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## **WEB 2.0: A SOCIAL INFORMATICS PERSPECTIVE (Draft Version: Please don't cite without asking us first)**

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### **ABSTRACT**

*This position paper argues that the Web 2.0 phenomenon is an important object of study for information systems research, and that a social informatics approach to understanding Web 2.0 is particularly relevant and useful. We discuss Wikipedia as an example of empirical research on Web 2.0 that can help bridge the divide between academic and popular discourse on new technology movements.*

**Keywords:** Web 2.0, social informatics, computerization movements, Wikipedia

### **Introduction**

One of the intriguing features of information systems (IS) research is its ability to focus research attention quickly on new and emerging technologies. According to Benamati et al. (2007, p. 657) "Evolving technology forces our discipline to change at a rate far exceeding that of other business disciplines." In three short years, the Web 2.0 phenomenon has captured the attention of the information technology and computing industries, the IT trade press, and several other professions and disciplines. How are we to make sense of this?

In this paper, we argue that this phenomenon should be an object of study by IS researchers, particularly those interested in the uses of social theory in information systems research (STIR). We do so for two main reasons; first, technology firms are rapidly adopting the label and using it as a marketing tool for range of interesting applications and second, Web 2.0 applications are becoming integrated into public and private sector organizations and are beginning to shape business and communication practices. After a brief discussion of Web 2.0, the case is presented for using a social informatics approach to study the phenomenon. The paper concludes with an example of research examining Wikipedia, an archetypal Web 2.0 application.

### **Web 2.0: The fourth stage of Internet growth**

The Internet is in its fourth distinct phase of growth. In the first phase, from its origins in the mid 1960s until the late 1980s, ARPANET was a well-kept secret, used primarily by the knowledge elite: government scientists and researchers in the Departments of Defense and Energy, and the National Science Foundation, and academic researchers, primarily in computer and the hard sciences. The second phase, from 1987 until 1992, saw the opening of the Internet to the general public. During this time, many commercial service providers opened gateways to the net. The third phase, from 1992 to 1996, began with the release of the HTTP protocol that supported the World Wide Web and the graphical browsers that allowed people to explore hyperlinked documents in a networked

environment. The web became an accessible information service on the Internet in 1991 and, as described by Berners-Lee (1991), “the WWW project merges the techniques of information retrieval and hypertext to make an easy but powerful global information system.” The general public and the public and private sectors quickly adopted the web integrating it into work and social life. Looking back, this third phase of the Internet can be seen as “Web 1.0,” where millions of pages have been linked into a network of digital resources and people have learned to use software tools to publish content and communicate with each other.

In its fourth stage of growth, the Internet seems to be becoming a place where people are organizing themselves into communities and groups that cooperate, collaborate, and sometimes compete. Some of the digital tools and services that are becoming prevalent in this phase include social networking, collaborative writing tools, folksonomies, web services, mashups, and peer-to-peer file sharing, to name a few. O’Reilly and Daugherty describe this stage in the evolution of the network as “Web 2.0,” a term they introduced (and trademarked) in 2004 (O’Reilly 2005). Recently, in response to criticism about the lack of a clear explanation of the term, O’Reilly (2006) has offered a more concise definition of the term as

The business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them.

The term has been picked up and used widely in several different domains; for example, there is discussion of Web 2.0 in the computer industry, where applications are being developed that support and enable the types of phenomena mentioned above, education, where experiments are ongoing with rich forms of elearning systems, and libraries, where conferences and online discussions are devoted to “Library 2.0.” Madden and Fox (2006, p. 1) explain that Web 2.0 was introduced as a marketing term that has become:

A useful, if imperfect, conceptual umbrella under which analysts, marketers and other stakeholders in the tech field could huddle the new generation of internet applications and businesses that were emerging to form the ‘participatory Web’.

## **Why a social informatics analysis of Web 2.0?**

What can be gained by analyzing Web 2.0 from a social informatics perspective? Social informatics is useful here because it directs research attention to the social, cultural and organizational contexts within which technologies are designed, implemented, and used (Kling et al. 2005). Four important principles for a social information analysis of Web 2.0 are discussed below.

