

The Paradox of Social Media: Risks for the Public Sector¹

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Abstract

Social media and Web 2.0 technologies have been judged both optimistically, as tools for collaboration and governance, and pessimistically, as agents of manipulation and invasion of privacy. Even though it is common that technological innovations spur speculations about different consequences, social media tools invite contradictory evaluations because of their contradictory technical aspects. In this paper we draw on medium theory and computer network theory to explain two fundamental technical aspects of social media: centralization (concentration of communication in one service provider, i.e. Facebook, Twitter etc.) and activeness (manipulation of information by the medium, i.e. Facebook filters). These two dimensions may foster effective communication and collaboration but, at the same time, contribute to user manipulation and invasion of privacy. The paper concludes by explaining how an optimistic realization of social media might demand specific efforts, such as governmental regulation, to contain their inherent technical risks.

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Introduction

Most studies of social media in the public sector assume that these technologies are good for government and society. Use of social media is thought to “enhance the quality of government” (Lee and Elser 2010), by improving civic engagement, citizen participation in government, mobilization against authoritarian regimes, customer service, among other benefits (Shirky 2008, 2012; Waller 2010; Downey and Jones 2012; Mergel and Greeves 2012). This perspective is usually based on the idea that a communication medium is an impartial “pipe”, a *neutral channel* through which messages can be exchanged. But as governments increase their use of social media (Mergel 2010; Bonsón et al 2012; Snead 2013), it is healthy to first ask if the assumptions are warranted: Are social media technologies truly a neutral medium? And, if the answer raises questions about the neutrality of social media, what are the implications for the increasing use of the technology by government?

This paper draws on medium theory and computer network frameworks to address these questions and finds that social media tools are not neutral. Rather they are *centralized* and *active* technologies, privately owned and manipulated for profit in ways that likely bring both opportunities and risks for public sector organizations and citizens. As governments increasingly use social media for different purposes, broader awareness and recognition of the risks of these tools is necessary. We conclude by presenting the implications of use of social media for public administration.

Social Media and Citizen Participation

The promise of social media in government is usually seen as that of “democratizing democracy – making it easier for a government to interact with its constituents in a productive environment of collaboration” (Mergel and Greeves 2012, p. 23). This government-constituent interaction depends on effective, barrier-free communication for collaboration to be productive, which, in turn, demands that effective communication resources be in place. As communication infrastructure theory (CIT) asserts, civic engagement is facilitated by communication infrastructure that provides “communication resources that can be activated to construct community, thereby enabling collective action for common purpose” (Kim and Ball-Rokeach 2006). Hence, communication resources are necessary, but not sufficient for effective communication; other types of barriers could hinder good communication.

To begin, we adopt a simplified version of Shannon and Weaver’s (1949) transmission model of communication in which communication is defined as the exchange of information (the *message*) between two people (the *emisor* and the *receiver*) over some *medium* (such as the telephone). In more detail, communication happens in the following steps: (1) the emisor has a piece of information that she wants to transmit to the receiver; (2) the message is modulated into some medium, such as the air (i.e. a regular conversation), or a letter (i.e. a written

message); (3) the receiver and the message have to make contact with each other; (4) the receiver apprehends the information conveyed in the message².

The elements of this model provide a heuristic or mechanism for identifying where possible barriers to good communication might occur. Communication might be hindered if the *message* is not correctly understood by the receiver; or if the *emisor* has the wrong attitude (i.e. insincerity) towards the communication process. Additionally, communication barriers can be created by the *medium*. While the *medium* (i.e. the telephone, the email, or Facebook) is an often overlooked barrier or assumed not to interfere or serve as a barrier to good communication, this assumption of neutrality does not hold for social media.

Social Media

The insight to look at social media as a medium that needs analysis in itself – that is, apart from the messages being transmitted – comes from medium theory. Before explaining the centralization and activeness aspects of social media, it is useful, as such, to make an overview of medium theory.

