The Future of Policy Informatics

CHAPTER · MARCH 2015

3 AUTHORS:

Justin Longo
University of Regina
12 PUBLICATIONS  16 CITATIONS

Dara M Wald
Iowa State University
9 PUBLICATIONS  19 CITATIONS

David M. Hondula
Arizona State University
26 PUBLICATIONS  116 CITATIONS
Chapter 19

The Future of Policy Informatics

Justin Longo, Dara M. Wald, and David M. Hondula

The preceding pages in this volume represent the first attempt to bring together in book form a collection of scholars, their thoughts, and evidence, with the objective of illustrating various essential elements of what policy informatics is and what it offers society. This edited collection set out some of the themes in this emerging field, demonstrated some of the specific methodologies and approaches under the policy informatics banner, and provided specific examples set in context for appreciating the contribution policy informatics can make in addressing complex public policy challenges now and in the future.

At the outset, policy informatics was defined as the study of how computation and communication technology is leveraged to understand and address complex public policy and administration problems and realize innovations in governance processes and institutions. Beyond the ‘how’ and ‘why’ of policy informatics, however, lies the ‘what’, ‘where from’, and ‘where to’ of policy informatics as a field of study. In this concluding chapter, at this point in the early development of the field, it is useful to consider where policy informatics comes from, where it appears to be heading, and what the field can hope to offer the future. We start by
considering the multidisciplinary origins of policy informatics: how the fields of information science, mass communication, and policy analysis—three key foundations of policy informatics—have each developed independently, how they together influence the character of policy informatics and frame future development of the field. In transitioning between this assessment of its past and a consideration of its future, we pause to evaluate the place of policy informatics in the spectrum of disciplines, interdisciplinary fields, and research areas. We then look to the future, noting some emerging complex policy challenges before considering how the field is positioned to respond in a way that takes advantage of both its foundations and emerging exogenous forces, specifically accelerating technology development and momentum towards opening governance.

The Foundations of Policy Informatics

In its most basic sense, policy informatics is an informatics approach to the study of public policy. Since the term ‘informatik’ was first coined by Karl Steinbuch in 1957 to describe the then-field of computer science, ‘informatics’ has expanded beyond its narrow interest in the evaluation of scientific information to include a number of subfields including bioinformatics, health informatics, and now policy informatics. We expand on the informatics background below, but those unfamiliar with the term policy informatics need not feel embarrassed as the field is certainly new by the standards of many fields. And owing to its newness, the depth of the field is relatively thin—for now.

For an indication of the relative newness of policy informatics as a distinct field, we need only glance at the arbiter of relevance and salience in the digital era: Google. Whether through
the Ngram Viewer that searches for the presence of particular phrases in the over 5 million books digitized by Google (Greenfield, 2013), or in Trends which measures how often a particular search term is entered relative to all searches and thus providing a window into what issues appear to matter across society (Choi & Varian, 2013), meaning, identity, and even existence are often determined by the data amassed by the search engine giant. Based on those measures, policy informatics barely registers. We certainly find the concept useful, but must admit that the term ‘policy informatics’ can hardly be said to be in common usage.

Policy informatics is also an understandably thin field. The authors collected in this volume are amongst the core of policy informatics with very few of the field’s leaders absent from this book. The field’s early innovators can also be found in a small number of other institutions such as the Virginia Bioinformatics Institute (Advanced Computing and Informatics Lab), articulations of the policy informatics approach (e.g., Dawes & Janssen, 2013; Helbig, Nakashima & Dawes, 2012), and collections such as a special issue on policy informatics in the Public Sector Innovation Journal (Johnston & Kim, 2011), and a forthcoming special issue on policy informatics in the Journal of Policy Analysis and Management. The overlap amongst these initiatives and authors confirm that the policy informatics community is both relatively small and cohesive, though the sustained and increasing level of activity in this space point towards the field’s rapid growth. Within that community, the conceptualization of policy informatics is also relatively cohesive. Some emphasize the data and computational aspects of informatics as applied to policy problems (Barrett et al., 2011), while other point towards the shifting notions of governance as being key to the field (e.g., Johnston & Hansen, 2011), but we do not anticipate that many would object to this volume’s definition repeated at the top of this chapter.
We also believe that the way we have segmented the broad disciplines and fields that provide policy informatics with its foundations would not cause many in the community to register a strenuous objection. While our characterization here is obviously influenced by our own disciplinary perspectives, and we do not suggest that these cover all of the traditions that inform the policy informatics movement, the following builds on some of the keywords in the definition above—specifically “computation”, “communication”, and “public policy” —to consider three disciplinary foundations for policy informatics: information science, mass communications, and policy analysis approaches. While these are by no means comprehensive across the entire field of policy informatics, nor do they represent the entire breadth of the community, we argue that they address much of what is implied under the heading policy informatics.

