affordances, can appropriate rhetoric *about* technology. About this, I argue that as rhetoric *about* Big Data, allusions to the middle-landscape that lurk within the expert witnesses' justificatory rhetoric demonstrate how rhetoric *from* Big Data adapts cultural myths and beliefs to itself in a manner that camouflages it as a wholly acceptable technology and, ultimately, stymies sustained critique.

   To adequately determine the worth of Big Data and represent a spectrum of funding priorities, the subcommittee at NGC heard testimony from representatives of industry, academia, and government. Three expert witnesses were summoned. The first to testify was Dr. David McQueeny, vice president of technical strategy and worldwide operations at IBM Research. As the witness representing industry, McQueeny brought years of experience at IBM to the panel. McQueeny was "responsible for setting the

direction of IBM's overall Research Strategy across twelve worldwide labs and leading the global operations and information systems teams" (NGC, 2013, p. 25), meaning that he had direct involvement with the research agenda of one of the largest technology firms that work with Big Data. Because of his position, McQueeny was knowledgeable about industrial investment priorities regarding Big Data. Representing academia was Dr. Michael Rappa, executive director of the Institute for Advanced Analytics at North Carolina State University. As founder of the nation's "preeminent Master of Science in Analytics" program and a participant in a variety of academic research initiatives oriented toward Big Data, Rappa possessed an intimate understanding of academic funding priorities. Dr. Farnam Jahanian, assistant director for the Computer and Information Science and Engineering Directorate at the National Science Foundation, was selected to speak on behalf of government. Because of his role at the NSF "to uphold the Nation's leadership in computer and information science and engineering through its support for foundational and transformative advances that are key drivers of economic competitiveness and critical in achieving our national priorities," Jahanian was uniquely able to testify on behalf of the funding priorities of government institutions (NGC, 2013, p. 53).

Together, McQueeny, Rappa, and Jahanian paint a picture of the state of Big Data in 2013, giving special attention to developmental needs and how federal funding might address those needs. While each witness tailors his testimony to his background and expertise, several interlocking themes emerge from their collective testimony. Together, these themes constitute a justificatory rhetoric that characterizes and forecasts Big Data in a manner that allows the witnesses to guide deliberation and stymie criticism. I argue that these themes are descendants of the middle-landscape myth and as such impact NGC by disrupting the committee's ability to adequately inquire into the worth of Big Data.

Big Data Technologies Improve the Nation

This theme manifests itself in the rhetoric of the three expert witnesses and in the lines of questioning used by the subcommittee. Its pervasiveness throughout NGC strongly suggests its presence in most discourses about Big Data at the time. Thus, by tapping into what was likely a common belief among the subcommittee, the witnesses attempt to cultivate a collective *telos*—in this case the goal is to grow Big Data and expand its beneficial side-effects—and direct deliberation toward how that *telos* will be achieved. Through

doing so, this theme demonstrates how rhetoric *from* Big Data, in the form of its affordances, is fit into a mythic rhetoric *about* Big Data that depicts it as necessarily benefiting the public. In this case, the ability of Big Data to synthesize large amounts of data into actionable information is described in a manner that resonates with assumptions about technology associated with the middle-landscape, drawing attention toward its mythic potential and away from its affordances that clash with those assumptions.

   The witnesses use sweeping generalizations and specific examples to contend that Big Data improves the nation. Typical of the sweeping generalizations is Rappa's statement during his oral testimony that "advances in computer technology and powerful analytic tools make it possible to . . . draw insights from data to solve pressing problems from increasing operational efficiency to combating fraud, to better health care, to protecting national security" (NGC, 2013, p. 26). Here, Rappa characterizes Big Data as a panacea to problems likely deemed relevant by the subcommittee. Sweeping generalizations like this are supported by nuanced demonstrations of Big Data's potential. For example, McQueeny's reference to data analytics being used by the Memphis Police Department to "find patterns that police could not see themselves" (p. 19) and Jahanian's reference to the use of Big Data technology by physicians to improve cancer patients' "survival times" (p. 41) both support the point. Together, the sweeping generalizations and specific examples used by witnesses paint a picture of Big Data as necessary to the future well-being of the nation. Driving this idea home, Jahanian contends that the Big Data industry provides an "enormous opportunity to position the nation at the forefront of advances in science and engineering, job creation, and economic development" (p. 52).