Insights from Medium Theory

Given the model of communication presented above, we may imply that communication studies could have different foci: the human components (the emisor and the receiver), the medium, and the message. However, as Meyrowitz (1985) points out, traditional studies of media have focused on the message, that is, on the content of what is transmitted, and its effect on people (usually the receivers). A first approach in the literature was to look at messages as stimuli, which would in turn provoke behavioral responses. In television studies, for instance, researchers “have examined what people watch, how much they watch, how they perceive and understand what they watch, and how what they watch affects what they later think and do” (p. 14).

Because of the clear limitations – and failures, according to Meyrowitz (1985) – of simple models based on message stimulus-behavior connections, several theoretical improvements have been proposed. Cultivation analysis, for instance, looks beyond specific messages to grasp how “the totality of media content creates a mythology about women, minorities, crime, and so forth, a mythology that subsequently shapes viewers’ perceptions of and response to their real environments” (p. 14). Another approach is the “uses and gratifications”, which analyzes how

² This model of communication has received improvements (Berlo 1960) and criticisms (Chandler 1995) for not taking into account different aspects of communication such as meaning, emisor-receiver power relations, among other issues (for an overview of approaches to communication, see Craig and Muller 2007). These limitations may prove serious for studies which look at different aspects of communication, such as message content. In the case of this paper, though, the focus is precisely on the technical aspects of social media; as such, the simplicity of the transmission model fits well with our goals.

users, by selecting content, affect the media. In this case, “media such as newspapers or radio stations, or genres such as soap operas or situation comedies, must adapt to people’s needs” (p. 14). Finally, there is the “political and economic critiques” perspective, which tries to explain the control mechanisms of the media and how the media advances specific “ideological, economic, and political ends” (p. 15). Although with different perspectives, each of these three approaches focuses on the *message* component of communication. They ignore the role media themselves play in communication; “[t]he medium itself is viewed as a neutral delivery system” (p. 15).

In response, medium theory calls for an attention to the medium itself, and the broad consequences it may have to society. In his essay entitled “The Medium is the Message”, originally published in 1964, McLuhan (1998) criticizes approaches that overlook the medium and focus only on content. The deeper changes to human behavior do not come from the content, but from the medium itself, which “alter sense ratios or patterns of perception steadily and without any resistance” (p. 18). Through invisible, subliminal effects, the medium affects human behavior at different levels, including cognitive structures. A new medium has the potential to alter “modes of consciousness” (Meyrowitz 1985, p. 18). His example of print and typography is clarifying. As he argues, the most relevant effect of print on humans is not the content of print, that is, what people read. Print, as a medium, reinforces linearity and uniformity (McLuhan 1998). Among other things, print contributed to the idea that being rational in the West means being “uniform and continuous and sequential” (p. 15).

Medium theory does not imply technological determinism, though. As Meyrowitz (1985) states, its proponents do not argue that “the means of communication *wholly* shape culture and personality, but they argue that changes in communication patterns are one very important contributant to social change and one that has generally been overlooked” (p. 18). In sum, medium theory argues that “the form in which people communicate has an impact beyond the choice of specific messages” (p.19).

A complete analysis of social media through the perspective of medium theory would be beyond the scope of this article. Medium theory serves here as an insight, calling attention to the fact that social media might produce effects apart from the specific messages being exchanged.

Centralization

While most communication technologies on the Internet are distributed, social media are centralized. Email serves as an example of distributed communication technology. Email transmission works based on the Simple Mail Transfer Protocol, which is defined by RFC2821 of the Internet Engineering Task Force (IETF 2001). In the SMTP model, transmission of an email message follows precise steps: 1) the user sends the message to the SMTP server (i.e. the user's

email account provider); 2) this SMTP server, working as a client now, connects to the server responsible for the recipient's email account; 3) the message is transmitted from the first SMTP server to the second. Finally, to receive the message, the recipient would have to connect to her email account in order to retrieve it.

The protocol architecture is distributed; there are numerous SMTP servers in the Internet, working in a distributed fashion, exchanging email messages with each other. Users of email, of course, need not be aware of this. When exchanging email, their perception might be of a direct connection with their friends, colleagues; but the underlying structure is less unified than the interface might suggest.