The first foundational leg of the emerging field of policy informatics might be best described as information science, a body of scholarship which has itself faced identity challenges throughout its growth that persist into modern academia. The concept of information management (and the study of that process) has existed since the advent of human society. While important lessons from its past (e.g., the advent of the scroll) offer valuable lessons for our future (e.g., Rayward 1996), our interest is in the evolution of information science in recent decades. In the post World War II period, the advances in disciplines connected to information science that policy informatics draws on are significant: ever-expanding computational capabilities with respect to the speed and volume at which information can be stored, processed, analyzed, and visualized; the spread of mobile technologies that permit access to information from a seemingly infinite number of locations and situations; technological improvements that allow for smaller and more affordable sensors with a wide array of capabilities; and methods by which such
information and analysis can be archived, organized, accessed, preserved, and communicated. These advances all provide opportunities for improving societal capacity to address its most pressing problems, with information science aiding the transition of data to knowledge and ultimately to societal wisdom (see chapter 3, in this volume).

Common terminology that we consider proximate to our definition of information science includes “computer science,” “data science,” “big data,” “general systems theory,” “information theory,” and “informatics” (e.g., Rayward 1996, Hjørland 2014). We stress that policy informatics, with its shared roots in policy analysis and communication, offers a more humanist perspective than the bleak outlook painted by Anderson (2008) for big data in which data collection and analysis replace the theoretical foundations of nearly all disciplines. But is it possible to isolate information science as its own, independent entity, from which policy informatics may build? And where does it sit with respect to other disciplines with a firmer theoretical foundation?

In some aspects, information science provides no sense of identity beyond science itself, given Rayward’s (1996, p. 4) suggestion that “almost everything could be argued to be information.” Machlup and Mansfield (1983, p. 22) articulate an only slightly refined vision, arguing that information science is “a rather shapeless assemblage of chunks picked from a variety of disciplines that happen to talk about information in one of its many meanings.” A widely applicable definition of information science is, they contend, impractical, based on the different interpretations and meanings of information within different disciplinary settings (Machlup and Mansfield 1983). Indeed the concept of interdisciplinary is a central tenet of many of the other definitions for information science brought forward in the 20th century, including the notion of information science as an “interdiscipline” (Rayward 1996). We identify the aspects of
information science most relevant for policy informatics to be those that are between the subfields of computer-and-information science and library-and-information science identified by Machlup and Mansfield (1983), the former of which focuses on the design and use of computers, and the latter on the improvement of systems by which records and documents are acquired, stored, retrieved, and displayed (Rayward 1996). Alternatively, Machlup and Mansfield offer a tightly focused view that sits at the intersection of the two, deemed “narrow” information science, covering key elements of our vision of policy informatics (allowing for a broad consideration of the term ‘information system’) including novel methods of information exchange, control of access to information, modeling and computer simulation of information systems and networks, and studies of the character and behavior of users of information systems and services.

Connections to the other foundations of policy informatics—mass communication and policy analysis—are obvious, but the contributions from information science rest in the technological and theoretical infrastructure within which the questions of the modern policy informatician are addressed. Surrounding the elements presented above, Rayward’s (1996, p. 11) definition of information science becomes attractive: “[modern] attempts to study in a formal and rigorous way processes, techniques, conditions, and effects that are entailed in improving the efficacy of information, variously defined and understood, as deployed and used for a range of purposes related to individual, social and organizational needs.”

