Leveraging Web 2.0 in Government

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High Performance Transportation Management

With today's gas prices, America cannot afford to spur added driving and sprawl instead of high performance transportation, public transportation, and smart growth. America's transportation systems are both broke and broken.

Transportation accounts for a third of America's greenhouse gas pollution. Forecast fuel economy improvements and lower carbon fuels won't solve the problem, with traffic growth countering these gains.
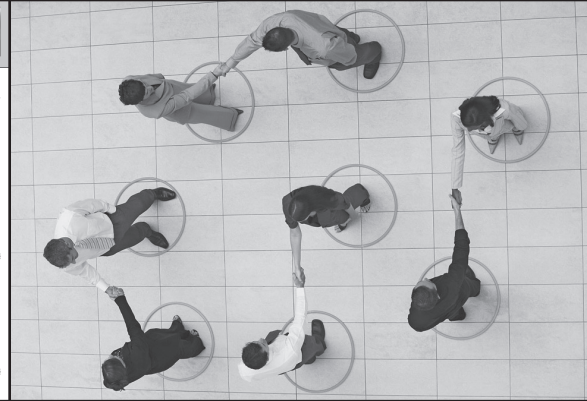
It's time to hold public agencies accountable for greenhouse gas and health impacts of transportation plans, investments, and operations. It's time to tie transportation spending to cutting traffic growth and greenhouse pollution. Let's align how we raise revenues for transportation with broader system goals and use pricing to shape choices and boost transportation equity.

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Ai-Mei Chang
Professor of Systems Management
University of Maryland University College

P. K. Kannan
Director, Center for Excellence in Service, and
Harvey Sanders Associate Professor of Marketing
The Robert H. Smith School of Business
University of Maryland

IBM Center for
The Business of Government

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Ai-Mei Chang
Professor of Systems Management
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Director, Center for Excellence in Service, and
Harvey Sanders Associate Professor of Marketing
The Robert H. Smith School of Business
University of Maryland

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F O R E W O R D

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, "Leveraging Web 2.0 in Government," by Ai-Mei Chang and P. K. Kannan.

In the past year, there has been enormous hype in the media about the growth of Web 2.0 and the use of social networking by the millennial generation. There has also been much publicity about the use of Web 2.0 in business and government. This report deconstructs the hype and presents the potential uses of social computing in government, discusses the barriers to Web 2.0, and presents what citizens think about Web 2.0. Interestingly, citizens in different age groups are open to new government initiatives to deliver services over the Internet using the interactive capabilities available in Web 2.0.

The authors' key findings will likely be discomforting to many government executives. Citizens, according to the focus group convened by the authors, trust government with their private data but do not see government as an effective deliverer of services. They trust the nonprofit and private sectors to deliver services more effectively. As a consequence, the authors believe government will be increasingly pressured to allow its services to be delivered by trusted intermediaries over the Internet rather than attempting to deliver them via their own websites.

The increased use of intermediaries has major implications for how government designs and delivers its services, as well as how government communicates and interacts with its employees and with citizens. It also has strong implications for how government agencies and programs are designed, organized, and administered. The authors maintain that government will increasingly be pressured to reduce its control by disaggregating its services and allowing more peer-to-peer interactions both among employees and citizens.
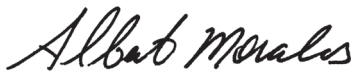
Albert Morales

Mark Cleverley

These trends pose big policy concerns around privacy, security, authenticity, and access that need to be addressed. Government faces cultural challenges as well, including agency hierarchy and accountability issues that need attention. Nevertheless, the authors offer a framework for government executives for how to begin sorting out these issues and how to begin leveraging Web 2.0 capabilities, starting with "just do it!"

Albert Morales
Managing Partner
IBM Center for The Business of Government
albert.morales@us.ibm.com

Mark Cleverley
Director of Strategy
IBM Public Sector Government Transformation
mark.cleverley@us.ibm.com

EXECUTIVE SUMMARY

With the advent of second-generation Internet technologies, the Web 2.0 environment is fast emerging as the communication, interaction, and service provision platform for all sectors. Both businesses and government organizations are recognizing the significant potential of the Web 2.0 environment in building relationships with customers, employees, and citizens, and in co-creating content and services that will benefit all players interacting in the environment. With the adoption of social computing and social media by citizens under the age of 25 already exceeding 75 percent, government organizations now need to plan and implement initiatives to engage and service the citizens of today and tomorrow. Given the focus within government organizations at all levels to engage and increase the civic involvement of citizens, the excitement about the Web 2.0 environment and ways to leverage it for government uses is understandable. So is the motivation for this report.

This study has four important objectives with regard to understanding how to leverage Web 2.0 for government-citizen and government-employee interactions:

- Understanding social computing as a phenomenon and the implications for harnessing its potential for government use

- Developing a framework for harnessing the power of Web 2.0 in government and identifying the critical issues in such uses

- Understanding the perceptions of citizens in interacting with government for service provision and civic engagement in the Web 2.0 environment

- Identifying the ways in which social computing engagement and effectiveness can be measured in Web 2.0 initiatives

Findings

Government needs to meet citizens where they are online. Social computing renders the online environment individual-user-centric. Younger citizens are increasingly engaging each other, interacting with businesses, and building an online cultural and commercial environment, all of which clearly call for government initiatives targeting citizens online. Governments will have to engage citizens at sites where they are rather than expect them to approach government portals. Citizens view this as "keeping up with the times," indicating the inevitability of such initiatives.

Citizens are willing to interact with government agencies online. In general, citizens have positive attitudes toward potential Web 2.0 initiatives. The more relevant the uses are for citizens, the more willing they are to interact with the government on the specific uses. Appropriately designed initiatives to engage citizens in their own settings will also enhance the trust citizens have in their government and help government build citizen loyalty. Such initiatives have the potential to increase the transparency of government agencies, which could lead to greater trust in them. It could also lead to greater citizen influence on government policies and actions.

The role of intermediaries will increase. Many businesses are being aided by third-party firms acting as intermediaries in providing content and service in the Web 2.0 environment. It is inevitable that, in order to engage citizens effectively in their social computing setting, governments will have to employ and leverage intermediaries to increase their coverage and reach to deliver content and "mashable"

services. Governments will also be able to provide customized services to citizens at a potentially lower cost with the help of intermediaries. The increased coverage and reach will come at the cost of decreased control, which means governments have to relinquish some control over how the content and service is reconfigured and distributed.

Government will need to rethink content and service design. Web 2.0 applications will necessitate governments rethinking how they design their content and services. Content has to be addressable in a very granular form so that intermediaries can pick the appropriate content and application they need to fulfill their service task. Privacy of citizen content and information has to be defined at a granular level for the same reason. Similarly, security considerations may dictate the design of the content and transportability of content to intermediaries as well as citizens in their online environment.

Government will have to find ways to embed authority in its web-based services. A survey of government initiatives and pilots in the Web 2.0 environment shows that they mainly span communication- and interaction-focused uses to date. Many citizens have been exposed to the Web 2.0 environment in an entertainment and/or social context. There is a level of informality in such uses that is likely to be associated with the more formal uses that governments may plan. Thus, imparting the appropriate level of authority to government initiatives is critically important to gain citizen trust in such uses.

Some citizens are concerned about equal access. The focus group studies indicated that many of the non-users of Web 2.0 technologies were concerned that they might be disenfranchised if similar opportunities were not provided in other more conventional channels. Equally important is the issue of access for those who do not have online access. Thus, there is a danger of some citizens becoming "second-class" citizens based on their abilities and access.

Citizens trust the government with personal data but not for service efficiency. Studies revealed that citizens trusted government more than businesses with regard to their personal data and privacy. However, in terms of service efficiency, citizens tended to trust the private sector to do a better job.

Given the specific nature of trust, governments can leverage reputed third-party service providers by teaming up with them to provide "mashable" services to citizens. It is imperative that government have appropriate control over private information in such joint ventures to realize the overall benefits.

Government will need to measure the effectiveness of its Web 2.0 initiatives. Surveys of current measurement techniques in the Web 2.0 environment in the private sector show that they are focused on two dimensions:

- Measurement of the levels of engagement

- Measurement of the effectiveness of the application

Both dimensions are necessary to calibrate the impact of the initiatives and justify a business case for their use. While measures of levels of engagement are useful for initial evaluation of government initiatives, the ultimate focus should always be on measuring the value generated for citizens.

Recommendations

Recommendation 1: Just do it. Government should embark on pilot projects to understand and experiment with social computing in the Web 2.0 environment.

Recommendation 2: Develop a government-wide inventory of common Web 2.0 issues. An inventory of common Web 2.0-related policy issues should be developed, and agencies need to address these issues collectively rather than having each agency individually develop their own solutions. This could be done from inside government—for example, out of the Office of Management and Budget's Administrator for E-Government and Information Technology—or via an external honest broker such as the Collaboration Project, sponsored by the National Academy of Public Administration (www.collaborationproject.org).

Recommendation 3: Strategically rethink how to deliver on your mission. Individual agencies or major programs should strategically develop service-focused uses that may involve using Web 2.0 approaches to reconfigure their business models or

services in order to more effectively deliver on their own core missions or outcomes that require collaboration with other agencies. This rethinking should be a part of their required agency-wide strategic planning process and not just within their technology offices.

Recommendation 4: Reconfigure your Internet information and services to be more component-based. As agencies redesign their websites, they need to focus on making their services and information more granular, or component-based, and give users the ability to use government information in "mashups" with other information sources. Along with the trend in service-oriented architecture (SOA) and the need for reusable service modules in the context of intermediaries extending the reach of government, government agencies need to develop policies to support the handling of such information and service modules. Given the increased role of reputed intermediaries in the Web 2.0 environment, government agencies might well consider leveraging intermediaries for Web 2.0 initiatives.

Recommendation 5: Ensure authenticity of government information and services. Agencies need to develop strategies and policies whereby they (or their customers) can ensure the authenticity of government-generated information and services. This is important as government begins to "meet" citizens where they are online and as intermediaries begin to "mash up" government data and services. Users need to be assured that government-provided information is clearly labeled so they can better judge the authenticity of the information or service they are accessing. Developing such an approach may be a government-wide initiative, possibly led by the National Institute of Standards and Technology.

Recommendation 6: Learn and keep an open mind. It is important for government agency executives to recognize that social computing is evolving even as the Web 2.0 platform morphs into Web 3.0 and beyond; it is in a perpetual beta state. This calls for executives to have a learning attitude toward the initiatives they launch in the social computing environment. Government agencies should start measuring the levels of engagement of Web 2.0 uses from day one and measure the effectiveness of uses through direct feedback from citizens on a regular basis.

In the context of fast-paced developments in the Web 2.0 environment and the increasing trend in citizen adoption of the environment, it is imperative that government organizations start implementing pilot projects with a view to learning and leveraging the new environment. However, such initiatives should be undertaken with a full understanding of the evolving environment, its implications for applications, and citizens' perception of such applications. We hope that this study will assist government executives in gaining a quick appreciation of these critical issues prior to planning their own initiatives.

Introduction

With the increased penetration of the Internet and wireless broadband services, and with the increasing technology readiness of citizens, in the past five years the breadth of activities that an average citizen performs online has been steadily increasing (see Pew Internet and American Life Project at www. pewinternet.org). The types of activities range from sending or reading e-mail (92 percent of Internet users in 2007 engaged in this activity), buying a product (66 percent), downloading games or videos (42 percent), to categorizing or tagging online content (28 percent) and blogging (22 percent).