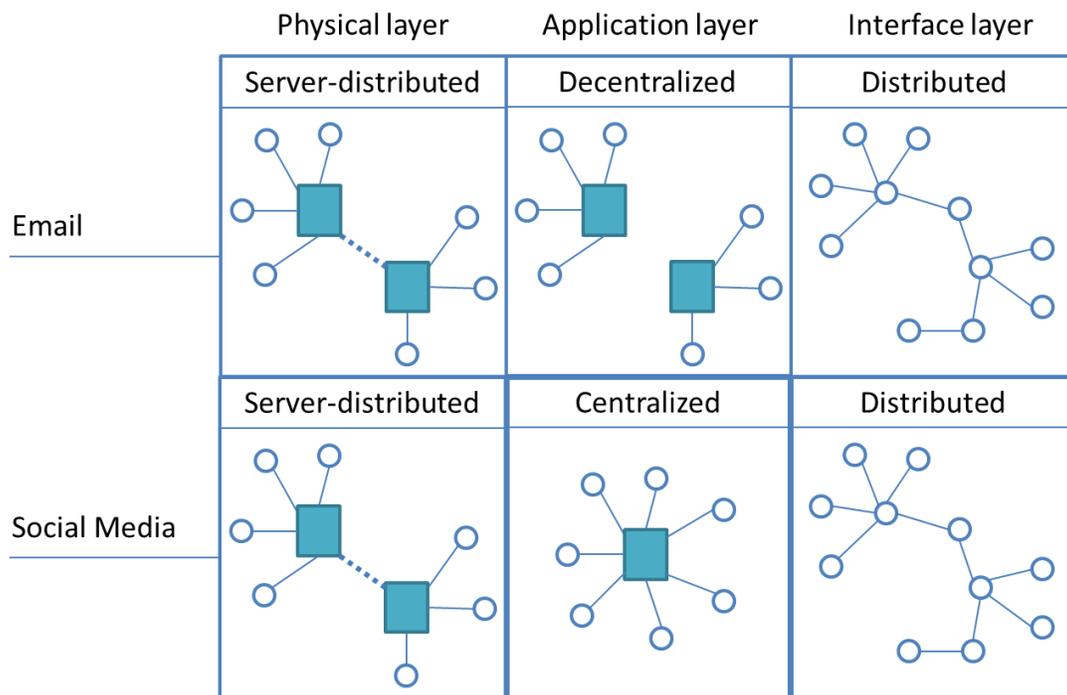


Figure 1. Layered view of technologies such as email and social media. Squares refer to servers and circles refer to Internet users. The highlighted cell depicts the centralized aspect of social media.

Figure 1³ illustrates the different perceptions of technology. The first row depicts the three layers related to email technology. The *physical layer* refers to the link structure of the Internet; each user (represented by a circle) connects to a server (squares) to have access to the Internet. Servers are distributed, and no single server is responsible for the access to the Internet. The dashed lines represent the cloud, that is, the fact that an email exchanged has to go through many different servers to reach its destination. The *application layer* refers to how users interact with their email account provider; each user has to connect to their own

³ Even though the layer terminology is used in Internet protocols (such as the TCP/IP), in this paper the terminology has different meanings.

providers (i.e. Gmail, Hotmail, Yahoo) in order to retrieve messages; it is, as such, a decentralized model of application. In fact it is so decentralized that any Internet user can set up a new SMTP server and start sending and delivering email messages. Finally, the *interface layer* refers to the way users interact with and perceive the application. When using email, users perceive – through the interface – their communication as direct email messages exchanged between each other; in a transparent fashion, they need not be aware of what happens at the other layers.

The second row of the table refers to social media – the primary example of which would be Facebook. The physical layer is the same because this technology also works on the Internet, using the same link infrastructure of any other Internet tool. The interface layer is the same because the perception regarding message exchange is also similar to email, that is, there is a perception of a direct connection with peers when interacting on Facebook or Twitter. At the application layer, though, social media is quite different. When communicating on Facebook, for example, users have to connect to one single provider; it is a centralized structure. In Facebook, or Twitter, there is no distribution; every single user of Facebook has to connect to Facebook in order to use it. There are no multiple providers – such as Gmail, Yahoo and Hotmail in the case of email. A user cannot set up a “Facebook server” and participate in the network; social media signifies, as such, a centralization of Internet communication – a transformation of the web into a beehive.

