Organizational Adoption of New Communication Technologies

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45.1 Introduction

45.1.1 Why Today’s Digital Technologies Are Different

Telegraph, telephone, photocopying, fax, courier mail, digital PBXs—organizations have steadily appropriated new communication technologies. In the digital era, e-mail came first. It had far fewer features than today, it was expensive, and adoption came slowly. Organizations had time to gauge the likely costs and benefits and to prepare.

This has changed. A wave of popular new communication technologies followed e-mail. Instant and text messaging, wikis, blogs and microblogs, social networking sites, video—many with free versions that employees can download, access via browsers, or bring in on smart phones. Many are used first for personal tasks. Work–life boundaries are blurring. The changed dynamic has benefits for an organization—acquisition and training costs are lower than they once were. It also creates challenges: Employees’ preferences and behaviors can conflict with a planned deployment or produce a de facto deployment that takes management by surprise.

Historically, new technologies often find industrial uses prior to widespread domestic use—clocks, sewing machines, and telephones were initially too expensive for most consumers. Early computers were expensive, but because governments placed them in universities starting in the 1950s, many students entered industry experienced with e-mail, text editing, and other computer use. Abetted by
Moore’s law and rapidly declining prices, students and other consumers continue to embrace many digital technologies before enterprises give them careful consideration.

This chapter focuses not on architecture and only a little on design; my concern is organizational use of messaging, wikis, weblogs, and social networking sites—communication technologies that support information sharing and coordination as well.

After a discussion of relevant terminology, I will briefly describe still-relevant high-level lessons from an earlier era. These inform two frameworks that I find invaluable in understanding seemingly contradictory outcomes that accompany widely used communication and collaboration systems. To motivate these frameworks, the first widely embraced digital communication technology, e-mail, is considered. The focus of this chapter then moves to studies of enterprise experiences with these new technologies that some employees first use spontaneously. The discussion and conclusion cover key points and forward-looking considerations based on the observations and analyses.

### 45.1.2 Terminology for Organizational Process

Information systems (IS) and computer science (CS) use the same terms to mean different things. IS generally has a longer-term perspective, from the first glimmer that something might be built or acquired to the system’s retirement years or decades later. CS, even within software engineering, has a more limited and more technical focus.

The terminology of IS reflects the perspective of a manager or IT professional. Adapting the framework of Munkvold (2002), *initiation* is the identification of needs and possible solutions, *adoption* is the organizational sign-off on a plan, *adaptation* is the development or acquisition and installation of the technology, training plans, and polices governing use, and *acceptance* signals actual use by employees, which is followed by *operation and maintenance*. The entire process is called the organizational *implementation*. A CS perspective is that of a developer or user, with the sequence *requirements analysis*, *development* (also called *implementation*) or *acquisition*, and *adoption*, the latter representing actual use.

Why is a dry discussion of terms of interest? Partly because misunderstanding terms impede communication and exploration of the literatures. But a deeper difference is seen in the contrast between *acceptance* and *adoption* to identify system use. Historically, users of organizational systems had no discretion: Their task was to *accept* a system. CS focuses on professionals and consumers who have discretion—they can *adopt* a product or ignore it.

As suggested by this emphasis on the distinction between passive acceptance and active adoption, this chapter focuses on users’ behaviors more than technical characteristics of technology. In organizations today, unlike the past, employee use of some technologies is initially discretionary. This aligns with the CS perspective, adoption, and can represent a change and challenge to IS managers and IT professionals.

Recapping, in the traditional systems perspective of IT professionals, once a technology is rolled out and found to work technically, a key process is complete, whether or not the technology is used at all. From a user perspective, the crucial adoption process *begins* at this point and focuses on whether the targeted individuals or groups *use* the technology. If included, a training perspective is in between: Developers of training focus on initial use and best practices.

### 45.2 Organizational Experiences in the Late Twentieth Century

For an existing organization, a new communication or collaboration system inevitably disrupts established communication channels, information repositories, and formally or informally designated authorities and responsibilities. The assumption that at some future point a more efficient and effective alignment will take shape is an assumption and is often not shared by everyone in the organization.

Reactions to the uncertainty of success take different forms. The role of evangelism is often stressed—encouraging people to suspend doubts and make a sincere effort to bring the organization to the
promised land. At the other extreme is resistance, either complete opposition or an effort to limit or slow the deployment. Resistance can surface before or after a decision to adopt. In some circumstances, a full embrace or strong avoidance might be rewarded, but another option is to be as informed as possible to seek convincing evidence that there will be a productivity benefit—a measurable return on investment (but see the following caveats)—and identify best practices. When possible, it makes sense to mirror the practices of similar organizations that had a good outcome.

Two complications surface regularly in studies of organizational adoption. Diverging views of organizational stakeholders can be critical for a communication or collaboration technology intended for broad use. Opinions vary based on differences in personality, preferences, or past experiences, but there is a more systematic source of differences, based on the nature of different roles people occupy. The next section introduces Henry Mintzberg’s framework of organizational parts, a wonderful aid in understanding studies of technology adoption. Mintzberg argues that almost all large or midsize organizations have several specific parts. Each part has a different structure. A new tool or process is viewed differently depending on where one sits. Failure to appreciate these differences and their consequences creates confusion and impedes adoption.

The second complication arises from the desire to minimize risk by focusing, often obsessively, on metrics and claims for a “return on investment.” Proving a productivity benefit is a seductive goal for marketers and acquisition managers, but benefits are often impossible to prove or disprove, especially for communication and collaboration tools that are secondary to organizational production. A desperate quest for “return on investment” often leads to accepting hyperbolic claims and laboratory study outcomes that do not generalize to real-world situations. Joseph McGrath, a leader in research into team and group behavior, produced a framework for thinking about group activities that can widen our lens to bring into view a range of issues that are missed when we focus narrowly on performance.

### 45.2.1 E-Mail

E-mail is not a new digital communication technology, but a review of its reception by organizations helps motivate our consideration of the Mintzberg and McGrath frameworks.

Multitasking operating systems led to e-mail and real-time chat among users of the same machine. The top-down ARPANET and the grassroots unix-to-unix copy network (UUCPNET) appeared in the 1970s. In the 1980s, commercial e-mail arrived: IBM PROFS and various minicomputer office systems, followed by client–server networks of PCs and workstations.

Acquiring and managing an e-mail system was expensive, but even when in place, organizational acceptance was slow. In late 1983, my manager at a large minicomputer company advised me to ignore the e-mail system and write a formal paper memo, saying “e-mail is a way students waste time.” Productivity benefits from e-mail use could never be proven. In the 1990s, leading analysts still argued that organizations would abandon e-mail once they understood the negative effects it had on productivity (Pickering and King, 1992).

Wasted time and the loss of confidential information were concerns. Some companies with internal e-mail systems blocked Internet access and restricted communication to work-related exchanges. Internet access was restricted until December 1995 at Microsoft. Even later, IBM considered it a bold step: “In 1997, IBM recommended that its employees get out onto the Net—at a time when many companies were seeking to restrict their employees’ Internet access” (Snell, 2005).

