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15 Years of Protest and Media Technologies Scholarship: A Sociotechnical Timeline

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Abstract

This article investigates the relationship between the invention of new media technologies and scholarship concerning protest and political engagement. Building on an innovative approach that moves beyond a systematic literature review, this article contributes to our understanding of scholarship concerning digital communication technologies and how they may have been adopted and shaped protest movements and political engagement. Based on visualizations, we draw a sociotechnical timeline of protest and media technology scholarship within three dimensions: technological development, methods and techniques, and the social phenomena under investigation. The article concludes by identifying major trends in protest and media technologies scholarship over the past 15 years. The sociotechnical timeline enhances our understanding of academic discourse at the intersection of protest and media technologies by highlighting shortcomings and potential for future research.

Keywords

collective action, protest, visualization, timeline, academic discourse, media technologies

Introduction

The relationship between technology and sociopolitical change has been a major topic in academic discourse concerning political engagement and protest. This development can be traced to the logics of academic publishing, academic research, the representation of social phenomena such as political activism, and technological innovations. This article takes its point of departure in the misconception that new media deterministically foster political engagement and spark protest, a misconception that can be traced back to the invention of radio in the pre-digital age (see Brecht, 1967). The development of the Internet in particular was inspired by countercultural ideas (see Turner, 2006), which still frame the ways in which we talk and think about web technologies. This resonates with journalistic and public discourse concerning new media technologies for protest, such as "Egypt's Facebook Revolution" (Smith, 2011) and "Iran's Twitter revolution" ("EDITORIAL: Iran's Twitter Revolution," 2009). Although understanding and informing public discourse are important tasks of scholarship, we need to gain insight into how academic discourse is constructed and how the discourse evolves over time as well.

Aided by visualizations, this article draws a sociotechnical timeline of protest and media technologies scholarship.

Visualizing the development of academic discourse over time enhances our knowledge about academic research, makes us aware of discourse's consequences, and facilitates our understanding of media technologies and protest by highlighting their shortcomings and potential. By focusing on media technologies and media practices related to political activism, this article makes visible and tries to avoid the problematic dynamic in a field in which technology can become a potentially reductive defining frame. In the following, we will discuss the academic construction of technology and protest. Based on this discussion, we will identify three dimensions of protest and media technologies scholarship, which form the point of departure for the sociotechnical timeline of how digital communication technologies have been adopted and have shaped research concerning protest movements and political engagement.

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The Academic Construction of Technology for Protest

We argue that studying academic discourse concerning technology and political action has three essential components: (a) technological development, (b) methods and techniques, and (c) the social phenomena under investigation. The interrelationship between these components resonates within the academic discourse concerning sociopolitical protest. In the following, we will identify each of the dimensions of a sociotechnical timeline in order to explore the interplay of actual technological development and academic research methods in the study of activism and political participation.

Social Phenomena

The way in which society adopts a technology is closely related to the values that we, as individuals and a society, attach to this technology. For users to accept a technology, they must believe that the technology adheres to their social values. In other words, Toscano (2012, p. 36) argues, "people define a technology's values and uses by the socially constructed heuristic or frame between themselves and the technology, that in turn, helps to define a technology." This describes the dialectic relationship between technology and society. The values attached to Internet technologies, Christensen (2011) suggests, reflect a "liberation technology view," which is co-constructed through policy documents and public statements. These play important economic roles, for instance, in financial support for technology development. As a continuation of this, academic discourse is influenced by public discourse and vice versa, but academic research is also largely dependent on external funding, which might cause these positive discourses to resonate in academic research. Between the social values inscribed within specific technologies and the focus of attention of academic research lies a complex and unsolvable relationship in which academic discourse might be expected to focus on technologies that society co-constructs in a positive way.

In this article, we understand the production of scientific research and its output in the form of publications within a larger social framework of knowledge production. Latour and Woolgar (1986, p. 32) study the construction of knowledge through "the process by which scientists make their observations" in the laboratory. They describe technical papers as a form of discourse that is not the product of one scientist but instead of terminology and concepts as well as "a community of fellow observers" (i.e., reviewers) who decide upon the validity of the research. These groups play an important role in persuasion about the value of research. The stabilization of facts is thus a process that is carried out through discourse. Once facts are stabilized, they appear as if they were there all along until their discovery by scientists. According to Latour and Woolgar (1986, p. 182), however, this discovery is a result of an ongoing process of discursive persuasion across different groups and with different social forces at play: "Reality is the consequence of debate, following each twist and turn in the controversy as if it were the shadow of scientific endeavour." Audiences, they argue, accept these facts as reality because of the mystifying manner in which they are constructed. Through this acceptance, academic discourse plays a major role in attaching values to technology and consequently in easing societal acceptance of the technology.

One related aspect that has gained prominence in academic discourse is the hegemony of English-language publications, which excludes scholars from (non-English speaking) developing countries due to their "detachment from Western academic literacy" (Canagarajah, 1996). Evaluation by the research community (peer-review) fosters this exclusive character to ensure the quality of academic publications and their alignment with English-language academic culture. Hegemony is reproduced and maintained in an "ideological complex" through publication practices that subsequently enter into the academic practices of non-English-speaking academics (Tietze & Dick, 2013). Ranking systems and the hierarchical indexing of academic publications for purposes of evaluation within the research community usually foster the hegemony of international (English-language) academic journals.

The first aspect we must consider thus concerns the criteria by which we select the social phenomena (i.e., cases of political engagement) for investigation in the context of academic publishing concerning media technologies and protest. This academic selection process and the criteria behind it represent the first dimension of our sociotechnical timeline, which we identify as "social phenomena."

Methods and Techniques

Research methods are important in reaching scientific results and are thus also important in academic discourse. Over the past decades, social science research methods in particular have moved away from a solely quantitative account, where results are written up in a report, toward more qualitative approaches, including new and experimental methods in interdisciplinary fields of research. As a result, the academic language in research publications has changed as well. In a study on academic discourse, Hyland (2005, p. 173) argues that, especially over the past decade, academic writing has become less of "an objective, faceless and impersonal form of discourse" in its traditional sense and more of a "persuasive endeavour involving interaction between writers and readers." Academics not only objectively write up results and produce text, they also build solidarity with their readers, which becomes part of their self-representation and credibility as academics (Hyland, 2005). The text itself is central for the development of a convincing and coherent argument.