From a more utilitarian perspective, it is the roots in information science that place the word “informatics” in policy informatics. Definitions for informatics date at least as far back as the middle of the 20th century, including Mikhailov, Chernyi, and Giljarevskij’s (1967, p. 238) suggestion that “informatics is the discipline of science which investigates the structure and
properties of scientific information, as well as the regularities of scientific information activity, its theory, history, methodology, and organization”. Hjørland (2014) recognizes that many sources consider informatics and information science to be synonyms, but ultimately concludes that the term informatics in and of itself, which has a connotation closer to computer science than library science, has little value except for notable exceptions: the use of so-called ‘compound terms’ like medical informatics, social informatics, and of course, policy informatics.

Like its academic ‘compound term’ relatives, policy informatics faces challenges within academic institutions. Among these are concepts of identity and terminology: “social informatics studies are scattered in the journals of several different fields, including computer science, information systems, information science, and some social sciences. Each of these fields uses somewhat different nomenclature. This diversity … makes it hard for many nonspecialists … to locate important studies” (Kling 2007, p. 205). More substantially, this lack of identity and the appropriate institutional framework for emerging areas of scholarship presents problems in the identification of merit, as reported by Greenes and Shortliffe (1990, p. 1119) in the field of medical informatics: “The unique nature of the medical informatics field was exemplified when the thesis committee unanimously acknowledged that the work was original and fully worthy of a doctorate, although none felt that the scope, content, and emphasis would have matched precisely with the advanced degree requirements of their own departments.” Our own experience suggests that researchers in policy informatics could face similar stresses in the years ahead as most academic institutions are limited in their capacity to rapidly adapt their framework to appropriately recognize such ‘interdisciplines’. It is likely that the emerging policy informatics community at large faces analogous challenges.
Just as information science struggled to define itself as an ‘interdiscipline’, the second foundational leg of policy informatics—communication research—has also faced serious questions about the range of fields, research areas, and disciplines it can claim. The aforementioned definition of policy informatics that frames the discussion in this book centers on the importance of communication in the development of innovative governance arrangements. An understanding of how information is processed and communicated is a prerequisite to fostering effective and informed decision-making. In this respect, policy informatics also derives much of its intellectual infrastructure from the field of communication research. Mass communication research as a field of inquiry also owes much to Harold Lasswell’s work in policy sciences (see below). After all, it was Harold Lasswell who first described social science as “for the intelligence needs of an age” (Peters, 1986, p. 535). It was from this tradition that leading interdisciplinary scholars at the University of Illinois and University of Chicago—including Wilbur Schramm (considered by many to be the founder of communication studies), the Hutchins Commission on Freedom of the Press, and Douglas Waples (a friend and collaborator of Lasswell’s) drew the boundaries of the field of communications studies (Rogers and Chaffee, 1994; Wahl-Jorgensen, 2004). During World War II, both Schramm and Waples worked in the Office of War Information, the domestic bureau in charge of wartime propaganda (Wahl-Jorgensen, 2004; Peters, 1986). Much of the early research in the field of communication stemmed from political concerns about persuasive communication and the proper role of the media in a democracy. In this respect, communication research originated as an exemplar of the policy sciences (Peters, 1986). Initially, the field attempted to conform to existing disciplinary boundaries, developing boundary organizations like the Institute of Communications Research at the University of Illinois (established by Wilbur Schramm in 1947) and the Committee on
Communication at the University of Chicago (1947-1960) to mediate the differences between the disciplines (Wahl-Jorgensen, 2004; Herbst, 2008). These efforts ultimately led to the founding of the International Communication Association in 1950 and its flagship Journal of Communication in 1951 (Herbst, 2008). Such organizations, journals, and identified subfields such as political communications (Chafee & Hochheimer, 1985) were developed in an attempt to define the boundaries of what was to become the field of mass communication (Herbst, 2008).