   Broad claims that new and developing technologies benefit citizens are a core tenet of middle-landscape beliefs, which highlight how technology becomes a moralizing force when appropriately deployed. This aspect of middle-landscape belief originates in 19th-century American attempts to fuse pastoralism with the growth of widespread industrialism (Segal, 1977, p. 138). Then, the American propensity to value pastoral landscapes for their moral value was threatened by the intrusion of industrial technologies into those landscapes—a reality that was solved by the conceptual fusion of industry and pasture. A conflation of well-kept gardens with well-kept machines—apparent in Inness's *The Lackawanna Valley*—developed into a belief that well-kept machines and other technologies impart pastoral-like civil benefits

to those who live amongst them. While Big Data and other network-based technologies are typically not physically situated within a pastoral setting, the allusive power of this imagery is apparent in metaphors like the "walled-garden" that have been used to describe the early internet. Marita Sturken and Douglas Thomas (2004) argue that "the transformative power awarded to new technologies is directly related to the idea that technologies arise not of the world in which we live but as a force that comes magically from elsewhere, a force seemingly outside of social and political influences" (p. 4). In this case, allusions to well-kept Big Data technologies transforming the nation for the better derive their power from the middle-landscape tradition and a type of nostalgia for the past (Rowe, 1991, p. 236).

Furthermore, beliefs advocated at NGC that Big Data is a means to improve the nation result in the characterization of Big Data as worthy of national pride. It is a practice that also derives from the middle-landscape myth. Because the notion of a middle-landscape developed in a uniquely American context—both geographically and ideologically—there developed over time a belief in the U.S. that American society is particularly suited to reap the benefits of industrial technology (Nye, 1994, pp. 17–43). At NGC, the descendants of this belief are best demonstrated in repeated referencing of competition between nations to create cutting-edge Big Data infrastructure. McQueeny demonstrates this best. When asked by Representative Randy Hultgren about the status of U.S. computer infrastructure in relation to the rest of the world, McQueeny states that while the U.S. is still in a leadership position, "other countries have noticed the success that we have had in . . . leading the way on high performance computing breakthroughs" (NGC, 2013, p. 64) and begun their own programs to challenge the U.S. This statement echoes sentiments in his written testimony, where McQueeny contends that when it comes to Big Data, "The U.S. is still ahead but others are catching up fast . . . in sum, the race is on" (NGC, 2013, p. 19). By framing the development of Big Data infrastructure as a race, McQueeny not only hearkens to the competitive aspects of industrial capitalism, but also suggests that winning this race will result in the U.S. winning a greater share of the prize—the ability to improve itself in ways that other nations cannot achieve. Ultimately, leading the world in the development of cutting-edge technologies self-affirms the deep-seated belief that American culture is better suited than others for actualizing the utopian potentials of developing technologies.

Big Data is a Resource

Describing Big Data as a resource is closely related to the belief that Big Data will improve the nation. If the prior theme makes claims about the potential of Big Data in the abstract, then the present theme provides substance to those claims by metaphorically characterizing Big Data as a physical commodity that enables change when it is brought into production. Metaphors related to this belief locate Big Data upon an imagined landscape—in this case, cyberspace—within which it is a natural resource to be both exploited and protected. Through using this type of rhetoric *about* Big Data to describe Big Data technology's technical ability to gather large quantities of information, NGC's expert witnesses again cloak rhetoric *from* Big Data in beliefs that paint it as a benign tool that produces beneficial products.

