Impact of Social Media and Web 2.0 on Decision-Making

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ABSTRACT. Information technology continues to provide opportunities to alter the decision-making behavior of individuals, groups and organizations. Two related changes that are emerging are social media and Web 2.0 technologies. These technologies can positively and negatively impact the rationality and effectiveness of decision-making. For example, changes that help marketing managers alter consumer decision behavior may result in poorer decisions by consumers. Also, managers who heavily rely on a social network rather than expert opinion and facts may make biased decisions. A number of theories can help explain how social media may impact decision-making and the consequences.

RÉSUMÉ.

KEYWORDS: social media, decision making, decision support, Web 2.0, DSS.

MOTS-CLÉS:
1. Introduction

Many factors affect individual, group and organizational decision-making behavior including information technologies and decision support systems. During the past 50 years, information technologies have become increasingly networked and more powerful. Recent improvements in user interfaces for social tools and increased use of mobile wireless computing have created social networks that are immediate, highly distributed, largely uncontrolled and pervasive. Information technology continues to provide new opportunities.

How we communicate, obtain and process information for personal and work decisions is definitely changing. People are using more socially based information due to developments with Web 2.0 technologies (cf., Power, 2007) that have improved the scope and effectiveness of social media. In general, the term ‘social media’ refers to the use of Web-based and mobile technologies to enhance human communication and create dynamic, interactive dialogues. More recent Web 2.0 technologies enable more and better user-generated content.

This article provides a broad overview of the impact of social media and Web 2.0 on decision-making. The next two sections review the concepts of social media and Web 2.0. The fourth and fifth sections try to answer two major questions: What is the impact of social media on decision-making? and, How do social media impact decision making? To utilize social media to improve decision outcomes, it is necessary to develop a theoretical context for social media and anticipate consequences of participating in, and using information from, social networks.

2. What is ‘social media’?

Kaplan and Haenlein (2010) define social media as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, which allows the creation and exchange of user-generated content." This definition is very general and people continue to disagree about the scope and hence the meaning of the term social media.

Part of the problem is that social media sources can change content quickly and with little control over accuracy. For example, in 2008 a Wikipedia article on social media stated "Social media is an umbrella term that defines the various activities that integrate technology, social interaction, and the construction of words and pictures. This interaction, and the manner in which information is presented, depends on the varied perspectives and 'building' of shared meaning, as people share their stories, and understandings." By April 2011, the Wikipedia definition was simplified as "Social media are media for social interaction, using highly accessible and scalable communication techniques. Social media is the use of web-based and mobile technologies to turn communication into interactive dialogue."
Reading these definitions from the “same” source suggests that a shift has occurred in the definition of social media from identifying a communication activity to tools used by people to communicate. One blogger, Joe Thornley (2008), tries to reconcile the discrepancies by arguing “Social media are online communications in which individuals shift fluidly and flexibly between the role of audience and author. To do this, they use social software that enables anyone without knowledge of coding, to post, comment on, share or mash up content and to form communities around shared interests.” So it seems that social media is both a communications activity and using web-based communication tools.

A number of online sources categorize the types of social media. At FredCavazza.net (2011), the Social Media Landscape is divided into 10 categories as shown in Figure 1: 1. publish (wikia); 2. share (YouTube); 3. discuss (phpbb, skype); 4. social networks (facebook, LinkedIn); 5. microblog (twitter); 6. lifestream (friendfeed); 7. livecast (justin.tv); 8. virtual worlds (Second Life, HABBO); 9. social games (pogo, doof) and 10. massively multiplayer online games (World of Warcraft, Happy Farm).

Kaplan and Haenlein (2010) identified six different types of social media: collaborative projects, blogs and microblogs, content communities, social networking sites, virtual game worlds, and virtual social worlds.

Social media have changed with improved technologies. These newer technologies support user generated content that is easily distributed. People can combine, edit and archive content easily. Publication of ideas and opinions is not reviewed, censored or evaluated for quality.
3. What is Web 2.0?

