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The Social Influence Model of Technology Adoption

HUMAN INNOVATION, IN COMBINATION WITH THE INTERNET, networking, and communications technologies have produced a new platform for social and business networking, formation of community, and communication. This emerging phenomenon is generally known as social computing. While there is no widely accepted definition of social computing, we define it as: *intra-group social and business actions practiced through group consensus, group cooperation, and group authority, where such actions are made possible through the mediation of information technologies, and where group interaction causes members to conform and influences others to join the group.*

In this article, we examine the adoption of information technologies in the context of social computing. Most current information systems research on individual technology adoption has focused upon the adoption of technology in organizations and has utilized such technology acceptance models as the TRA[7] and TAM.[5] It has been suggested, however, that a new perspective on adoption may be necessary to fully capture the nature of technology acceptance in social computing situations,[9] where the technology is embraced rather than simply accepted by the user, and where the action made possible by technology is seen as a behavior embedded in society.[3]

Few studies have investigated technology adoption targeting the individual at the level of society, community, or lifestyle experience. There is little research that approaches adoption in the context of social computing, and to our knowledge, no models have been developed to investigate this phenomenon. This study addresses this gap by developing social constructs and providing a theoretically grounded model for technology adoption in the context of social computing.

We develop a cross-disciplinary model of technology adoption to address the multi-faceted context of social computing. Our model suggests that social computing action, social computing consensus, social computing cooperation, and social computing authority are antecedents to social influence, and augment usefulness and ease of use. In social influence, group membership legitimizes actions and the individual is guided by the group's rules of practice. Social influence leads to technology adoption. Technology adoption incorporates two essential elements, the embracement of the technology by individuals and its embedment[3] in society. Each of the model's constructs will be explained in further detail.

As Figure 1 demonstrates, while technology may influence society, society often exerts influence on technology. Consider SMS text messaging. A technology that was originally intended to deliver subscriber information was adopted by end users as a vehicle for social behavior. Peer-to-peer (P2P) file swapping offers another example. A technology that was intended to provide an efficient mechanism for remote file access was adopted by end users to create music sharing networks. The strength of social influence is evident, as text mes-

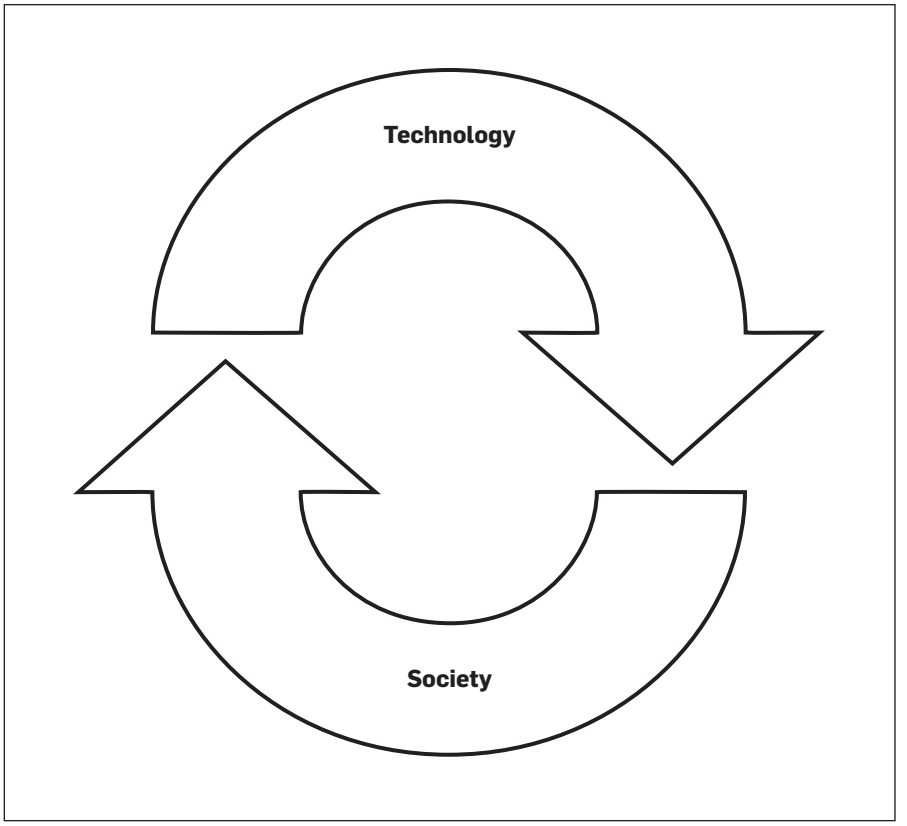
saging has now outpaced voice mobile calling as well as email. Similarly, sales of traditional music media such as CDs are declining as the number of music downloads and uploads via P2P networks continue to increase.