This becomes particularly challenging in emerging or interdisciplinary fields that lack a clear set of methods and

techniques of study. Already in 1988, Bazerman (1988) argued that interdisciplinary research is limited by "the construction of text, as it is impossible to understand what constitutes an appropriate text in any discipline without considering the social and intellectual activity which the text was part of" (p. 5). The text is a construct of a larger framework of meanings, and to understand the text, we must understand the world (or the discipline) in which the text is representative of a significant activity. Understanding the words that people use to describe what they are doing also helps us understand their scientific practices. Academic writing within this framework is part of a discussion, which is based on its own goals, terms, issues, lexicon, and arguments. In disciplines such as political science, "uncertainties over the consequences of findings and methodological propriety lead to an uncertainty over the reality and meaning of results" (Bazerman, 1988, p. 285). This is partially a result of a lack of disciplinary coherence in methods, techniques, and academic writing, with the result that such problems attain even greater visibility in new interdisciplinary fields and emerging subfields.

The second dimension in which we draw a sociotechnical timeline involves the "methods and techniques" used in scholarship concerning protest and media technologies. This includes the questions that can be asked and the contributions that can be made by employing certain methods and techniques.

Technological Development

The complexity of academic discourse production becomes evident when we focus on academic research on protest technologies. The relationship between technology and sociopolitical change has been a major focus in academic discourse concerning activism. Fisher (2010) argues that the discourse concerning technology as democratic, participatory, and emancipatory for the individual supports and legitimizes a new phase of capitalism, with consequences such as withdrawal of the state from the market, decentralization, flexibility of production and labor, and privatization. Technology's emancipatory potential is particularly reflected in concepts that stress the active user and the potential liberation of the market (such as Benkler, 2006; Shirky, 2008). Especially problematic, Christensen (2011) argues, is the technology discourse based on the theoretical foundation of "liberation technology or technologies of liberation," referring to the role of social media in the so-called Arab Spring. From this perspective, there is "a causal relation posited among specific forms of technology, the expansion of rights, and other forms of economic and social development" (Christensen, 2011, p. 237). This techno-determinist reasoning in mainstream media has resonated across numerous publications concerning the role of social media in these events and later in the Occupy Movement and the Indignados Movement (see Bruns, Highfield, & Burgess, 2013; Castells, 2012; Dahlgren,

2013). These waves of studies follow the adoption of a new (social) media platform in society. This is reflected in a change in terminology in academic discourse concerning these technologies and their associated societal impacts.

The idea that technology may encourage a more democratic, participatory environment, fostering grassroots engagement can be found with the invention of earlier media technologies (see Brecht, 1967). Tracing the cultural roots of the development of Internet technology or digital media in general is an endeavor undertaken to debunk myths concerning technology's emancipatory potential and its role in society today (see Carey, 2005; Coleman, 2007; Curran, Fenton, & Freedman, 2012; Turner, 2006). Several authors have traced their origins in order to reach a conclusion as to why the potential of Internet technology and social media for grassroots action, political engagement, and participation was generally so positively evaluated. One argument is that these statements were insufficiently rooted in media history (Allen, 2012; Carey, 2005), and another involves the lack of social, cultural, and political context (Carey, 2005) in the discussion as well as a failure to understand the rationality built into the hardware and software of the technology (Coleman, 2007, p. 365). The positive discourse concerning technology also legitimizes technological innovation, fosters technological implementation (as argued above), and may result in collaboration with tech companies that can provide data and technical knowledge for studying these new phenomena, with this latter result having become particularly important in the era of big data studies. This leads to flawed understandings of the interaction between technology and political engagement.

The way in which technological development is addressed in academic discourse is consequently an important component of a sociotechnical timeline concerning protest and media technologies scholarship. We identify technological development as the third dimension, which comprises the wording used to discuss media technologies in academic scholarship concerning protest as well as the consequences attached to these (new) media technologies.

A Short Note on Academic Archives and Ranking

Today, scientific publishing is sorted, filtered, and archived. Scientific databases such as SCOPUS, Web of Science, PubMed, and more recently Google Scholar play a central role in archiving, storing, and making searchable academic publications. While scientific databases allow access to the growing corpus of academic research, their archives and libraries of academic publications are constructed through algorithms that are grounded in a certain logic that is not identical with the academic citation system or with other digital archives. Following Foucault's (2003) *Archeology of Knowledge*, the archive consists not only of shelves and artifacts that the historian can investigate but also involves a

larger apparatus and set of rules that allow the archive to exist, including the institution and building in which it is located. The archive is thus a construction and product of discourse. We are capable of reconstructing the language that underpins it. This has important consequences for our understanding of academic databases as an archive. The archive that is constructed (such as Google Scholar) consists not only of the academic publications and a database, but the database itself is a construct of algorithms that perform sorting, filtering, and ranking functions. These mechanisms are often a black box, invisible, and we can only speculate upon how they are constructed through academic ranking systems, which are products of the research community, its funders, and publishers in interaction with the internal logics and system of the database (Giustini & Boulos, 2013; Harzing, 2014).

To understand academic discourse concerning the interdisciplinary field of protest and media technologies over time, we employ Google Scholar as a digital archive. In this context, Google Scholar is a sociotechnical platform defined by the evolving academic practices, on one hand, and a specific (often opaque) technological infrastructure, on the other. Although we are fully aware of the impact and the active role that such a sociotechnical platform plays in defining our data, it has been noted that Google Scholar works in a manner comparable to other electronic academic databases (Jacsó, 2005). If some aspects of Google Scholar—such as the frequency of its updates or its relation to the more general Google algorithms—are opaque, there are other aspects that make it a more suitable platform than the alternatives for the purpose of this research. Google Scholar covers a wide and interdisciplinary range of subjects, mainly in the social sciences, that are often under-represented in other digital databases (Kousha & Thelwall, 2007). Giustini and Boulos (2013) note that although Google Scholar cannot provide systematic review of biomedical fields, it remains the best available tool for the interdisciplinary effort we propose in this article. Moreover, Google Scholar provides a less biased comparison across disciplines than other systems (Harzing, 2014).

