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Abstract:

This tutorial outlines major changes in the Internet that enable the world wide web to become more interactive and participative. These changes led to new capabilities such as weblogs (blogs), wikis, social networking sites, and application mashups. Millions of individuals became active users of these facilities. Increasingly, companies are finding ways to monetize these features.

Keywords: Web 2.0, blog, wiki, social networking, mashups

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I. INTRODUCTION

Amid all of the innovations ushered in by the information age and the development of software and communications technology, the world wide web has been remarkable in touching the lives of people around the world. Yet, until the emergence of Web 2.0, as it is called, many individual experiences fell far short of expectations (Figure 1).

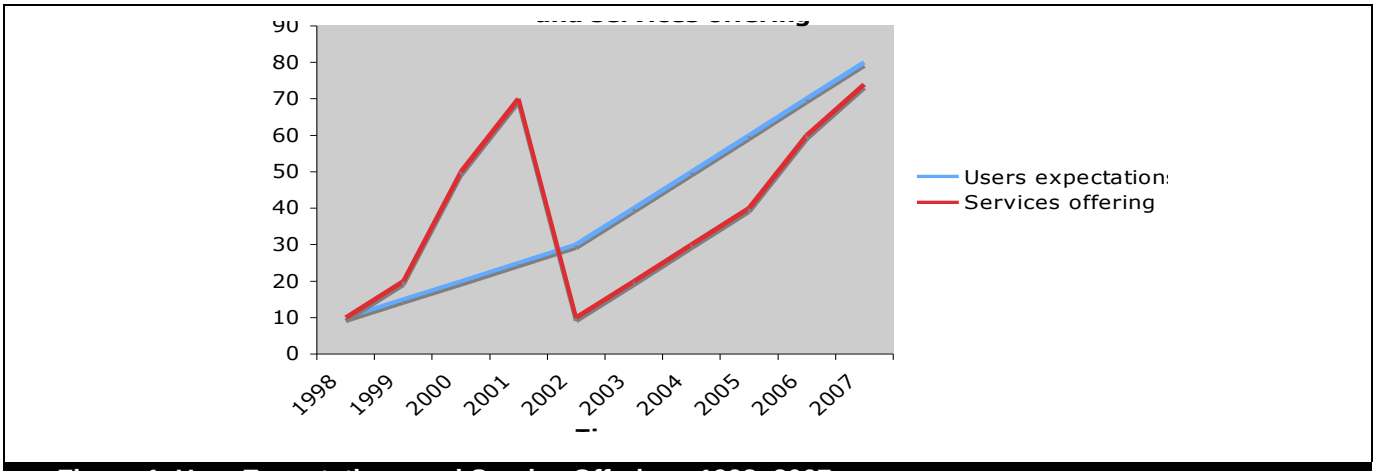


Figure 1. User Expectations and Service Offerings 1998–2007

II. DEFINITIONS

Web 2.0 is difficult to define, and the term itself is often debated. What is not debated is that the new world wide web is more interactive, more participative, and facilitates more collaboration than earlier static web pages. This paper draws heavily on material published by Tim O'Reilly and John Batelle (2004), who popularized the term. O'Reilly and Battelle summarized key principles they believed characterized Web 2.0 applications:

- The web as a **platform**
- **Data** as the driving force
- An architecture of **participation**
- **Open source** development
- Content and service **syndication**
- The end of the software adoption cycle ("the **perpetual beta"**)

It is characterized by several major transitions from earlier, first generation web implementations. Among them are:

- Designed → Customizable (e.g., iGoogle)
- One to many → Many to many
- Publication → Conversation
- Authority → Consensus

These transitions have been embodied in new products/capabilities that invite a high degree of user participation in the origination, editing, and organization of information. Key among these capabilities:

- Conversation: **Blogs**
- Syndication: **RSS**

- Consensus: **Wikis**
- Sharing: **Social bookmarking**
- Applications: **Mashups**

A **blog** is a website where entries are made in journal style and displayed in a reverse chronological order. A blog entry typically consists of the following:

- *Title:* the main title, or headline, of the post
- *Body:* main content of the post
- ***Permalink****:* the URL of the full, individual article
- *Post date:* date and time the post was published

A blog entry optionally includes the following:

- *Comments*
- *Categories* (or tags): subjects that the entry discusses

Trackback and or pingback: links to other sites that refer to the entry.[1]

RSS stands for Really Simple Syndication. It is a protocol that allows for the aggregation of different websites, thus reducing the need to consult individual websites as their content is updated. Finding RSS feeds is relatively easy. Special icons represent RSS feeds and are found on most blogs, news sites, journal sites, and many search tools. Click on an RSS icon and save the link to an RSS newsreader or aggregator. Any time that feed is updated (new blog post, new news item, and new search results) your newsreader or aggregator will include the updated items. RSS feeds require a reader, sometimes called an *aggregator,* to display them in a readable format. Web browsers often have the ability to read RSS feeds. Web services such as *Bloglines* and *Newsgator Online* can aggregate many feeds and be accessed from any computer.