   Emphasizing the bountiful quantity and potential of the data resource, McQueeny states that "There exists today an overabundance of data" and that "leveraging the capabilities presented by this will be a key factor in determining which countries pull ahead economically and which fall behind" (NGC, 2013, p. 24). Echoing this sentiment and suggesting that abundant data is a type of natural resource that can be brought into production, Jahanian argues that the nation's ability to "store, integrate, and extract meaning . . . from data" (NGC, 2013, p. 41) is vital to the future of the U.S. During questioning by the subcommittee, McQueeny further draws parallels between data and natural resources by suggesting that data collection technologies like LIDAR might create data sets out stands of trees that then can be used to guide the sustainable exploitation of timber—a situation that would see Big Data as a resource in a twofold sense (NGC, 2013, p. 59). The perception at NGC of Big Data as a resource is further supported by rhetoric that explains how data is made useful. For example, when Representative Ami Bera asked the witnesses how data quality is ensured, Rappa responded: "I think most data starts off as bad data" and that "cleaning and cultivating that data makes its useful" (NGC, 2013, p. 62). Here, we see an understanding that data, like any natural resource, must be processed and turned into a product before it is useful. Similarly, McQueeny, when describing how Big Data works, states that analytic tools are "applied to unstructured data from the web" and "transform latent data into meaningful, actionable information," thus emphasizing the need to transform data from its natural state into something new and useful (NGC, 2013, p. 18).

The belief that data is an abundant resource manifests during NGC in metaphors that characterize data as a commodity that can and should be brought into productive use. The use of such metaphors to describe Big Data has been widely noted and the types of metaphors used by witnesses at NGC are generally symmetrical with those used by others. Cornelius Puschmann and Jean Burgess (2004) organize common metaphors about Big Data into two broad categories: "Big Data is a force of nature to be controlled" and "Big Data is nourishment/fuel to be consumed" (pp. 1698–1701). Importantly, categories such as these—which are derived from common trends in public discourse about Big Data—point to a pervasive understanding of data as a resource that exists within American society and suggest that the expert witnesses' rhetoric was influenced by previous exposure to such ways of thinking. These metaphor types are perhaps best summed up by a common retort during the early 2010s that "Big Data is the new oil"—a saying that alludes to data as a resource and as a potential source of prosperity (Rotella, 2012).

The present theme's connection with the middle-landscape myth is apparent when we consider the relationship between wilderness and the industrialized pasture therein. As an unproductive and untamed area, wilderness within middle landscape narratives is typically perceived as dangerous waste. Those who dwell in its midst are characterized as "savage" and "uncivilized" for their inability to call forth the productive potentials latent in their homeland. This attitude is apparent in early American writings influenced by middle-landscape beliefs. For example, in the 1785 pamphlet by Celadon titled *The Golden Age; or, Future Glory of North-America Discovered by an Angel to Celadon in Several Entertaining Visions,* when describing the western regions of North America, an angel who identifies itself as the guardian of America says:

> This western part of America is yet but an uncultivated desart (sic); the haunt of savages (sic); the range of wild beasts—but soil in general is much richer than that of the eastern division . . . do you see yonder long valley.—How full of the choicest timber! What fine springs it contains! And how many perennial rivers glide through it, at suitable distances! (pp. 11–12)

Here, wilderness is characterized as an untapped resource—whether that resource is timber, soil, or navigable waterways—whose conversion to a productive capacity will benefit the nation.

Similarly, the characterization of Big Data as a resource metaphorically places it upon an imagined landscape of cyberspace. To extract, mine, process, or bring into useful production data that is going to waste is to, as Jahanian puts it, "transform all aspects of our lives" (NGC, 2013, p. 39).

Characterizing Big Data as a resource that must be brought into production necessarily raises issues of privacy, as the data sets that Big Data processes are usually composed of personal information and traces of the activities of individuals. While the origin of the word data—it is typically defined as the understanding of something given, like a fact or piece of information—does not suggest a sole focus on personal information, the contemporary propensity to use large quantities of data from the internet, coupled with "a shift toward even greater computability and commercialization" (Puschmann & Burgess, 2014, p. 1694) in the Big Data industry, encourages the commodification and trade of data previously considered private. Because of this trend, emerging Big Data technologies are often embroiled in controversy about protocols for using the "resource" that is private information. NGC is no exception. For example, Rappa defends the use of personal information by reminding the subcommittee that a government confidentiality agreement binds organizations to protect the data that they use, thus suggesting that the government does in fact exercise oversight on the matter (NGC, 2013, pp. 59–60). Jahanian suggests that privacy can be built into data analytic systems, thus ensuring that not all data is exploited by virtue of the technology of exploitation itself. While addressing the privacy issue, McQueeny writes that "organizational processes and technology can protect privacy" and that by doing so "organizations using personal information . . . become better stewards of information and help individuals make more informed choices" (NGC, 2013, p. 20). McQueeny's use of the word "stewardship" mirrors later language in the hearing where he uses the same word to refer to how Big Data will "cultivate valuable natural resources that need tremendous amounts of stewardship" (NGC, 2013, p. 59). This diction is common to environmental discourses, and its use here suggests that data is a resource that can be overexploited at detriment to the nation.