Why was management skeptical? The anthropologist Constance Perin (1991) noted that e-mail was useful for individual contributors (ICs) who rely on rapid information exchange, but problematic for managers who must deal with security issues, rapid rumor propagation, and circumvention of hierarchy. Few managers then had keyboard skills, and interrupt-driven e-mail was not as useful for managers whose time was tightly structured and who dealt with formal documents more than informal discussion. Managerial resistance faced when the cost came down, familiarity based on home use rose, but most crucially, in the 1990s, it became possible to routinely send attachments—the documents,
spreadsheets, and slide decks that are the lifeblood of managers. In some industries, management may yet rely on paper, but for much of the world, e-mail is mission-critical. Concerns about e-mail overload have led some enterprises to experiment with avoiding it, but its value is generally unquestioned. Employees use it to work more efficiently and effectively more than to waste time.

45.2.1.1 Assessing the E-Mail Experience

Most of the technologies we will examine reflect this e-mail progression:

1. Initial use by students and consumers, especially in North America
2. Resistance by organizations skeptical of productivity benefits
3. Young employees familiar with the technology see positive organizational uses
4. Organizational acceptance and adoption grows

Organizational resistance is not always irrational. There is a cost, a learning curve, and a disruption of the existing balance of communication channels, information repositories, and responsibilities. Utility varies across the organization, and benefits that are realized are not always those initially envisioned.

Passage of time has increased the speed with which a new technology can spread. Tools today cost less to introduce. Technophobia is gone. Executives and managers are hands-on users of technology at home and at work.

E-mail needed a quarter century to be widely embraced by organizations. Differential utility to people in different roles and the difficulty of proving an effect on productivity impeded adoption. Now we will consider this experience from the perspectives of Henry Mintzberg and Joseph McGrath.

45.2.2 Mintzberg’s Typology of Parts

Henry Mintzberg’s (1984) partitioning of an organization is shown in Figure 45.1. Executives (strategic apex), managers (middle line), ICs (operating core), the people formulating work processes (technostructure), and the support staff (everyone else) typically have different approaches, constraints, opportunities for action, and priorities.

Mintzberg observes that organizations can be grouped into five organizational forms, each marked by strong influence by a different part of the organization. In a start-up, the executives control directly; in a divisionalized company, middle management is empowered; in a professional bureaucracy such as a university or surgical ward of a hospital, the operating core (faculty, surgeons) has considerable

FIGURE 45.1 Five organizational parts.
authority; and so on. In addition, each part of an organization favors a distinct approach to collaboration and coordination: direct supervision (strategic apex), standardization of outputs (middle managers would like to be given a goal and left free to decide how to reach it), standardization of skills (faculty or doctors are certified and then assume they need not be strictly supervised), standardization of work processes (the focus of the technostructure), and mutual adjustment, in which all employees work out their contributions, the approach favored by people in support roles in organizations such as film companies that rely on them. Mintzberg’s elegant framework illuminates the different perspectives that come naturally to people in different roles and different parts of an organization. It is no surprise that different features of a technology will appeal to or repel different stakeholders; indeed, this is found in many studies, often overlooked by the researchers, as we will see.

Mintzberg wrote before computers were used for communication and collaboration support in organizations. He did not focus on technology use, but we can extend his model. Consider the three central parts and corresponding roles: ICs, managers, and executives. They differ in the nature of their function and primary activities, their ability to delegate, and the sensitivity of their activities.

ICs who make up the operating core typically engage heavily in communication and are collocated to facilitate this. Managers focus more on sharing structured information—usually documents, which today include spreadsheets and slide decks. Executives of course also communicate and share information, but their primary job is to coordinate the activity of different groups. Communication, information sharing, and coordination—distinct emphases that affect their visions of what a new general-purpose technology will deliver.

Executives’ calendars are heavily scheduled far into the future. Managers also have a lot of meetings. Most individual contributors are shielded from meetings so they can produce something—products, services, or documents for use by management.

The ability to delegate work correlates with one’s level in the organization. Executives are more likely today to be hands-on users of a technology, but they may not use it long before assigning the task to a subordinate. Managers can delegate some work. The sensitivity to public disclosure of one’s work activity also varies. What an IC does is often accessible to others in the organization, whereas an executive’s meetings can be highly sensitive. Managers are in between—sensitivities trade off with the benefits in efficiency that can result when their peers know their availability and focus.

In sum, members of these three groups have different structures to their workdays, which impacts tool use. Differences affecting the technostructure and support staff have not been explored as thoroughly. Engaged in defining and improving work processes, technostructure members may advocate for the use of formal workflow systems that promise metrics. The difficulty of representing work activities in software with sufficient flexibility to accommodate exceptions that arise can create tension. IT professionals, members of the support staff, manifest yet another pattern of tool use and often focus on security and reliability, sometimes to the point of obstructing other employees’ work.

In retrospect, many efforts to introduce technology are impeded or blocked by not anticipating or recognizing these differences. In Orlikowski’s (1992) study of the deployment of the Lotus Notes shared workspace platform in a major consulting company, the strategic apex (senior partners) saw the potential benefits. The operating core (consultants) saw only drawbacks and did not use the system. The IT personnel deploying the system (support staff) had a different incentive structure and used the system very effectively.

Similarly, studies of shared calendar adoption showed sharp disagreements over features among executives, managers, and ICs (Palen, 1998; Palen and Grudin, 2002). When early desktop videoconferencing systems were installed in executive offices, the “direct-dial” calling that they required conflicted with admin-assisted executive meeting initiation (Poltrock and Grudin, 1995). In a study of web use recounted by Jones et al. (2001), the top managers unlike others delegated all save cursory web searching. Understanding this could inspire the design of features to support executive use. These and other examples are covered in more detail in Grudin (2004a,b).
45.2.3 McGrath’s Typology of Group Activities

McGrath (1991) described team behavior in terms of three functions and four modes (Table 45.1). Of particular interest are the functions, the columns. Production is the core driver of activity, the reason the group came together. But McGrath placed activities to promote group health and to ensure members get what they need at the same level, arguing they are necessary and in fact continually engaged in. They may go unnoticed—as social animals, we unconsciously attend to them, although not always adequately. The rows in Table 45.1 represent the modes in which a group may find itself at different times—taking on a new task, executing, and occasionally focusing on solving problems or resolving conflicts.

This typology may seem evident, yet it can be a revelation—because our attention is focused almost exclusively on the lower left cell, performance, the production function in execution mode. Management focuses on this cell. Researchers study it in the lab. The quest to show a return on investment is perpetual and can lead to narrow, short-term assessments of productivity.

Mysteries are solved by recognizing this myopic focus on performance. Why do some systems do well in lab studies but bomb in organizational settings? Why are others that show no effect in the lab embraced in practice? Dennis and Reinicke (2004) found that insufficient support for group and member well-being explains the lack of commercial success of “group support systems” despite their proven performance benefits in controlled studies. Anonymous brainstorming may work well in the lab, but in an enterprise setting, the identity of a speaker may be crucial, and credit for contributions may motivate participants. Another example is video. It showed no performance advantage over audio in decades of studies, but when other cells of McGrath’s framework were examined, video was found to have significant effects in problem-solving and conflict-resolution tasks (Williams, 1997; Veinott et al., 2001). In addition, participants liked video. Greater positive affect could over time contribute to performance in subtle ways.