15 Years of Collective Action, Protest, and Activism

To describe the academic discourse concerning protest and media technologies, we must take into account the field's complexity. When describing how academic research has dealt with a specific problem over time, we risk basing our results based upon a poorly considered selection of research boundaries. After the dotcom bubble burst in 2000, a more systematic studying of the Internet became necessary and "uses of the internet kept expanding and democratizing" (Wellman, 2004, p. 126). Our sociotechnical timeline starts with these developments and leads up to now. In this study, the research boundaries needed to be sufficiently broad to cover the possible intersections between the elements being studied as well as clearly enough defined to deal with a time span of 15 years.

Academics have traditionally investigated pre-existing research through the established practice of literature review, as we have done in this article. Literature review can be briefly described as "a comprehensive overview of prior research regarding a specific topic" that "shows the reader what is known about a topic, and what is not yet known, thereby setting up the rationale or need for a new investigation" (Denney & Tewksbury, 2013, p. 218). Creswell (1994) identifies several purposes for a literature review: to share the results of other studies that are closely related to the reported study; to relate a study to the larger, ongoing dialogue in the literature concerning a topic; and to provide a framework for establishing the study's importance. All of the purposes identified by Creswell, as well as the description provided by Denney, require that a clear topic or specific research area be the focus of the review activity.

A literature review would thus be an insufficient technique for this study, as the core interest is not a specific topic but instead the academic discourse produced at the intersections of technological development, social phenomena (i.e., types of activism), and research methods and techniques. For the three-dimensional timeline in this study, we needed to define how the actual data set would emerge from these dimensions. In this study, triangulation refers to the necessity of dealing with three independently evolving dimensions composing a single problem (other than triangulation as a social science method as defined by Jick, 1979). To take these into account, we

- Queried Google Scholar using the combination of keywords "collective action OR activism OR protest" for every year from 2000 until 2014;
- Scanned the results and read the abstracts of the articles,[1] looking for explicit mentions of media technology or media practices;
- Selected the first 10 academic articles per year that were returned using the selected keywords and contained an explicit reference to media technology or media practices in the title or abstract;
- Recorded for each selected article: the page on which it was returned by Google Scholar, the media technology under investigation, the particular protest or collective action that served as a case, and bibliographic information.

The resulting data set, a selection of 150 papers, has specific characteristics: rather than focusing on specific technologies, it focuses (through the initial selection of keywords) on the academic discourse concerning social protest and political activism, and it detects the internal relevance (based on Google Scholar's ranking mechanism) of papers from a media technological or practices perspective. We used the resulting data set, composed of bibliographical
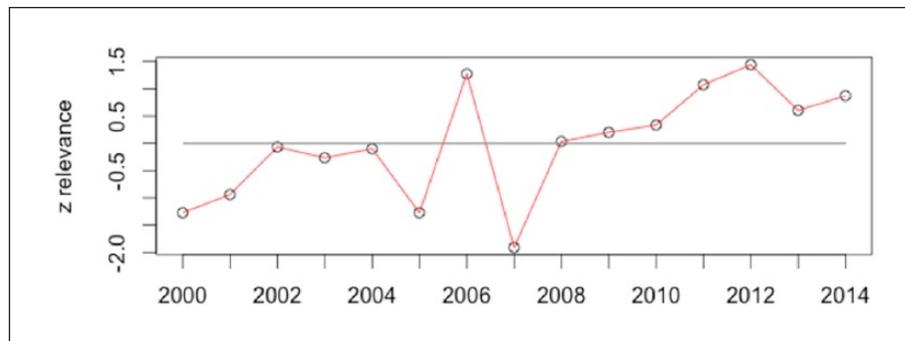
Figure 1. Relevance of articles on protest and media technology.

information and abstracts, to develop categories through a qualitative coding process that we applied to the rest of the data set (Mayring, 1999). Using this, we visualized how the three analyzed dimensions have changed over the past 15 years. In the visualizations, related categories (such as various qualitative methodologies) received similar colors to improve readability.

Time-series visualizations act as an exploratory tool for observing trends and tendencies over the years. Tufte and Graves-Morris (1983) have noted that time series offer a level of strength and efficiency of interpretation found in no other graphic arrangement, providing a large amount of information that would be lost, or barely accessible, using a table. Time series also allow the comparison of data both within the same visualization and between different visualizations. Presenting our results in time-series visualizations permits comparison of data over time to detect trends and, on a more complex level, realizes how every single timeline represented in the figures represents one dimension of a multidimensional problem. Among the possible strategies for visualizing time series, we opted for 100% stacked area charts for two reasons: (a) the total number of publications analyzed every year is known and defined by design (as described above), and (b) the distribution of categories should be understood as parts of a whole, namely, the academic discourse concerning technology and political action.

Toward a Sociotechnical Timeline

Until recently, media technologies played a minor role in studies concerning protest, activism, and collective action from a social movement studies perspective. When media technologies were discussed, it was mostly in the context of the concepts of how social movements were "framed" in the media or were part of "opportunity structures" (e.g., see Della Porta & Tarrow, 2005; Gitlin, 2003; McAdam & Snow, 1997; Tilly, 2004). This has changed quite drastically during the past 10 years, as numerous studies have been conducted on how activists use the Internet and, later, social media platforms to mobilize support and organize themselves and their

campaigns (see Bimber, Flanagin, & Stohl, 2005; Breindl, 2012; Neumayer & Svensson, 2016 for an overview).

The timeline we have developed offers the ability to assess the relevance of articles focusing on media technology in discourse concerning protest and collective action. This ability to assess relevance requires a definition of relevance. We defined a relevance value as the simple sum of the page numbers in which the articles were returned by Google Scholar, defined as $\sum_1^n r_i$. This produces a theoretical maximal value when all selected articles (with various media technological foci) are returned on Page 1 and a minimal value when the articles are returned by Page 20 (which was the highest page number in our data). This formula provides a solid relevance value based on the ranking performed by Google Scholar.