Web 2.0 applications facilitate information sharing, user-centered design, and collaboration. New information technologies have often driven innovations in computerized decision support systems. Recently, Web 2.0 technologies have significantly impacted the design of DSS, especially mobile DSS. Web 2.0 applications are generally superior to the first generation of Web-based DSS applications. Web 2.0 may be the eighth major technology innovation to impact decision support for managers. One perspective is that DSS 1.0 were built using timesharing systems; DSS 2.0 were built using minicomputers; DSS 3.0 were built using personal computers and tools like Visicalc, Lotus and Excel; DSS 4.0 were built using DB2 and 4th generation languages; DSS 5.0 were built using a client/server technology on LANs; DSS 6.0 were built using large scale data warehouses with OLAP servers; DSS 7.0 were built using Web technologies. Has enough changed with Web 2.0 technologies that we are now embarking on DSS 8.0?

Based upon an examination of the Web 2.0 conference and expo site (web2expo.com, 2011), some of the technologies and phenomena associated with Web 2.0 include: social networking applications, online mapping, portable visual elements, mashups, syndication, tagging, open source, rich Internet applications, Ruby on Rails, AJAX, Flex, Flash, LAMP, web services, virtual worlds and the mobile web.

Michael Wesch created a video entitled "Web 2.0 ... The Machine is Us/ing Us" at YouTube. Wesch is an Assistant Professor of Cultural Anthropology at Kansas State. His research is primarily focused on the impacts of digital technology on human interaction. His main message is the "machine" is us! With Web 2.0, form and content can be separated, data can be exported, and it is now easier to upload content to the Web. Users are creating and organizing a database-backed Web. In some unspecified way, the "machine" is learning from our actions. Web 2.0 is "people sharing, trading, collaborating" (Wesch, 2011) and by doing so all of us are organizing and managing the content of the web by our individual actions. Wesch claims that Web 2.0 leads us to rethink and re-imagine concepts like copyright, authorship, privacy, love and ourselves.

Some of the Web 2.0 examples shown by Wesch include Blogger, flickr maps, YouTube and Wikipedia. Flickr is probably the best online photo management and sharing application, and it may be useful to have geo-tagged photos accessed from a map representation. Blogs are now well accepted and a new blog is created every half second; however, it isn’t clear how many people read them.

O'Reilly (2005) has been a major proponent of the Web 2.0 vision. He identified seven principles of the vision: 1) the web as platform; 2) importance of harnessing collective intelligence; 3) primacy of database management and importance of owning data; 4) end of the software release cycle; 5) using lightweight programming
models that allow for loosely coupled systems; 6) ensuring software is not limited to a single device; and 7) creating rich user experiences.

Much of the capability of Web 2.0 comes from new computer languages, techniques, and infrastructure. XML provides information in reusable containers or repositories. AJAX and similar tools provide Web users with the ability to manipulate data, not just retrieve data. The Internet infrastructure is available with wired and wireless access, has high capacity bandwidth, is low cost to use and is widely accessible. The convergence of these factors gives Web 2.0 users the ability to do things on the Web now that can not be done in any other way (Carton, March 5, 2007).

Danny Kolke, President and CEO of Etelos (www.etelos.com), argues "all applications are based on content. When you are looking at a page - it's just content." For data-driven decision support we need structured data -- precontent. For model-driven DSS, we need access to models that can be manipulated -- content creators. For knowledge-driven DSS, we need access to knowledge and rules -- metaccontent. Finally, we need communications capabilities for decision support-- content creating and sharing. Web 2.0 technologies may help with managing, accessing and using our decision support content.

The evolving technologies that seem most useful for creating a new generation of decision support systems are associated with building rich Internet applications (RIA). Web applications built with AJAX, Flex, and similar tools have the features and functionality of traditional desktop applications. With new client-side presentation-layer tools, we can use a slider to change data and perform calculations without sending data back to the server. These tools should help implement dashboards and improve web-based charts. Social networking in organizations seems useful for creating innovative communications-driven DSS. Tools like Wikipedia may be the forerunners of novel document-driven DSS. Tag clouds may or may not help DSS users interact with and understand a specific DSS.