Like rhetoric that characterizes data as a resource, rhetoric that calls for the stewardship of data links to the middle-landscape myth. The easiest way to envision how is to return to Inness's *The Lackawanna Valley*. Here, we must pay close attention to the balance between forest and cleared land. While it is obvious that

timber is exploited as a resource to better the settlement in the distance—smoke from the locomotive and various other industrial sites attests to this—a pastoral balance is yet apparent between industry and the remaining stands of trees. It is this balance between cultivated nature and industry that grants the scene its serene and civilizing force—no sharp distinction exists between "the man-made and the natural terrain" (Marx, 1964, p. 221). Virtue exists in understanding the stewardship required to balance the two. In the imagined cyberspace of the digital middle-landscape, timber is replaced by data. Overexploitation of the data resource destroys its utopian potential and grants force to rhetoric that defends its stewardship. By associating with rhetoric that praises stewardship, Big Data's technical affordance of mass data exploitation effectively becomes an afterthought.

The Current Workforce is Inadequate for the Needs of the Big Data Industry

In all cases, the expert witnesses display noticeable concern for workforce development, calling attention to rhetoric from Big Data's need to cultivate a scene within which large numbers of individuals think in the terms of its own logic. Importantly, this theme shows how Big Data's technical need for a workforce able to understand and make use of its output can be woven into beliefs that depict self-reliance as a virtue. As such, this is the most common theme throughout NGC. McQueeny's contentions in his written testimony that an unskilled workforce is "a major inhibitor to the growth of next generation computing and Big Data" and that "Big Data requires new skills, knowledge and new types of decision making" are representative of this theme (NGC, 2013, p. 20). In fact, read without context, the transcript of the hearing might be interpreted as a record of deliberation about workforce training for Big Data rather than about funding priorities in general. However, according to NGC's hearing charter—the document that outlines the parameters of the hearing—the subcommittee requests that witnesses "describe private and public Big Data research and development efforts, applications of Big Data initiatives; and management challenges, including workforce development issues" so that they might deliberate over issues of departmental coordination, privacy, and prioritization of funding (NGC, 2013, p. 7). Juxtaposed with the original call, the witnesses' proclivity to focus on workforce development is curious.

The witnesses' emphasis on workforce development emerges in two ways. Discussion of workforce development in relation to

education is most common. For example, Rappa—the expert witness who represents academia—argues that the biggest challenge currently facing the nation is "our ability to educate a data savvy workforce that has the analytical skills to put data into action" (NGC, 2013, p. 26). Similarly, McQueeny contends that "collaborations between IBM and top U.S. universities are building a workforce of professionals and are creating new jobs" for "data-hungry employers," referring to a newly founded MS in Business Analytics at Rensselaer Polytechnic Institute as evidence of IBM's own attempts to develop the workforce (NGC, 2013, p. 21). This theme also emerges in examples given to justify how Big Data improves the nation. For example, Jahanian gives an account of how workers trained in data analytics "pioneered an intelligent thermostat that uses machine learning to transform home heating and cooling . . . using algorithms . . . for lower energy use" (NGC, 2013, p. 40). According to the narrative crafted by the witnesses, this type of technological advance is only possible if a workforce knowledgeable about Big Data is readily available.

Where the prior two themes ("Big Data is a Resource" and "Big Data Technologies Improve the Nation") are comprised of rhetoric that metaphorically alludes to, characterizes, and potentiates the nature of Big Data as a descendent of the middle-landscape myth, talk about workforce needs in relation to Big Data carves out a place for citizens in relation to that myth. As Herrick (2017) notes, myths about technology appeal to the public's presumed desire for order and make possible cohesive social identities in relation to technology. He argues that the work these myths do when "defining what belongs and what is excluded" conveys values, creates enemies, and "reflects rhetorical intent" (p. 21). In early middle-landscape narratives, the apparent success of industrial cities like Humphreysville, Waltham, Lawrence, and Lowell was referenced by proponents of industry to encourage the public to adopt skillsets that would position them to be successful in a middle-landscape, with those who resisted labeled as Luddites or worse (Segal, 1977, p. 139). Those equipped for life in the middle-landscape were simultaneously depicted as self-reliant individuals and as people granted "personal fulfillment" from industrial "co-operative identity" (Machor, 1987, p. 13). A confluence of individualism and collectivism was a hallmark of American pastoralism—especially within the middle-landscape myth—and allowed it to become a "cornerstone of intellectual and artistic experience" especially regarding "appropriate grounds for human settlement" or activity (Rowe, 1991, p. 226). This confluence made possible the melding of individualism with the necessarily collective nature of industry, a