But tension between interdisciplinary research driven by shared interests and the institutionalization of the field along traditional disciplinary boundaries resulted in clashes amongst scholars. These conflicts culminated in a public debate published in Public Opinion Quarterly in 1959. The debate featured Wilbur Schramm and colleagues writing in response to Bernard Berelson, a professor of behavioral sciences recognized as a preeminent scholar of public opinion and communications and one of the founders and leaders of the Committee on Communication at the University of Chicago (Sils, 1980). In what has come to be described as his “obituary of communication study,” (Wahl-Jorgensen, 2004, p. 561) Berelson famously asserted “as for communication research, the state is withering away” (1959, p. 1), to which Schramm responds that in death the communication field is in “a somewhat livelier condition than I had anticipated” (Schramm et al., 1959, p. 6) and suggests that, though not without its problems, communication research “is an extraordinarily vital field at the moment, with a competent and intellectually eager group of young researchers facing a challenging set of problems” (Schramm et al., 1959, p. 9). Despite criticism of Schramm’s response as a “self-celebration he constructed himself” (Wahl-Jorgensen, 2004, p. 561), his role as an advocate for a fledgling field helped propel the field of mass communication forward to establish it as a
legitimate discipline recognized and supported at many of the top institutions across North America (Wahl-Jorgensen, 2004; Herbst, 2008).

Due to the “historically permeable borders and openness of Communication as a discipline” (Herbst, 2008, p. 607), it developed with a “determined eclecticism” (Menand, 2001). Some have argued that the broad origins and disciplinary nature of communication theory led to a richness of ideas without a guiding domain, set of theories, or disciplinary goals (Craig, 1999). However, others have argued that the conscious embrace of “the epistemological proposition of determined eclecticism” (Herbst, p. 608)—instead of a determined effort to ground the field within the boxes outlined by other disciplines—contributed to an expeditious recognition of communication as a legitimate discipline organized around a diverse set of methods, questions, and theories. As a new field struggling to create a position for itself within the academy, policy informatics could learn much from the disciplinary struggles fought by fields like mass communication. Just as communication scholars battled over how to develop a field grounded in a unified set of theories (see Craig, 1999; Myers, 2001; Craig, 2001), the development of policy informatics is likely to create a similar theoretical skirmish. In this era of information and post-disciplinarity, where “organizing structures of disciplines themselves will not hold” (Case, 2001, p. 150), does it make sense for policy informatics to try to justify the boundaries of our discipline or instead embrace the pursuit of novel questions and disciplinary eclecticism? Before we address this question directly, we explore the third foundational leg of policy informatics: policy analysis.

Turning to the part of this volume’s definition of policy informatics focused on complex public policy and administration problems, we see how policy informatics owes much to the interdisciplinary field of the policy sciences, or what has ultimately come to be called policy
Interest in increasing the relevance of the social and natural sciences for informing government decision making preceded World War II (Hall, 1989), but it was through the publication of Lerner and Lasswell’s edited volume *The Policy Sciences* (1951) that an integrated, multidisciplinary approach to the study of public problems first took shape. Harold Lasswell drew on what he saw as the best elements of the social sciences—principally, the disciplines that emphasized quantitative methods in their inquiry—and, adapting the American pragmatism of John Dewey and others hoped for a scientific approach to studying “the fundamental problems of man in society, rather than upon the topical issues of the moment” (Lasswell, 1951, p. 8). Lasswell displays a particular respect for the advances made in economics and psychology during the first half of the 20th century, a perspective that lies at the root at the rational approach to policy analysis and the belief that human behavior can be objectively observed, quantitatively analyzed, and accurately predicted—a perspective that continues to influence the field (Morçöl, 2001).

It seems a reflection of the particular point in history that Lasswell was writing—immediately following the formative experiences of the Great Depression and World War II, immersed in a “crisis of national security” and “the urgency of national defense” (1951, p. 3) as motivators for a more rational and scientific approach to governing and benefiting from the advanced state of social science method—that led him to highlight the policy sciences as the great hope for the advancement of the human condition at about the same time that Vannevar Bush was promoting the potential contribution of computer technology to the same end (Bush, 1945) and Wilbur Schramm was establishing the field of communications research (see above).