Tim Berners-Lee (2006), credited with the invention of the World Wide Web by implementing the first HTTP client-server connection, questioned if the term ‘Web 2.0’ is meaningful since many of the technology components have been present since the creation of the Web. He states "I think Web 2.0 is of course a piece of jargon, nobody even knows what it means. If Web 2.0 for you is blogs and wikis, then that is people to people. But that was what the Web was supposed to be all along." The Web has enhanced capabilities.

4. How do social media impact decision making?

Social media are increasing their penetration into everyday life because of Web 2.0 and an enhanced infrastructure. These online technology tools help people use the Internet to communicate with friends and to share information and resources
with our networks of contacts. Some evidence suggests that the impact of social media on personal and managerial decision making can be extensive. Anecdotal evidence suggests social media is altering our opinions and influencing our choices by impacting decisions of consumers and business decisions of managers. This emerging area of research seeks to understand social media’s growth and its influence on decision making while developing theories to explain the manner in which real-time communications from other people in our social and professional networks alter our behavior.

Social media tools have increased connectedness between people due in part to the accessibility of the tools for the average user. According to Metcalfe's law, the value of a telecommunications network is proportional to the square of the number of connected users of the system. In 1993, George Gilder formulated Metcalfe's for social networks (Shapiro and Varian, 1999, p. 184; Wikipedia, 2011). He asserted that the number of interconnected and interacting users is the measure of worth for social networks, so the value of a social network increases as users are added to the network. As technologies improve and new users rapidly join a network, the value of social networks for individuals increases exponentially.

Theories related to communication, social, and media phenomena appear relevant for the impact of the expanded use of web-based social media on decision making. Potential theories include media richness theory, crowd behavior theory, crowd convergence theory, conformity theory, peer pressure theory, and communications saturation theory. One or some combination of theories from traditional media environments may prove useful for web-based social networking services that are connecting a broad range of people who share interests and activities. A fruitful area of research is anchored in the philosophy of the Web 2.0 vision that encourages and promotes social interaction and democratic information creation and sharing.

According to media richness theory (Daft and Lengel, 1984), social perceptions, message clarity, and ability to evaluate others impact how media richness alters decision quality. Richer media facilitate social perceptions and perceived ability to evaluate others' deception and expertise. Tools like electronic mail and electronic conferencing facilitate communication clarity when participants have less task-relevant knowledge. Kahai and Cooper (2003) found that mediating constructs on decision quality depend on the levels of participant expertise and deception. In general, it was found that richer media have significant positive impacts on decision quality when participants' task-relevant knowledge is high. Moreover, effects of participant deception can be mitigated by employing richer media.

Social media also create new forms of peer pressure that are more immediate and broader in scope that anything experienced in face-to-face situations. Peer pressure refers to the influence exerted by a peer group in encouraging a person to change his or her attitudes, values, or behavior. Both informational and normative conformity discussed in the literature (see, for example, Aronson et al., 2007) seem to occur in
Social networks. Informational conformity can have an impact on decision making because the decision maker turns to the members of his/her social network to obtain accurate information. Normative conformity may also bias decisions because the decision maker conforms in an effort to be liked or accepted by the members of one or more social networks.

Social media can encourage crowd or mob behavior that can be dangerous. Sigmund Freud's contagion crowd behavior theory (Levy, 1989) argues that people who are in a crowd act differently and are less aware of the true nature of their actions. On the other hand, convergence theory holds that crowd behavior is not a product of the crowd itself, but is carried into the crowd by particular individuals; thus, crowds represent a convergence of like-minded individuals. In other words, while contagion theory states that crowds cause people to act in a certain way, convergence theory posits that people who wish to act in a certain way come together to form crowds. Social media help people form crowds and influence behavior.