reality that lubricated the introduction of industry into American life.

Echoing the history of industrial discourse in the United States, allusions to the middle-landscape myth at NGC constitute a rhetoric that divides people who can work with Big Data from people who cannot, positioning those who can with future prosperity and those who cannot with failure. For example, Rappa contends that students trained in data analytics are better suited for the workforce than students who are not because they are people "who work well in teams, can communicate . . . insights to decision makers, who can actually use the tools and apply the knowledge in an organizational context," and who possess the technical insight necessary to bring about lasting change (NGC, 2013, p. 57). Building on this notion, Rappa and McQueeny both suggest that privacy concerns are easily mitigated when "conscious," "clear-eyed," and "respectful" data analytic professionals are in charge of processing Big Data (NGC, 2013, p. 60). Just as with the industrial technologies that this rhetoric about Big Data echoes, it is the workers who are trained to properly use Big Data who are rhetorically granted success and are best able to reap data's bounty. By appealing for worker training, the witnesses essentially call for worthy volunteers to pioneer a digital version of *The Lackawanna Valley*—a space that is brought into existence using allusions to the middle-landscape myth. These volunteers must be self-reliant—a characteristic they express through the burden of self-funded education that requires students to make choices "based upon future employment predictions in the new economy" (Lakes, 2008, p. 343). In demonstrating their proclivity to be individually motivated, they are granted the benefits of Big Data technologies that inherently rely on the existence of a collective.

Big Data, Rhetoric, and Foreclosing Deliberation about Technology Policy—A Conclusion

Deliberately or not, the expert witnesses' rhetoric that comprises the three themes I detail above echoes the middle-landscape myth and positions Big Data within a similar, but imagined, digital middle-landscape. Doing so allows rhetoric *about* Big Data to resonate with and veil rhetoric *from* Big Data by impeding forthright deliberation about the rote, technical aspects of Big Data technology. The witnesses draw upon the American middle-landscape myth by using a mishmash of natural, utopian, ameliorative, and transformative narratives to deflect critical

inquiry into the technical reality and social implications of Big Data. Instead of engaging in critical inquiry, NGC presupposes Big Data's acceptability and concentrates attention upon its potential. The success of the more visible, narrative portions of Big Data's technology-practice—evidenced by a dramatic increase in funding after NGC—allows its technical dimensions to become further entangled with public life while remaining essentially unnoticed.

   The success of middle-landscape allusions at NGC resides in how these allusions allow the witnesses to turn the hearing's lines of questioning upon the subcommittee without appearing to break with the spirit of the occasion. The witnesses flip the script primarily through the ubiquitous third theme: the inadequate workforce. While it is only a small portion of what they were requested to testify on, the witnesses use deliberation about workforce development as a pivot upon which to address a variety of issues, including the past successes, research, privacy, and future possibilities of Big Data. Whether intentional or not, approaching NGC in this manner inhibited its potential as a general inquiry into the value of Big Data and reframed NGC as an inquiry into how the subcommittee might help to better facilitate the development of what is characterized as a necessary technology.