Communications based on a centralized shared space were not invented by social media, though, and some conceptual development must be done at this point. In the transmission model of communication presented above, the message has to “travel” to the receiver, such as voice moving over the air, a letter being carried by the post office until the final destination, or an email being transmitted over the Internet. There is an alternative possibility, though, which happens when the message is placed by the emisor at a previously agreed place, and the receiver travels to this place to find it. An example of this is a bulletin board, or even the refrigerator door: a place where messages can be placed and emisors and receivers identify as a medium. This second type of communication is referred to as stigmergy, based on the way termites communicate, and have been recently adopted, as a concept, for Internet-based collaborations such as Wikipedia and open source projects. As Elliott (2006) states, “as stigmergy is a method of communication in which individuals communicate with one another by modifying their local environment, it is a logical extension to apply the term to many types (if not all) of Web-based communication, especially media such as the wiki”. Stigmergic communication means that emisor and receiver share the same “environment”, which in the case of Web applications is composed by website pages (HTML documents). For example, on Facebook, two friends share information by posting (altering) each other’s Wall pages (environments).

By bringing users together to a centralized application, in which they share an environment, social media enhances its capability to develop more interactive features. A user can post a “status update” on Facebook, which is seen by hundreds of friends. Within minutes, friends start to “Like” and comment on the post, and friends (and friends of friends) can immediately see this ongoing interaction, generating “network effects”. Centralization helps the management of these complex interactions – and this is why decentralized social network systems face “a number of technical challenges” (Yeung, Liccardi, Lu, Seneviratne and Berners-Lee , p. 4). Besides feature implementation, the fact that data is stored in a single place makes its management easier; in fact, we could argue that a distributed system, with copies of personal data in different places, would make control of information harder, and increase the problem of lack of privacy⁴.

Centralization of social media also has its problems, though. The evident one refers to the fact that it empowers the sole holder of everybody’s personal information. As Esguerra (2011) says, “[t]o use Facebook, you have to immigrate to Facebook Island and get a Facebook House, in a land with a single ruler”, and Moglen (2011) states that “everybody is just in one big database controlled by Mr. Zuckerberg”. These criticisms are usually accompanied by remarks of the profit-orientation of many social networks and to the non-open source nature of their software. They are frequently part of a call for the development of distributed social networks⁵.

As centralization presents both advantages and disadvantages, the issue becomes a matter of trust in the service provider; to what extent can we trust social media providers such as Facebook, Twitter or YouTube? In the next section the problem of the activeness of the medium is presented, followed by a discussion of its effects on the issue of trustworthiness.

Activeness

Most communication technologies are indifferent to the content being exchanged. The television may have different effects on our modes of consciousness, as medium theory would state; but the television itself does not manipulate the content that the broadcaster sends to the TV sets. In the same vein, the telephone – or the telephone circuit network – does not participate actively in a conversation; when John and Alice are speaking to each other, it transmits voices passively, without selecting content in or out.

While most kinds of medium are passive, social media – and Facebook in particular – are *active*, in two respects. First, social media does not work as a neutral channel, but rather as an

⁴ This argument has been made by technicians debating challenges with distributed social networking.

⁵ There are many services offering distributed social networking, such as Diaspora, Friendica, StatusNet, Tent, among others. There are big challenges with the implementation of such services, though. See, for instance, Paul, Buchegger and Strufe 2011; Buchegger and Datta 2009; Bortoli, Palpanas and Bouquet 2011. See also the debate on Hacker News at <https://news.ycombinator.com/item?id=4418904>, or on LWN.net at <http://lwn.net/Articles/518261/>.

intermediary that decides which messages go through. Let us take, for example, Facebook's News Feed feature, through which a user receives status updates from their friends. The actual content delivered to the user is based on the EdgeRank algorithm, which works with scores of affinity (between the user and content creator), weight of type of content (i.e. "comment", "like") and a "time decay factor" (Kincaid 2010). The inner workings of the algorithm are proprietary, and users cannot really tell who is receiving their updates; as Ingram (2013) states, "Facebook is a black box". There has been debate regarding how Facebook's proprietary algorithm works, with claims that it might push users to pay for promoted posts (Bilton 2013a; Bilton 2013b; Ingram 2013), or that it prioritizes new products or ads (Constine 2013). Other stream of criticism relates to the fact that it might create information bubbles, with users receiving only content that confirms their beliefs (Pariser 2011).