45.2.4 Reframing the E-Mail Experience

In an organization, e-mail is rarely a prime focus of work. It is used intermittently to support the central tasks. How can one measure the overall impact of getting an occasional quick answer to a question? Does a higher frequency of interaction improve a group’s health? How much? How do we measure the effect on performance? Yet unless we believe that eventually a performance improvement will be realized, how do we justify the disruption and unknown outcome of adopting a new communication tool? Those resisting change can make a case.

The two frameworks provide a different perspective on the remark that “e-mail is a way students waste time.” That perspective had support from the beginning. The ARPANET was planned as a file-sharing system, a natural vision for managers. E-mail became the tail that wagged the dog, a natural outcome for the ICs in different locations who had to keep the system running and were often its principal users.
A student’s principal “production task” may be to learn, but a close second can be building and maintaining social networks that aid in studies and in reaching other career and life goals. E-mail supports activities that serve each of McGrath’s functions. Bringing in Mintzberg, informal communication serves students—and ICs in organizations. Managers, not unlike instructors, rely more on formal communication and structured documents. What they perceive as wasted time might not be.

I observed a computer game on a public machine become popular in a competitive group comprising software engineers and a few often-marginalized employees in support roles—usability engineer and technical writer. The top 10 scores were displayed. The usability engineer began playing, culminating in a 16 h stretch during which he achieved by far the highest score. A waste of time? The respect he earned from the software engineers increased his influence. Playing the game may have yielded the highest return of anything he undertook that year. Employees can waste time, of course, but assessing what is ultimately productive is inevitably a judgment call.

45.2.5 Typologies as Guidance

Typologies are not theories, they are frameworks. They emphasize certain features. The test of a typology is whether or not it is useful. These typologies can be used as lenses for understanding empirical phenomena. Examples include those noted earlier and discussed later. Another use is as a checklist for a design or acquisition team, which can consider a system’s impact or lack thereof on groups and activities represented by different cells in the typologies. Weiseth et al. (2006) constructed a comprehensive organizational process and technology framework drawing on these typologies. Their framework is centered on models of content, content lifecycle, and process integration. They identify 13 distinct activities in support of coordination, decision-making, or production, each a potential focus of technology support. They identify physical workspace, digital devices, and portals as technological components that bear consideration.

I emphasize that a challenge facing the use of these approaches is the difficulty of proving effects on productivity. When marketing a system, or when considering acquisition and deployment and the cost in terms of adjustment, there is an irresistible impulse to ask for evidence of productivity benefit. Those who claim that they can measure benefits are very popular, but the claims are often not well-founded. Effects, positive or negative, are often subtle.

45.3 A Decade of New Communication Tools in the Enterprise

For decades, as computer use spread, e-mail and bulletin boards or newsgroups were the primary digital communication tools. There were also some chat programs, and information sharing was supported by file-sharing systems built on the evolving file transfer protocol (FTP).

Prior to 2000, most groups—professional colleagues, a set of customers, hobbyists, classroom parents, a housing association, and so forth—could not assume all members were accessible via the Internet. As this changed and more groups become reliably connected, prospects improved for tools to support communication and information sharing. (I do not know of systematic studies, but a critical mass hit my community in the late 2000s—schools and other groups suddenly assumed parents and others had e-mail access, with telephone backup for emergencies.)

The tools that arrived included instant messaging (IM), text messaging, wikis, blogs, microblogs, photosharing sites, geolocation, and a range of social networking sites. Digital voice was built on the conventions of analog telephony; digital video reached and then surpassed familiar capabilities of analog video; the others for the most part broke new ground.

Widely adopted by students and consumers, most of these technologies generally crept into organizations under the radar of management and IT staff. IM and text messaging prospered among consumers.
in the late 1990s. After 2001, like a phoenix rising from the ashes of the Internet bubble, diverse new communication and information-sharing technologies were embraced. People had acquired technology and sought things to do with it. Wiki and weblog concepts dated back to the late 1990s, but significant levels of use appeared later.

### 45.3.1 Instant Messaging and Text Messaging

Basic messaging functionality dated to the early days of multitasking, but widespread use on the Internet arrived with clients such as ICQ (in 1996), AOL Instant Messenger (1997), Yahoo! Pager (1998), and Microsoft’s MSN Messenger (1999). Text messaging had a similar history with a notable twist. Experiments in the early 1990s followed the advent of 2G cellular technology, but use mushroomed only after telecoms had worked out billing systems in the late. The twist was geographic: The other technologies discussed in this chapter reached prominence first in the United States, with most software and platforms developed there. Text messaging ran on mobile phones produced mainly in Europe and Asia; low messaging costs were set there and use followed.

By 2001, half of all U.S. Internet users, 60 million, had adopted IM. Many of them were part of the workforce, but IM (and text messaging) was overwhelmingly used by students and consumers. Contact lists comprised family and friends.

That said, IM clients were easily downloaded onto computers in most workplaces. IM slowly came into focus in organizational IT departments. In late 2001, an IM client intended for organizational use—no winks or emoticons—was included in Windows XP. Consulting companies began advising organizations on IM use. The advice might be summarized, “IM is a way students waste time.” The expressions, “productivity drain,” “communication quagmire,” “worse than e-mail overload,” “no data security,” and “no enterprise management” appeared in Gartner reports over the next few years (Lovejoy and Grudin, 2003). Professional IM client uptake was not strong. Many employees were using IM, but did not want a second client, and those not using one for personal communication did not flock to adopt one for workplace use.

Table 45.2 lists the similarities between IM in the mid-2000s and e-mail 20 years earlier. In the 1980s, no directory of e-mail addresses existed, and addresses were highly unpredictable; people could contact acquaintances. Memory was too expensive to save e-mail messages, so it was an ephemeral, informal channel. All of that changed. Young people interviewed 20 years later praised IM and text messaging for being “informal, unlike e-mail.” E-mail was by then routinely saved and used in court cases...
Organizational use of IM built up under the radar. In 2003, a company marketing tools described an effective approach: Ask IT managers how much their employees used IM at work. The reply was often “none.” They then installed measurement tools that revealed significant use of downloaded IM clients. They claimed that IT managers often then became interested in tools to monitor and control IM use (personal communication).

Workplace uses of IM were a major focus in studies of communication tools conducted in 2004 (Grudin et al., 2005). Use for quick questions and answers was reported by over 90% of IM users; for socializing by 43%. Many noted that IM was less expensive than the phone when on the road. Others used it during phone calls, teleconferences, and meetings—to get relevant information from people not present, to hold private conversations with others in the meeting, or to forward information to everyone present without interrupting the conversation. Some managers were as heavy IM users as ICs; for example, using it to do other work when in a large meeting that was focused on issues not relevant to them.

Other workplace uses addressed work–life balance issues. E-mail is less intrusive and therefore relied on to organize a school band concert or field trip, but when the event is imminent and quick responses are needed, work interruptions are tolerated and organizers sometimes shift temporarily to IM. In another example, a woman kept an IM window open on her computer at work so she could see from a status change that her son was safely home from school, since his first activity was to get on IM to interact with friends. Prior to using IM, she had interrupted work to telephone to confirm that he made it home.

Could the cumulative impact on productivity of these discrete, relatively low-frequency activities be measured? Laboratory studies do not reliably generalize to the low-frequency use typically found in workplaces. Yes, a quick answer to a question could be significant, but would not other channels have served equally well?