The United States and other developed countries have seen a full integration of technology into citizens' lives—an integration that goes beyond the Internet, through wireless and mobile connectivity to virtual realms and virtual worlds. Over the past five years alone, the percentage of U.S. citizens involved in social networking and virtual community activities (broadly defined as networking in sites such as MySpace, Friendster, LinkedIn, and other special interest sites; reading/creating blogs; instant messaging; and using Web 2.0 applications) has doubled to over 30 percent in the general population (NTRS 2008). For those in their teens and 20s, this percentage is much higher (64 percent of the online teens create content online in such sites), indicating an ever-increasing trend in the use of the online environment for social networking, exchanging information, creating and building up content, and conducting transactions.

Given these trends, it is expected that tomorrow's adult citizens are going to spend a significant amount of time online for social, commercial, and business activities, displacing many of the activities and the time that is now spent offline. This has tremendous implications for both businesses and governments as they seek out useful interactions with their customers and citizens.

Cognizant of these trends, businesses and governments are already taking a very close look at Web 2.0 and online communities in order to leverage them for designing and marketing products and services and for providing customer and citizen service. This is reflected in the astronomical sums paid for, or contemplated for, social network sites such as MySpace and Facebook, highlighting their value-creation potential for both businesses and customers. A recent McKinsey global survey of business executives (McKinsey 2007) found that more than 75 percent of the executives plan to maintain or increase their investments in Web 2.0 technologies including peer-to-peer networking, social networking, and web services. Many businesses are also using these technologies to communicate externally with customers and business partners, as well as internally to increase collaborative efforts among employees.

Similar efforts are already ongoing in many government organizations, highlighting the fact that governments are not far behind in understanding the importance of technology and citizen usage trends. The Web 2.0 initiatives—podcasts and virtual worlds—of the Centers for Disease Control (CDC), NASA's internal social networks and virtual worlds, and the U.S. intelligence community's Intellipedia are just a few of the recent efforts launched within the federal government. Many examples have already emerged from the United Kingdom and Japan at other levels of the government. While efforts can be viewed as experimental or leveraging the low-hanging fruit, it is very important to identify and understand the nature of Web 2.0 technologies

and their suitability for various enterprise-level applications, the ways in which government can leverage these technologies for strengthening the government-citizen relationship and for intra- and inter-government use, and the perceptions that citizens have regarding the use of these technologies for interacting with governments. Without such an understanding, there is the potential danger of ignoring social trends among citizens and thus rendering governments somewhat irrelevant and reducing civic engagement with such citizen groups. This report aims to fill this gap by researching certain specific issues, which we outline in the remainder of this section.

Era of Web 2.0

The era of Web 2.0 is upon us. The Web 2.0 platform is a networked world supporting individual users creating content individually and collectively, sharing and updating information and knowledge using sophisticated, diverse sharing devices and tools, and remixing and improving on content created by each other. It is a network platform that allows high levels of user interactions, resulting in content and updates that are in the "permanent beta" stage, which in turn enables rich user experiences that go much beyond the Web 1.0 era. Many technologies populate the platform—blogs, mashups, peer-to-peer computing, RSS, social networks and online communities, podcasts, wikis, tagging and bookmarking, to name a few—leading to an environment of "collective intelligence" (O'Reilly 2005) that all users and firms can harness. (See page 11 for a glossary of Web 2.0 terms.) These applications share some common characteristics. They have the potential to deliver enhanced customer service experiences, to allow high levels of interactions and the co-creation of services, and to deliver self-service through a variety of devices, both wired and wireless.

The challenge to businesses and governments in this era of Web 2.0 is how to effectively harness this potential and the collective intelligence that is constantly evolving in this environment. This challenge is not confined to the technology arena alone. It involves the organizational and social structures as well, and results in transformations in both areas. This is because the era of Web 2.0 is one of "social computing" that is characterized by a rapid shift of control from the firms and institutions to the users. Thus, from the government institutional perspective,

the notion of the co-creation of services and governance issues would have to deal with (1) the shift in control to users and (2) users and external organizations acting as intermediaries to service other users. The design and delivery of content and services will have to be transformed. The framework and processes to create citizen relationships, to strengthen citizen trust and loyalties, and to enhance civic engagements will have to be thought through and designed carefully.

Issues of Focus

This report has four important objectives with regard to understanding how government agencies can leverage Web 2.0 for government-citizen and government-employee interactions:

- Understanding social computing as a phenomenon and the implications for harnessing its potential for government use

- Developing a framework for harnessing the power of Web 2.0 in government and identifying the critical issues in such uses

- Understanding the perceptions of citizens in interacting with government for service provision and civic engagement in the Web 2.0 environment

- Identifying the ways in which social computing engagement and effectiveness can be measured in Web 2.0 initiatives

The first objective of the study is understanding the basic concept of Web 2.0, its characteristics, and the technology and tools that underlie it. We will focus on how the potential embedded in Web 2.0 can be harnessed for enterprise and government applications. This understanding also provides the lay of the land in terms of potential applications, especially from the government viewpoint. We will also examine some applications in the private sector that highlight this potential.

The second objective of the study is to provide, based on the understanding of the concept and its potential, a framework for applying social computing in the public sector. This will include intra-governmental applications as well as interactions with external constituents. Recent well-publicized initiatives in the government will also be high-

A Glossary of Web 2.0 Terminology

Blogs: A frequently updated, chronologically ordered publication of personal thoughts and opinions with permanent links to other sources, creating a historical archive. This can be published on personal websites or institutional websites as communication tools.

Mashup: A web application that combines data from more than one source into a single integrated tool. For example, the use of cartographic data from Google Maps to add location information to real-estate data from Craigslist, thereby creating a new and distinct web service that was not originally provided by either source.

Open-source software: Software developed in the public domain by multiple developers that is available for sharing, enhancing, and various other uses. Linux and Pearl are good examples.

Peer-2-peer (P2P) computing: Allows direct sharing of files from one user PC to another user's PC using the web as the platform. Examples of P2P computing include BitTorrent, Gnutella, and FreeNet. Such P2P connections between users can form large networks that can also be used to distribute telephony in real time.

Perpetual beta: A term used to describe software or a system that never leaves the development stage of beta. Perpetual beta has come to be associated with the development and release of a service in which constant updates are the foundation for the habitability/usability of a service, as is common with many Web 2.0 applications.

Podcasts and vlogs: Online audio and video blogs that can be downloaded to devices such as PCs or handheld devices (wireless phones, mp3 players, iPods). These can be subscription based or free, single-use or repeated-use content.

RSS (Really Simple Syndication): A family of web-feed formats used to push frequently updated content such as blog entries, news headlines, or podcasts to users' PCs or devices. An RSS document, which is called a "feed," "web feed," or "channel," contains either a summary of content from an associated website or the full text. RSS makes it possible for people to keep up with their favorite websites in an automated manner that's easier than checking them manually.

Search engines: These include the ubiquitous search engine tools such as Google, Yahoo, Ask Jeeves, etc., as well as blog search tools such as Technorati, Bloglines, etc., in addition to specialized search tools at institutional websites.

Social networking sites: Online networking platforms that allow registered users to interact with other users for social or professional purposes. Examples include MySpace, Facebook, and LinkedIn.

Tagging and social bookmarking: Methods that help Internet users to store, organize, search, and manage bookmarks of webpages. These applications allow users to create tags or descriptions of the webpages using their own keywords, thus creating metadata (that is, data about data). These tags and bookmarks can be shared among users.

Virtual worlds: A computer-based simulated environment intended for its users to inhabit and interact via avatars. This habitation usually is represented in the form of two- or three-dimensional graphical representations of humanoids (or other graphical or text-based avatars). Most, but not all, virtual worlds allow for multiple users. The world being computer-simulated typically appears similar to the real world, including features such as gravity, topography, locomotion, real-time actions, and communication. Communication has, until recently, been in the form of text, but now real-time voice communication using VoIP is available. This type of virtual world is now most common in massively multiplayer online games. Examples include Active Worlds, ViOS, There, Second Life—although not games per se but more like virtual environments that can include gaming—Entropia Universe, The Sims Online, Red Light Center, Kaneva). Particularly massively multiplayer online role-playing games include EverQuest, Ultima Online, Lineage, World of Warcraft, RuneScape, AdventureQuest, and Guild Wars.

Wikis: Collaborative publishing technology that allows multiple users to work on and publish documents online with appropriate version control. Wikis allow hypertext links to content in any form, enhancing user experience and interactions.

lighted. Finally, critical factors that need to be considered in such applications will be examined.

The third objective of the study is to examine the perceptions of citizens regarding the use of Web 2.0 applications for government-citizen interactions as well as intra-governmental applications. Based on feedback from citizen groups both in focus groups and survey settings, we specifically focus on the practicality of the applications and citizens' enthusiasm for such applications. We also examine their views on the impact of such applications on enhancing their trust in government, their relationships with government, and the level of their civic engagement.

The fourth objective is to examine how to measure the levels of engagement in Web 2.0, as well as the effectiveness of such applications from the perspectives of service and governance objectives.

Finally, in the last section of the report we summarize the key findings based on the above four components of the study and provide practical recommendations for government executives for implementing Web 2.0, which will inevitably be demanded in the immediate future.

Understanding the Impact of Web 2.0

The origins of the social computing phenomenon, the centerpiece of the Web 2.0 platform, started much before businesses were beginning to discover the uses of the Internet for transaction purposes in the Web 1.0 era. However, the seeds of today's application started around the same time as users began congregating in online or virtual communities. In their narrowest form, virtual communities can be defined using the earliest (and still valid) definition:

> *social* aggregations of a *critical mass* of people on the Internet who engage in public discussions, *interactions* in chat rooms, and information exchanges with sufficient *human feeling* on matters of common interest to form webs of *personal relationship*s (Rheingold 1993).

The common bond is strengthened by personal relationships that ensure some degree of loyalty of the members to the community. However, commercial interests are a part of the individual-level needs, and it is not uncommon to find communities for business transactions focused on individual and organizational needs—communities of buyers and sellers, such as eBay, uBid, or Aucnet. These individual- and business-oriented communities consist of a critical mass of members whose needs are mainly *commercial* in nature and who use the communities mainly for *networking* and/or building *business relationships*. While these communities may lack the human feeling element and the social interaction, they involve such significant informational exchange, consumer evaluation of other users, and communication that we consider these communities as virtual communities.

In the era of Web 1.0, four types of virtual communities started to evolve depending on the types of

consumer needs being met (Armstrong and Hagel 1995; 1996). The four types are:

- Transaction-oriented communities

- Interest-oriented communities

- Fantasy-oriented communities

- Relationship-oriented communities

Many of them exist today in their earlier forms, although many of them have morphed into Web 2.0 forms.

Transaction-oriented communities. Online communities that evolved during the Web 1.0 era were limited to textual interaction among community users, with the community organizer (mainly businesses and third-party firms) focused on providing content to users and controlling the interactions, and interested in extracting information from community members. For example, the transaction-oriented communities primarily facilitated the buying and selling of products and services and delivered information that was related to fulfilling those transactions. These communities did not address the members' social needs in any manner, and the focus was on interaction between members either to transact business or to provide informational leads or consultations about other possible participants in transactions. Examples of such communities of transaction include:

- BestBuy.com or CircuitCity.com, where consumers get information and tips from the vendor and buy products at the website

- Amazon.com, where visitors can get reviews of books from other readers

• Business communities such as DigitalMediaNet.com, which meet members' transactional and/or informational needs.