   How this shift of focus functions is most evident in the way the subcommittee questions the witnesses. During the first round of questioning, members of Congress repeatedly ask how federal funding might improve the Big Data workforce, with questions explicitly inquiring into education at community colleges, getting children interested in data analysis, retraining workers with obsolete skillsets, and the pedagogical practices that best facilitate teaching about Big Data. The flipped script is especially palpable in the following question raised by Representative Dan Lipinski: "How can the federal government most effectively partner with industry to achieve common goals and do you believe that industry has sufficient input into the Federal Government's research agenda as it relates to Big Data?" (NGC, 2013, p. 66). Questions like this became felicitous as a result of how alluding to the middle-landscape myth characterizes data as a necessary resource and places the future prosperity and moral worth of the nation in the hands of the subcommittee. By invoking the middle-landscape tropology, the witnesses encourage the subcommittee to advocate for "wise" labor practices lest they be perceived as stunting the growth of the nation. Creating a sense that either the public or government must support industry to safeguard their own future has been termed "industrial apocalyptic rhetoric" and often allows those who do not fit into its

narrative to be scapegoated—especially when that narrative invokes deeply embedded cultural beliefs (Peeples *et al.*, 2014, p. 245). Lipinski's question, which comes after several inquiries into how the Big Data workforce might be grown, demonstrates the subcommittees' reactive, rather than proactive, response to the witnesses' testimony and shows their desire to not be listed among those who reject the Big Data myth. In other words, they respond in the terms proposed by the witnesses. As such, government contribution—or lack thereof—to pioneering Big Data's imagined middle-landscape becomes the focus of critical inquiry rather than the Big Data industry itself.

In their capacity as rhetoric *about* technology, allusions to the middle-landscape at NGC raise troubling questions about our ability to deliberate collectively over the technical dimension of Big Data technology-practice (that is, rhetoric *from* Big Data). Because the middle-landscape myth expresses the tension between industry and nature within American culture (Pacey, 1983, pp. 121–123), its invocation signals a situation within which dialectic between these two forces occurs. The middle-landscape's appearance within a congressional hearing about technology policy is unsurprising and suggests a need to critically deliberate over the technology at hand lest that landscape become dominated by some manifestation of industry. As the landscape of cyberspace is metaphorical, the dialectic that often occurs is between personal data—which is represented by nature—and the right to exploit it. Upon the landscape of cyberspace, humans themselves become Heidegger's (1977) "standing reserve" (p. 17)—ready to be exploited so that they can ostensibly better themselves with the products of that exploitation. Pacey (1983) argues that what matters most in situations where such dialectic occurs is not "which values come out on top, but how conflicts are handled" (p. 122). That is, because this type of policy debate has potential to drastically affect the character and quality of life, it is necessary to work through the issues it raises from as many angles as possible. Richard Sclove (1995) terms this ideal a strong democratic approach to innovation—a type of deliberation neatly summed up by the retort: "No innovation without representation"—and argues that all technology policymaking should "seek democratic procedures for formulating and applying rationally contestable design criteria" (p. 32). A strong democratic approach necessarily requires the existence of institutions that foster these circumstances (Sclove, 1995, p. 37).

At NGC, the success of narratives derived from the middle-landscape myth is symptomatic of the impact of rhetoric *about*

technology on the U.S. democratic institutions' ability to deliberate about rhetoric *from* technology. Substantial evidence of the veiling ability of Big Data's narrative dimensions arrived during June of 2013, just over a month after NGC. At that time, Edward Snowden leaked documents detailing the U.S. government's access to and gathering of private data. These practices immediately stunned the public and were hailed as "extremely unusual" (Greenwald, 2013). Violating privacy in this manner doubled back on the ubiquitous narratives that characterized data collection as virtuous stewardship that improves the well-being of the nation. Poignantly, permission was granted to the FBI to surveil Verizon's call records, the data mining operation that was first to break headlines, on April 25th, 2013—the day *after* rhetoric at NGC effectively hailed the use of Big Data as vital to the future of the nation. Clearly, public oversight had fallen victim to rhetoric *about* technology, and rhetoric *from* technology had been allowed to develop effectively unchecked.

   The potential susceptibility of congressional deliberation to rhetoric *about* technology qua narrative and myth—as demonstrated by my own analysis of NGC and by Gring-Pemble, Kauffman, and others—undermines congressional ability to foster a strong democratic approach, allowing one side of the nature/technology dichotomy to outweigh the other. Using culturally resonant narratives to justify Big Data allows its proponents to veil the implications of its technical affordances by dressing them up in utopian and ameliorative garb. Nye (2006) suggests that technology and narrative have an affinity with one another, as both require "the imagination of altered circumstances" and imply "a succession of events" (p. 3). An affinity between the technical processes of Big Data and the narrative possibilities of the middle-landscape myth stymies critical inquiry by situating the technic within an imagined landscape that reframes rhetoric *from* Big Data as culturally acceptable. Consequently, Big Data appears to be a technology that is discontinuous and unintegrated with previous technologies, despite the fact that it is necessarily built upon prior infrastructure and as such exudes the same rhetoric *from* technology and social implications (Hu, 2015, p. 2).