The IM client feature used most after messaging was file sharing. It took decades to fully integrate attachments into e-mail; its early presence in IM facilitated adoption in work settings.

Nevertheless, by the time IM was widely used in organizations, students and consumers were moving to web-based software.

### 45.3.1.1 Critical Mass Requirements for New Social Media

Web-based social media differ in terms of the scale of participation. A blog requires one author and an audience of variable size. A wiki requires group participation, but the group can be small. A social networking site such as MySpace, Facebook, LinkedIn, or Twitter requires larger numbers of participants to be effective. More specialized sites such as Foursquare and Pinterest require large scale with a narrower focus. These came into prominence in roughly that sequence.

### 45.3.2 Corporate or Employee Blogs

The term weblog was coined in 1997. The LiveJournal and Pyra Labs Blogger platforms appeared in 1999. By 2002, how-to-blog books were in bookstores. Visibility picked up in 2003 when Google bought Blogger, Wordpres was released, and LiveJournal hosted its millionth blog.

In late 2004, *Communications of the ACM* published a special issue on “the blogosphere.” Bloggers were mostly teenagers or in their early 20s, maintaining online diaries on LiveJournal and elsewhere to be read by friends or family. A smaller but significant set of blogs sought larger readerships: essays or pronouncements on technology and other subjects by journalists, pundits, political candidates, and entrepreneurs. Some of the latter hesitated to call the former “bloggers,” but some personal blogs were indexed by search engines and evolved to wider readership, whereas some pundits failed to find
many readers. Early research examined both student blogs (e.g., Nardi et al., 2004) and the elite or “A-list” blogs (Bar-Ilan, 2004).

Technorati has published “state of the blogosphere” reports since 2004 (http://technorati.com/state-of-the-blogosphere/). “Corporate blog” initially referred to any whose author was clearly linked to an organization. Many were employees blogging about their work and lives. Today, a “corporate blog” is one authored by one or more people whose principal job responsibility is to blog on behalf of an organization. In this chapter, “employee blog” is used as a general term.

In late 2004, Technorati was tracking four million blogs, which produced four posts per second around the clock. Five thousand, one in 800, were employee blogs. Measurable numbers were from employees of companies such as Oracle, SAP, and Sun. Others were from companies marketing blogging tools and from mainstream media sites. These were more likely to include people paid to blog. The organization with the most employee bloggers identified by Technorati was Microsoft, which had close to 1000 or one-fifth of the world total.

In 2005, IBM formally encouraged its much larger employee population to blog publicly (Snell, 2005) and the picture changed. Gartner forecast that corporate blogging was losing its “hype” status and would be mainstream within 2 years.

A study conducted in the summer of 2005 identified complex reactions to the introduction of employee blogging at Microsoft (Efimova and Grudin, 2008) and is the basis for the case study that follows. Microsoft and IBM are not typical organizations, of course; many discourage most or all employees from blogging externally. However, many of the observations resonate with other accounts.

45.3.2.1 Case Study: Microsoft Adopts External Blogging (2003–2005)

Students with externally hosted weblogs, hired as interns or employees in 2000–2001, were the first Microsoft bloggers. They attracted negligible attention. By mid-2002, some employees manually hosted personal weblogs on their work machines.

There are three possibilities for employee blogging, two for externally facing blogs and one for internal blogs. By using a web-based blogging platform, any employee could manage an externally facing blog from his or her work computer. If a company is willing to dedicate a server to host external weblogs, it can facilitate, promote, and monitor employee blogging. It also makes it much easier for external readers to find a relevant employee blog—“one-stop shopping,” at least for blogs on the server. Finally, a blog visible only inside the firewall would require an internal blog server.

Grassroots efforts by passionate employees to establish servers eventually brought blogs to the attention of low-level managers. An internal weblog server, maintained on an unused machine through volunteer efforts, hosted a few dozen weblogs by the end of 2002. Late in 2002, a list of externally visible employee weblogs was published by someone outside the organization. This helped create a sense of a community engaged in externally visible blogging. It also brought blogging to the attention of people in the company’s legal and public relations groups for the first time. The subsequent meetings and reflection on practices led to some tensions but no actions.

By mid-2003, a server hosting externally visible weblogs was operating with budget support from a manager who perceived a benefit in using weblogs to communicate with customers. However, the company is decentralized enough that the wisdom of letting employees’ blog was still being actively debated.

Blogging was still very much below most radar screens. In April 2003, one author came across a disgruntled employee’s blog written for friends in which he described actions that would be grounds for termination. Later that year, a contractor was dismissed for a relatively minor disclosure in a blog. Many in the weblog community had made similar disclosures. This fed a sense that legal and public relations representatives who in meetings said “consult us when in doubt” wanted to shut blogging down. Mainstream media reported a Google employee fired for blogging about everyday life at work, and blog-related dismissals at Delta Airlines, ESPN, and elsewhere (e.g., Cone, 2005). IBM’s public embrace of external employee blogging was still 18 months in the future.
Discussions among bloggers, human resources, legal, and public relations that followed the dismissal were regarded as mutually educational. Blogging picked up, leading to the 2004 Technorati report, but debate continued. A senior vice president had begun blogging in May 2003, and Bill Gates and Steve Ballmer spoke of blogging approvingly (Dudley, 2004). But another senior vice president in 2005 castigated bloggers as “self-appointed spokespeople” for projects, products, and the company.

By the summer of 2005, unofficial lists of employee bloggers for Amazon, Google, IBM, Sun, and other companies were on the web. Microsoft IT administrators responsible for two externally visible servers that carried 2,000 blogs estimated that 3,000 of the 60,000 employees were active, but a reliable employee survey found over 7,000 blogs, many hosted on web platforms. Some felt that external hosting promoted a perception of independence and gave them ownership of their writing. The internal server was still largely unmonitored and volunteer-run, to the disappointment of the 800 internal bloggers.

In interviews, senior attorneys and publication relations managers described a shift in attitude. Previously skeptical, they now saw value in employees connecting with developers, users, and others outside the company. Bloggers provided useful support and put a human face on the company. Two attorneys said that the 2003 contractor offense would no longer result in a punitive reaction. Avoiding disclosing of sensitive information was not a new concern; a blog might have a faster or broader impact than e-mail or a newsgroup post, but the rules were the same. Similarly, a senior public relations manager described his group’s highly sophisticated approach to modeling how blogs, press releases, and the mainstream media interacted. Their goal had become to get in front of and work with employee blogging, not to suppress it.

Bloggers could be a source of joy or stress for middle managers. Many employees cleared their intention to blog with their direct manager, who knew and trusted them, but worried that higher-level managers would not approve. Tensions could arise when an employee’s blog about a product or team effort developed a large external following. An employee might seek more time for blogging, irritate less visible but equally productive team members, lobby for changes by suggesting them in a visible forum, and create issues by taking a new position inside or outside the company, or otherwise discontinuing their blog.

Managers also had to assess whether time was being used productively. Bloggers who set out to post only about professional issues discovered that an occasional personal item led to a positive reader response. Authors believed it made them more effective; managers had to justify non-work-related posting in a company that had some skeptics in upper management.