Standing as a bookend to Lasswell’s seminal conceptualization of the policy sciences in 1951 was his introductory article in the inaugural issue of the journal *Policy Sciences* (Lasswell,
and the subsequent expansion of those ideas in book length (Lasswell, 1971) where he characterized the policy approach as problem-oriented, multidisciplinary, set within a wider social context, and explicitly normative. Edward Quade’s introductory editorial to the first issue of *Policy Sciences*, while seeking to advance the quantitative revolution that motivated the policy science approach, goes to some lengths to downplay the expectations that can be placed upon the management and decision sciences as they are further deployed in public policy areas. He calls the policy sciences an effort “simply to augment, by scientific decision methods and the behavioral sciences, the process that humans use in making judgments and taking decisions” (Quade, 1970, p. 1). While the new journal sought to publish “hard” papers that “keep the analytical component up”, Quade stressed that the new discipline of the policy sciences must also recognize “extrarational and even irrational processes as sources of knowledge” (1970, pp. 1-2).

This distinction proved to be prescient for the future of the policy analysis movement. Following the dominance of analytical methods throughout the 1970s (Yang, 2007), profound shifts away from traditional analytical activities undertaken by policy analysts, and towards public management functions (Howlett, 2011) and the providing of support for the political agendas of ruling parties (Forester, 1995), began to take hold—the very status Harold Lasswell sought to rescue political economy from in the 1950s. As much as policy analysis is usually considered distinct from politics, the post-positivist policy perspective highlights the normative basis of policy analysis and the crucial role that politics plays in the process (Fischer, 2003; Mayer, van Daalen & Bots, 2004; Meltsner, 1976; Mouffe, 2000; Stone, 1997). Policy analysis continues to struggle with the alternative views from within the field as to how it should evolve,
between a return to its quantitative roots and a further embrace of post-positivist efforts to democratize policy analysis (Morçöl, 2001).

These existential struggles define the boundaries and illuminate the various perspectives within policy analysis, but are also useful for helping us understand the emerging field of policy informatics. With the world of policy analysis marked by “ambiguity, relativism and self-doubt” (Lawlor, 1996, p. 120), policy informatics re-engages these debates by pursuing the contribution that both information sciences and communications research can make in resolving emerging complex policy problems. To be clear, policy informatics should not be thought of as a technological solution to the problems of society, but rather as the appreciation of the role that technology can play as part of a toolset for helping society find solutions to complex problems. That policy informatics searches for those solutions equally in databases, algorithms, formal models, participatory platforms, and civic deliberation confirms policy informatics as a direct descendant of policy analysis.

One of the questions that often get asked of new academic subject areas is whether it represents an emerging discipline, a status that many wear as a badge of honor. There is no shortage of fields discussing whether theirs is “an emerging academic discipline”; a sample of the many examples would include medical informatics (Greenes and Shortliffe, 1990), knowledge management (Grossman, 2007), supply-chain management (Cousins, Lawson and Squire 2006), and nanotoxicology (Oberdörster, Oberdörster and Oberdörster, 2005). Among the many long-established disciplines in academia to which these emerging fields aspire are the standards of most university campuses such as economics, psychology, biology, physics, philosophy, and history. Disciplines matter so much because academic research and university
teaching have traditionally been organized according to disciplines, and resource allocations are
often made based on those categories (Becher and Trowler, 2001).

It is not always clear what constitutes a discipline, or distinguishes it from a field, subject
area or sub-discipline. Take, for example, the three foundation fields we surveyed above.
Information science continues to experience contentious disagreement over the placement of the
term “science” (Rayward 1996), exactly what constitutes “information”, and thus what precisely
is being studied (Hjørland 2014). Despite describing communication as both a new discipline and
a field, Herbst (2008) suggests it still struggles to justify itself, has failed to develop a unified
theoretical framework, and continually struggles to avoid seclusion. And even after more than
sixty years of activity, Radin (2013, p. 6) refers to policy analysis as “not an exact science but
rather an art.” Some criteria have been proposed for determining when a subject becomes a
discipline: a specific topic or object of research (which may be shared with other disciplines); a
body of accumulated specialist knowledge (usually unique to the discipline); theories and
concepts to organize the discipline’s knowledge; a specific technical language; specific research
methods aligned with the discipline’s research requirements; and, crucially, an institutional
presence such as courses taught at universities, academic departments, professional associations,
and dedicated academic journals (Krishnan, 2009, p. 9).