Reference List

Bazerman, C. (1998). The production of technology and the production of human meaning. *Journal of Business and Technical Communication, 12*(3), 381–387.

Cavanaugh, B. (2007). The new middle landscape. In H. K. Miller (Ed.), *Societies and cities in the age of instant access* (2007). Springer.

Celadon. (1785). *The golden age; or, future glory of North-America discovered by an angel to Celadon, in several entertaining visions. Vision I.* United States.

Cooper, C. A. (1996). *Violence on television: Congressional inquiry, public criticism, and industry response.* University Press of America.

Ellul, J. (1964). *The technological society.* Vintage Books.

Dorsey, L. G. (1997). Sailing in the "wonderous now": The myth of the American navy's world cruise. *Quarterly Journal of Speech, 83,* 447–465.

Fischer, W. R. (1984). Narration as a human communication paradigm: The case for public moral argument. *Communication Monographs, 51*(1), 1–22.

Fitzpatrick, J. R. (1941). Congressional debating. *Quarterly Journal of Speech, 27,* 251–255.

Gibson, J. J. (1977). *The ecological approach to visual perception.* Houghton Mifflin.

Goldstein, E. (n.d.). GE Big Data. *Eric-goldstein.com.* http://eric-goldstein.com/work/ge-big-data

Greenwald, G. (2013, June 6). NSA collecting phone records of millions of Verizon customers daily. *The Guardian.* https://www.theguardian.com/world/2013/jun/06/nsa-phone-records-verizon-court-order

Griffin, C. J. G. (2013). "Operation Sunshine": The rhetoric of Cold War technological spectacle. *Rhetoric & Public Affairs, 16*(3), 521–542.

Gring-Pemble, L. M. (2001). "Are we going to now govern by anecdote?": Rhetorical constructions of welfare recipients in congressional hearings, 1992–1996. *Quarterly Journal of Speech, 87*(4), 341–365.

Hamlett, P. W. (1983). A typology of technological policymaking in the U.S. Congress. *Science, Technology, & Human Values, 8*(2), 33–40.

Heidegger, M. (1977). The question concerning technology. In W. Lovitt (Ed.), *The question concerning technology and other essays* (3-35). Garland Publishing.

Herrick, J. A. (2017). *Visions of technological transcendence: Human enhancement and the rhetoric of the future.* Parlor Press.

Hocker Rushing, J. (1983). The rhetoric of the American Western myth. *Communication Monographs, 50*(1), 14–32.

Hu, T.-H. (2015). *A prehistory of the cloud.* MIT Press.

Hughes, T. P. (1987). The evolution of large technical systems. In W. E. Bijker, T. P. Hughes, & T. Pinch (Eds.), *The social construction of technological systems: New directions in the sociology and history of technology* (51–82). MIT Press.

Ihde, D. (1990). *Technology and the lifeworld: From garden to earth.* Indiana University Press.

IEEE-USA Staff. (2013). *Congress looks at big data and next generation computing challenges.* IEEE-USA. Retrieved May 5, 2018. http://te.ieeeusa.org/2013/May/Big-Data.asp

Jordan, J. W. (2003). Kennedy's romantic moon and its rhetorical legacy for space exploration. *Rhetoric & Public Affairs, 6*(2), 209–231.

Kauffman, J. L. (1994). *Selling outer space: Kennedy, the media, and funding the Apollo Project, 1961–1963.* University of Alabama Press.

Lakes, R. D. (2008). The neoliberal rhetoric of workforce readiness. *Journal for Critical Education Policy Studies, 6*(1), 1–17.

Larsen, T. H. (2010). *Enduring pastoral: Recycling the middle landscape ideal in the Tennessee Valley*. Rodopi.

Lutton, J. (2015, April 15). DARPA is spending big on big data. *FCW*. https://fcw.com/articles/2015/04/15/snapshot-data-programs.aspx

Machor, J. L. (1987). *Pastoral cities: Urban ideals and the symbolic landscape of America*. University of Wisconsin Press.