An intense quest for metrics to assess the value of employee blogging did not get far. Employees who would never write a formal article for the company website blogged to provide information, share tips, and engage in discussions with customers or partners. But how is this value measured? Blogs humanized the organization, an intangible asset. Blogs were used to document and organize work. Employees reported following external blogs and discovering colleagues and ideas that they had not encountered by internal communication—again, how does one attach a numerical value to this?

In mid-2005, a few people were assigned to blog. Groups were experimenting with approaches to willfully creating a team or product blog, often contributed to and sometimes written by multiple people, with or without bylines. All involved editing, in some cases casual, in others more formal. Everyone recognized that immediacy and informality were keys to effective use of this medium.

It was at this time that IBM publicly encouraged its employees to blog, which helped validate the medium at Microsoft as well. Some full-time bloggers appeared, focused on image, marketing, and public relations.

In subsequent years, blogging has become more professional, regularly featured in newspapers. Multiauthored blogs are more prevalent. In some respects, blogs have been absorbed into the broader authored digital media, a little more spontaneous and unedited. Bloggers surveyed by Technorati aged. LiveJournal faded away. Although millions of blogs are active, focused on hobbies and other activities, the sense of immediacy passed to social network sites and microblogging (Twitter), discussed later.
45.3.3 Wiki Use in Organizations

Wikis are more constructional than conversational. The content of IM and text messages, blogs, and social network posts generally recedes untouched into the past; most wiki content is there to be edited. That said, wikis often contain conversational sections, social network sites blend persistent and conversational information, and generally there is a move toward hybrid applications.

A major organizational use of wikis is internal, as a dynamic information repository for project management or to communicate across groups. Wikis are also designed for interacting with partners, customers, or vendors (e.g., Wagner and Majchrzak, 2007). Finally, employees make use of Wikipedia and other public wikis. Published research into this is limited, but given that attorneys cite Wikipedia in legal articles and judicial opinions (People, 2009) and physicians consult it (Hughes, 2009), we can assume use is highly widespread.

Most published wiki research examines Wikipedia, followed by public wikis. Neither is the focus here, nor will findings generalize. Wikipedia is a special case, and any wiki on the web has about one million times as many potential viewers as a large organizational wiki. Vandalism is a major concern for public wikis but not inside a firewall. Information accuracy is a major issue for public wikis; in organizations, it plays out differently, focused mainly on staleness. Organizational wiki users typically also communicate via other channels (e-mail, face to face, etc.), whereas most Wikipedia discussion occurs through the tool itself. The "Academic Studies of Wikipedia" page in Wikipedia is a good starting point for those interested in that topic.

Another major focus of wiki research is on classroom use. Classes are about finding, organizing, and sharing knowledge. Students are often open to new tools. Nevertheless, results are mixed; educational institutions have routines that can create conflicts, notably around assessment (Forte, 2009). Virtually all classroom wikis are short duration, lasting one term. Classrooms bear some resemblance to start-up companies, but on the whole, they are not models for enterprise use.

Poole and Grudin (2010) classified organizational wikis. Our principal focus is on one category: topical or project-specific wikis contributed by multiple employees. A second category comprises "pedias" that span an entire organization, modeled on Wikipedia. They first appeared around 2005 when Wikipedia’s success became evident. Most prominent in the media was Intellipedia, piloted in 2005 by the U.S. intelligence community and launched in 2006. MITREpedia, Pfizerpedia, and others followed. Careful studies have not been published, and recent years have seen little mass media attention to pedias (other than Wikipedia). The third wiki category comprises what are effectively personal intranet web pages. These are often started by an individual hoping to attract other contributors; when they do not materialize, either the wiki dies or the founder continues it as a solo endeavor, posting information deemed useful.

Published wiki research favors surveys of wiki users and papers written by wiki developers or evangelists in early stages of engagement. Majchrzak et al. (2006) received 165 survey responses from wiki-oriented listserv participants who felt wikis are sustainable and work better when directed at novel solutions or managed by credible sources. Interviews based on small numbers of participants and single sites identified problems familiar from earlier knowledge management system implementations: lack of management support, data that are obsolete or difficult to find, and usability problems (Ding et al., 2007; White and Lutters, 2007).

Egli and Sommerlad (2009) is an upbeat but objective report of a law firm’s implementation of a wiki to support collaboration, information display, and personal use. Challenges they identified are covered later.

Phuwanarturak (2009) describes wiki use in two short-term university IT department projects involving young, mostly wiki-savvy developers. The tool was used, though some disliked the slow updating and preferred IM for communication. This resembles the use of wikis in start-ups, also discussed later.

In a mixed survey and interview study covering thousands of wikis in several organizations, Grudin and Poole (2010) found that the vast majority of wikis were abandoned, often early. Many others never
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attracted a second contributor and became personal web pages on the intranet. Factors leading to abandonment and conditions conducive to success are discussed next.

With public wikis including Wikipedia, the bottom-up zeitgeist has meant that administrative structures, quality control practices, and reputation and incentive systems have emerged and evolved over time in response to the environment. The organization and reorganization of information also occur over time. Discussions happen through the wiki. This organic, self-contained process has slim chances of surviving the force fields of a dynamic organization.

Most organizations already have administrative structures, people responsible for certain topics, quality control processes, incentive and reputation systems, information repositories, and established communication channels. The existing structures cannot be grafted onto the wiki. If a known authority does not participate, others may be uncertain how to proceed. An employee may feel uncertain about editing the contribution of a senior person, whether or not that person encourages it. Should material in repositories elsewhere be duplicated in the wiki? Should communication happen in the wiki, in e-mail or distribution lists, or by convening meetings? Decisions on such matters do not bubble up and often remain unresolved.

Small start-ups are a sharp contrast. Lines of authority are ill-defined; everyone pitches in when they can. Employees are often younger, tech-savvy, and ready to try anything. There are few firmly established repositories, authorities, or communication channels. Literature cited earlier supports start-up ventures as promising for wiki use. Grudin and Poole (2010) reported successful wiki use in three start-ups—and also in two start-up-like efforts within a major corporation.

Information organization in a wiki is flexible when it is created, but often difficult to adjust later when information needs become better understood or change. Also, the formatting of content is often inflexible. These are sources of wiki abandonment. Changing a wiki in response to a group division or merger can be very difficult, as can the extraction of information for other uses. Wikis that use a global namespace hinder extension. Broken links and information that is obsolete or difficult to find are chronic problems. As with other file systems or document repositories, structure is critical, and the requirements are often not knowable or carefully worked out when a wiki is created.

Another major issue derives from Mintzberg: Even when they all agree the wiki will be a wonderful critter, executives, managers, and ICs have different views of exactly what it will be. Executives may envision the end of the elusive knowledge management quest to capture the knowledge or retiring employees for reuse by others. (This will not happen.) Managers may anticipate a “project dashboard” maintained by their team. (This is unlikely as well.) ICs may approach it as a resource for ad hoc problem solving, posting answers to frequently asked questions and other information useful to people like themselves. (This is the most likely success, if disillusioned executives and managers do not pull the plug.) Grudin and Poole (2010) found that enthusiasm could be strong at the top and bottom of organizations, with managers caught in the middle, trying to deal with the inevitable disruptions accompanying a new system.