First, previous social informatics research has shown that attempts to analyze new computing technologies are often based on a “highly simplified conception of social life” (Robbin and Day, 2006). The original definition of Web 2.0 defines social life in either abstract terms, such as ‘network effects’ or ‘collective intelligence’, or by using positive, community-based metaphorical language, such as ‘folksonomies’ and ‘participation’. A social informatics approach would use empirical research and social theory to carefully examine the social reality of Web 2.0 in practice.

Second, the social informatics tradition argues that computerization has political consequences; there are ‘winners and losers’ (Kling et al. 2005). The notion of political winners and losers is missing from the original Web 2.0 definition of ‘network effects’ and ‘collective intelligence’. The value of Web 2.0 applications simply increases for all users as more people participate. As Web 2.0 technologies enter more complicated institutional contexts, such as large corporations and government agencies, a social informatics analysis would carefully search for instances where all parties do not equally share in the gains from the implementation and use of these technologies.

Third, a social informatics analysis presumes that technologies are interpreted and configured differently by users, often leading to different outcomes for the same ‘technology’ (Kling et al. 2005). Because user configurability and recombination is central to the Web 2.0 concept, through mechanisms such as mashups, APIs, and news feed syndication, finding a simple, deterministic impact of Web 2.0 will be difficult.

And fourth, a social informatics analysis usually presumes that a critical stance is valuable for examining the utopian claims of technology promoters and enthusiasts (Robbin and Day, 2006). Using revolutionary metaphors from both the open-source and personal computing movements, Web 2.0 has been claimed to be a ‘technology of freedom’ that

puts power in the hands of its users. Subjecting these claims to careful scrutiny is an opportunity, and perhaps even an obligation, for information systems research.

As an example of how Web 2.0 can be analyzed from a social informatics perspective, we discuss the research to date on Wikipedia, an important and well-known Web 2.0 story.

## **Web 2.0 as a Computerization Movement: The Wikipedia example**

Web 2.0 is an example of what Kling and Iacono (1998; 1995) and Iacono and Kling (1996) call a “computerization movement” (CM). CM is defined as “a kind of movement whose advocates focus on computer-based systems as instruments to bring about a new social order” (Kling and Iacono, 1995, p. 3). Influenced by sociological thinking about social movements, Kling and Iacono (2001) explain that CMs arise around core ICTs and have organizational structures, called “computer movement organizations” (CMO) and historical trajectories. They depend on the collective actions of a range of participants who mobilize resources to create and maintain technological action frames and public discourse about the CM, ideologies and myths about the role of the CM in society, and organizational and social practices that shape the uses of the core ICT. By using a social informatics approach to study Web 2.0 as a CM, researchers will be able to gain insight into the processes by which a social movement emerges and, if successful, takes hold, focusing on the social and organizational factors that shape its development over time.

A wiki is an example of a Web 2.0 application that can illustrate the claim that a CM is emerging around a core ICT. A form of social software, a wiki is a collaborative writing tool that is being used to support many different types of social activities both in organizations and in society. Perhaps the most widely known implementation of a wiki is Wikipedia, an application that is at the center of a loosely organized collective of contributors and a foundation that, in the terms introduced above, is its primary CMO. Wikipedia is an appropriate object of study because it was used as one of the applications in the O’Reilly (2005) conceptualization of Web 2.0. Web 2.0 was compared to Web 1.0 using 12 applications, with Wikipedia, being one of the applications of Web 2.0; Wikipedia was compared to Britannica online of Web 1.0. Two other applications that represent Web 2.0 in O’Reilly’s conceptualization are the building blocks of Wikipedia: the use of Wikis (compared to content management systems) and participating (compared to publishing).

As it has developed over time, Wikipedia is displaying the characteristics of a CM. It has grown through the collective actions of thousands of participants leading to complex social and organizational practices that shape its uses. It has been the subject of considerable public discourse out of which has emerged an ideology about the purposes and importance of this tool. Wikipedia can be further distinguished from other types of CMs by making use of a typology proposed by Hara and Rosenbaum (2007, under review). It is external, meaning that it is situated primarily outside of organizations, and nonmarket driven, because it is currently supported by a not-for-profit foundation. It is wide, because it has thousands of participants and stand-alone, meaning that it is a single software application. Finally, in terms of the way in which it is presented in the public discourse, it is largely perceived as positive.