One motive of the organizers of such communities was to increase the "stickiness" of the websites so community members would stay longer and spend more money. Although communities of transactions could be organized by anyone, the organizers were usually the vendors themselves.

Interest-oriented communities. The second type of community that evolved during the early years of the Internet was the community of interest. In such communities, members had significantly higher degrees of interaction than in a community of transactions, and the interactions were usually on topics of common interest. Motley Fool, a community for financial investors; the Well, one of the oldest communities; and BioMedNet, a professional community for physicians are good examples. These communities usually had chat rooms, message boards, and discussion groups for extensive member interaction, which was/is mainly textual in nature, with the user-generated content organized by directories.

Fantasy-oriented communities. The third type of community was a fantasy-oriented community where users role-played. For example, some online applications created fantasy environments in which groups of users could interact by typing special commands and messages (often referred to as "massively multiplayer online role-playing games"). Early examples of such communities include Oberin and Runescape.com.

Relationship-oriented communities. The fourth type of community was the community of relationship built around certain life experiences that are usually intense and lead to personal bonding between members. Examples include the Cancer Forum, a community for cancer patients and their close friends and family, as well as communities that focus on religion, divorce, and other topics.

All four of these types of communities of the Web 1.0 era were either meta-communities or "community portals" that organized several smaller, focused, virtual communities centered on common interests and relationships. Similarly, in the business-to-business realm, vertical mega-portals organized a number of tightly focused virtual communities in vertical industries. In this sense, the concept of a virtual community was still evolving in the Web 1.0 era.

Value Creation in Online Communities

Even with the earliest forms of online communities, it is quite clear that there is significant value-creation potential for users, businesses, and governments (see Figure 1).

Figure 1: Online Communities in the Web 1.0 Era
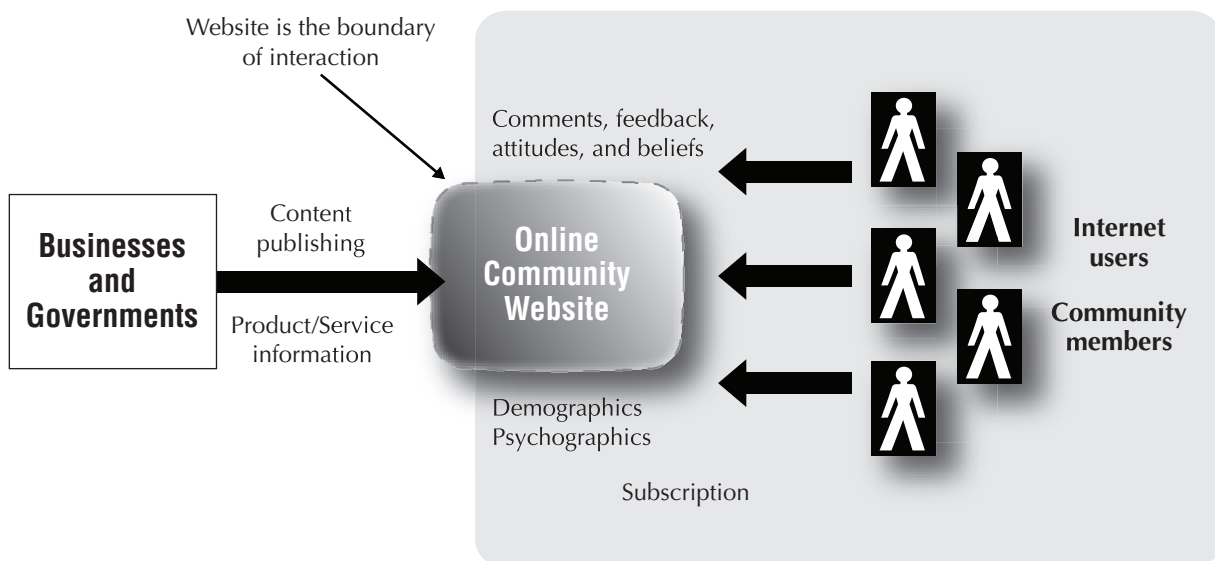
The types of value creation include the following:

- **Value in content creation:** Members' input to the community consists of information content in the form of comments, feedback, elaborating their attitudes and beliefs, and informational needs. Members may provide such content unsolicited, or in response to queries by other members or the organizer of the community (be it a business such as BestBuy.com or a government agency such as the Social Security Administration). Thus, members provide useful information that is retrieved and used by other members of the community. The community organizers may also put in their own content, which members may find very valuable. For example, the organizers of BioMedNet provide content in the form of information on the latest medical research and techniques, which physician members would find very useful.

- **Value in subscription revenues.** In many communities, the members would also be willing to pay *subscription fees* to become members of the community since they may highly value the information they receive from the community. People pay subscription fees to become members of communities such as America Online. Such subscription fees may be viewed as a charge that members bear to be part of an exclusive community or for accessing the content in the communities that they value.

- **Value in targeting the right segment.** Another possibility for value creation in online communities arises from the fact that a community brings together consumers of specific demographics and interest. This presents opportunities for transacting business and communicating messages about products and services that are of interest to consumers and which marketers and advertisers value and are consequently willing to pay for. In as much as business transactions take place in communities, value is created. In addition, virtual communities can attract ad revenues from advertisers eager to communicate their messages to community members (currently a significant source of revenue for virtual communities). Similarly, in the case of state governmental agencies, virtual communities could target businesses that

have specific needs for information and allow businesses to learn from each other in such communities.

- **Value in understanding the needs of consumers and citizens.** In addition to business transactions and ad revenues, there are other opportunities for value creation. These arise from the marketing information that is generated within communities, which the environment (marketers and advertisers, among others) would find valuable. Such information includes demographics and psychographics of members; their attitudes and beliefs about products, services, and issues; their behavior data with regard to business transactions within communities; and information on their interactions and interaction dynamics.

- **Value in product/service creation and ideation.** Research communities working on software projects such as Linux OS kernel, Apache server software, and Perl also add value by designing and creating new software products and extensions. Although none of these communities are formed with for-profit motives, members derive value from each other's contributions and work toward the common good of the researcher and user communities.

The manner in which value is created in virtual communities also depends on who organizes the community and who owns it. Transaction-oriented communities are generally organized, controlled, and run by marketers. In such virtual communities, value is created mainly though transactions rather than through ad revenues. The marketing information generated in the communities may also reside with the marketers, who may or may not sell such information. In many cases, marketers who own virtual communities can use such information to derive synergies for other related business functions, such as better customer service, mass customization in service and delivery, marketing research feedback, and so on. If the community is controlled and owned by the members themselves, the main focus is to derive sole benefits for the members, and value is created in content exchange and/or through subscription fees. If the community organizers and those who run it are not marketers, advertisers, or members but unrelated third parties, such communities are in a better position to leverage the full range of possibilities of value creation. This intermediary
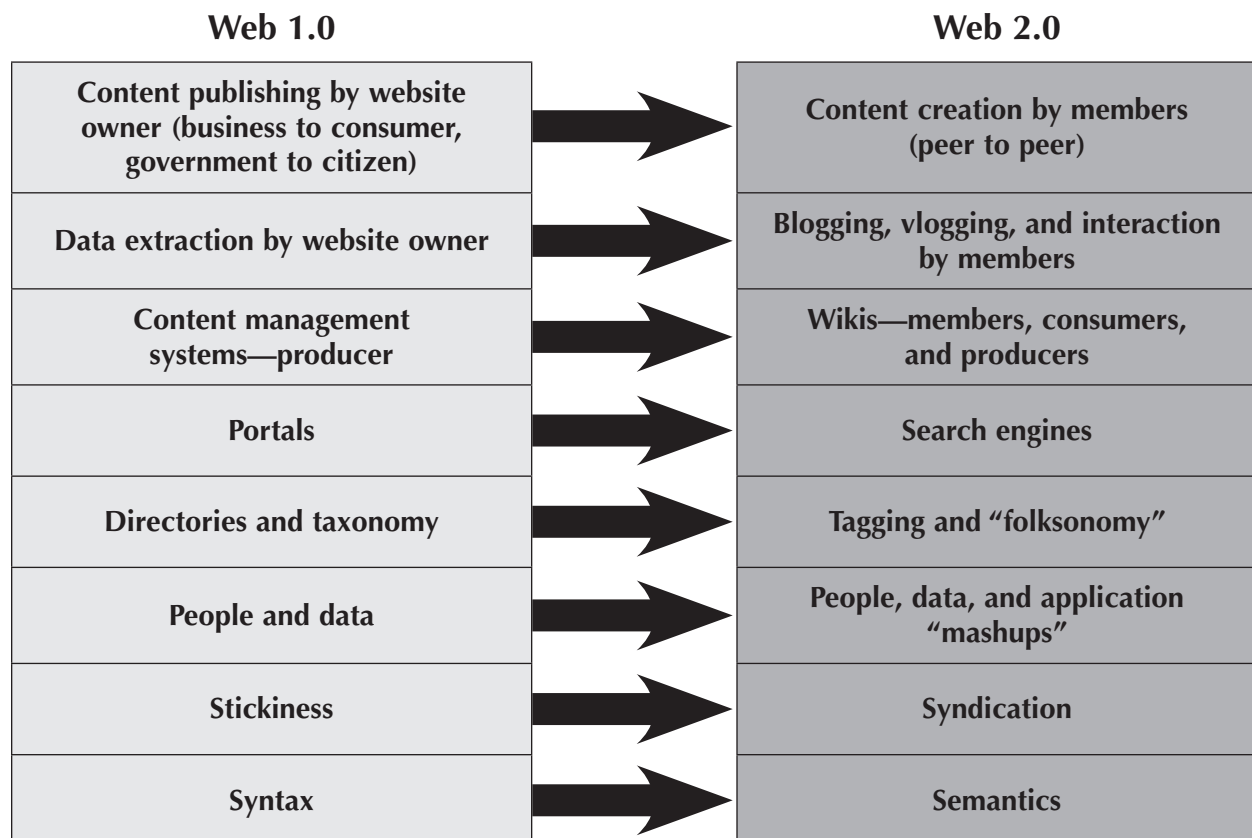
role of online communities plays a key role in value generation potential, which has increased exponentially with the advent of Web 2.0.

The Impact of Web 2.0

The evolution of the Web 2.0 platform based on the network among Internet users has changed the Internet environment significantly. The nature of this transformation can be illustrated as shown in Figure 2. Instead of the content being published and controlled by a website administrator as in Web 1.0, content is created and controlled in a peer-to-peer setting by Internet users. Rather than users being just consumers of information, they also become the producers of content. In contrast to community websites creating directories, users create their own tags and organize the information in their own way. One of the most significant transformations is that users can use their own applications to create new information based on the information they come across at websites. This provides users of the Internet and the community members greater control of content and freedom to express their views and needs.