As the Internet, networking, and communications technologies become increasingly embraced by individuals and embedded in everyday lives and activities, technologically enabled social structures are emerging that are changing the way individuals interact and communicate, and are facilitating fundamental changes to business practices. People socialize and network via their Web browsers by joining social networking sites such as MySpace.com and LinkedIn.com. Text messaging has created a form of communication that has its own user-defined language and protocols. A recent study by Cision on the influence of Web blogs on mainstream media showed that the mention of blogs in top magazines and newspapers has increased from just over 2,000 in 2005 to over 13,000 in 2008.

In a 2006 study, Forrester Research found that although social computing is in infancy, societal changes are being witnessed, as individuals increasingly take cues from one another, in addition to traditional sources of authority, such as corporations, media, political institutions or religions. Social computing mechanisms such as blogs, e-Bay-esque Web sites, Web-based forums such as MySpace.com, text messaging, and instant messaging are often utilized instead of traditional sources of news, purchasing, and social interaction.

Unauthorized P2P file sharing provides an example of how technology is used in the formation and organization of groups with shared interests. Through *cooperation* with a particular *action*, communities based upon the shared interest of music exchange are created by the *consensus* of the group that it is acceptable to use the Internet and communication technologies to share music among group members. Though the action is illegal in the traditional sense, the decentralized nature of P2P makes regulation difficult and largely immunizes its activities against established forms of *authority*.[1] Furthermore, unauthorized file sharing has become socially acceptable (embedded) due to the new authority imposed by the group.[2,4,8,12] The embracement and embedment[3] of P2P file sharing is evident as the number of P2P networks continues to grow. Individuals have historically exchanged music via low quality mechanisms such as magnetic tape; however, the development of file formats such as .mp3 that could carry music of high quality and the adoption of P2P transferred some portion of the power wielded by the entertainment industry to the consumer. P2P file exchange has provided a means for obtaining music outside of mechanisms sanctioned by the entertainment industry, such as purchasing CDs or obtaining .mp3 files from legitimate sources.

Figure 1. Cycle of Influence between Technology and Society



As social computing becomes prevalent, creating new ways to examine human behavior in the context of information technology becomes important. Parameswaran and Whinston9 suggest that social computing has brought about a much more complex model of computing that may not fit within the confines of current knowledge. Current research on IT adoption focuses largely upon the concepts of usefulness and ease of use, which may not fully explain technology adoption in the context of social computing. Due to the social influence inherent in social computing and the embedment and embracement of technology in the lives of individuals and the interactions of society, it has become important to examine technology adoption from a cross-disciplinary and multifaceted context, and in terms of social and business interactions.

Social Computing Defined

Due to its nascent nature, there is no widely accepted or recognized definition of social computing. However, the phenomenon is being recognized in both academia and industry. The University of Michigan's School of Information defines social computing as *online communities*, *social networks*, *and user-contributed content*, while Forrester Research provides the following: *"Easy connections brought about by cheap devices, modular content, and shared computing resources having a profound impact on our global economy and social structure."* The Social Computing Group at IBM suggests that social computing is *"digital systems that provide a social context for our activities."* Our research leads to the following definition of so-

cial computing: *intra-group social and business actions practiced through group consensus, group cooperation, and group authority, where such actions are made possible through the mediation of information technologies, and where group interaction causes members to conform and influences others to join the group.*

Given its rapid rise, investigating technology adoption behavior from a social computing perspective is essential to practitioners and academics, and is an important area of research largely unexplored in the field of information systems (IS).[9] There is a growing awareness of social computing, however, as evidenced by academic programs in social computing in universities such as University of Michigan, the University of California at Berkeley, and Cornell University, and social computing research groups established by companies like Microsoft and IBM. Social computing poses new challenges for research and the IS field can benefit from studies examining technology adoption and use in social computing.