A second way in which Facebook is *active* is by manipulating affordances. Many features of the tool – such as suggesting other people you may know, or making it easy to share information with others – make certain activities (i.e. sharing personal information) easier, therefore increasing their occurrence (Dijck 2013). One example of Facebook manipulating affordances is the "frictionless sharing" feature. It is an automatic sharing, allowing applications to post user activity to the user's Facebook Wall without asking the user at each time. Some have said that Facebook is actively manipulating users to make them share more information online (Nagesh 2011).

As with centralization, activeness presents both advantages and disadvantages. Algorithms such as EdgeRank might help users focus attention on what is more relevant; and facilitating the process of sharing might increase communication and collaboration among people. This increase in manageability of information comes at the price of freedom; as Pariser (2011) states, it can "lead you down a road to a kind of informational determinism in which what you've clicked on in the past determines what you see next" (p. 16).

Table 2 represents how centralization and activeness are related. Even though these two dimensions are better understood as continuous, the table represents them as binaries for clarity. An example of distributed, passive technology, is email: there is no centralized server, and the tool is mostly passive in terms of manipulation of affordances. To the right, web forums and chat applications exemplify passive and centralized tools – as it happens in stigmergy, users have to access to a centralized application to use the tool. At the lower right, there is Facebook, with the centralization and activeness aspects mentioned before. Finally, at the lower left, distributed social networks, composing here what should be seen as a theoretical cell, as most of this networks are still under development, as mentioned above.

	Distributed	Centralized
Passive	Email	Web forums, Web chats
Active	Distributed social networks	Facebook

Table 2: Centralization and Activeness aspects of internet tools.

Implications for Public Administration

Governments have been using social media with the fundamental assumption that they are benign tools. As our analysis show, this is not warranted. Centralization and activeness make social media promising and liberating, but also make them risky and constraining. The analysis of social media presented above indicates three broad issues with the use of social media in the public sector: hidden risks; the privatization of cyberspace; and the conflict between public versus shareholder value.

The combination of centralization and activeness makes the advantages visible, but the risks less visible; by not understanding how these tools work, governments and citizens cannot make accurate calculations in their interests. This brings about the question of *trustworthiness*: as individuals and organizations are using these tools for public-spirited applications – such as civic engagement –, how can we trust a centralized and active third-party to provide it? Governments cannot even know or control, for instance, who receives their messages on Facebook; is that kind of awareness sufficient for the use of these tools for civic engagement? This paper does not provide an answer to this question, but rather argues that governments should know and assess the risks involved.

Second, social media may present a privatization of what was once thought to be a public space. As Pariser (2011) points out, it once seemed “that the Internet was going to entirely democratize society. Bloggers and citizen journalists would single-handedly rebuild the public media. Politicians would be able to run only with a broad base of support from small, everyday donors. Local governments would become more transparent and accountable to their citizens”. This is what can be called the promise of the Internet as an *Agora* that would increase horizontal conversation and, thus, democracy. As mentioned above, this is still the promise seen by most studies regarding social media in the public sector. Social media, by providing a centralized, shared space, would be the perfect arena for the building of a democratic *Agora*.

As presented above, far from being an *Agora*, social media are centralized and active technologies, controlled by private third-parties. As Constine (2013) says when criticizing Facebook’s algorithms for selecting messages that appear in the news feed, “[p]osting to Facebook is free, but the cost is acceptance of Facebook’s iron grip on the opaque news feed. Facebook’s still a gift horse, but it’s an inconsistent one. We might not want to saddle up and build a business completely dependent on something that could buck us off so easily”. Ingram

(2013) states that we do not use Facebook, but it uses us, and that it “can — and will — do whatever it wants with the algorithms controlling its news feed”.