The Web 2.0 platform has had a tremendous impact on content creation, ownership, and distribution in the online setting. In addition, the notion of a community has also undergone a transformation, especially with respect to defining its boundaries and ownership. The Web 2.0 environment focuses on the individual users and their networks. Instead of the previous focus on personal websites, individuals now create personal blogs, podcasts, and vlogs (video blogs) that they link and stream to other users, creating a network of related content—some created on their own, some downloaded or residing in other websites or blogs, personal or commercial—organizing and searching the content using their own keywords ("folksonomy" or social bookmarking), and distributing this information to others in their network (see Figure 3). They connect to each other's PCs and other devices, and transfer content and files of audios and videos. They collaborate on creating products and services online in the open; they download content and applications from other websites, personal or commercial, and create "mashups" that combine data and applications in creative ways to provide new services and information hitherto not seen or thought of. For example,

Figure 2: Transition from Web 1.0 to Web 2.0

Web 1.0		Web 2.0
Content publishing by website owner (business to consumer, government to citizen)	→	Content creation by members (peer to peer)
Data extraction by website owner	→	Blogging, vlogging, and interaction by members
Content management systems—producer	→	Wikis—members, consumers, and producers
Portals	→	Search engines
Directories and taxonomy	→	Tagging and "folksonomy"
People and data	→	People, data, and application "mashups"
Stickiness	→	Syndication
Syntax	→	Semantics

they may download content from the Internal Revenue Service website, add their own comments or applications on how to compute a special deduction, and transmit it to their friends to use. Individuals may choose to congregate in popular social networking sites, participate in role-playing games in virtual worlds, contribute content and interact with other users on YouTube, or network with others from wherever they are online.

The notion of a "walled-garden community" is quickly disappearing. While social network sites such as Flickr, YouTube, MySpace, and FaceBook are still run by commercial enterprises with profit motives, one could envision similar communities existing alongside in the open Web 2.0 environment, totally self-regulated, without the overt oversight of any entity and without any profit motive.

The clear lines of ownership of the content and ownership of the platform used for social computing are also undergoing transformation. Boundaries of online communities can now include content residing in proprietary sites or the use of such information to create mashups that reside elsewhere. These mashups are in constant flux; they are "perpetual

beta" applications that are constantly evolving as they provide service to users. Mashups can be created by individual users or by businesses and institutions with public and commercial interests. They network with users online and provide service to communities of users.

In essence, open communities along with the walled-garden communities have emerged as important intermediaries that can create value for businesses and governments through content, product, and service creation and dissemination to other users in the Web 2.0 environment. Communities such as MySpace, LiveJournal, YouTube, and FaceBook, which are rapidly emerging as communities for social interactions, allow members to share content and interact through blogging and chats. These virtual communities overlap several of the different orientations of Web 1.0 communities. For example, communities such as MySpace, FaceBook, and others have allocated "concept spaces" where members with similar interests can create websites, transact business with each other, play out their fantasies, and build relationships through interactions.

Figure 3: Social Computing in the Web 2.0 Era
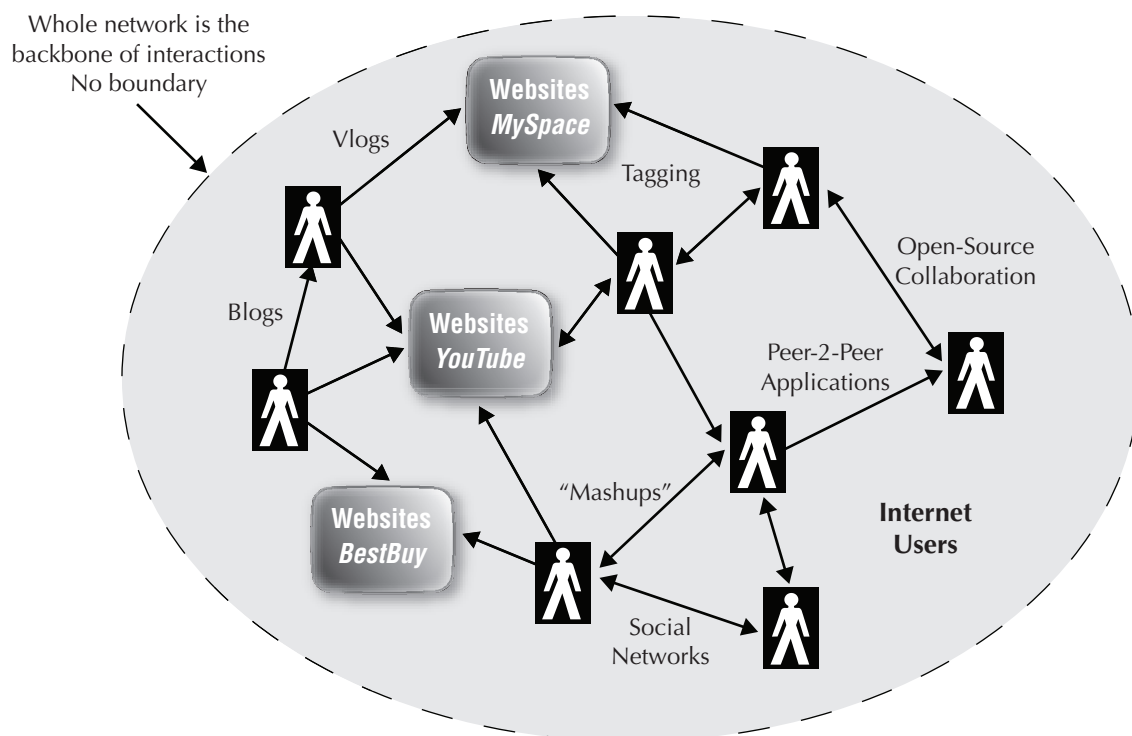
Implications of Web 2.0 for Government Agencies

The Web 2.0 platform renders the online environment individual-user-centric. From the government and business viewpoint, this means institutions will have to engage citizens and customers at sites where they are (in social network sites and online communities) rather than create portals and all-purpose websites and expect citizens and customers to approach them. This has implications for how service provision and uses of Web 2.0 are designed—pointing to the need to move away from portals to citizen-centric Web 2.0 applications such as "mash-ups" to deliver products and services to users' devices.

Reaching citizens where they are—in their communities—will also enable governments to harness the collective intelligence of citizens, such as feedback on services, ways to improve the design of content and services, and ways to distribute content and services efficiently to various citizen groups. In addition, such an engagement with citizens in their own settings will enhance the trust citizens have in their government and help government to build citizen loyalty.

To engage citizens and customers in their online communities, governments and businesses need to increase their *coverage* and *reach* to deliver content and services. To do this in a cost-effective way, institutions will have to rely on emerging intermediaries, who could be individual citizens themselves or other businesses and firms who will create and enhance content and create "mashups" and applications to distribute services to citizens. Use of intermediaries will also enable governments to provide enhanced, customized services to their citizens at much lower costs than the current centralized provision of service.

Governments and businesses have to *necessarily relinquish control* in distributing service to citizens and customers through the intermediaries. This is because the intermediaries will need to access content and services from the government in a way that is most suitable for providing the appropriate service to the citizen constituents they focus on. This has clear implications for the content and service quality that citizens obtain through the new distribution outlets.

Government interactions with citizens will also become less formal in such settings, which may have a negative impact on the power of the government to wield authority. This may also lead to loss of control and bypassing hierarchical structures. In addition, there is potential for conflicts with intermediaries and among intermediaries in how content is presented and customized to citizen constituents.

The most important implication for governments and businesses as a result of the loss of control, informality of interaction, use of intermediaries, and the need for customization to citizens/customers is that the content and service have to be designed in an entirely different way from how they are now designed.

- Content has to be addressable in a very granular form so that intermediaries can pick the appropriate content and application they need to fulfill their service task.

- Privacy of citizen content and information has to be defined at a granular level for the same reason.

- Security considerations may dictate the design of the content and transportability of content to citizens in their online communities.

Finally, evolving Web 2.0/3.0 applications will demand a new environment of collaborative culture within government agencies and organizations, which will also necessitate newer ways of designing jobs and managing human resources within the agencies.

These implications will be revisited in the next section as we focus on a framework for governmental applications that leverage Web 2.0.
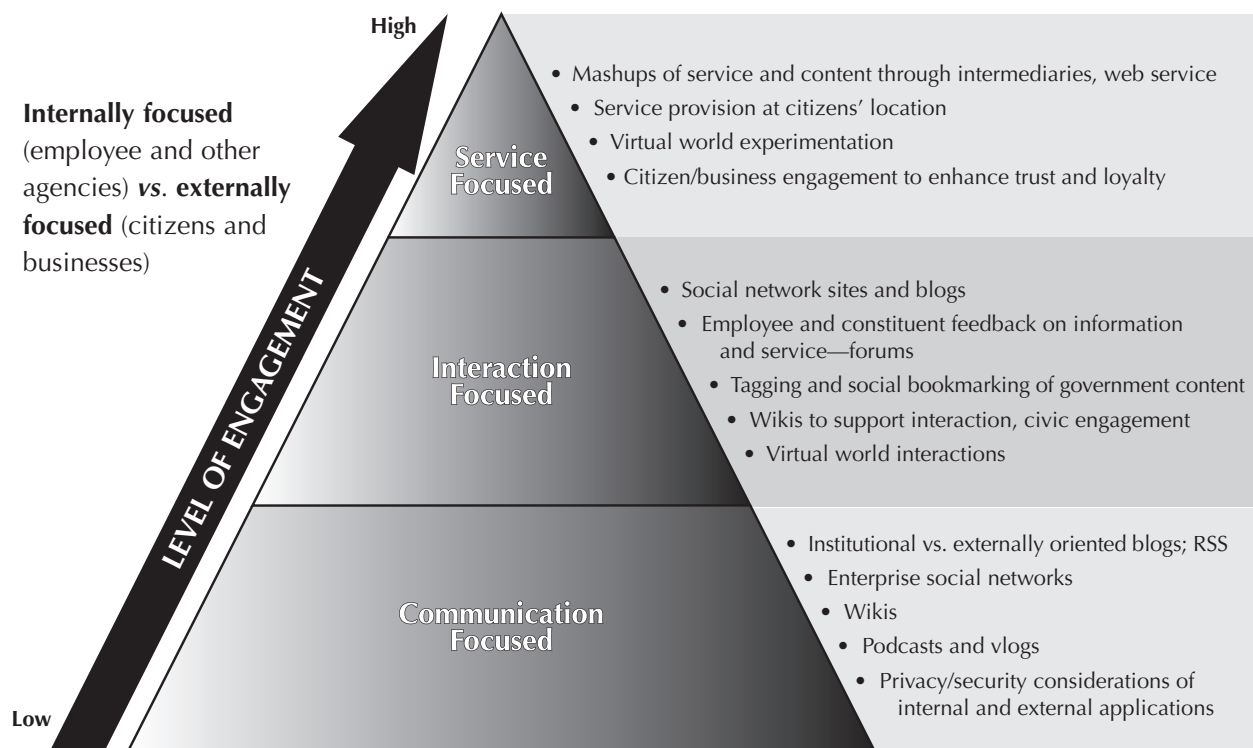
A Framework for Using Web 2.0 in Government

It is important for government executives interested in leveraging Web 2.0 to have an appreciation of the framework for using Web 2.0. The Web 2.0 environment can span three distinct types of uses—those that are communication-focused, those that are interaction-focused, and those that are service-focused, as shown in Figure 4.

As depicted in Figure 4, the level of engagement with the citizens and constituents increases as the focus shifts from one of pure communication to one of service delivery and fulfillment. In some sense,

the communication-focused uses, which form the foundation for the higher-level engagements of inter-action- and service-focused uses, are also the low-hanging fruit that governments can start taking advantage of immediately. In a similar manner, the internal uses (within government) are somewhat easier than the externally focused uses. In what follows, we discuss the characteristics of each level of use, with highlights of some ongoing government applications.