In defining the relevance of an article in the data set, every citation is counted independently from the venue from which the citation derives. Although this prevents us from taking into account the academic prestige of journals and other publication venues, it allows us to overcome potential distortions caused by the convergence of academic disciplines represented by journals with varying levels of visibility within their own discipline. The value of a relevance index as defined in this study depends solely on how many citations a specific paper has received.

Figure 1 shows the normalized value of the technology relevance index we measured. Despite fluctuations, we can observe a clear trend over the past 15 years. Starting in 2008, the relevance of technology-related papers grows steadily. This suggests an increasing centrality of media technologies and practices in contemporary academic discourse concerning collective action and protest. The increasing centrality of media technologies creates the starting point for the sociotechnical timeline of protest and media technology scholarship, which we will draw within the dimensions of the technology under investigation, the social phenomena that are examined, and the research methods that are employed. Next, we will observe how the academic discourse within these dimensions has developed over time and how the resulting timeline contributes to our understanding of the increasing centrality
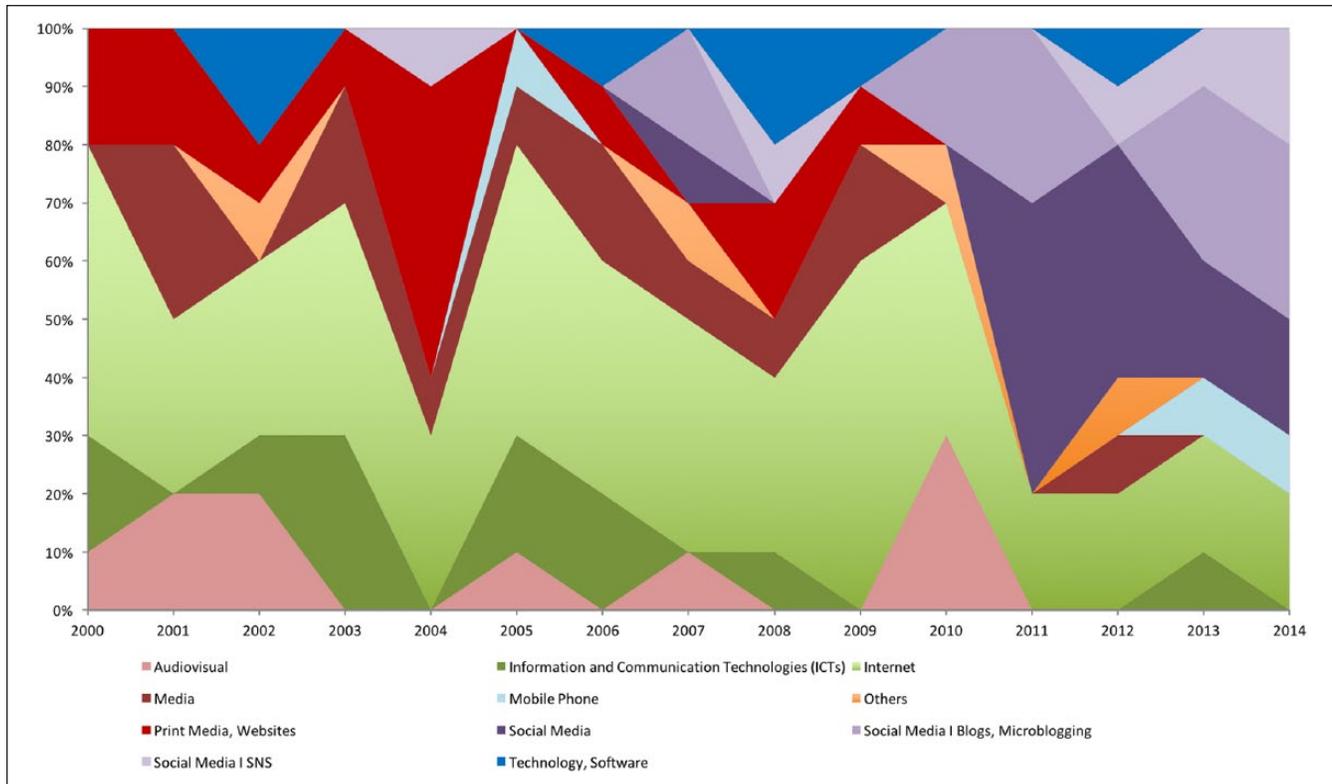
Figure 2. Media technologies.

of media technologies in academic research concerning political protest, activism, and engagement.

Technology: From Cyberspace to Twitter

> They [new technologies] do new things. They give us new powers. They create new consequences for us as human beings. They bend minds. They transform institutions. They liberate. They oppress. (Silverstone, 1999, p. 10)

In 1999, in an introductory essay to the first issue of *New Media & Society*, Roger Silverstone asks, "What's new about new media?" The answer, he reminds us, must be found in the relationship between continuity and change and through inquiry into the complexities of innovation as a social and technological process. In our timeline of technologies being studied in academic scholarship concerning protest, collective action, and activism, we categorized the technological terminology researchers use in a process that takes into account new aspects as well as continuity. The relationship at the conjunction of technologies and sociopolitical change has been expressed not only in various technologies that have been studied as relevant (and new) over the past 15 years but also in the large variety of names and labels used to identify specific technological innovations or (new) technology-based practices. Media technologies in academic discourse,

particularly when addressed as media practices, are not clearly identifiable machinery or tools developed from scientific knowledge but are semantically rich concepts in which the technical aspect (the technology itself) is entangled from social expectations regarding the technology, research methodologies, and a common academic language.

This semantic entanglement creates challenges when mapping technologies over time. It makes it necessary to juxtapose generic expressions such as Internet (or even more obviously, the term cyberspace, which enjoyed a brief flash of glory at the dawn of the millennium) with specific sociotechnical platforms such as Twitter and Facebook. From this perspective, and acknowledging these unavoidable limitations, Figure 2 maps the evolution of the researched technologies addressed in conjunction with sociopolitical change. Rather than giving us the opportunity to follow a specific technology or platform over time, Figure 2 should be understood as a way of observing how specific semantic areas have emerged and consolidated over the years through words used to represent technological change. One can see a shift from a general, unspecific use of words representing digital technologies toward a more technology-specific set of keywords. In the visualization, based on codes and categories from the publications in our data set, we can observe a gradual disappearance of "Internet" as the technology under investigation and (particularly after 2010) in favor of a shift to specific platforms,

such as blogs, microblogs, and social network sites. Moreover, the category "social media" enters the academic discourse with increasing relevance from 2010.