Another potential negative effect of social networks is a saturation effect that can impact decision makers. "Saturation refers to the communication overload experienced by group members in centralized positions in communications networks" (Shaw, 1976, p. 148). Shaw argued that "the greater the saturation the less efficient the group and the less satisfied the group members, although saturation probably influences effectiveness to a greater extent than it does satisfaction" (Shaw, 1976, p. 148). Two types of saturation appear to be of interest to social media investigations: 1) channel saturation and 2) message unit saturation. Channel saturation refers to the number of different methods of receiving input, and message unit saturation refers to the number of messages received on a channel, at the point of overload for the receiver. These phenomena are correlated because the number of channels a person must deal with influences the number of messages the person must read and respond to.

A preliminary review suggests that social media impact decision making by creating more connections to receive information and opinions. People tend to trust the opinions of participants in online networks in which they have chosen to participate. Social media are rich information sources and these tools facilitate crowd behavior, increase peer pressure and may result in saturation and associated negative impacts.

5. What is the impact of social media on decision making?

Although disagreements remain about the scope and meaning of the term social media, researchers are examining the impact of more and better user-generated content of all types on personal, group and managerial decision-making. Research is
also attempting to discern whether social media applications impact decision making in a positive or negative way.

Interestingly, speculation about blogging and social media's impact on decision making can be found as early as the 1980’s. In “Ender's Game” by Orson Scott Card (1985), a major subplot involves Ender's sister and brother, Valentine and Peter Wiggin. They are child prodigies like the hero, Ender, and using the aliases of "Locke" and "Demosthenes" they blog on the Internet about politics, diplomacy and all-out war with Russia. Their writings find audiences at the highest levels of government, and each sibling gradually gains a following, manipulates events and influences opinions resulting in global turmoil. Social media manipulates opinions.

Early evidence suggests that the impact of social media on individual and organizational decision making can be extensive. For example, some commentators believe social media has "been integral to the Arab revolutions and revolts of 2011” (e.g., Kirkpatrick, 2011). In the US, political recall elections have been facilitated by social media. Akron lawyer Warner Mendenhall who led a recall election collected more than double the 3,200 signatures needed to put the recall on the ballot, using blogs and robocalls to spread information (El Nasser, 2011). El Nasser (2011) quotes Mendenhall, "Even five years ago we couldn't have accomplished that... We have a wonderful ability to coordinate and to share information ... We're able to do it more rapidly.” Recently, social media facilitated riots in London, but it also helped people coordinate their efforts to clean-up the city (BBC News, 2011).

The Society for New Communications Research (http://sncr.org/) has sponsored studies related to the impact of social media. One such study by Bulmer and DiMauro (2010, 2011) stated that "The convergence of the Internet, Web 2.0, and mobile technologies has created a disruptive shift in business. The era of Business-to-Person (B2P) communications driven by all things social (social media, social networks, and social influence) has emerged as a new model for engagement, and Social Media Peer Groups (SMPG) have evolved to take important and influential shape in a new business and economic environment." Bulmer and DiMauro's survey of 356 professionals including primarily CEO’s and directors had 12 Key Findings on Social Media’s Impact on Business and Decision-Making by CEO’s and Managers:

1. Professionals tend to belong to multiple social networks for business purposes.
2. The “Big Three” social networks, LinkedIn, Facebook and Twitter, have emerged as professional networks.
3. Mobile is emerging as a frequent professional networking access point.
4. Traditional decision-making processes are being disrupted by social media.
5. Professional networks are an increasingly essential decision-support tool.
6. High levels of trust exist in information obtained from online networks.
Changes are taking place in organizations’ internal and external use of social media.

There is a recognized need for peer input in decision-making.

Connecting and collaborating are key drivers for professionals’ use of social media.

"Final" decision makers are more likely to indicate that they conduct research via a search engine (82 percent vs. 70 percent of Decision Supporters).

Those professionals with more networks are more likely to gather opinions through their online network, read blogs and query the Twitter channel as early steps in the decision process.

Younger respondents are more likely to read a company blog and to query the Twitter channel vs. older demographics.