Figure 4: A Framework for Government's Use of Web 2.0

High

Internally focused (employee and other agencies) *vs*. **externally focused** (citizens and businesses)

LEVEL OF ENGAGEMENT

Low

Service Focused
- Mashups of service and content through intermediaries, web service
- Service provision at citizens' location
- Virtual world experimentation
- Citizen/business engagement to enhance trust and loyalty

Interaction Focused
- Social network sites and blogs
- Employee and constituent feedback on information and service—forums
- Tagging and social bookmarking of government content
- Wikis to support interaction, civic engagement
- Virtual world interactions

Communication Focused
- Institutional vs. externally oriented blogs; RSS
- Enterprise social networks
- Wikis
- Podcasts and vlogs
- Privacy/security considerations of internal and external applications

Communication-Focused Uses

The primary objective of communication-focused uses is to disseminate government information that is relevant to citizens as far and wide as possible so that:

- Citizen groups gain an increased awareness of the content.

- Citizens have easy access to the information wherever they are.

- Governments can promote citizen-focused informational campaigns, all in a cost-effective manner.

The focus of these uses is to increase the reach of government content using social computing tools, such as blogs, podcasts and vlogs, RSS, wikis, and enterprise social networks. They can also be effectively used within government organizations focused on government employees and other government agencies. Tools such as widgets can be made available to bloggers to embed them in their blogs so that a direct link is provided to the relevant information within government websites. If the content is addressable in a granular fashion, then it makes direct links to the specific portions of the content easier.

The viral nature of these tools makes the distribution of content easier and faster. These uses also have minimal risks, especially if the content is designed in such a way that modifications are difficult. Some well-publicized example applications follow.

- The initiatives undertaken by the Centers for Disease Control (CDC), which assign a high priority to educating the public, fall within this realm. They have been undertaking pilot projects such as eCards, which citizens can send to their family members and thereby distribute health-related CDC messages virally; podcasts of health-related information; setting up a presence on social network sites such as MySpace, eons.com (a community for citizens over age 50), and sermo.com (a physician-community site) and distributing widgets linking content in the CDC websites; and targeting influential bloggers in the health care field for its content from CDC experts (Kash 2007).

- The blogging efforts of the Library of Congress to allow their experts to share their knowledge with a broad audience with regard to the content they have and create a high level of awareness. In addition, the Library of Congress provides RSS feeds and syndicated feeds, and also provides downloadable content in different formats (Novak and Springer 2007).

- The efforts of the National Academies Press (publishing wing of the National Academies) in disseminating content in different forms (print, PDF and PDF chapters), marketing their titles using podcasts, and providing widgets that can be placed in blogs is in a similar vein to the initiatives of the Library of Congress (Kannan, Pope, and Jain 2008).

- The European Commission has launched its own channel to promote its audio and video on YouTube, called the EuTube. This is an example of providing content to citizens where they congregate in the social networking sites.

- Many government organizations have followed the private sector in using online communities to spread the word about job openings and opportunities within government organizations and to actively recruit at these sites. For example, the Central Intelligence Agency has been using Facebook.com to recruit potential employees to its National Clandestine Service (Bruce 2007). While such efforts can be viewed mainly as advertising focusing on the target market, the viral nature of these sites may provide cost-effective tools for communication.

- Many elected officials in the government use blogging as a way to communicate with their constituencies (see Wyld 2007). In addition to blogging, politicians are looking into leveraging many of the social networking sites to communicate with supporters and raise funds.

- Japan's Ministry of Internal Affairs and Communications (MIC) has been experimenting with the social networking platform as a disaster information and management tool in the city of Nagaoka (Lazer 2006). The city of Kobe, Japan, has deployed a network of citizens connected by wireless networks to act as emergency workers and coordinators in the event of earthquakes.

Commercial businesses have invested significantly in using many of the social computing tools for marketing communication purposes. Efforts are under way to identify influential bloggers and opinion leaders in social network sites such as MySpace, Facebook, and LinkedIn so that marketing through word-of-mouth can be achieved effectively. Additionally, many organizations are experimenting with blogging and social networks within their organizations and across the supply chain to make their processes more efficient (Van den Bulte and Wuyts 2007). Such efforts, which are already being undertaken by elected officials and politicians, can be useful in the government realm, too.

Communication-focused uses are the low-hanging fruit. Agencies should start experimenting with these first before planning any other application. However, there is an important issue to consider before implementing these uses. While communication-focused uses are the easiest to implement among the three levels of use, the challenge is to impart to the uses (such as blogs, wikis, etc.) an authoritative quality that comes with the government domain. It is important to rise above the informality of the use, which, while necessary for building relationships with users, may make issues seem less serious. The identity of bloggers and contributors has to be established clearly so that the invisible boundaries of self-restraint and civility are not crossed.

If blogging and wikis with the government organization are encouraged, clear rules for participation and commenting have to be established so that lines of authority are not violated. The key is to impart authority to the conversation in a setting where some of the control for such activity does not exist.

The Web 2.0 platform also allows third parties to download and extract content from government sources and disseminate the information widely to citizens. For example, an independent website called GovTrack (www.govtrack.us) collects data from government websites through automated processes and daily downloads. The intent of the website is to make information widely available to citizens and also make government operations more transparent. While this helps government agencies to use outside resources to help in dissemination, it is also a challenge to ensure the authenticity of government information provided at third-party websites.

Interaction-Focused Uses

The primary objectives of interaction-focused uses are:

- To interact with citizens (and employees) to get their feedback on policies, issues, services, and plans of the government

- To get feedback on service design and new ideas

- To benefit from the "wisdom of the crowd" through creation of new content, extending the content/information provided by the government

- To make users intermediaries in creating mash-ups of content and application that can benefit other citizens

The fulfillment of these objectives is further facilitated by the benefits of network scale effects and reach. Businesses are fast leveraging such benefits through creative use of social computing tools. For example, Cisco Systems uses a network of academics residing all over the world for e-learning; many businesses are using online community chat feedback for new product/service development (*Wall Street Journal* 2007); and some firms now routinely use online recommendation data generated by community members to redesign their products/services. Some efforts in the government domain are as follows:

- The U.S. intelligence community's Intellipedia program is an internally focused knowledge management program using social computing tools that allow employees to post information, tag information and data, and collaborate with each other at the Intellipedia site on different programs. The program supports 37,000 users—20,000 working on top-secret projects and another 10,000 on classified projects—and has been very popular with potential users (Kash 2007).

- NASA's Ames Research CoLab started out as a physical collaboration facility, but soon morphed into a three-dimensional virtual online center that allows researchers from all over the world to build relationships with NASA scientists in a social network setting. The virtual center enables contributors from around the world to participate in conferences and briefings on a more regular basis and facilitates enhanced research collaboration (Kash 2007).

- The Library of Congress is in the process of implementing several pilot projects that would allow users of its information to tag the content and provide metadata information (social bookmarking). The pilots have three specific goals: (1) to provide the library's public domain content in user community environments, (2) to encourage user-generated tagging to help users as well as the library, and (3) to create folksonomy to supplement expert-generated taxonomy. The library plans to expose such user-generated content on its website for other users to take advantage of after verification procedures to ensure the integrity of the content (Novak and Springer 2007).

- Spartanburg County, South Carolina, and the town of Cary, North Carolina, have undertaken social networking initiatives at the local government level that clearly highlight the potential of social computing to enhance constituent and citizen engagement. Using Neighborhood America's enterprise social networking system and the public comment system, the local governments have been able to foster high levels of citizen engagement and feedback in designing local community projects. Officials use such tools to interact with citizens, share information, and thus facilitate improved decision making (Bevarly and Ulma 2007). This is an example of how social computing can complement offline local community efforts given the advantages of online communities—asynchronous interaction from one's own home and during one's free time.

- The Centers for Disease Control has initiated a successful pilot project by opening a virtual flu clinic on Whyville.net focused on children. The virtual clinic has led to a 15 percent vaccination rate among the visitors in a six-week period. The CDC is also initiating virtual health workshops in Second Life (Kash 2007).

- The United Kingdom's Department for Work and Pensions is piloting a social network site for UK senior citizens with the aim of encouraging social networking among the targeted community to interact on issues related to all areas of life beyond work and pensions (Marketing Week 2007).

- Cisco High Tech Policy Blog (December 13, 2007) reports of an incident in Canada in which bloggers used their networking power to stop the passage of a piece of legislation. In the context of Canada's copyright protection efforts, Canadian government officials had indicated their intentions to introduce legislation that was rumored to be ratifying specific World Intellectual Property Organization (WIPO) treaties. "However the bill's specifics were not shared with those concerned and, naturally, the lack of information led stakeholders to draw their own conclusions on what it would or wouldn't entail. Through a number of social media outlets, the ringleaders against potential copyright measures were able to quickly generate a flood of negative press and even mobilize a protest at the office of the government Minister who is responsible for copyright. The coverage forced the government to withhold the tabling of legislation and rethink its strategy" (Cisco High Tech Policy Blog). This is another indication of how social computing can play a highly interactive role in participatory governance.

- The U.S. Patent and Trademark Office (USPTO) is enlisting the public's help in reviewing patent applications by allowing the public to examine patent applications and provide input of prior examples. Launched in 2007, this initiative—Peer-to-Patent: Community Patent Review Pilot—allows the USPTO to reduce its backlog of reviews through community involvement in the patent examination process, and is an excellent example of how community networks can help government agencies be more efficient and effective (Deloitte 2008).

Interaction-focused uses are more challenging to implement compared to communication-focused uses—the challenge being to authenticate the content created by users before it is mashed up into new content. For example, in the Library of Congress application, the librarians have to ensure that new tags created by users using social bookmarking are, in fact, correct before letting other users view the new content. Such authentication processes can require significant time and effort.

Service-Focused Uses

The service-focused uses are the holy grail of social computing, possibly the most difficult to implement successfully but most impactful if successful. These

uses involve marrying the network effects of social computing with the intermediary role of network members. They require government organizations to give up significant control over the content and applications and how they are used by intermediaries using mashup applications to provide value to downstream users. By the same token, the potential for superior, efficient, customized service is great. The use of virtual worlds to experiment with service designs and to obtain citizen/user feedback also falls into this category of application. There are not many government exemplars in this realm, but there have been many reports recently outlining potential uses, some of which are presented below:

- In the area of content provided by a government agency, intermediaries could integrate government content with non-government content and create new information products that enhance the value of the information provided by government sources. For example, a user may download information from the Library of Congress and add content from other sources in the same content area, thereby enhancing the value of the original content for other users. Restaurant inspection data can be combined with food critic reviews and customer online recommendations to create enhanced value for the community (ec3org.com 2007).

- Banks could help their customers file taxes by combining information from government with the information they have on their customers internally to make the process more efficient for citizens (Di Maio 2007).

- An online travel agent could integrate its services with government immigration and health systems to provide "mashable" services to its customers (Di Maio 2007).

- The British Columbia Ministry of Transportation in Canada combines Mapquest data with real-time traffic data to create a "mashup" of current driving conditions and advice to drivers and commuters. Such information to citizens allows them to avoid congested routes while regulating the traffic load on main arteries (Deloitte 2008).

The possibilities are many. They require government agencies to provide information in a fine-grained form that is addressable and accessible by interme-

diaries, and to trust and give authority to intermediaries to design customized services and thus provide value to citizens, while reducing the overall cost of service provision. In the coming years, such applications will help governments realize the value of social computing.

However, in service-focused uses, while the use of intermediaries can provide wider reach and customized service at lower costs, the issue of uniformity in service quality for all citizens can be problematic. What if one constituent is not well serviced by a specific intermediary while another constituent gets superior service from another entity? This could raise issues of equity in service quality.

In addition to the above challenges, all of the uses have issues concerning the protection of the privacy of citizen data in government control, the security of such data when it is transferred, and the legality of the content and service provision that might compromise the privacy of citizens. These issues call for innovative designs of content unbundling and content protection so that the government can safely guarantee privacy, security, and legality of the data.