Social media resemble, as such, an *Antigora* – “a privately owned digital meeting arena”⁶ (Lanier 2006). And beyond antigoras, social media are also *active*, acting as an intermediary in communication exchanged in its arena, which is run for the interests of the owner of the arena. By making use of this type of medium, governments are increasing the capacity of these antigoras to better pursue their interests. Besides, by using these tools and inserting more information about civic activity in it, the public sector is enhancing social media’s capacity to control information and manipulate affordances.

Third, there is a contradiction between governments’ and the medium’s interest; while governments seek to maximize public value, social media tools aim at maximizing shareholder value. Even though this contradiction can be found between government and any medium provider— such as telephone companies –, there are two aspects of social media that make this more problematic: 1) these tools are centralized and active, and thus affect the communication process; 2) governments do not take that into account and treat social media as a neutral, benign channel.

Governments should take into account that in the case of social media the medium itself – apart from any particular use governments make of it – affects civic engagement. Facebook itself, for instance, affects how people will interact; and the choices Facebook makes – that is, the choices Facebook managers and shareholders make – will affect governments’ plans on social media (i.e. engaging citizens). Besides, the more governments and citizens use these tools, the more social media (themselves, as medium) will be a determining factor of how people engage in the future.

By ignoring the implications of centralization and activeness, governments are helping to make social media the repository for public dialogue; they are helping centralize public activity within antigoras. In the future, governments’ objectives in social media might be hindered because of clashes between the public and the antigora’s shareholder value. As argued before, though, centralization and activeness have both advantages and disadvantages; but to fully realize the potential of social media, governments must acknowledge and manage the risks involved.

⁶ Lanier’s concept of antigora has a different intent though; he uses the concept to characterize locked-in market monopolies. Nevertheless, the idea fits well with our purpose in this paper.

References

- Berlo, D. K. (1960). *The Process of Communication*. New York: Holt, Rinehart & Winston.
- Bilton, N. (2013a). Disruptions: As User Interaction on Facebook Drops, Sharing Comes at a Cost. *Bits Blog – The New York Times*. March 3rd, 2013. Available at: <http://bits.blogs.nytimes.com/2013/03/03/disruptions-when-sharing-on-facebook-comes-at-a-cost/>. Retrieved on April 22nd, 2013.
- Bilton, N. (2013b). Facebook News Feed Draws More Criticism. *Bits Blog – The New York Times*. March 5th, 2013. Available at: <http://bits.blogs.nytimes.com/2013/03/05/facebook-news-feed-draws-more-criticism/>. Retrieved on April 22nd, 2013.
- Bonsón, E. et al. (2012). Local e-government 2.0: Social media and corporate transparency in municipalities. *Government Information Quarterly* 29, 123-132.
- Bortoli, S.; Palpanas, T.; & Bouquet, P. (2011). Decentralised social network management. *International Journal of Web Based Communities* 7(3), 276-297.
- Buchegger, S.; and Datta, A. (2009). A case for P2P infrastructure for social networks—opportunities and challenges. In: *Proceedings of WONS 2009, The Sixth International Conference on Wireless On-demand Network Systems and Services*. Snowbird, USA.
- Chandler, D. (1995). *The transmission model of communication*. University of Wales, Aberystwyth. Online: <http://www.aber.ac.uk/media/Documents/short/trans.html>.
- Constine, J. (2013). Facebook's News Feed, A Skittish Gift Horse. *TechCrunch*. March 3rd, 2013. Available at: <http://techcrunch.com/2013/03/03/no-sir-i-dont-like-it/>. Retrieved on April 22nd, 2013.
- Craig, R. T. and Muller, H. L. (eds.). (2007). *Theorizing Communication: Readings Across Traditions*. Thousand Oaks: Sage.
- Dijck, J. V. (2013). *The Culture of Connectivity: A Critical History of Social Media*. Oxford: Oxford University Press.
- Downey, E. and Jones, M. (eds.). (2012). *Public Service, Governance and Web 2.0 Technologies: Future Trends in Social Media*. Hershey: IGI Global.
- Elliott, M. (2006). Stigmergic collaboration: The evolution of group work. *M/C Journal* 9(2). Available at: <http://journal.media-culture.org.au/0605/03-elliott.php>. Retrieved on May 24th, 2013.