Based on those criteria, does policy informatics represent an emerging discipline? The
answer, in part, lies in our field’s interest in governance processes and outcomes over institutions
of government (Johnston, 2010). One central issue that distinguishes policy informatics from, for
example, e-government, is its focus on governance over government, as this volume’s definition
of policy informatics draws attention to with its reference to innovations in governance
processes. To make explicit the distinction, a government is an institution with formal authority
in a geo-political jurisdiction run by a combination of public servants and political leaders who have the power to enforce their decisions, whereas governance describes how a range of institutions, actors, rules, and norms, often operating across geopolitical boundaries, come together to influence, negotiate, and arrive at shared decisions (Rhodes, 1996). Four features of new governance configurations are that they operate through partnerships rather than enforced arrangements, are multi-jurisdictional, have a plurality of stakeholders, and are network-based (Bevir, 2012).

This interest in process and outcome over institutions is one reason why the status of discipline should not be a primary concern of policy informatics (Kersbergen and Waarden, 2004). As new approaches to organizing academic inquiry come to focus less on the name of the discipline or department (a perspective that would align with a focus on government), instead becoming more oriented towards agile reconfigurations of interest and inquiry, policy informatics comes to exemplify its own focus on governance as a way of understanding how the field is conceptualized. The question then evolves to not whether policy informatics is a discipline, but rather whether that status is an appropriate goal. In the world of Mode 2 science—characterized by Gibbons et al. (1994) as knowledge production that happens outside disciplinary and academic contexts, and is problem oriented—and in settings where innovation in research and knowledge production is promoted (Crow, 2010; Stehr and Weingart, 2005), disciplines no longer have the relevance and authority they once did. Just as governments are challenged to explain their relevance in a world of governance (Peters and Pierre, 1998), we propose that policy informatics can just as usefully explore its future as a field and contribute to the pursuit of science without the distraction of trying to claim for itself the status of emerging discipline.
The Future of Policy Informatics

These foundations of the policy informatics movement discussed above—information science, mass communication, and policy analysis—provide a sketch of some of the origins of the field. In this final section, we turn to the question of where the field might go in the future. The development of policy informatics will draw on its disciplinary traditions, but its future will be forged in response to several exogenous forces including the appreciation of complex policy challenges, continuing advances in technology, and changing expectations of governance. Policy informatics is coming of age in this environment and—perhaps more acutely with policy informatics than other academic communities—external forces will strongly influence the field’s development.

Because of the uncertainty of the future and the immediacy of the present, policy informatics is, as much as any other field, largely a servant of current problems. But if policy informatics is to remain relevant, it must prove its effectiveness in the face of emerging, important, complex policy challenges that will confront us in the future. Complex policy challenges are systems level problems that exhibit features such as profound uncertainty, rapid emergence, multiple issue interconnectedness, and a diversity of stakeholder interests (Geyer and Rihani, 2010). Specific conditions of complex policy problems include partial order (Kim, 2012), profound uncertainty (Dryzek, 1983), and often-rapid emergence that challenges our mental models and predictive capacity (Howlett and Ramesh, 1995). They are thermodynamically open and non-linear (Homer-Dixon 2010), have whole-system implications (Kendall 2000), and have probabilistic rather than deterministic outcomes that are subject to interpretation (Fischer 2003). Owing largely to the systems dynamics strengths of policy informatics (see especially chapters


5–8 in this volume), the field is particularly well positioned to address complex policy challenges.