All of these challenges indicate that there are serious issues that need consideration before rolling out social computing on a large scale. However, at the same time, they should not stop pilot initiatives and experimentation, which are the key ways to learn about potential problems and tackle the challenges.

Identifying and Developing Strategies to Respond to Barriers to Using Web 2.0 Tools in Government

By John Kamensky

The social networking tools that are increasingly common in the private sector and in people's personal lives are not as common in government. There are a number of barriers to this increased usage for government, because using these tools can create challenges to the way government organizations and employees work. Older public sector executives tend to view the Internet as a way to improve productivity and customer service. Others see it as a way to up-end old business models based on hierarchy and positional authority.

Citizens and businesses will increasingly demand that government increase its use of Web 2.0 tools as a way of doing business. Therefore, government executives will need to systematically identify the barriers to the adoption of Web 2.0 and develop strategies to respond. Following is a beginning of what some have identified as potential barriers.

Barriers Stemming from Demographics

Younger government employees say they want to be able to use in the office the capabilities they have at home and in their non-work life. The Millennial Generation has grown up with ubiquitous access to Web 2.0 tools and has integrated them into how they work, learn, and play. They tend to be far more interactive over the Internet, which is different from how older generations use the Internet and how they get their work done. This clash in work styles sometimes contributes to issues related to both access to and acceptance of Web 2.0 social networking tools in some government agencies.

Barriers Stemming from the Availability of Current Technology

Some agencies have outdated hardware or software that is not capable of accessing or using Web 2.0 tools. Some agencies still have limited access to the Internet or have limited bandwidth that cannot handle graphics-rich applications. Others have outdated software that is not capable of running these applications.

Institutional Barriers

Those on the cutting edge of the use of Web 2.0 tools in government are beginning to develop a list of institutional barriers to the adoption of these tools and approaches. These come from a variety of places in agencies. Following are some of the more prominent:

- *Offices of General Counsel.* The risk-averse legal culture is often a first barrier to the adoption of Web 2.0 technologies in a number of agencies. They raise legitimate concerns, such as the inadvertent loss of intellectual property, rules governing the retention of government records, rules of engagement/propriety, and the fear of making a commitment or a violation of information sharing. While legitimate, solutions have been developed in private industry and some agencies, but these are typically not widely shared and the result oftentimes is that agency legal officers prohibit action rather than find a solution.

  In some cases, there is a legitimate need to update statutory provisions that were written before the Internet was envisioned. For example, what constitutes an "official" record? How does an agency ensure 508 disability compliance if its website contents are reused by a private entity? How are indemnity issues resolved if government uses commercially run platforms (e.g., Google, YouTube)?

- *Offices of Public Affairs.* Public affairs officers are traditionally an agency's gatekeeper for what information is shared, both externally and internally. This ensures legitimacy and confidence in who can speak on behalf of the agency and helps keep the agency "on message." The immediacy of Web 2.0 tools raises concerns about information not being cleared through traditional channels and vetted in advance. Finding ways to manage this tension in a public environment becomes an important challenge.

- *Chief Information Officers*. CIOs have a legitimate concern about the security of their networks if employees operate outside firewalls. Some also independently decide which websites to block employees from accessing because of a fear that employees are "playing" on social networks. Some try to manage access because of a fear of overloading servers or compromising network bandwidth.

  Another key issue CIOs face: How do you ensure the integrity and authenticity of government data when it can be used by others in "mashups" to provide insights or services that the government does not provide itself? Ultimately, CIOs may be encouraged to shift their thinking from data being "owned" by government agencies to being a common resource to be shared by all.

- *Privacy Officers*. In some agencies, privacy officers are raising concerns about possible violations of privacy for both employees and citizens as a result of access to Web 2.0 social networks or related software applications.

- *Program Line Managers*. Traditional managers are often uncomfortable with their loss of control over the flow of information and unsanctioned/spontaneous cross-organizational collaboration. In a Web 2.0 world, where the younger generation values peer-to-peer relationships, this begins to shift authority and power from the position held or credentials to a judgment based on capability and contributions.

The Collaboration Project, sponsored by the National Academy of Public Administration, is developing a catalog of barriers identified by "early adopters" in federal agencies and is sharing solutions that individuals have developed to adapt a tool or approach within their own agencies. The Academy hopes that by sharing both problems and solutions across agencies that broader policy fixes will be easier to devise.

John Kamensky is Senior Fellow, IBM Center for The Business of Government, and Associate Partner, IBM Global Business Services.

Citizen Perceptions of the Potential Uses of Web 2.0 in Government

It is no secret that social computing is a rapidly increasing trend among citizens in the U.S. Based on the 2007 National Technology Readiness Survey (NTRS 2008), which measures citizens' awareness and use of technological advancements and devices, 30 percent of U.S. citizens have a personal website, blog, or social networking page on a site like MySpace or FaceBook. It is more telling when the responses are broken down by age category: 77 percent in the 18-to-34 age group, 30 percent in the more-than-34 and less-than-45 age group, and 26 percent in the 45 and above age group.

While the trend may be increasing, would citizens want to communicate and interact with the government in such settings? What is their attitude toward government initiatives in reaching out to them in these settings? Would they welcome potential government use of Web 2.0? How would it impact their civic engagement, relationship with government, trust in government, and, ultimately, citizen loyalty? We explored these issues with citizens in focus groups to develop some understanding of their perspective. We reiterate that these findings are exploratory in nature and could be starting hypotheses that could be examined in pilot projects.

We conducted four focus groups in early January 2008: Groups 1 and 2 included U.S. citizens in the age group 18 to 25; Groups 3 and 4 included U.S. citizens in their late 30s and 40s. Participants in Groups 1, 2, and 3 were all members of some type of online social network community—MySpace, Facebook, LinkedIn, or other such network. Group 4 participants were aware of such social network sites, but none of them were members of any such site. To provide an appropriate context for exploring the issues, each group was provided with three or more scenarios describing potential uses of Web 2.0 by government. These spanned all of the three levels of uses that we had identified in the previous section. See the sidebar for descriptions of each of the six scenarios.

Focus Group Findings

The following are the major findings from the focus groups:

Attitude toward government initiatives. In general, the use of Web 2.0 by government was seen positively by the citizen groups regardless of age. Comments such as "keeping up with the times" and "forward-looking" were frequently used. Citizens were already having similar experiences with many private sector firms and, therefore, had similar expectations with regard to government initiatives.

Willingness to interact with government agencies. In general, the more relevant the issues are for the citizen groups, the more they were willing to interact with the government on specific uses. For example, the younger groups (Groups 1 and 2) thought the disaster management and tips to avoid influenza applications were appropriate and welcomed such initiatives. However, the teen safe-sex application was considered "too intrusive" and elicited comments such as "it should not appear in my network unless I give explicit permission." Some less relevant applications were perceived as "intrusions," "tacky," "turn-off," etc. On the other hand, the older groups (Groups 3 and 4) found the interaction-oriented applications very relevant and useful.

Perceptions concerning government initiatives. The communication-focused applications were seen as quite useful and trustworthy. Some concerns were

Focus Group Scenarios

Communication-focused uses
Scenario 1: Safe-sex practices and information targeted at teens and those in their early 20s are provided in social networking sites with blogs and podcasts from expert health professionals. The primary aim of the application is to provide relevant information to teens and to direct them to appropriate sources if they need more information.

Scenario 2: Tips to avoid influenza and common communicable diseases are provided in blogs and podcasts from health experts and government sources such as the Centers for Disease Control, targeting the users of popular networking sites. The primary aim is to educate the target audience in the social networking sites in prevention methods.

Scenario 3: Disaster management applications focusing on informing citizens how to respond to a campus shooting incident, terrorism-related events, or natural disaster events such as tornadoes, and what actions to take to protect themselves. Such applications provide local campus or local government information on evacuation, actions, and related recommendations through social network sites, handheld wireless devices, and instant messaging applications.

Interaction-focused uses
Scenario 4: Enterprise social networking tools are provided to citizens on local government websites to interact with local government leaders and other concerned citizens with regard to issues such as neighborhood school closings and school redistricting due to budget cuts, etc. Such forums replicate public forums and hearings in an online environment.

Scenario 5: Governments interact with citizens in social network sites and virtual worlds such as Second Life about how to redesign a government-sponsored student loan program.

Service-focused uses
Scenario 6: "Your favorite bank has teamed up with the federal government to help you with customized tax filing. The government will provide all specific information regarding your filing status and data to the bank, and the bank will use its information on you to provide 'mashed-up' services."

For the younger citizen groups, Group 1 was provided with Scenarios 1, 3, 4, and 5, while Group 2 was given Scenarios 2, 3, 4, and 5. For the older citizen groups, Group 3 was provided with Scenarios 1, 3, 4, and 6, while Group 4 was provided with Scenarios 1, 4, and 6.

expressed regarding the authoritative nature of these communications ("How would I know that the messages are actually posted by government sources?" "Could it be a prank by my friend regarding a terrorist attack?" "Is it just a rumor?").

Privacy issues. The service-focused use raised many questions regarding the privacy of citizen data and local businesses getting hold of that data. In fact, groups tended to trust the government more with their private data than they trusted local businesses, who, they felt, could be swayed by "profit motives." Regardless, many agreed that the mashed-up services could be very useful and convenient.

Impact on civic engagement. In general, the more relevant the use was for the citizen group, the more likely they were to have higher levels of engagement with the application. The local government uses (Scenario 4) elicited the highest level of enthusiasm by the older citizen groups (Groups 3 and 4) and the least by the younger group (Groups 1 and 2). The more frequent the interaction, the more the desire to participate and change the world, the more likely they were to participate in the social computing engagements. Many felt that capturing the voice of citizens in local matters was very important, and it becomes easier with convenient online access and virtual town hall meetings. Such uses could provide a structured discussion, clear reasoning,

and asynchronous mode of interaction, and could lead to better-informed decision making. Respondents also felt that they would have "more say" in decision making and thus have more influence in their government's policies and actions.

Concerns about equal access. Group 4 participants (those who were not members of any social networking sites) specifically raised the issue of equal access in online forums (Scenario 4). Online forums are not accessed by all, and poorer, less-educated citizens often do not have access to such sites. Given this, participants felt that care should be taken by the local government that all voices are heard in making their ultimate decisions lest any stakeholder's voice is ignored. Similar thoughts were also expressed by younger groups (Groups 1 and 2) with regard to the use of Second Life for designing loan programs (Scenario 5). Some participants expressed the view that such sites are "just fun" and "opinions and expressions should not be taken too seriously."

Trust in government and relationship with government. The communication-focused uses were seen as advertisements and public-oriented messages and were described as "the government doing its job." While these applications increased the positive image of the government (when they were seen as "useful" rather than "intrusive"), trust was not mentioned very often by the participants. When specifically queried about trust in the context of these applications, some participants indicated that the trust they had in their banks to do the job right might "rub off" on the government, and thus government might benefit by teaming up with businesses in providing such service. At the same time, businesses were trusted less than the government when it came to safeguarding personal data, as businesses have a profit motive. There was also consensus among the focus-group participants that service-focused uses can help make the inner working of government agencies more transparent to citizens. This could lead to increased citizen trust of government.

Implications for Government Use of Web 2.0

The focus group findings have several significant implications for governments when considering the use of Web 2.0:

Matching applications to the appropriate target group. The findings from focus groups highlighted the importance of targeting the applications. In general, the more relevant the applications were for the target group, the more receptive the groups were to the applications. Those applications that were more local and demanded more frequent interactions elicited much higher interest for participation and higher levels of engagement.