A New Perspective on Technology Adoption

Technology adoption has long been of interest in IS research to predict as well as explain user behavior. Such research is important for product design and development as well marketing and sales. However, the development of a novel perspective based on social computing is vital, as fundamental changes in user behavior challenge current knowledge.

Most technology adoption research to date has been investigated through theories such as the Theory of Reasoned Action (TRA)[7] and the Technology Acceptance Model (TAM)[5] or some extension thereof. However, recent studies by major research firms such as Forrester and Jupiter have found the user playing an increasingly interactive and central role in issues of design, development and marketing. Furthermore, mere acceptance is deemed insufficient in technology adoption that is in the social computing context.[3] For example, Baron et al.[3] found *"very strongly the inadequacy of "acceptance" as a descriptor of behavior with respect to text messaging"* and suggest that such models are inadequate when technology is embedded in a consumer community of practice and where consumers have co-created its value.

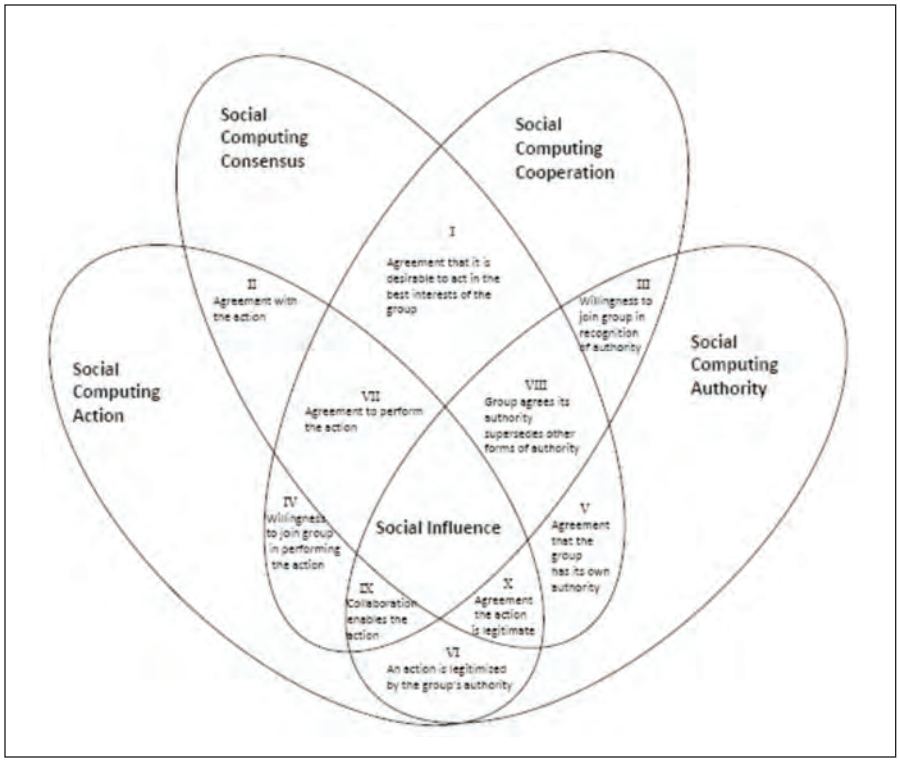
The Social Influence Model

The Social Influence Model (SIM) of Technology Adoption developed in this article incorporates the use of a Social Influence construct as the antecedent to Technology Adoption. As in prior technology adoption studies, most social influence research has been conducted through a narrow theoretical lens. In examining the role of social influence in technology adoption, much research has relied upon the TRA, wherein the *subjective norm* construct plays a central role. Subjective norm incorporates the idea of the influence that others in one's social environment have over one's behavior.[7] Many studies in IS research have defined the subjective norm construct as the extent to which referent others believe an individual should adopt or use a technology.[3] However, Schepers and Wetzels[10] found mixed and inconclusive results in technology adoption studies utilizing the subjective norm construct. Furthermore, a study of mobile phone usage by Wilska[11] suggests that the current use of the social influence construct is likely to be inadequate for *"the consumer of the future"* where the use of technology has become embedded in consumers' everyday life and work habits.