Danis and Singer (2008) describe a 2-year-old enterprise wiki that had an exceptionally strong design team. It also benefited from an executive who was a strong proponent and no alternative to adoption: It replaced a system that was removed. The wiki was designed and deployed by an IBM research group for use in an annual project proposal review. The executive envisioned it being used year-round, but this did not materialize, and when he later retired, the wiki was retired as well (personal communication). Early stages in the migration of a document repository to a wiki are also described in Alquier et al. (2009).

45.3.4 Social Networking at Work

A decade after they began to attract notice, web-based social networking sites are being used by over 15% of the world’s population. The prominent initial public offerings (IPOs) of LinkedIn and Facebook signal that social networking is considered reasonably mature. Their use by politicians, entertainers, and athletes helps legitimate them to organizations, which in any case have more difficulty keeping their use out than bringing it in.
Early terminal-based computers and the early Internet supported social activity. From 1995 to 1997, ICQ and AOL Instant Messenger were released and phone-based text messaging ramped up, acquainting more people with buddy lists and real-time or quasi-real-time digital communication. Classmates.com and Six Degrees were early efforts to use the web to provide a persistent device-independent online home for social activity.

Activity increased substantially 5 years later; perhaps the Internet bubble had to grow and burst, leaving many more people online and looking for something to do there. From 2002 to 2004, Cyworld, Friendster, Plaxo, Reunion.com, Hi5, LinkedIn, MySpace, Orkut, Facebook, and Microsoft Live Spaces were released and actively promoted. Different sites became prominent in different regions.

By 2013, the field has shaken out. Facebook, LinkedIn, and Twitter (which appeared in 2006) dominate outside China. Specialized new sites include Foursquare, Pinterest, Instagram, and Google+. Yammer is a prominent vendor of social networking that keeps exchanges within a corporate firewall. It was acquired by Microsoft in 2012.

**Early use by students:** Students were enthusiastic early adopters. Academic achievement and socializing are key student activities and social networking sites help with at least one of these. Students tend to start with less complex social networks, and early clients were not complex.

Colorful and chaotic MySpace was once the most active site. Studies of high school and college students (Hargitai, 2007; Boyd, 2008) found that students aiming at professional occupations tended to consider MySpace gaudy and not serious. Use declined in favor of Facebook.

Facebook famously began on college campuses. Student Facebook networks initially resembled IM or SMS buddy lists (Lampe et al., 2006, 2008). Many students felt faculty should be excluded, with women particularly concerned about privacy (Hewitt and Forte, 2006; Fogel and Nemad, 2009). Over time, fewer students allowed open access to their Facebook profiles, with women reporting more use of access control and long-time users less concerned (Tufekci, 2012). Attitudes to privacy depended on whether students networked primarily to communicate with existing friends or to find people with common interests.

Facebook was made available in anticipation-generating waves to elite universities, other universities, and high schools, and in 2006, employees of a few enterprises followed by general availability. When LinkedIn was launched in 2003, it asked for a person’s occupation, employer, and past university, which discouraged student use. Its growth was deliberate but steady. It served job seekers, recruiters, and also professionals interested in a free, professional-looking web page and self-updating address book.

**Use by the general population:** The age, ethnicity, and socioeconomic profiles of the general population of social networking site users differ from most enterprise employee profiles. In addition, most studies rely on surveys of self-selected individuals. Enterprise use contexts differ in other ways; notably, anonymity is common in general web use but not on corporate intranets.

However, some studies of general use foreshadow results found in enterprise settings and discussed later. Naaman et al. (2010) found clusters of Twitter users: Some focused on posting about themselves and their activities, others primarily relaying information. Regrets expressed following Facebook posts remind us that technologies mature through trial and error (Wang et al., 2011). Similarly, flaming was a major topic in early e-mail use.

Media attention tends to focus on potential problems: students posting material they will regret, people fired for postings deemed inappropriate, and possible misuse of personal information by site owners. The growth in popularity of the medium indicates that this has not markedly affected uptake, but it could shape behavior in subtle ways.

**Workplace studies:** Many studies of enterprise use of social networking address internal systems confined to a company’s employees. Most of these are prototype systems built and deployed at IBM, such as Beehive (later called SocialBlue), Blue Twit, Cattail, Dogear, and Timely.
A second set of studies examines employee use of sites such as Facebook, LinkedIn, and Twitter for work (and other) purposes. Some uses are directed outward—recruiting or public relations—and others inward—to build social capital, find answers to nonconfidential questions, and so forth.

Internal prototypes have advantages: With restricted membership, employees can discuss company-confidential information. Researchers can log and analyze use and conduct follow-up interviews. Drawbacks include limited participation—typically a few percent of enthusiastic employees who are willing to invest time in a system likely to be discontinued. This limits the generality of results, even within the enterprise deploying it.

45.3.4.1 Case Study: IBM Beehive (2007–2011)

In 2007, IBM launched a Facebook-like social networking system called Beehive. In 2008 and 2009, 15 papers on different aspects were published, with more to follow. At the time of the first published studies, fewer than 0.1% of IBM employees were using Beehive (DiMicco et al., 2009); toward the end 17% had profiles (Thom-Santelli et al., 2011), although the final study indicated that fewer than 1% of employees posted once in a 4-week period (Thom et al., 2012). The system was taken offline in early 2012, with some features incorporated into IBM Connections.

Nine months after deployment, employees used Beehive to share personal information, to promote themselves by describing skills and accomplishments, and to campaign for projects (DiMicco et al., 2008). It was not used to find information or get quick answers to questions. In a finding frequently reported, many people initially used it with close colleagues but later found it more useful for establishing weaker ties with other colleagues. They found new contacts through “friends-of-friends” and did not experience privacy concerns. Other popular uses included sharing structured lists (Geyer et al., 2008a).

Several efforts aimed to increase participation. A ratings-based incentive system had a short-term effect (Farzan et al., 2008, 2009); removing it had a strong negative effect (Thom et al., 2012). Recommender systems were explored in efforts to (1) increase participation by recommending expansion of profile information (Geyer et al., 2008b), (2) identify and suggest new contacts (Chen et al., 2009; Guy et al., 2009; Daly et al., 2010); (3) increase engagement (Freyne et al., 2009), and (4) direct people to items of interest (Freyne et al., 2010). More profile information correlated with more contacts (Dugan et al., 2008). An interesting finding was that personal network structures could be inferred more effectively from outward-facing social network information than from relatively private e-mail thread data (Guy et al., 2008).

A major theme was the use of Beehive to build social capital (Steinfield et al., 2009; Wu et al., 2010). There was evidence of utility for organizational acculturation (Thom-Santelli et al., 2011), though communication was largely within geographical region (Thom-Santelli et al., 2010). Employees expressed the wish that Beehive was integrated with other social networking sites (e.g., Facebook).

In early 2009, Zhang et al. (2010) studied one organization’s use of Yammer, the Twitter-like tool for internal corporate use (with less constrained post length) launched in 2008. Yammer was used by 1.5% of employees to broadcast group or business unit status, ask and answer questions, send directed messages for real-time interaction, relay items of interest, and follow individual posters. Hashtag use to identify topic was rare. Almost all users were over 30 years old; about a quarter were also active Twitter users. With such limited adoption, even enthusiastic users had difficulty finding value.

Yammer reports use by employees of 200,000 companies, including over 400 of the Fortune 500, with around 4 million users or about 20 employees per company on average (http://www.yammer.com, 10/5/2012). It remains unclear how social networking inside a firewall will fare.