WIKIS are a type of website that allows the visitors themselves to easily add, remove, and otherwise edit and change available content. Due to the ease of interaction and operation, a wiki an effective tool for **collaborative authoring.**

The open philosophy of most wikis—allowing anyone to edit content—does not ensure that editors are well intentioned. Wikis represent consensus over authority—the knowledge of many people is considered more valuable and correct than the knowledge of any one person, even an expert. Wikis like Wikipedia still rely on the valuable input of experts to correct errors and improve the value of the resource. In an article in *Nature* (Giles 2005), Wikipedia was compared to Encyclopedia Britannica and found to be about as accurate in articles on the sciences. Wikis use a slightly different markup protocol than the web.

III. SOCIAL NETWORKING, BOOKMARKING AND SHARING

Sharing of information takes on many forms:

- File sharing and peer-to-peer networks
- Ratings, rankings, opinions (i.e., Amazon or Angieslist.com)
- Friends lists (i.e., MySpace, Facebook, LinkedIn)
- Social bookmarking
- Sharing links (del.icio.us)
- Sharing lists (LibraryThing, All Consuming)
- Sharing articles (CiteULike, PennTags)

1. Adopted from http://en.wikipedia.org/wiki/Blog.

Social networks permit people to maintain close, up-to-date contact with one another and with their entire cadre of friends and associates. Websites facilitate the sharing of ideas, the search for solutions, and the distribution of files. In a business or professional context, the facilities allow for intimate collaboration among colleagues in enterprises and between institutions. It is the explosive growth of these social networks that has given rise to the great interest in Web 2.0 and the new, contemporary style of communication. Many of the entries in social networks take the form of blogs—where entries are organized in reverse chronological order and segmented by subject.

It is the potential for extensive collaboration among businesses and other institutions that holds the promise for the integration of Web 2.0 capabilities with more formal business process transactions.

An example of a typical page from *LinkedIn* is shown in Figure 2.