Given these characteristics, what can we learn about this CM? The literature on Wikipedia is mostly anecdotal and while the number of articles, users, and languages that constitute the public discourse about Wikipedia expand daily research is lagging behind. Research has focused on the quality, reliability, and accuracy of entries in Wikipedia using a variety of methods. Researchers have compared Wikipedia entries to established online encyclopedias (Emigh and Herring 2005; Giles 2005; Rosenzweig 2006), developed a framework for quality of information on Wikipedia (Stvilia et al. 2005), focused on the evolution of articles over time (Viégas et al. 2004; Viégas et al. 2007), approached the problem of quality of Wikipedia content from a social network point of view (Korfiatis et al. 2006), and have measured the quality of articles through the use of open access research in articles (Willinsky 2007). Some scholars have focused their attention on the semantic coverage of Wikipedia, mapping the relationship between categories and authors (Holloway et al. 2006), while others have proposed a way that Wikipedia can incorporate semantic web components to improve its usability (Volkel et al. 2006). Most of the studies about Wikipedia fall under this stream of research, which mostly does not take a social informatics perspective, but rather focuses on the quality, reliability, and accuracy of the Encyclopedia.

A smaller number of studies have focused attention on the Wikipedia community. Researchers have made an effort to understand the motivation for users’ contributions to Wikipedia (Forte and Anderson 2005), types of coordination

behaviors posted on Wikipedia (Viégas et al. 2007), differences between novice and expert users (Bryant et al. 2005), and differences among contributors from various countries (Pfeil et al. 2006). Forte and Anderson (2005), using Latour and Woolgar's work on the incentive system, have stressed that contributors to Wikipedia are motivated by incentives similar to those of the scientific community. They report that contributors to Wikipedia are motivated to collaboratively identify and publish true facts about the world (Forte and Anderson, 2005). In another study, Bryant et al. (2005) have used activity theory as a framework to analyze technology use and emergent social norms on Wikipedia, as well as to understand how these influenced the transformation of members' participation over time. They found that novices mainly contribute to articles in their knowledge domain by correcting mistakes and making minor changes, while experts mainly see the Wikipedia as a whole and contribute to the community and the site rather than merely to a single article. Variations in participation and contribution to Wikipedia have also been identified among members of Wikipedia in different languages (Pfeil et al. 2006). Through a cross-cultural content analysis of history pages among Wikipedia in four different languages the authors found cultural differences in the style of contributions across the four cultures, some of which are correlated with the dimensions identified by Hofstede. A variety of coordination behaviors have been identified through an analysis of the Wikipedia talk pages and the most frequent posts involved planning efforts for writing and editing articles (Viégas et al. 2007). Another analysis of the Wikipedia community has employed the transaction cost theory, and reported that effective procedural and institutional authorities in Wikipedia explain the community's success in combating the problem of undesirable pieces of information (Ciffolilli 2003). It is evident that only a handful of studies that focus on Wikipedia fall into the stream of research employing a social informatics perspective.

## Conclusion

A social informatics approach to the study of Web 2.0 and Wikipedia in particular is currently in its infancy. A critical analysis of the political winners and losers in Wikipedia has yet to be done. There is a need for an examination of the abuse of power by Wikipedia administrators, an understanding of the dynamics between Wikipedia administrators and trolls, and an identification of the reasons for resignation of novice and expert from contributing to Wikipedia. Studies may seek to identify the effects Wikipedia and other Web 2.0 applications have on traditional publishers. Furthermore, it is crucial to understand the newly formed hybrid models, as manifested in projects such as the citizendum, which emerged out of the intertwined relationship between the traditional processes of scholarly knowledge creation and the capabilities of Web 2.0 applications.

Social informatics researchers have argued that there is a serious disconnection between the popular discourse on new technologies, and academic discourse based on research (Kling et al. 2005). If information systems research hopes to keep pace with the dramatic rate of technological change, newly emerging computerization movements such as Web 2.0 need to be engaged quickly yet deeply. A social information perspective on Web 2.0 offers one way to achieve this difficult goal.

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