Recently, Bulmer and DiMauro (2011) released results from a survey of 105 participants in 97 organizations in 20 countries that found that social network participation increasingly affects executive decision making at companies. They report "A majority (80%) of respondents are able to accelerate decision process and information/strategy development by participating in online communities. Endorsement (e.g. like, read, share, retweet) is at the center of collaboration in social media communities. 'The Crescendo Effect' in social media environments has great impact on buying decisions."

Peter Auditore (2011), director of SAP’s Business Influencer Program, defined the Crescendo Effect as "simply how many Tweets, Facebook, LinkedIn mentions and other digital means of notification a blog may get. This is paramount because the new flow of influence, (which has metamorphosed into a new form of advertising and word of mouth marketing,) acts like a crescendo through the ecosystem of whoever liked your blog enough to recognize it. Make sense? It is not the number of views that the blog gets but the ecosystem of the viewers, how they collaborate and how the influence flows from it."

Social media tools like blogging, cooperative publishing (wikia), video and photo sharing (YouTube), discussions (phpbb, skype), social networks (facebook, LinkedIn), microblogs (twitter), lifestreaming (friendfeed), video livecasts (justin.tv), virtual worlds (Second Life, HABBO), social games (pogo, doof), and massively multiplayer online games (World of Warcraft, Happy Farm) have an impact personal and managerial decision making. What is the impact? We posit that social networks, blogs and microblogs are currently having the largest impact on decision making, and we offer our initial hypotheses based on the literature and limited empirical evidence:

1. Business decision support tools developed to use social media data will help managers better understand trends and customer opinions.
2. Social media tools can act as communications-driven decision support systems (DSS) for organizations and social affinity groups.

3. Informal and formal groups using social media may tend to make decisions as “gangs” or “mobs” and behave without reflection or rational thought and planning.

4. Consumers will and do solicit information for decision making using social media and the information received will be considered reliable.

5. Managers can and will use social media to make predictions and to influence consumer behavior and product decisions.

6. People referred from social media sources are more likely to purchase, and are more satisfied with, online purchases (Reed, 2011).

7. Traditional decision-making processes are being disrupted by social media (Bulmer and DiMauro, 2010).

8. High levels of trust exist in information obtained from online networks (Bulmer and DiMauro, 2010).

9. Social media changes decision making by challenging the notion of who is an "authoritative" source (Garland, 2009).

Overall, the impact of social media on decision making should increase in the future. Easy to use tools like Facebook and YouTube have increased first and n-order connectedness exponentially. Web 2.0 and similar technologies are likely to increase the rationality and effectiveness of decision making in some cases while negatively impacting decision-making in other cases. For example, the use of social media that enable organizations to alter consumer decision behavior may result in either better or suboptimal decisions by consumers.

6. Conclusion

Social media are increasingly available and are used by managers within companies and in our personal lives. Although the Information Technology community has some difficulty defining social media, most people can agree on examples of social media applications. It appears possible to monitor social media and identify patterns. From a business and organization perspective, a tool such as sentiment analysis software discovers business value in opinions and attitudes in social media, news, and enterprise feedback. Sentiment analysis claims to assist managers discover the "true Voice of the Customer". Proponents argue an automated tool is necessary to keep track of the vast amount of information on the Web related to customer satisfaction and support, brand and reputation management, financial services, or product design and marketing (cf., http://sentimentsymposium.com/).

Anecdotal evidence suggests that in some situations the impact of social media on personal and managerial decision making can be extensive, and the impact is dependent on which specific social media application is used. It appears possible to determine if a specific application is a useful decision support tool or if it harms
decision making by applying traditional decision making metrics like satisfaction with the decision, time spent making a decision, the number of alternative evaluated, and decision quality. It is possible to develop frameworks and theories to assist in understanding the influence of social media on decision making by utilizing and extending existing theories. A number of theories can help explain how social media impact decision-making and the consequences of using social media as an input to decision-making.

7. Notes

NOTE. – This article incorporates material from four columns that have previously appeared in DSS News written by D. Power.

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