Therefore, the SIM model posits to inform current knowledge by the development of a Social Influence construct applicable to technology adoption wherein social influence results at the confluence of four related phenomenon: *social computing action*, or actions performed through use of technology such as Web browsers, cell phones and file sharing software, *social computing consensus*, or agreement from all people that it is right to carry out the action, *social computing cooperation*, or participating in a way that is in the best interests of the group, and *social computing authority*, or recognizing that the authority imposed by the group supersedes traditional authority. Figure 2 provides a graphical view of this construction.

Figure 2 demonstrates the way in which social influence is formed by the overlapping effects of the four constructs. For example, intersection I demonstrates the overlapping effects of consensus and authority, while intersection VII demonstrates the overlapping effects of action, consensus, and cooperation, and so forth. Social influence is the central component, occurring where all four constructs overlap, where there is cooperation with

Figure 2. Social Influence



the group on performing the action, consensus is reached on performing the action, and the authority imposed by the group dictates the legitimacy of the action. As the action becomes known to more and more individuals, the influence of the group becomes stronger, causing members to conform to the dictates of the majority and influencing others to join. As the action becomes widespread, it becomes difficult to control through traditional forms of authority, providing growing power and influence to the group. The convergence of social action, social cooperation, social consensus and social authority create social influence which has a direct positive relationship with technology adoption in the context of social computing. Thus the inclusion of the four antecedents provides a novel way to examine technology adoption wherein the technologies needed to participate in social computing, such as Web browsers, P2P file swapping, cell phones, and text messaging are increasingly utilized in everyday practices.

Figure 3 depicts the Social Influence Model of Technology Adoption. Table 1 provides a listing of the constructs and the references used in the construction and support of the model. A detailed explanation follows.

Figure 3. Social Influence Model of Technology Adoption.

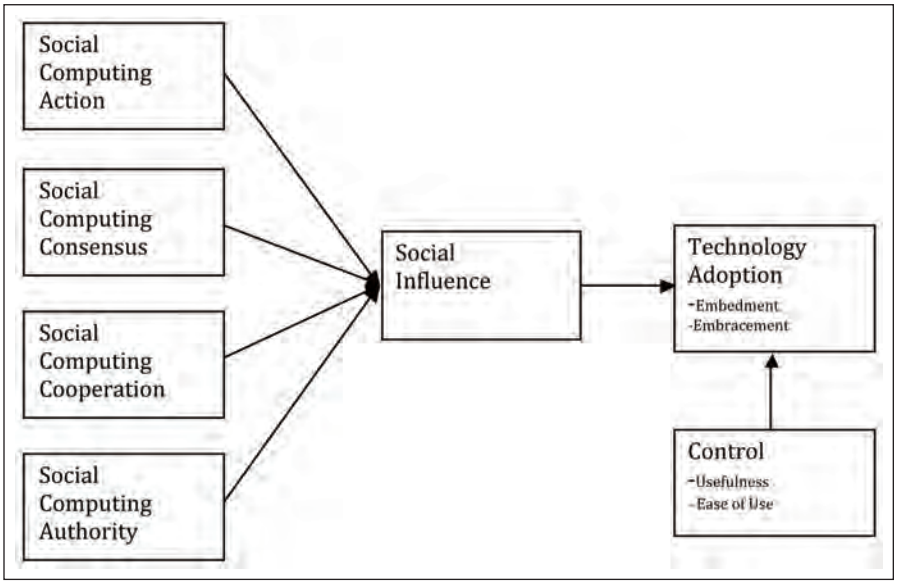


Table 1. Construct References

Construct	Reference
Social Computing Action	Chapin[4]
Social Computing Consensus	Horowitz[8]
Social Computing Cooperation	Axelrod[2]
Social Computing Authority	Zambrano[12]
Social Influence	Baron[3], Dholakia et al.[6], Fishbein and Azjen[7], Wilska[11]
Technology Adoption	Baron et al.[3]
Control (Ease of Use, Usefulness)	Davis[5]