Being sensitive to privacy considerations. Participants generally considered some applications (e.g., teen safe-sex initiatives) as too intrusive while similar initiatives on preventing communicable diseases were generally found more acceptable. This indicates that there is a fine line between what is considered private and intrusive and what is considered an acceptable topic.

Communicating the authoritativeness of the content. The findings also suggest that government uses should clearly communicate the authority and authenticity of their content. There is a clear need to be careful in framing the content and signals of authenticity while communicating to citizens using these tools.

Ensuring equal access. It is important to communicate to citizens and ensure that within agencies Web 2.0 is but one channel through which communication, interaction, and service provision are provided by government agencies. Other equivalent channels must be provided to ensure equal access for all citizens.

Building citizen trust. The findings suggest that carefully designed co-branded service opportunities with reputable third-party businesses can be useful to enhance the reputation of government service provision. It is important that citizens are aware that the government maintains control of and safeguards their private information in such applications rather than totally outsourcing it to the third party. In addition, government can design Web 2.0 initiatives in such a way as to increase its transparency to citizens. This can lead to increased citizen trust.

In summary, the overall take-away from the focus groups was that Web 2.0, if designed right, has significant potential to provide value to citizens, increase their civic engagement, and increase their trust in government and government service provision.

Measuring Engagement and Effectiveness

Measuring the effectiveness of Web 2.0 is a critical task in successful implementation. That said, the applications and technology are evolving so fast that measurement tasks are somewhat lagging behind even with private sector applications, and there is a lack of standard measures (Peterson 2007). Whether governments are initiating only small-scale pilot projects or contemplating a larger roll-out, it is essential that measurement issues are considered right at the beginning of the project and appropriate plans made in conjunction with a clear statement of objectives for the initiatives.

The measurement tasks can be categorized into two levels: (1) measuring engagement and (2) measuring application effectiveness. Engagement measures focus on reach and impact of the communication-focused, interaction-focused, and service-focused applications. Effectiveness measures go beyond these initial measures and focus on how successful the measures have been in meeting the ultimate objectives from the viewpoint of effecting change in citizen attitudes and behavior; providing service at the appropriate quality level; creating new content, applications, and social intelligence (knowledge); increasing citizen satisfaction; increasing trust in government; and creating lasting citizen-government relationships. (When the uses are internally focused within the government organizations, the focus is on employees). Engagement metrics are pre-requisites for effectiveness measures and thus are common for all applications.

Measuring Engagement

These measures focus on two main aspects of any social computing: (1) usability of the application, and (2) the extent of engagement as a result of the application. For communication-focused applications, the focus will be on measuring the reach (for example, who among the targeted segment downloaded the podcasts), the extent to which a communication piece was transmitted virally, the session length at a virtual-world application, and so on. Many applications such as blogs can be measured using tools provided by firms such as MeasureMap and BlogBeat. For example, these tools can provide:

- The number of visitors to a blog per day

- The number of links from other blogs that have been used on a given day

- The number of comments posted in response to the blog

- The number of links in posts that linked readers to other content

RSS reach can be measured using tools from Feedburner (Google). Firms such as Web Analytics and Google Analytics provide many options to measure direct engagement of citizens in terms of their session lengths, comments, uploads, invitations to others, and so on.

Measuring engagement using the measures outlined above is the first step in measuring the impact of a pilot project and making a business case for further investments in Web 2.0 projects. While these measures are sufficient to understand the effectiveness of communication-focused applications in creating awareness of the issue in question, it is necessary to benchmark the cost/reach of social computing tools and compare them to the costs of alternative channels of communication.

Measuring Effectiveness

The ultimate success of Web 2.0 initiatives in government has to be measured on the basis of their effectiveness in meeting the overall objectives of the specific application. For example, if the Internal Revenue Service were to measure the success of its "mashable" services with banks acting as intermediaries, then the measurement has to focus on the process and outcome variables—ease of use, reduction in mistakes in filing, reduction in overall effort, increase in citizen satisfaction with the process, and overall cost incurred by IRS per tax filing. These measures would then be compared against the benchmarks to make an overall assessment of success. Similarly, if a local government were to evaluate its enterprise social networking tool, the measures of effectiveness have to go beyond the number of citizens participating, posting comments, and interacting to the quality of decision making, citizen satisfaction with the process, increase in citizen trust and loyalty, and so on. While measures of engagement will be useful, they cannot be substitutes for measures of effectiveness.

When a use is internally focused, as in the case of applications for the intelligence community, the measures of effectiveness should focus on:

- Creation of new relevant knowledge

- Increased effectiveness of the intelligence community in solving cases

- Increased effectiveness in collaboration

The ultimate focus of measurement should always be on measuring the value generated from the social computing application regardless of the type of application initiated.

Findings and Recommendations

We started out the report with four specific objectives with regard to leveraging the Web 2.0 environment for government uses:

- To understand "social computing" as a phenomenon and the implications for harnessing its potential for government use

- To develop a framework for harnessing the power of Web 2.0 in government and identify the critical issues in such uses

- To understand perceptions of citizens in interacting with government for service provision and civic engagement in the Web 2.0 environment

- To identify ways in which social computing engagement and effectiveness can be measured in Web 2.0 initiatives

While the report details many findings in each of the sections, the key findings are summarized below. This is followed by recommendations for government agencies contemplating Web 2.0 initiatives.

Findings

Government needs to meet citizens where they are online. Our secondary research into the nature of social computing reveals that it renders the online environment individual-user-centric. Younger citizens are increasingly engaging each other, interacting with businesses, and building an online cultural and commercial environment—all of which clearly call for government initiatives targeting citizens online. Governments will have to engage citizens at sites where they are rather than expect them to approach government portals. Citizens view this as "keeping up with the times," indicating the inevitability of such initiatives. There is a clear danger that

governments may become increasingly remote to the citizens of tomorrow, with much reduced engagement levels, if steps are not taken to engage citizens where they are.

Citizens are willing to interact with government agencies online. Our focus group studies reveal that, in general, citizens have positive attitudes toward potential Web 2.0 initiatives. The more relevant the uses are for citizens, the more willing they are to interact with the government on the specific uses. These uses also tended to be more local, thus demanding more frequent interactions with citizens and leading to higher levels of engagement. At the same time, initiatives should not be seen as too intrusive or compromising citizens' privacy. Appropriately designed initiatives to engage citizens in their own settings will also enhance the trust citizens have in their government and help government build citizen loyalty. Citizens feel that such initiatives have the potential to increase the transparency of government agencies, which could lead to greater trust in them. It could also lead to greater citizen influence on government policies and actions.

The role of intermediaries will increase. Our secondary research also finds that in the Web 2.0 environment many businesses are being aided by third-party firms acting as intermediaries in providing content and service. While some of these intermediaries are new firms and businesses, many are established firms taking advantage of the opportunities that the online environment has provided to them. It is inevitable that, in order to engage citizens effectively in their social computing setting, governments will have to employ and leverage intermediaries to increase their coverage and reach to deliver content and "mashable" services. Governments will

also be able to provide customized services to citizens at a potentially lower cost with the help of intermediaries.

The increased coverage and reach will come at the cost of decreased control, which means governments have to relinquish some control over how the content and service is reconfigured and distributed. It also implies that data security and privacy issues have to be carefully considered in such uses.

Government will need to rethink content and service design. Our secondary research reveals that Web 2.0 applications will necessitate governments rethinking how they design their content and services. Content has to be addressable in a very granular form so that intermediaries can pick the appropriate content and application they need to fulfill their service task. Privacy of citizen content and information has to be defined at a granular level for the same reason. Similarly, security considerations may dictate the design of the content and transportability of content to intermediaries as well as citizens in their online environment.

Government will have to find ways to embed authority in its web-based services. A survey of government initiatives and pilots in the Web 2.0 environment shows that they mainly span communication- and interaction-focused uses to date. While they are also the easier uses to implement, the challenge is to impart to the uses an authoritative quality that overcomes the informality of the social computing setting. Many citizens have been exposed to the Web 2.0 environment in an entertainment and/or social context. There is a level of informality in such uses that is likely to be associated with the more formal uses that governments may plan. Thus, imparting the appropriate level of authority to government initiatives is critically important to gain citizen trust in such uses.

Content that is mashed up by intermediaries also needs to be authenticated by the government to safeguard its quality for the ultimate consumers—the citizens. Citizen perceptions that government has the appropriate level of control in services provided by intermediary channels might be critical for the eventual success of such services.

Some citizens are concerned about equal access. The focus group studies indicated that many of the

non-users of Web 2.0 technologies were concerned that they might be disenfranchised if similar opportunities were not provided in other more conventional channels. Equally important is the issue of access for those who do not have online access. Thus, there is a danger of some citizens becoming second-class citizens based on their abilities and access.

This issue is particularly challenging in the government environment, where agencies cannot pick and choose their constituents. However, this only highlights the importance of proper communication and expectation setting for online and Web 2.0 uses.

Leveraging the Web 2.0 environment within a multichannel setting, where citizens have the option of choosing their channel of interaction, can provide government agencies options to experiment with newer forms of channels that can lead to improvements in efficiency and effectiveness in service delivery. But it can also lead to increased costs in the short run.

Citizens trust the government with personal data but not for service efficiency. Focus group studies revealed that citizens trusted government more than businesses with regard to their personal data and privacy. Given their profit motives, businesses are seen as more likely to misuse citizens' personal data to gain competitive advantage. Governments, on the other hand, have a responsibility to protect their citizens' data and thus are viewed as being more responsible with personal data.

However, in terms of service efficiency, citizens tended to trust the private sector to do a better job. Citizens have a choice when it comes to businesses, and poorly performing businesses are weeded out in competitive environments. Given the specific nature of trust, governments can leverage reputed third-party service providers by teaming up with them to provide "mashable" services to citizens. It is imperative that government have appropriate control over private information in such joint ventures to realize the overall benefits.

Government will need to measure the effectiveness of its Web 2.0 initiatives. Measurement initiatives and measurement standards are somewhat lagging behind, even in the private sector initiatives. This is

understandable given that many Web 2.0 initiatives are in an experimental phase. Surveys of current measurement techniques in the Web 2.0 environment in the private sector show that they are focused on two dimensions: measurement of the levels of engagement and measurement of the effectiveness of the application. Both dimensions are necessary to calibrate the impact of the initiatives and justify a business case for their use. While measures of levels of engagement are useful for initial evaluation of government initiatives, the ultimate focus should always be on measuring the value generated for citizens.

Recommendations

It is clear from our findings that the Web 2.0 platform (and beyond) is the interaction environment of the future. We may not know all about how this environment is going to unfold as time goes on (Web 2.0 evolving into Web 3.0 and beyond), but government agencies have to invest time and effort right now to understand the environment and gain relevant experience working in it to plan for the interaction media and service delivery channel of the future. The following recommendations are made with this objective as the central focus and government agencies as the target.

Recommendation 1: Just do it. Government agencies should embark on pilot projects to understand and experiment with social computing in the Web 2.0 environment. Communication-focused uses are good starting points, ones that will allow agencies to ramp up slowly based on the experience gained. By the same token, internally focused uses are low-hanging fruit. Regardless of the focus, social computing engagements can be time- and effort-intensive. *Agencies should not embark on these pilots if resources are very limited.*

Recommendation 2: Develop a government-wide inventory of common Web 2.0 issues. An inventory of common Web 2.0-related policy issues should be developed, and agencies need to address these issues collectively rather than having each agency individually develop their own solutions. These issues will likely be related to communications-focused and interaction-focused uses.