Since we cannot know this future, we instead point towards a brief sample of current complex public policy challenges that can serve as examples of the types of critical issues that will face future policy makers and that policy informatics, amongst other fields, will be challenged to respond to. Climate change, more accurately anthropogenic global warming, is one such issue where long timescale increases in the average temperature of the Earth’s climate system are attributed largely to increasing concentrations of greenhouse gases that result from human activities (Stocker et al., 2013). The effects of increasing global temperatures include rising sea levels, changing precipitation patterns, and more frequent extreme weather events including heat waves, floods, and droughts. The climate challenge is representative of an emerging, important, complex policy challenge because of the lack of current impacts that can be attributed with certainty, the long time lags between action and effect, the possible devastating risks to human and natural systems, the uncertainty as to the impact of actions taken today on future outcomes and the uncertainty as to future impacts, the role of natural cycles in the context of anthropogenic forcing, and the role that future technology may play in mitigation and adaptation. One emerging response to the climate change problem is global scale geoengineering or climate engineering, which involves interventions that seek to modify the atmosphere and climate system at the global scale to counteract anthropogenic global warming. Two broad types of climate engineering efforts involve removing carbon dioxide from the atmosphere, and reducing the amount of sunlight reaching the earth. The challenge of climate engineering represents a complex policy challenge because of the untested impact of these interventions, the possible destructive impacts from miscalculation and unintended consequences, the unknowns
with respect to how countries might respond to unilateral actions by other countries, and the absence of a global governance regime to regulation action (Keith, Parson, and Morgan, 2010). Examples of other issues that fall into this category of emerging, important, complex policy challenges include large landscape and cross-boundary resource management, terrorism and armed conflict (see chapter 9 in this volume), advanced robotics and artificial intelligence, pandemic disease (see chapter 15 in this volume), inequality and inequity, and sexual violence.

In addition to complex policy challenges, society will continue to witness accelerating technology development in coming years. New developments will be built upon previous technologies and the pace of change will accelerate. Assuming the continued general thrust of Moore’s Law—that the number of transistors on an integrated circuit doubles approximately every two years—we can anticipate further reductions in the cost, size, and power consumption of computer devices. From these advances in the basics of technology hardware, the capacity, power, and reach of computer technology will continue to develop. The technology outputs from basic and applied research will, in turn, be adopted, deployed, and reconfigured by inventors and entrepreneurs seeking new functions and business opportunities. Services, functions, and applications unknown to us today will someday soon become commonplace, while some technologies currently occupying our focus will fail to materialize. If we were writing this 15 years ago, following the failure of the Y2K bug to wreck havoc as predicted (Backus et al., 2001), we may or may not have focused on the coming dominance of social media, the rapid decline of traditional media and the resultant freeing up of cognitive surplus directed towards content production and collaboration (Shirky, 2010), the business requirement that much Internet content and services be offered free of charge (Anderson, 2009), the phenomenon of “commons-based peer production” (Benkler and Nissenbaum, 2006), the ubiquity of powerful mobile
devices, or the accumulation of massive datasets and enthusiasm for predictive analytics. As we write this today, the ‘Internet of Things’—the idea that devices in our homes, workplaces, and public spaces, not traditionally thought of as computer devices, will have their own IP address and be connected to and controlled by other devices on the Internet—is predicted to be the next great advance in technology (Atzori, Iera, and Morabito, 2010). This may indeed turn out to be true. Or not. What is likely true is that some of the most significant changes to occur in coming years are unknown to anyone today.

However, these changes are likely to become additional tools in the policy informatics arsenal for addressing emerging, important, and complex policy challenges that may confront us in the future, while simultaneously giving rise to some of those future policy challenges. Whatever the future of technology development holds, policy informatics is well situated to take advantage of significant changes because the central premise of the field is built upon the application of new computation and communication technologies. This does not mean that the field should blindly adopt and promote every new technology. Indeed, part of the field’s origins in policy analysis and communication research demonstrate a willingness to question the negative social implications of some technology and media developments, and the inequities that some new technologies create and exacerbate. But to the extent that new computation and communication technologies can be employed to help understand and address complex public policy problems, policy informatics evolved to use those tools in the service of devising governance innovations.