Model Explanation

The four antecedent constructs for social influence are based upon several foundational theories. Social Action Theory follows two schools of thought. The first field of social action theory dictates that the action is planned and directed toward clear goals. The second field suggests that the action did not occur through a well-thought out plan, but occurred due to interrelationships among social forces.[4] We take the latter view that most social computing actions do not come into existence through careful planning by either the developers of the technologies or the end users who use the technology. It is our contention that social computing actions such as P2P file sharing and text messaging became social activities as a few people discovered that the technologies could be used toward social and group activities and others became convinced that they should also engage with the groups in these activities. Consensus Theory, sometimes referred to as the theory of right and wrong, states that an action is right if there is agreement from all people who are involved in a particular situation that it is right. All individuals are able to arrive at a reasonable way to resolve differences of opinion. In other words, there is a consensus of shared values and expectations.[8] Modern perspectives on the Social Theory of Authority propose that a relation of authority exists when individual performs some action because it is dictated by others and when there is acceptance of authority by the individuals.[12] Finally, Cooperation Theory examines what is best for the individual actor in the short term versus what is best for the group in the long run[2] and whether cooperation is in the best interests of all. We postulate that each of these antecedents contributes to Social Influence.

Following Wilska,[11] and Baron,[3] social influence as defined in most current research is insufficient with respect to technology adoption in the context of social computing. Therefore, Social Influence as constructed for this study is defined as the degree to which the individual perceives that important others believe he or she should join the group, the degree to which the individual values being a member of the group, the degree to which group membership is perceived important, the degree to which the individual believes in group authority, and the degree to which the individual believes the needs of the group are more important than of the individual.[3,6]

Technology adoption in the context of social computing is evaluated in terms of its embedment and embracement in daily life and activities.[3] Embracement is measured by evaluating the value of the technology to the individual, the empowerment experienced by the individual and the degree of anticipation by which the technology is viewed. Embedment is measured by evaluating the degree to which others

in the environment utilize the technology in the same way, at the same or greater level, the degree to which the message provided by the technology is understood by the recipient, and the degree to which the user views the technology as a necessity.

Notably, the model assumes that prevalent technology acceptance models do not fit within the context of social computing. Baron et al.[3] argue that consumers have created or co-created the value of text-messaging with producers. In doing so, they own and embrace the technology-based service; therefore, acceptance does not play an important role in participation. The same logic can be applied to other social computing activities such as P2P music sharing. File sharing technology originally intended to enable remote access to digital files was adopted by consumers as a way to form music sharing communities. We expect the traditional variables related to use, for example, perceived ease of use and usefulness to play a role in the adoption of any technology; therefore, they are included as control variables.

Implications for Research

This study serves to increase current knowledge of social influence by providing an overall construct and its four antecedents. The four antecedents are derived from underlying theories. In future research, it is important that appropriate variables and items be developed to operationalize these constructs. Once the constructs are measured, then the entire model can be verified and modifications made as necessary. Additionally, social computing is not an American or western phenomenon but a global one. An interesting way to extend the research would be to examine national cultural implications. For example, social computing is an inherently group-based phenomenon. How will tests of the model differ with subjects from individualistic countries such as the United States versus subjects in more collectivistic societies such as China?

Implications for Practice

A recent study by Forrester Research found challenges for IT architects and developers as a result of easy access to online information, software, and communities. The study suggests that architects and developers should embrace social computing. It is increasingly difficult to govern through formal authority based upon traditional institutional power. Companies should develop new tactics to succeed in the social computing environment that embrace new concepts of management and communication in dealing with employees, consumers and partners as power may shift from institutions to communities. A recent Jupiter study suggests that although bloggers and online communities currently make up only a small proportion of online population, their influence is on the rise in such areas as politics and societal issues. Furthermore, studies have found that the use of online tools such as communities and forums have created user-centric forces that have profound effects on design, development and marketing.

Given the notion of consumer involvement in product design, development and marketing, the practitioner can benefit from a fresh perspective on technology adoption. Many of today's consumers want to be influential in many aspects of products and services, and companies can provide these opportunities through social computing tools. Consider mass customization. In this environment, social computing technologies provide new opportunities for involving the customer in the design, production, and delivery processes before the actual sales transaction.

The practitioner should also take note of the effect of social computing on traditional business models. As stated earlier, the music industry is an example. Consumers are slowly moving away from the more traditional ways of obtaining music such as purchasing CDs and moving toward more consumer-centric ways such as downloading and uploading of music via P2P networks. While certainly consumers appear willing to obtain music files from legitimate sources, such as iTunes, the music industry has been slow to move away from its traditional ways. We believe it is important for practitioners to be proactive rather than reactive, and begin to consider ways that business can capitalize upon current trends in social computing. C

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