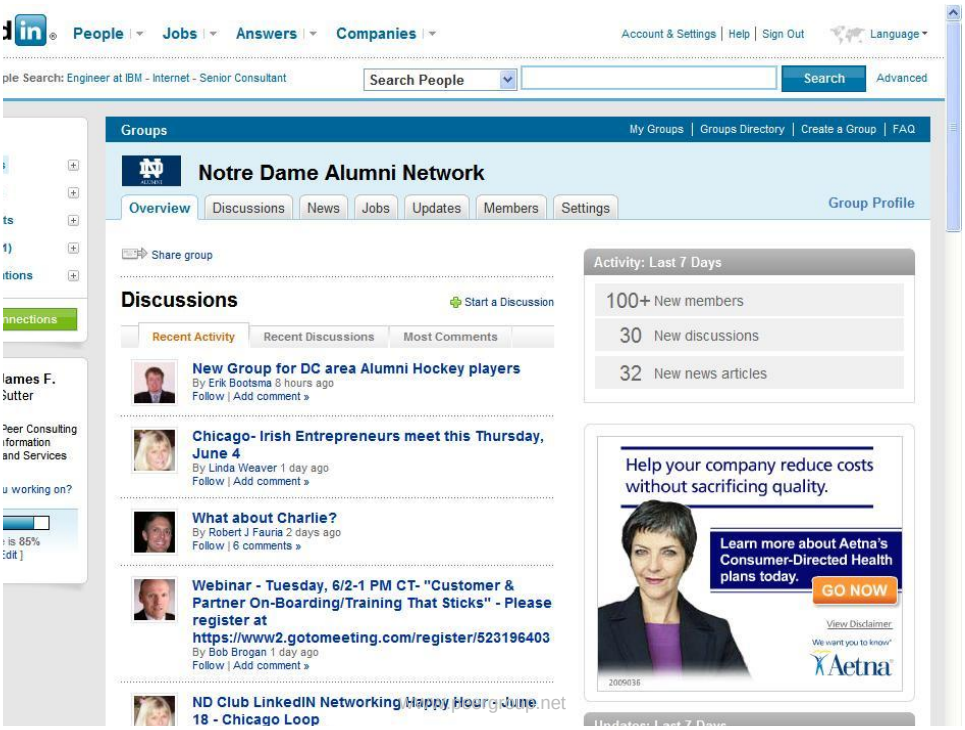


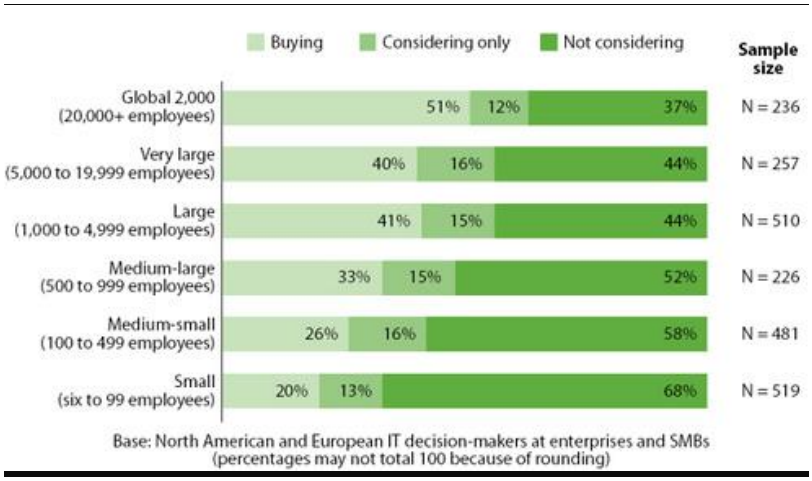
Figure 2. Screenshot of Typical *Linked In* PAGE

IV. MASHUPS

Another aspect of Web 2.0 that offers significant potential in terms of the rapid and efficient creation of software solutions and capabilities is the "mashing" together of two or more web services or web-based applications. The "mashup" approach takes advantage of properly constructed applications that are designed in accordance with web service standards. It permits the linking together of an array of capabilities, that, in aggregate, produces a comprehensive solution. This way of constructing an application avoids the re-creation of existing web-based capabilities (reuse), and builds a hybrid web service. Web- based mashups rely on authors exposing their application programming interfaces (API) to allow one web service to be "consumed" by another. Many relatively small systems have been built in this manner. The potential exists to assemble comprehensive solutions that have wide applicability.

V. ENTERPRISE 2.0

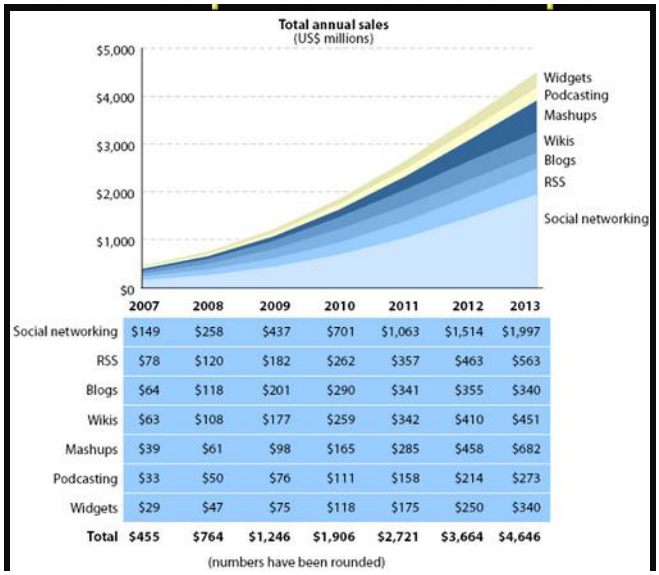
While the user experience from adding Web 2.0 capabilities to the world wide web has been wildly popular, obtaining a concrete financial payoff has been a challenge.



Source: Forrester Research (used with permission)

Figure 3. Adoption of Web. 2.0

Companies, large and small, are at various stages in terms of adopting Web 2.0. However, as shown in Figure 3, the trend is definitely in the direction of wide adoption of the richer Internet experience. In large companies, well over half the firms surveyed report having committed funds to the roll out of Web 2.0. Moreover, funds spent by enterprises with Web 2.0 capabilities is growing, according to reports published by Forrester Research (Figure 4).