Higher uptake of internally developed social networking systems such as D Street at Deloitte is reported in the press. A complex social business platform at MITRE was the focus of a well-executed study employing logs, surveys, and interviews after 2 years of use (Holtzblatt et al., 2012). The Handshake system includes blog, wiki, file sharing, and social network features. Of the 60% of employees who tried it, benefits were largely reaped by the 18% who used it actively. Benefits were attributed to standard social networking features, the integration of capabilities that include heavier-weight collaboration around documents, and
the ability to create groups that span the firewall to include customers. Focusing more on organizational and technical challenges, Rooksby and Sommerville (2012) describe internal and public site use in a large government agency. The appropriateness and risks of accessing public sites was a key issue.

Corporate uses of Facebook, Twitter, and LinkedIn: A quarter to a third of companies reportedly ban employee access to external social networking sites from the workplace (e.g., Purdy, 2012). However, employees can circumvent bans using smart phones. As with Internet, e-mail, and web use, prohibition is unlikely to persist. Past experience indicates that employers who can trust employees not to misuse new technologies benefit overall from employee use. Still, employee uncertainty about appropriateness affects behavior, as reported in Rooksby et al. (2012). Lampe et al. (2012), unexpectedly not finding Facebook used by university staff for work-related questions and answers, attributed it to such concerns.

Apart from the Microsoft case study provided later, research into enterprise uses of public social networking sites has focused on early adopters and heavy users. This provides a view of how sites can be used and some issues that are encountered but limits the generality of the findings, as does the rapid uptake of these technologies: Every year the landscape changes, with more users, new features and options, and higher levels of experience. Compare studies that were conducted in different years with caution. That said, some trajectories are evident.

In an early study of Facebook use in an enterprise, DiMicco and Millen (2007) identified three categories of Facebook profiles of young professionals moving from college to the workplace: “reliving the college days,” comprising personal information, informal status messages, use of the Wall, and nonprofessional images; “dressed to impress,” primarily job-related information with some personal information and formal images; and “living in the business world,” consisting of limited profiles from new users as opposed to those who first adopted it as students.

Zhao and Rosson (2009) recruited 11 heavy users of Twitter at a large IT company in late 2008, using personal contacts and “snowball” referrals. Anticipating the Yammer findings described earlier, Twitter was used by these enthusiasts for “life updates” or personal status, timely sharing of information with friends or colleagues, and as “personal RSS feeds” to monitor trusted external sources of news.

In early 2009, Ehrlich and Shami (2010) compared Twitter and BlueTwit, a short-lived internal IBM tool that allowed posts of 250 characters. BlueTwit had been adopted by one-third of 1% of all employees. Thirty-four active users of both tools were identified. Fifty-seven percent of their posts were from five users who averaged 18 per day. On BlueTwit, they did less status posting and directed more information and comments to specific individuals than on Twitter. How to generalize from this sample of the 400,000 employees is unclear. A widely publicized Twitter-based event lasting a few days attracted stories conveying the company’s culture (Thom and Millen, 2012). Although only about one-fifth of 1% of employees posted stories, it was considered a success.

Surveys of communication at a small company in mid-2008 and mid-2009 found Facebook, LinkedIn, and Twitter use increasing, with weekly use of Facebook and Twitter the norm (Turner et al., 2010). The authors anticipated that use of Twitter would thrive. Voida et al. (2012) is a study of the use of sites to communicate externally; they examined volunteer organizations and found them using sites to raise funds, publicize events, and recruit volunteers, but sites were not useful for volunteer coordinators, whose need was to focus on individuals and build strong ties.

45.3.4.2 Case Study: Cross-Sectional Trend Study of Microsoft (2008–2012)

Each April starting in 2008, a different random sample of 1,000 Microsoft employees (out of about 90,000) was invited to take a survey on communication practices. The survey explored their attitudes toward and behaviors around public social networking sites. Over 40% responded each year; their demographics matched those of the company as a whole. Employees varying in age, gender, role, level, geographic location, attitude toward social networking, and behavior were subsequently interviewed three of the years. Skeels and Grudin (2009) describes the first year, Archambault and Grudin (2012) the first four, and Zhang et al. (under review) the fifth year.
Microsoft is atypical but varied: 45% of the employees are in business groups, 45% are in sales and marketing, and 10% support operations. Almost half are in the Seattle area and the rest are distributed around the world. In 2008, 49% had Facebook profiles and 52% had LinkedIn profiles, the latter used less frequently. By 2012, over 80% of all age groups had Facebook profiles. Over 50% reported being daily users of Facebook, and 20% daily users of LinkedIn, primarily in sales and marketing divisions.

In 2008, a major issue was the tensions arising from having contacts from different facets of life or who spanned other boundaries—friends versus coworkers, family members, what do you do when your manager, vice president, or customer asks to be your friend? People tended to use just one site. Access control mechanisms were just appearing. By 2012, use was more sophisticated—people had set up different Facebook groups and used LinkedIn groups, used Facebook pages, and used Facebook, Twitter, and/or LinkedIn differentially. People wanted to be able to scan all their sites in one place; for example, on their phone as they waited in a queue. Concerns about privacy diminished as people felt they were establishing more control over their networks. One finding was that female employees made more use of access control features and expressed fewer concerns about the use of sites than male employees did.

The segmenting of online social worlds is discussed by many researchers, most incisively by Stutzman and Hartzog (2012) who studied a special population: adults with multiple identities on a single site. Although a highly atypical group, why and how their informants differentiated audiences and used their identities is consistent with the observations of Microsoft employees.

Are social networking sites useful for external professional networking? Many employees were unsure in 2008 but by 2012 agreed. For networking within the company, however, even in 2012, 20% disagreed and almost 30% were neutral. In 2008, managers were less likely to see internal utility; by 2011, managers were more likely than ICs to see the potential for internal use. For those seeing social networking as useful, strengthening ties with coworkers was from the start a strong rationale.

By 2011–2012, Facebook use had plateaued at 60% daily use and around 80% occasional use. Twitter use plateaued in 2010 with close to 10% of employees using it daily. Occasional Twitter use continued to grow, reaching 30% so far; people used it to track work-related and personal events and feeds and to publicize work-related developments. In conclusion, social networking was integrated into the personal and work lives of many, who showed no indication that they might abandon it. Instead, they took countermeasures when developments made them uneasy. Despite mass media stories of overload and burnout, social networking appears to be here to stay.

45.4 Discussion

When the Internet bubble burst in 2000 and 2001, it left behind a strong digital infrastructure. Businesses and homes had acquired computers and Internet access. Moore's law was not revoked, so capability grew and prices fell. The communication media discussed in this chapter capitalized on the infrastructure and critical mass of users remaining when loftier ambitions were swept away. This is one interpretation of the timing of the embrace of these innovations, along with Wikipedia, Delicious, Flickr, YouTube, and others.