Marx, L. (1964). *The machine in the garden: Technology and the pastoral ideal in America*. Oxford University Press.

Miller, C. R. (1978). Technology as a form of consciousness: A study of contemporary ethos. *Central States Speech Journal, 29*(1), 228–236.

Miller, C. R. (1994). Opportunity, opportunism, and progress: Kairos in the rhetoric of technology. *Argumentation, 8,* 81–96.

Miller, C. R. (1998). Learning from history: World War II and the culture of high technology. *Journal of Business and Technical Communication, 12*(3), 288–315.

Miller, C. R. (2010). Rhetoric, technology, and the pushmi-pullyu. In S. A. Selber (Ed.), *Rhetoric and technologies: New directions in writing and communication* (ix-xii). University of South Carolina Press.

Next generation computing and big data analytics: Joint Hearing before the Subcommittee on Research & Subcommittee on Technology Committee on Science, Space, and Technology (NGC)*,* 113th Cong. 1 (2013). U.S. Government Printing Office.

Nye, D. (1994). *American technological sublime*. MIT Press.

Nye, D. (2006). *Technology matters: Questions to live with*. MIT Press.

Nye, D. E. (2004). Technological prediction: A Promethean problem. In M. Sturken, D. Thomas, & S. J. Ball-Rokeach (Eds.), *Technological predictions: The hopes and fears that shape new technologies* (159–176). Temple University Press.

Pacey, A. (1983). *The culture of technology*. MIT Press.

Peeples, J., Bsumek, P., Schwarzem, S., & Schneider, J. (2014). Industrial apocalyptic: Neoliberalism, coal, and the burlesque frame. *Rhetoric & Public Affairs, 17*(2), 227–254.

Pinholster, G. (2013, April 9). White House proposes $142.8 billion in federal R&D support for FY 2014. *American Association for the Advancement of Science.* https://www.aaas.org/news/white-house-proposes-1428-billion-federal-rd-support-fy-2014

Puschmann, C., & Burgess, J. (2014). Metaphors of big data. *International Journal of Communication, 8*, 1690–1709.

Rotella, P. (2012, April 2). Is data the new oil? *Forbes.* https://www.forbes.com/sites/perryrotella/2012/04/02/is-data-the-new-oil/#65f73e847db3

Rowe, P. G. (1991). *Making a middle landscape*. MIT Press.

Science News Staff (2013, April 12). Obama's 2014 science budget: Research gets some help, and hurt. *Science.* http://www.sciencemag.org/news/2013/04/obamas-2014-science-budget-research-gets-some-help-and-hurt

Sclove, R. E. (1995). *Democracy and technology*. Guilford Press.

Scola, N. (2013, June 14). Obama, the "big data" president. *Washington Post.* https://www.washingtonpost.com/opinions/obama-the-big-data-president/2013/06/14/1d71fe2e-d391-11e2-b05f-3ea3f0e7bb5a_story.html?utm_term=.ab95ca76ec7f

Scott, J. Blake. (2006). Kairos as indeterminant risk management: The pharmaceutical industry's response to bioterrorism. *Quarterly Journal of Speech*, *92*(2), 115–143.

Segal, H. P. (1977). Leo Marx's "middle landscape": A critique, a revision, and an appreciation. *Reviews in American History, 5*(1), 137–150.

Sturken, M., & Thomas, D. (2004). Introduction: Technological visions and the rhetoric of the new. In M. Sturken, D. Thomas, & S. J. Ball-Rokeach (Eds.), *Technological visions: The hopes and dreams that shape new technologies* (1-18). Temple University Press.

Turkle, S. (2004). "Spinning technology": What we are not thinking about when we think about computers. In M. Sturken, D. Thomas, & S. J. Ball-Rokeach (Eds.), *Technological visions: The hopes and dreams that shape new technologies* (19–33). Temple University Press.

The White House. (2012). Press release: Obama administration unveils "big data" initiative: Announces $200 million in new R&D investments. *Obama White House Archives.* https://obamawhitehouse.archives.gov/the-press-office/2015/11/19/release-obama-administration-unveils-big-data-initiative-announces-200