While changing technology will shape society, the history of technology use and social development indicate that society is also capable of harnessing technology in support of its own preferences. We are witnessing two seemingly contradictory though simultaneous trends with
respect to power and control: consolidation and decentralization. The use of new technologies in support of greater freedom, transparency, democracy, and openness illustrate this point. From Arab Spring revolutions in the Middle East to political reconfigurations in America, social media has had a profound effect on once stable governing regimes though governments have proven adept at using technology to reassert their authority. Once insurmountable corporate hegemonies have been undermined by newly available technologies, replaced in some cases by consumer power but also by new corporate giants. Citizen voice has been amplified through new social media channels, weakening the power of centralized government institutions and strengthening demands for wider involvement in decision-making, though the dismissal of these diverse voices as noise has weakened their contribution to policy making. Transparency has become an expectation, with the onus on public administrators to argue why public information should not be regularly and routinely released (McIvor, McHugh, and Cadden, 2002), though there is skepticism over whether transparency alone contributes to democratic legitimacy (Lindstedt and Naurin, 2010). The open data movement continues to promote the regular release and availability of government held digital data repositories for unrestricted reuse, with at least three objectives: to encourage third-party developed citizen services, to expand policy networks for knowledge creation, and to increase government transparency and accountability (Longo, 2011). Platforms for engaging the capacity of citizens to be active participants in knowledge discovery, innovation, and decision making have the potential to strengthen our societies and our democracies (Noveck, 2009). Participation in research and knowledge creation can also be facilitated by extending mechanisms such as citizen science beyond their use to date as ways to engage volunteer labor inputs in research activities, to including citizen scientists in the design and conduct of research, and the interpretation of results (Shum et al., 2012). That these
movements have gained significant momentum in a short period is due to the combination of advances in technology and fuelled by the access expectations that web users have. Policy informatics can continue to promote this movement towards openness not as advocates for a normative position but by testing what works, when, and identifying platforms that demonstrate success.

---

Conclusion

The preceding has been an attempt to set the policy informatics movement in context, to describe some of the disciplinary traditions that inform, and what the field can hope to offer the future. We described a sample of the multidisciplinary origins of policy informatics, sketching the view from the fields of information science, mass communication, and policy analysis. Each of these fields continues to influence the character of policy informatics and will continue to do so in the future. In looking towards that future, we considered two particular strengths of policy informatics: its willingness and ability to adopt and shape technology development, and its support for the principles of opening governance.

These forces are not unequivocal benefits on the side of policy informatics, however. Both technology development and open governance are essentially value-neutral forces. When ubiquitous video technology and social networks are used to generate a viral campaign raising millions of dollars in donations through the “Ice Bucket Challenge”, most would laud the power of networked technology to raise awareness and generate charitable giving (Townsend, 2014). But when technology allows anyone with a 3D printer to acquire instructions over the Internet for constructing their own handgun, bypassing whatever regulations may exist, we may question
the supposed benefits that knowledge sharing over the Internet enables (Jensen-Haxel, 2011). And as much as open governance enables policy informatics to address complex public policy problems and develop innovative governance solutions, it also raises policy problems of its own and may give rise to governance challenges. The Internet allows citizens direct access to their political leaders and civic debate. But when Internet trolls are able to violate the rights of others, acting behind a mask of anonymity to threaten violence and promote hatred, we might ask whether online discussion is the broken part of the Internet (Buckels, Trapnell, and Paulhus, 2014). Advances in technology are thus neither good nor bad; rather, they are simply inevitable. Society will benefit greatly from having publics and scholars that can fluently understand and guide these future consequences from the ambiguous to the intentional.

As we noted previously, no one knows what will happen in the future, including us. Our only prediction is that policy informatics will have no shortage of public policy challenges to address. But we will enjoy the company of a vibrant community of scholars to investigate them with. This book is just the start of a long conversation about what policy informatics is and what it can offer in the future. We are excited to be part of that future, and to help build it together with colleagues, governance leaders, practitioners, and citizens, to explore ways to leverage technology to help understand and address complex public policy and administration problems, and promote innovations in governance.
References


Endnotes


2. http://www.google.com/trends/explore#q=policy%20informatics


4. See the 2013 Call for Papers for this special issue at http://onlinelibrary.wiley.com/store/10.1002/(ISSN)1520-6688/asset/homepages/JPAM_Call_for_Papers_Policy_Informatics.pdf?v=1&s=8449bac34b95809daf2dfeb9d2f8101e61bf307a. The special issue is scheduled to appear in 2015, with Dr. Anand Desai (see chapter 3 in this volume) and Dr. Yushim Kim (School of Public Affairs, Arizona State University) serving as co-editors.

5. http://media.illinois.edu/icr/history

6. Harold Lasswell’s preference for the term *policy sciences*, grounded in his noticeable admiration for the advancement of social science methods in the first half of the twentieth century, has not adhered widely in the policy literature. The term *policy analysis* is the more common term for the field that Lasswell thought of as the policy sciences (Parsons, 1995).