This inventory could be done from either inside government—for example, in the Office of Management and Budget's Administrator for E-Government and Information Technology—or via an external honest broker such as the Collaboration Project, sponsored by the National Academy for Public Administration (www.collaborationproject.org). The issues could range from technology, legacy systems, cultural barriers, employee job description changes, and employee training to security, privacy, and measurement issues. This report has outlined these issues in the preceding sections.

Recommendation 3: Strategically rethink how to deliver on your mission. Individual agencies or major programs should strategically develop service-focused uses that may involve using Web 2.0 approaches to reconfigure their business models or services in order to more effectively deliver on their own core missions or outcomes that require collaboration with other agencies.

This rethinking should be a part of their required agency-wide strategic planning process and not just within their technology offices. For example the U.S. Army's recruiting service introduced an online interactive game, "Today's Army," as a recruiting device, which has become an effective way to recruit new soldiers (www.todaysmilitary.com). Such a specific effort could be preceded by focused market research to appropriately design any such use for the citizen segment and identify the Web 2.0 environment where citizens could be targeted.

Recommendation 4: Reconfigure your Internet information and services to be more component-based. As agencies redesign their websites, they need to focus on making their services and information more granular, or component-based, and give users the ability to use government information in "mashups" with other information sources. For example, the National Weather Service allows its weather information to be reconfigured and used by commercial entities (www.nws.noaa.gov). Along with the trend in service-oriented architecture (SOA) and need for reusable service modules in the context of intermediaries extending the reach of government, government agencies need to develop policies to support the handling of such information and service modules. Given the increased role of reputed intermediaries in the Web 2.0 environment, government agencies might well consider leveraging intermediaries for Web 2.0 initiatives.

Recommendation 5: Ensure authenticity of government information and services. Agencies need to develop strategies and policies whereby they (or their customers) can ensure the authenticity of government-generated information and services. This is important as government begins to "meet" citizens where they are online and as intermediaries begin to "mash up" government data and services. Users need to be assured that government-provided information is clearly labeled so they can better judge the authenticity of the information or service they are accessing. Developing such an approach may be a government-wide initiative, possibly led by the National Institute of Standards and Technology.

Recommendation 6: Learn and keep an open mind. It is important for government agency executives to recognize that social computing is evolving even as the Web 2.0 platform morphs into Web 3.0 and beyond; it is in a perpetual beta state. This calls for executives to have a learning attitude toward the initiatives they launch in the social computing environment. Government agencies should start measuring the levels of engagement of Web 2.0 uses from day one and measure the effectiveness of uses through direct feedback from citizens on a regular basis. Measures should focus on usefulness, satisfaction, and trust. Refinements should be implemented based on these measures. As the environment evolves, these initiatives will have to change with it.

In conclusion, it is fair to say that the time is now for government agencies to start the above learning process. The Web 2.0 environment and its newer, evolving forms are providing opportunities for government agencies to have flexible, collaborative, low-cost operations; provide citizens more personalized service through multiple channels; and make government agencies more transparent and accountable to their citizens. It also has the immense potential to render democratic governments truly participatory. Such initiatives also have the power to attract younger, talented workers to government agencies. It is time for government agencies to rise to the challenge and avail themselves of the opportunities in the Web 2.0 environment.

References

Armstrong, A., and J. Hagel. (1995). Real profits from virtual communities. *The McKinsey Quarterly,* 3, 127–141.

Armstrong, A., and J. Hagel. (1996). The real value of online communities. *Harvard Business Review,* 74, 134–140.

Bevarly, Dan, and Jeffery G. Ulma (2007). "Citizen Involvement in the Digital Age," *The Public Manager,* Winter 2007-08, Vol. 36, No. 4, p. 3–7.

Bruce, Chaddus (2007). "CIA Gets in Your Face(book)," Wired.com, available at http://www.wired.com/techbiz/it/news/2007/01/72545.

Cisco High Tech Policy Blog (2007). "The Power of Web 2.0 on Government Legislation" December 13, http://blogs.cisco.com/gov/2007/12/the_power_of_web_20_on_governm.html.

Delaney, K., R. Buckman, and R. Guth. (2006). "Social Whirl: Facebook, riding a web trend, flirts with a big-money deal; as big companies pursue Networking Sites," *The Wall Street Journal,* September 21, p. 1.

Deloitte Report (2008). "Change your world or the world will change you: The future of collaborative government and Web 2.0," Canada.

Di Maio, Andrea (2007). "What Does Web 2.0 Mean to Government?" Gartner Publication ID Number: G00146261, March 8.

ec3org.com (2007). "Government in the Age of YouTube: The Implications of Internet Social Networks to Government," eC3 Symposium White Paper, National Electronic Commerce Coordinating Council, presented at the 2007 eC3 Annual Conference, December 3-5, Austin, Texas.

Gibler, Paul (2006). "Social Computing in the Web 2.0 Era," WisTechnology.Com, July 2.

Kannan, P. K., A. Chang, and A. B. Whinston. (1998). Marketing information on the I-way. *Communications of the ACM,* 41, 35–43.

Kannan, P. K., Barbara Kline Pope, and Sanjay Jain (2008). "Pricing Digital Content Product Line: A Model and Application for National Academies Press," *Marketing Science* (forthcoming).

Kash, Wyatt (2007). "Agencies Advance Use of Online Social Networking Tools," *Government Computer News,* November.

Lazer, David (2006). "Government Social Software— SNS in Japan," Complexity and Social Network Blogs of Institute for Quantitative Social Science and the Program on Networked Governance, Harvard University, accessed at www.iq.harvard.edu/blog/netgov/2006/12/government_social_software_sns.html.

Marketing Week (2007). "Government Introduces Social Network for Older Generation," *Marketing Week,* London, November 1, p. 13.

McKinsey (2007). "How Businesses are using Web 2.0: A McKinsey Global Survey," *The McKinsey Quarterly.*

National Technology Readiness Survey (NTRS) (2008). Report, Working Paper, The Robert H. Smith School of Business, University of Maryland, College Park, MD.

Novak, Kevin, and Michelle Springer (2007). "Government as a Participant in Social Networks: Adding Authority to Conversation," paper presented at the *Toward More Transparent Government Workshop on eGovernment and the Web Conference,* 18-19 June, United States National Academy of Sciences, Washington DC.

O'Reilly, Tim (2005). "What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software," published on www.oreilly.com, September 30.

Peterson, Eric T (2007). "On the Difficulties of Web 2.0 Measurements," available at http://www.e-consultancy.com/news-blog/361762/eric-t-peterson-on-the-difficulties-of-web-2-0-measurement.html.

Rheingold, H. (1993). *The Virtual Community: homesteading on the electronic frontier.* Harper Perennial Publishers.

Van den Bulte, Christophe, and Stefan Wuyts (2007). Social Networks and Marketing, Marketing Science Institute.

Wall Street Journal, (Feb. 17, 2007).

Wyld, David (2007). "The Blogging Revolution: Government in the Age of Web 2.0," IBM Center for The Business of Government.

ABOUT THE AUTHORS

Ai-Mei Chang is Professor of Systems Management at the University of Maryland University College, where she teaches graduate-level courses in e-business/e-government and information technology.

Her research and teaching interests include e-business/e-government, with particular emphasis on e-business strategies, social networking, information brokering, and mobile commerce; enterprise architecture; and enterprise security. She has published several articles in scholarly journals such as *Communications of the ACM; International Journal of Electronic Commerce; IEEE Transactions on Systems, Man, and Cybernetics; IEEE Transactions on Engineering Management; Decision Support Systems; Journal of Organizational Computing and Electronic Commerce; Information Systems Research;* and *Information Processing & Management*. She has also co-authored a chapter in the book titled *The Handbook of Electronic Commerce*.

Dr. Chang has presented her research at conferences such as the Hawaii International Conference on System Sciences, and ORSA/TIMS. She is a member of the ACM and IEEE Computer Society. Dr. Chang is an associate editor for *Decision Support Systems and Electronic Commerce* and serves on the editorial board of the *Journal of Organizational Computing and Electronic Commerce*. A member of several National Science Foundation review panels, Dr. Chang has also served on the program advisory boards of the eGov conference, Program Management Conference, and Information Security Conference, and has co-chaired several eGov conference tutorial sessions.

Prior to joining the University of Maryland, Dr. Chang was a professor of systems management and director of the Center for eGovernment Education at the Information Resources Management College, National Defense University in Washington, D.C. Prior to that, she was an assistant professor of management information systems at the Karl Eller School of Business, University of Arizona, Tucson.

Dr. Chang received her bachelor of science degrees in computer science and mathematics, and her Ph.D. in management information systems, from Purdue University.

P. K. Kannan is the Director of the Center for Excellence in Service and the Harvey Sanders Associate Professor of Marketing at the Robert H. Smith School of Business at the University of Maryland.

His current research focus is on Service Science, Management and Engineering (SSME). As part of his center activities, he is working with several organizations—business, government, and think tanks, both in the U.S. and abroad—to develop an agenda of research and practice focused on service excellence. His other interests focus on new product/service development, design and pricing digital products and product lines, marketing and product development on the Internet, e-service, social networks, and customer relationship management (CRM) and customer loyalty. He has received several grants from the National Science Foundation (NSF), Mellon Foundation, SAIC, and IBM for his work in this area. His research papers have been published in *Marketing Science*, *Management Science*, *Journal of Marketing Research*, and *Communications of the ACM*.

Dr. Kannan's research has won the prestigious John Little Best Paper Award (2008) and the INFORMS Society for Marketing Science Practice Prize Award (2007). He was also a panelist in the NSF Workshop on Research Priorities in e-Commerce (1998) and a Fellow of the American Marketing Association (AMA) Consortium on e-Commerce (2001). He serves on the editorial boards of *Marketing Science*, *Journal of Marketing*, *Journal of the Academy of Marketing Science*, *Journal of Service Research*, and *International Journal of Electronic Commerce*. He has served as the chair for the American Marketing Association Special Interest Group on Marketing Research and is a member of INFORMS and AMA.

His teaching interests include social media and social networks, customer relationship management, new product development, Internet retailing and pricing, and marketing models/research. He has taught courses on these topics in executive programs for Black & Decker, Home Depot, ARINC, McCormick, Northrop Grumman, and Hughes Network Systems. He has corporate experience with Tata Engineering and Ingersoll-Rand, and has consulted for companies such as Frito-Lay, PepsiCo, Giant Food, Black & Decker, SAIC, Fannie Mae, and IBM.

Dr. Kannan received his Ph.D. in management and marketing from the Krannert Graduate School of Management, Purdue University.

K E Y   C O N T A C T   I N F O R M A T I O N

To contact the authors:

Dr. Ai-Mei Chang
Professor of Systems Management
University of Maryland University College
6304 Landon Lane
Bethesda, MD 20817

e-mail: Chang.aimei@gmail.com

Dr. P. K. Kannan
Director, Center for Excellence in Service, and
Harvey Sanders Associate Professor of Marketing
The Robert H. Smith School of Business
University of Maryland
Van Munching Hall
College Park, MD 20742
(301) 405-2188

e-mail: pkannan@rhsmith.umd.edu

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For additional information, contact:
Jonathan D. Breul
Executive Director
IBM Center for The Business of Government
1301 K Street, NW
Fourth Floor, West Tower
Washington, DC 20005
(202) 515-4504, fax: (202) 515-4375

e-mail: businessofgovernment@us.ibm.com
website: www.businessofgovernment.org