While technologies are defined by specific social values that frame their range of potential action (Toscano, 2012), this process appears to co-evolve with the specific parts or practices of the technology itself. In our data set, the Internet and, later, social media and Twitter in particular have been referred to from a deterministic perspective as enablers, facilitators, vehicles of democracy, forces for social change, and catalysts as well as (in reaction to the deterministic hype) from a functionalist perspective as mere tools or channels that activists can use. The higher level of specificity reflects the emergence of specific words in journalistic discourse ranging from "Facebook revolution" (Smith, 2011) or "Twitter revolution" ("EDITORIAL: Iran's Twitter Revolution," 2009) relative to early policy papers with references to terms such as "the information superhighway," which may indicate the interdependency of academic discourse with public discourse. At the same time, "Internet" has never been a single technology but has always referred to a broad set of specific technologies, transmission protocols, and social practices ranging from WWW browsing to email. Nevertheless, during the early 2000s, academics and journalists alike thought and wrote about the Internet as a single technology in relation to political protest, despite referring to particular functionalities.

The more recent trend of focus on platform-specific problems is important for understanding platform-specific media practices, such as their contradictory role in social change due to commercial impact or state influence. Focus on a single platform (such as Twitter, YouTube, Facebook, MySpace), however, suffers from novelty enthusiasm and might describe technology (and technology-enabled practices) as a series of novelties instead of as a more nuanced and stratified set of co-existing ever-evolving practices and their entanglement within the wider media ecology. Focus on "trending" platforms can create blind spots in academic research concerning protest, activism, and collective action. Does (encrypted) email communication still play a role in political activism? Or can we generalize from Facebook and Twitter studies to other forms of communication, activist tactics, and practices? This leads us to the next dimension in our sociotechnical timeline.

Activism: From Issues to Networks

Activists today navigate media technologies to re-define reality, mobilize, develop collective identity, attack, and produce visibility. According to Melucci, "contemporary movements strive to reappropriate the capacity to name through the elaboration of codes and languages designed to define reality [. . .] thereby escaping from the predominant forms of representation" (Melucci, 1996, p. 357). The researcher, Melucci argues, plays an important role in the process defining reality by escaping predominant representations. By

choosing a phenomenon or case to study from a particular academic disciplinary perspective, the researcher co-constructs the field under investigation. This becomes particularly visible when trying to map the past 15 years of research into cases of collective action, activism, and protest with a focus on media technology or media practices.

The second dimension of the sociotechnical timeline concerns specific cases of sociopolitical protest that have attracted researchers' attention. Identifying and categorizing topics for each paper require several iterations of coding, grouping, and re-grouping. Many papers focus on a very specific aspect of a broader phenomenon, whereas others frame multiple protest events together while aiming for a comparative perspective. Nevertheless, it has been possible to reach a sufficiently stable categorization for two dimensions: the geographical area in question and a broader typology of activism, protest, and collective action.

Interpretation of the first dimension is rather straightforward and defined by the geographical location with which the paper is concerned. The timeline in Figure 3 shows the focus of academic research concerning protest and media technologies over the past 15 years. It becomes evident that, up until 2008, most studies focused on the United States and Canada. Although the field of study becomes more diverse from a geographical perspective after 2008, we can still see a relatively high number of studies focusing on North America. This relative centrality of the United States and Canada as sources of examples and relevant cases can be related to accessibility due to language advantages (i.e., English language) as well as the general dominance of the English language in academic publishing (Canagarajah, 1996; Tietze & Dick, 2013). The increasing geographical spread of protest and media technology scholarship from 2009 may be a result of the transnational awareness of protest in Iran (as the first "Twitter Revolution"), the Middle East (and the so-called "Arab Spring"), China (due to censorship issues), as well as renewed forms of protest, such as the waves of protest in Europe as a result of the economic crisis.

There are several developments that we might relate to increasing geographical diversity. Besides the obvious diffusion of information and communications technology (ICT) across new parts of the world (and as a consequence, the increasing relevance of media technologies for political action), we might argue that digital technologies make certain processes more transparent and traceable, and consequently, publicly mediated communication becomes more accessible to researchers. Scholars have access to a wider range of sociopolitical movements (regardless of location) due to the permanent nature and searchability of digital data. While this might appear obvious, it highlights the complex nature of academic discourse and its dependency on data availability in terms of research questions and theoretical development.