	2007	2008	2009	2010	2011	2012	2013
Social networking	$149	$258	$437	$701	$1,063	$1,514	$1,997
RSS	$78	$120	$182	$262	$357	$463	$563
Blogs	$64	$118	$201	$290	$341	$355	$340
Wikis	$63	$108	$177	$259	$342	$410	$451
Mashups	$39	$61	$98	$165	$285	$458	$682
Podcasting	$33	$50	$76	$111	$158	$214	$273
Widgets	$29	$47	$75	$118	$175	$250	$340
Total	**$455**	**$764**	**$1,246**	**$1,906**	**$2,721**	**$3,664**	**$4,646**

(numbers have been rounded)

Source: Forrester Research (used with permission)

Figure 4. Global Enterprise Web 2.0 Spending

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Companies that have reported benefits from adopting Web 2.0 technologies include:

- Intuit—which formed a community of power users to aid in answering questions and providing expert assistance to other Intuit customers. This activity reduces the cost of Intuit provide all the assistance by hiring personnel to handle these queries. In addition, the community serves as an evangelical group, promoting solutions and techniques using Intuit products.
- Texas Instruments—which uses collaborative facilities to help engineers applying the company's digital signal processors to respond immediately to questions and problems in lieu of using a traditional call center. Also, solutions to common problems are shared throughout the user community.
- IBM—which deployed a social networking capability in place of the traditional phone book and locator system. In addition to serving as a reference for contact information, this "Facebook-like" facility enables people to share areas of interest, expertise, and work experience with colleagues throughout the firm.
- Dell—which states that $3 million of its 2009 computer revenue can be attributed to Twitter, the micro-blogging service. Twitter is growing at 130 percent per month and now has 65 million users.
- Southwest Airlines reports that readership of its blog reached 2 million.
- Pizza Hut Facebook page has 970,000 fans. Facebook, the social networking site, has 350 million users.
- Stormhoek Vineyards—established a wine club and rich website where customers can blog regarding tasting experiences and food pairings, and subscribe to wine related publications. The winery reported that sales tripled from 2005, when it inaugurated these capabilities, to 2007 (Bennett 2007).

CIO Magazine conducts frequent surveys among its readers in the Information Systems departments of enterprises and other institutions. A 2008 survey outlined the Web 2.0 capabilities being rolled out by the companies reporting (Table 1).

Table 1*: Corporate Web 2.0 Capabilities Being Rolled Out 2008

Which of the following technologies are being offered to employees as corporate applications?	Percent of sample answering
Instant messaging	50%
Wikis	30%
Blogs	23%
RSS	18%
Social networking	10%
None of the above	31%

Source: CIO Magazine (used with permission)

CIO Magazine provided a further breakdown of the typical applications that these capabilities enable:

- Wikis—collaboration, knowledge capture and management
- Blogs—internal communication, marketing/PR
- Community sites—marketing, customer engagement
- Social networks—company directory on steroids

It was found that one of the major objectives in instituting these applications was to attract and retain smart younger workers. In many of these companies, employees introduced a Web 2.0 collaboration tool from a commercial source.

Published reports from Forrester Research show that large businesses spend more on employee collaboration tools than customer-facing Web 2.0. That trend is expected to reverse by 2010.

By 2013, companies will spend nearly a billion dollars more on customer-facing Web 2.0 than on internal collaboration.[2] This finding is important because, while improved internal collaboration leads to greater efficiency and productivity, it is difficult to quantify the results. Major investments in Web 2.0 technologies will be predicated on the expectation that greater interaction and coordination with customers and trading partners will help companies grow revenue—as was the case of Stormhoek Vineyards.

VI. CONCLUSIONS

Social networking, blogging (web publishing), wikis, and mashups have become wildly popular among users of the world wide web. Wikipedia and the social networking sites are accessed daily by millions of users. These new software capabilities have facilitated an outpouring of user-generated content, and have fostered a level of collaboration hitherto unknown. Enterprises, large and small, are taking advantage of this new source of content to assist customers, promote products, and receive timely feedback regarding the experience customers are having with products and services and those of their competitors.

REFERENCES

Editor's Note: The following reference list contains hyperlinks to world wide web pages. Readers who have the ability to access the web directly from their word processor or are reading the paper on the web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the web pages, not AIS, is (are) responsible for the accuracy of their content.
4. The author(s) of this article, not AIS, is (are) responsible for the accuracy of the URL and version information.

Bennet, E. (2007). "Turning Browsers into Buyers" *Baseline* June 14*. http://www.baselinemag.com/c/a/Mid-Market/Web-20-Turning-Browsers-into-Buyers./*

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ABOUT THE AUTHOR

Jim Sutter is a management consultant specializing in Information Technology, focusing on technical evaluation and its advanced application. He has worked with companies such as Xerox, Chrysler, and Rockwell in the development of information technology plans and architecture. He has advised companies such as IBM, Oracle, Digital Equipment, and Berkeley Networks in areas of customer requirements and product planning.

Before joining the Peer Consulting Group, Jim Sutter had twenty years experience as a top chief information officer in several Fortune 50 companies.

EDITOR'S NOTE

This tutorial was presented by the author at AMCIS 2009 in San Francisco, CA.

2. Forrester Research 2008.

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