Esguerra, R. (2011). An Introduction to the Federated Social Network. Electronic Frontier Foundation Deeplinks Blog, March 21st, 2011. Available at <https://www.eff.org/deeplinks/2011/03/introduction-distributed-social-network>. Retrieved on April 18th, 2013.

IETF (Internet Engineering Task Force). (2001). RFC 2821. Available at <http://www.ietf.org/rfc/rfc2821.txt>. Retrieved on April 18th, 2013.

Ingram, M. (2013). Remember, Facebook isn't a platform for you to use — you are a platform for Facebook to use. *GigaOm*. March 4th, 2013. Available at <http://gigaom.com/2013/03/04/remember-facebook-isnt-a-platform-for-you-to-use-you-are-a-platform-for-facebook-to-use/>. Retrieved on April 22nd, 2013.

Kim, Y. and Ball-Rokeach, S. J. (2006). Civic Engagement from a Communication Infrastructure Perspective. *Communication Theory* 16(2), 173-197.

Kincaid, J. (2010). EdgeRank: The Secret Sauce That Makes Facebook's News Feed Tick. *TechCrunch*. April 22nd, 2010. Available at: <http://techcrunch.com/2010/04/22/facebook-edgerank/>. Retrieved on April 22nd, 2013.

Lanier, J. (2006). The Gory Antigora: Illusions of Capitalism and Computers. . In: *Internet Liberation: Alive or Dead?* The Cato Institute. Available at <http://www.cato-unbound.org/2006/01/09/jaron-lanier/the-gory-antigora/>. Retrieved on April 22nd, 2013.

Lee, M. and Elser, E. L. (2010). The Nine Commandments of Social Media in Public Administration: A Dual-Generation Perspective. *PA Times, American Society for Public Administration* 33 (3), p. 3.

McLuhan, M. (1998). *Understanding Media: The Extensions of Man*. MIT Press.

Mergel, I. 2010. Government 2.0 Revisited: Social Media Strategies in the Public Sector. *PA Times, American Society for Public Administration* 33 (3), p. 7 & 10.

Mergel, I. and Greeves, B. (2012). *Social Media in the Public Sector Field Guide: Designing and Implementing Strategies and Policies*. San Francisco: Jossey-Bass.

Meyrowitz, J. (1985). *No Sense of Place*. New York: Oxford University Press.

Moglen, E. (2011). Why Political Liberty Depends on Software Freedom More Than Ever. Speech at the 2011 FOSDEM Conference in Brussels on Feb 5th, 2011. Available at <http://www.softwarefreedom.org/events/2011/fosdem/moglen-fosdem-keynote.html>. Retrieved on April 18th, 2013.

Nagesh, G. (2011). Privacy advocates want Facebook probed on recent changes. *The Hill*. September 29th, 2011. Available at: <http://thehill.com/blogs/hillicon-valley/technology/184625-privacy-advocates-at-odds-with-facebook-over-changes>. Retrieved on April 22nd, 2013.

Pariser, E. (2011). *The Filter Bubble*. New York: Penguin.

Paul, T.; Buchegger, S.; and Strufe, T. (2011). Decentralized social networking services. In *Trustworthy Internet*. Milan: Springer.

Shannon, C. E. and Weaver, W. (1949). *The Mathematical Theory of Communication*. Urbana: University of Illinois Press.

Shirky, C. (2008). *Here Comes Everybody*. New York: The Penguin Press.

Shirky, C. (2012). How the Internet will (one day) transform government. *TED Talk*. Available at http://www.ted.com/talks/clay_shirky_how_the_internet_will_one_day_transform_governme nt.html. Retrieved 2013-03-29.

Snead, J. T. (2013). Social media use in the U.S. Executive branch. *Government Information Quarterly* 30(1), 56-63.

Waller, S. N. (2010). Social Media for Public Parks and Recreation Organizations: Bridging the Communication Gap. *PA Times, American Society for Public Administration* 33(3).

Yeung, C. A.; Liccardi, I.; Lu, K.; Seneviratne, O.; and Berners-Lee, T. (2009). Decentralization: The Future of Online Social Networking. W3C Workshop on the Future of Social Networking Position Papers. Vol. 2. 2009.