The centrality of what researchers identify as relevant becomes even more evident when visualizing the issues and
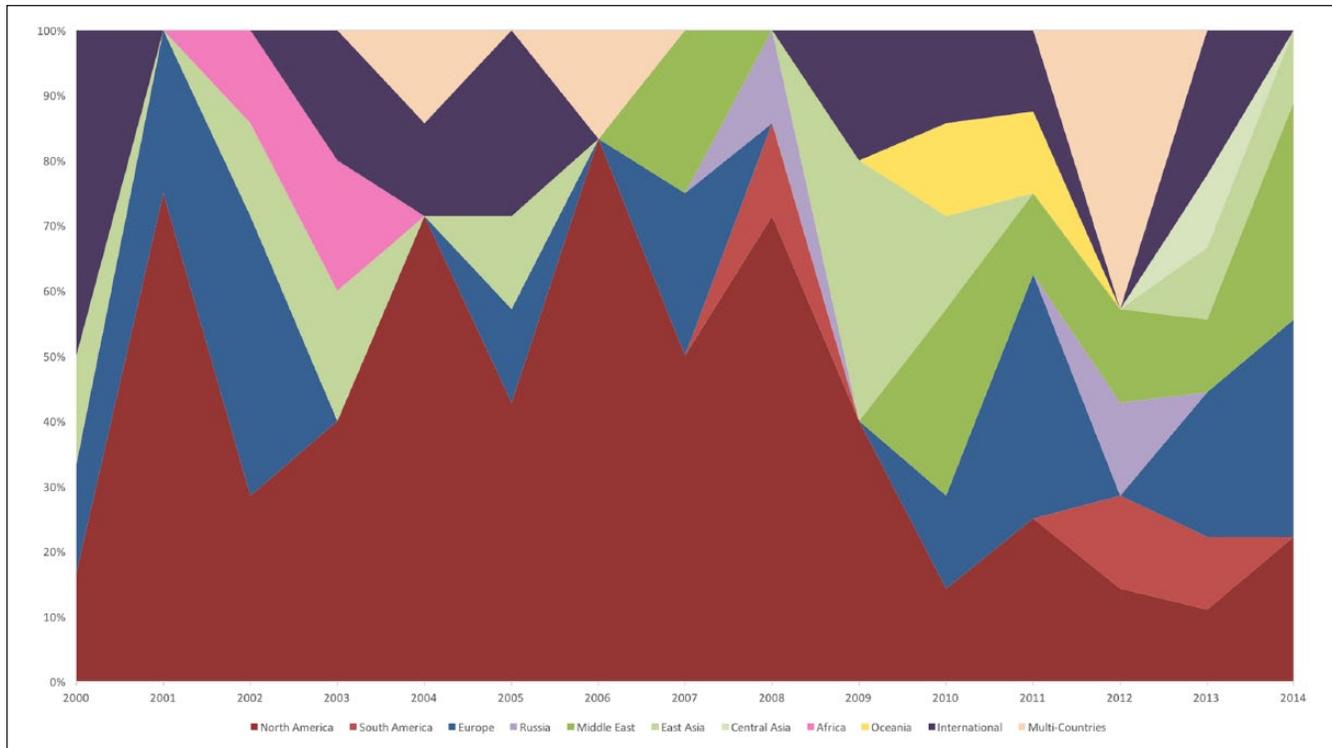
Figure 3. Geographical location.

forms of activism studied over the past 15 years. Figure 4 shows the evolution of various types of sociopolitical actions over time. Collapsing the great variety of protest movements or cases that were analyzed into a limited number of categories is problematic if we seek to visualize them in an absolute sense. In order to deal with this complexity, we grounded our categories in the authors' words, trying to summarize in a single label both the nature of the social movement (in terms of goals and ideology) and the focus of the researchers (in terms of which aspects of the sociopolitical movement have been analyzed).

In Figure 4, it is relevant to highlight how, alongside the stable presence of long-term societal issues (environmental activism, human rights activism, civic engagement, etc.) from 2011, we observe the emergence of the "networked activism" category. This category includes the recent protest movements (Arab Spring, Indignados, Occupy) around the world, which Castells (2012) discusses as *Networks of Outrage and Hope*, stressing the centrality of networked technologies in these movements. The main connection between these movements is that journalists and academics alike have stressed the central role of social media technologies in waves of protest around the globe. This differs from earlier works (mainly essays) focusing on media activism, digital activism, online activism, or cyberactivism in a general sense, which we categorized as technology-based activism. This introduces a new perspective on technology-based protest movements. Unlike in earlier studies, the presumed

centrality of technology in these events becomes an identification criterion for the relevance of these cases. This is in line with the introduction of digital methods for studying these phenomena, which leads us to the next dimension in our sociotechnical timeline.

Methodology: From Essays to Digital Methods

Research methods are indicative of a particular academic tradition, usually within a particular discipline, and consequently a relevant dimension for constructing academic discourse. The evolutionary development of methods over the past 15 years highlights the way in which research methods are not merely a set of tools but also define which kinds of activism and social participation can be observed as well as which kinds of research questions can be addressed. To observe this evolution, we re-coded our data and grouped the research methods used in the articles into larger categories. While some level of grouping was necessary to facilitate identification of relevant patterns, we sought to maintain a high level of methodological specificity framed within a general and well-accepted distinction between qualitative and quantitative approaches (Booth, Booth, & Falzon, 2003).

Figure 5 shows the evolution over the past 15 years of research methods to study protest and media technologies. To increase general readability, different methods belonging to the same macro-approach have been visualized in similar
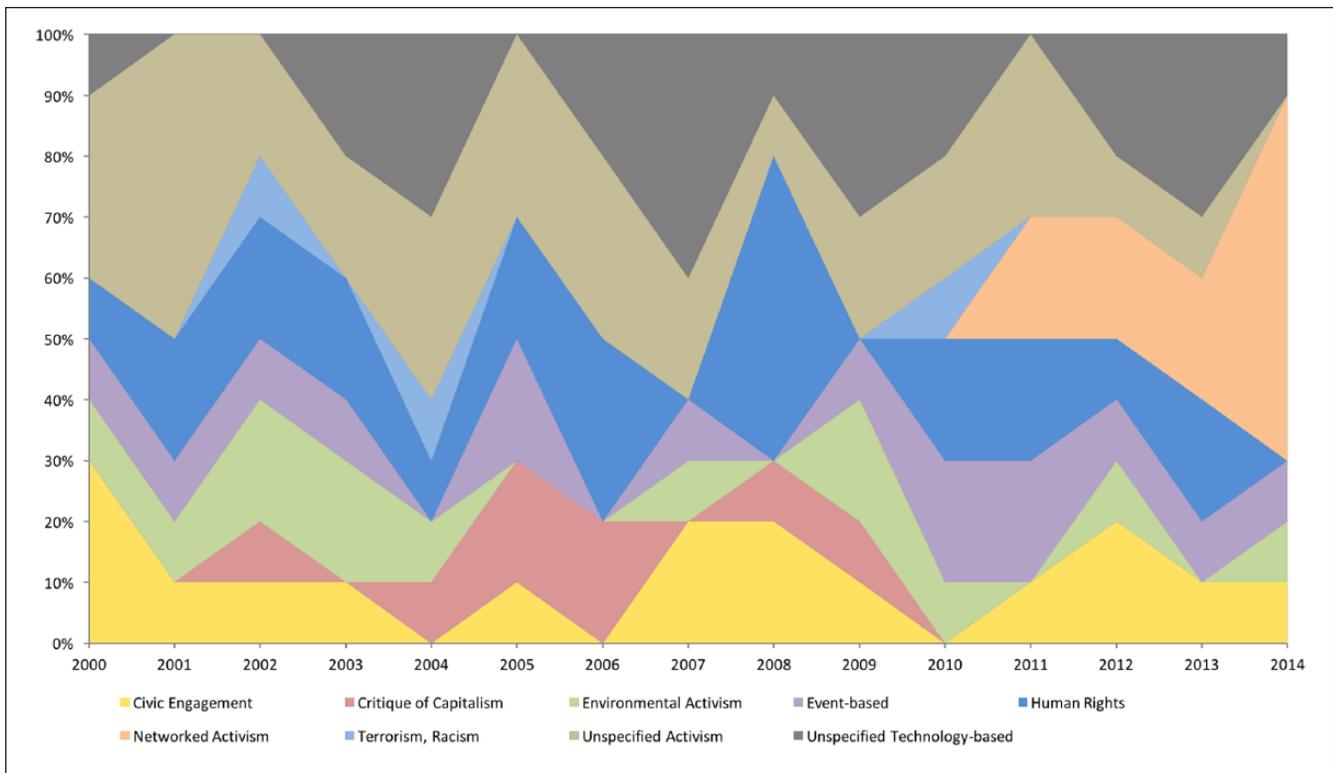
Figure 4. Type of activism.

colors: theoretical papers with no empirical data analysis are represented in green, quantitative approaches in various shades of orange, qualitative approaches in shades of blue, literature review papers in gray, and mixed-methods papers in purple. We can observe that theoretical papers have declined in relevance since 2011 when empirical research began to dominate. Until 2007, qualitative methods were the main technique of empirical inquiry, and it is only within the past 5 years that quantitative methods have become the major technique. We can also observe the emergence or temporary disappearance of certain methods. Social network analysis has become extremely relevant since 2012, whereas qualitative case studies were the main approach between 2002 and 2003 but have had a rather limited presence over the past few years.

A possible explanation for this development is the consolidation of a research field composed of different disciplines, including media studies, communications, political science, and computer science as well as the development of specific interdisciplinary methods for studying digital sociopolitical phenomena, particularly through the integration of computational methods. Even more evident is the development away from essays as the most relevant publications to more empirically driven results. Taking a closer look at the contributions that authors are seeking to make with their work, it becomes clear that the earlier attempts to understand the potential of Internet technologies and protest give policy recommendations or indeed call for more empirical investigation. While these articles tend to make a very broad contribution, the development of digital methods also results in more narrowly defined research gaps, which the authors try to bridge through their investigations. In the future, the art will be to find the right balance between using established methods (from disciplines, for instance, in the social sciences) and leaving room to explore the potential of interdisciplinary digital methods.

15 Years of Protest and Technology: An Overview

Through visualizations of a timeline of the past 15 years, we have observed how academic discourse has focused on various technologies and forms of activism and how it has been based on various research methods. Table 1 summarizes these trends, highlighting various phases. While our data collection showed how academic literature about protest and participation increasingly stresses the relevance of media technologies, the visualizations allow us to observe in details three major underlying dynamics: (a) increasing focus on specific technological platforms rather than the larger media ecology (Figure 2), (b) increasing selection of cases of protest based on the relevance of media technologies (Figure 4), and (c) increasing use of quantitative digital methods and a decline in theoretical papers and qualitative research (Figure 5).
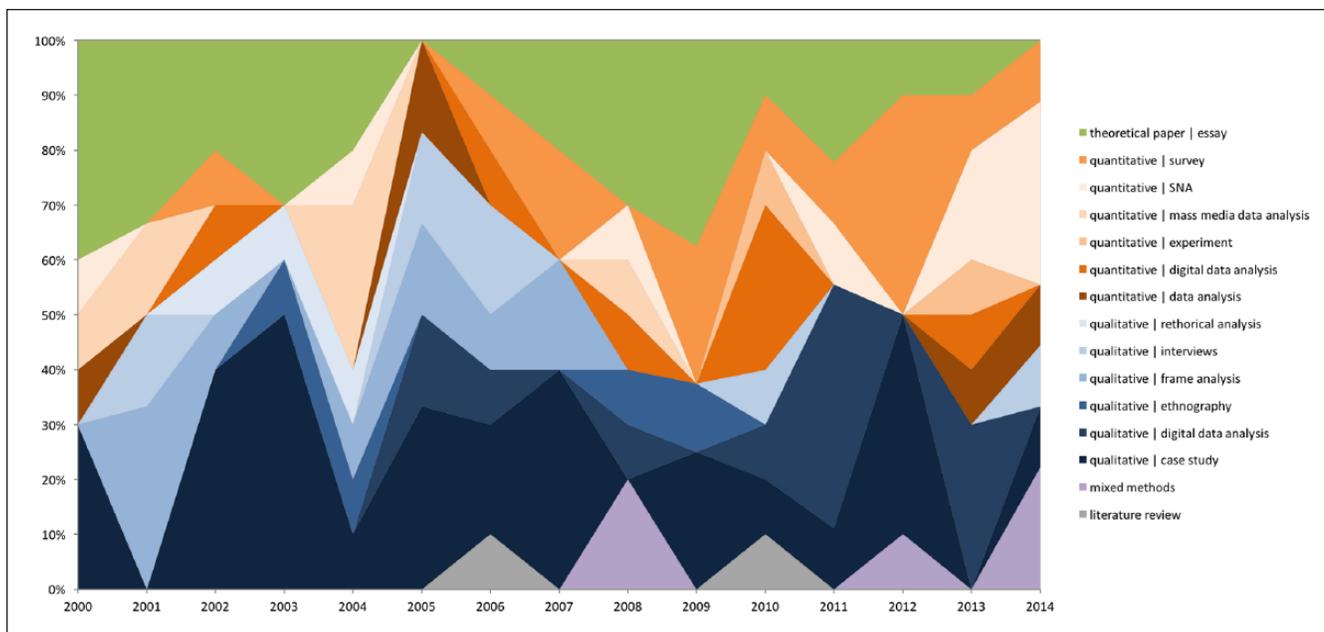
Figure 5. Methods and techniques.

While these trends go in hand with a natural focus on "new" phenomena, they take insufficient account of continuity and established methods and theories, as Silverstone (1999) reminds us to do. The move from qualitative explorative studies and theoretical essays toward quantitative studies might appear natural as we begin developing methods and techniques for studying phenomena that have been too new to be understood within the larger protest ecology. Nevertheless, abandoning theoretically grounded research, development of new theoretical concepts, and in-depth analysis of specific case studies in favor of technologically defined examples can result in the prioritization of research conducted within a short period of time and favoring novelty. For example, over the past 5 years, there has been a prioritization of protest and media technologies research combining social network analysis with quantitative digital data analysis to focus on how Twitter or Facebook, as a platform, has permitted the emergence of specific network structures. Although the development of interdisciplinary methods for studying digital media and political action certainly has its merits, we should be cautious about granting absolute priority to sense social media data over established methods from social movement studies.

The trend toward focusing on "new" technologically defined phenomena could potentially lead to the development of digital methods for studying political action. The emergence and the consolidation of a new research area is undoubtedly a positive outcome. This development might, however, be accompanied by an increasing use of big and digital data at the expense of investigating the larger media ecology, established research methods, long-term ethnographic studies (which also take into account forms of

communication and activist tactics that are less traceable and accessible than Twitter), and theorizing and conceptualizing on the basis of past findings. Similarly, while the increasing automation of data collection and analysis might be a natural process (particularly considering the close collaboration with computer science), we should bear in mind the issues we face when seeking to generalize about activists and their media practices and tactics.

Returning to the argument that Latour and Woolgar (1986) put forward regarding observations in the laboratory, we suggest that the discovery of facts as a result of co-construction by the academic community is made easier by a focus on phenomena and technologies that are new and thus "undiscovered." What might be problematic in this particular field of research is that we lack an established set of methods and theories upon which we can build and instead build upon loose interdisciplinary ground. One example of this might be the unrepresentativeness of digital data when seeking to understand societal phenomena (and maybe even predict protest) through platforms such as Twitter. While the interdisciplinary nature of the study of media technologies and protest might be a strength, we need to have a basic understanding of the methods we put into action, the phenomena we study, and the empirical and conceptual findings upon which we theorize.

Challenges Ahead

It is vital to develop interdisciplinary methods and theories for studying contemporary phenomena of political action and media technologies. If we are to avoid ontological and epistemological pitfalls, however, this research must be grounded in the knowledge we have gained over time. By

Table 1. Overview of Sociotechnical Timeline.

Years	Technology	Activism	Method
2000–2005	Focus on Internet; Others: ICTs, websites, blogs, print media, TV news, mobile phone	Focus on unspecified activism; Others: technology-based activism (media, digital, online, cyberactivism); Issue-based cases: environmental, human rights, event-based (summit activism).	Focus on theoretical papers (essays) and qualitative methods (case studies, ethnography, frame analysis, interviews, analysis of online data); Few quantitative studies (survey, content analysis).
2005–2010	Focus on Internet; Others: ICTs, blogs, websites, print media, TV news.	Increasing focus on technology-based; Others: unspecified, civic engagement; Issues: human rights, critique of capitalism; event-based, environmental (declining).	Focus on theoretical papers and qualitative methods; Increase in quantitative methods (digital data analysis, survey).
2010–2015	Focus on emerging category of social media; Others emerging: microblogging, SNS, smartphones; Declining focus on Internet.	Focus on unspecified technology-based and emerging category of networked activism; Declining focus on unspecified and civic engagement; Issues: event-based, human rights, environmental (declining).	Focus on quantitative methods (SNA, digital data analysis); Decline in qualitative methods (case study, digital data analysis); Drastic decline in theoretical papers.

ICTs: information and communications technologies; SNS: social networking service; SNA: social network analysis.

acknowledging the "new" *in continuation of* previous media technologies and research concerning their use in political action, we can take into account the larger media ecology, media tactics and strategies, and their changing role in the over-mediated environment through which activists navigate today. It is in this environment that activists develop new tactics and renegotiate the meaning of established forms of communication, transforming them into activist practices (see Gerbaudo, 2012; Mercea, 2011; Treré, 2015). On the basis of our empirical studies, we can conceptualize and theorize by building bridges between the old and the new (see Bakardjieva, 2015; Dahlgren, 2013; Gerbaudo & Treré, 2015) and between various fields and disciplines (such as social movement studies, media studies, communication studies, Science and Technology Studies [STS], political economy, critical theory; see Cammaerts, 2012; Cammaerts, Mattoni, & McCurdy, 2013; Mattoni, 2012). In addition, we must further develop (digital) methods for studying activists' media practices and tactics in these complex communication environments by drawing upon established sets of methods and understanding their potentials and limitations (Giglietto, Rossi, & Bennato, 2012). We must learn about our own bias, as it is entrenched within the unobtrusive structures of academic publishing, to sculpt a more reflexive field of research into protest in today's variable communication ecologies. Finally, we must investigate further how academic factors influence scholarship concerning protest and political engagement.

Aided by visualizations of trends in protest and media technology scholarship, we have highlighted the loop created by the recursive construction of newness based on new technologies, new terminology, new criteria for selecting cases of activism and protest, new theories and concepts, and new methods and techniques. Although this work enhances our understanding of the media environments through which

activists navigate in their struggle, we also need to follow Gerbaudo and Treré (2015) in creating links between areas of previous scholarship. By making visible these needs for consolidating research into political action in today's variable media and communication ecologies, we also uncover the construction of academic discourse concerning these phenomena. This article, rather than claiming to tackle this issue in itself, instead encourages us to put the "hunt for the new" on hold and take the opportunity to look back. By reviewing the findings on protest and media technologies, we can begin building upon that knowledge—methodologically, empirically, theoretically, and critically—in order to understand social change and hopefully to use media technologies for social change.

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1. We excluded books from our collection due to their different publication process.

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