The pace of experimentation and change is unlikely to be maintained. A vacuum was filled. The technologies are maturing. The high valuations of LinkedIn and Facebook indicate an expectation that they will prosper. Hundreds of millions of users are accumulating years of experience, finding benefits and comfort levels. Most new entries focus on niches—Instagram for pictures, Pinterest for web collages, and Foursquare for location check-in—rather than challenging Facebook in the way it challenged Friendster, Orkut, Bebo, MySpace, and others. Moore's law still has not been revoked. Smaller form factors are more important, but they too extend rather than replace existing practices.
45.4.1 Contagion

An innovation requires a critical mass willing to see through the initial disruption as effective practices are worked out and promulgated. Communication technologies have one advantage: Best practices can be shared through the technology itself.

A student cohort is ideal for a communication technology—a small group that communicates intensely, is young and willing to experiment, and has relatively few external ties and habits. One of the cohorts is excited about the possibilities of a new technology, and friends will give it a try. Start-ups share these qualities—an intense need to communicate, inherently experimental and youthful composition, a focus that blocks out other ties, few habits built up around other channels and repositories, and relatively little hierarchy.

For IM, weblogs, and social networking sites, achieving use was not the challenge. Consumer clients or platforms were quickly adopted. One challenge for enterprises is determining whether to embrace the technologies. If they opt to do so, they must either determine how to make use of the clients and platforms employees are already using, convince employees to shift to or also adopt corporate versions, or find a way to integrate the two.

Wikis are an exception. Most employees, even young ones, are not yet active wiki contributors, so it is a more traditional adoption context. Start-ups are promising candidates for the reasons listed. Adoption in mature organizations requires other approaches to achieving critical mass. A project that resembles a start-up—a new team or new assignments, no existing repositories, and preferred communication channels—is a good candidate.

On a national scale, the breakup of the Soviet bloc unleashed an entrepreneurial ferment among young professionals: ICQ IM and LiveJournal blogs, used overwhelmingly by students in the United States, established a strong presence in eastern European enterprises.

The importance of evangelism and executive backing in spurring adoption is often stressed for large enterprises in relatively individualistic or command-and-control cultures. Use may spread more contagiously in consensus-oriented cultures. This may be why some blogging and mobile technology adoption in Asia transcends age and occupation to a greater extent than in Europe and North America.

These emerging technologies benefited from two external developments. One is the uncertainty that surrounded the rise of the web. An anxious search for business models that would be viable in a digitally connected world opened doors for experimentation. Another is the successful use of the technologies by people in entertainment, government, and crisis situations. Examples are the use of Twitter by Oprah Winfrey, star athletes, and popular entertainers, and the complaints of the Obama team that they could not use familiar communication tools when entering the White House in January 2009—which revealed that they truly relied on these channels. Studies of use of blogging and social networking sites in Middle East crises (e.g., Al-Ani et al., 2012; Starbird and Palen, 2012) are evidence that these tools can be powerful in certain contexts.

45.4.2 Evolution

Over time, three aspects of the information in these channels changed: its formality, its progression from text to multimedia, and the sizes of intended audiences. Each presents a trade-off. Quick, informal information exchange can be useful; in other contexts, organized, formal documents can be essential. Text is economical and often sufficient; photos and other multimedia are engaging. A small targeted group was convenient and may be desirable, but some messages are intended for broad audiences, and we do not always know when and for whom one will be useful.

Information exchanged informally sometimes proves to be useful later, but when communication is routinely saved and could be forwarded, a medium becomes more formal. Spell checkers are added. It is subpoenaed in court cases. E-mail started informally and became formal. IM and text messaging moved into the informal communication niche; now they too are saved and subpoenaed.
For decades, most digital communication was text, but with websites came multimedia. At work as well as home, people love photos. Cell phone buddy lists and IM contacts were initially limited in number, but websites for maintaining lists of contacts and followers changed this.

These factors drove the progression from messaging to social network sites for some purposes: from limited social networks of friends to segmented audiences that can be useful for work. Many early bloggers addressed friends and family only or broadcasted to the public. Enterprises slowly engaged with blogging, internally or externally, seeking large but targeted audiences. Twitter feeds may be impacting heavy-weight corporate blogs, which require more time to construct and read. For most purposes, 140-character announcements of products or events are easier for everyone involved.

45.4.3 Approaches to Organizational Deployment

The single most important consideration when considering a new communication technology intended for wide use is the differing perspectives of ICs and managers. It is not that they are at loggerheads—their desired outcomes are usually shared. They differ in how they work, what will help them, and how they perceive each other working. They have different views of what a tool will do. Understand and address this during design and deployment and the odds of smooth adjustment should improve substantially.

Wikis are a clear example. On the surface, wikis appeal to both groups: Information can be structured and anyone can contribute. In practice, the structures a manager envisions may not align with the content individuals find useful to contribute. Manager and IC interests converge in posting answers to questions frequently asked by new employees streaming into a start-up. In other situations, lack of clear credit and accountability interfere with open editing. If a Wikipedia page has erroneous information, no one’s job is on the line, but in an enterprise it can be different.

Executives may believe they know how managers should work and managers may believe they understand ICs, but understanding how a new technology will fit into one’s own workflow is hard enough. Imagining it for someone in a different role is beyond reach. If employees can be trusted or lapses detected, letting people find the tools useful to them may be advisable, with high-level modeling, encouragement, and evangelism to get it bootstrapped.

The corollary is that an environment with diverse, interoperable tools available in one place is promising. Companies are building and experimenting with integrated platforms such as MITRE’s Handshake and Deloitte’s D Street. Experiences with an integrated system at Hewlett Packard are described in Brzozowski (2009) and Brzozowski et al. (2009). Commercial offerings are still taking shape, such as IBM Connections, a social networking capability that added blog, wiki, microblogging, forums, and communities over time, absorbing some of the functionality in research prototypes described earlier, and Sharepoint, Microsoft’s document repository system that has also added blog, wiki, messaging, communities, and team sites.

Integrated internal systems have not yet fully proven themselves. The functionality is there, and organizations are trying them. The Holtzblatt et al. (2012) case study may be illustrative. After 2 years, 18% of employees reported benefits. This is significant, but short of the ultimate goal. Whether use will end up as widespread as e-mail is an empirical question.

45.4.4 Prospects for Enterprise Communication Technologies

In the consumer sphere, a decade of experimentation, exploration, and rapid change seems to have given way to a period of integration and consolidation. Organizations still face significant uncertainties, however. Should messaging remain a general platform or be embedded in different applications? Will an internal pedia or internal social networking platform be used, or should the focus be on making use of external tools? Can wiki and blog features address the chronic challenge of organizing information so that it can be retrieved with appropriate context? Other major challenges include addressing tensions
and opportunities around work–life balance for individuals and cross-enterprise communication with suppliers, customers, and partners.

Fears that accompanied the arrival of individual communication tools are dissipating. Trepidation is reduced as workers become more technology-savvy. They may as likely to see unmet potential as they are to imagine the worst.

People are using more tools and consequently value the capability to select among information threads rapidly and efficiently. The solution is not to merge all communication into a single channel; it is to provide a single place in which to quickly skim over or select among feeds, drawing on different channels for different purposes. Prospects for a new service improve if it appears alongside familiar services. The “place” can be a sequence of phone app buttons, a desktop window that aggregates multiple sources, or a large persistent display sitting to the side of one’s primary work displays. At the same time, highly relevant information should also appear in context.

People report finding useful information and contacts within their organization through reading public blogs or Twitter streams issued by their organization. Is this evidence of the inadequacy of internal tools, a strength of external tools that should be exploited, or both? By analogy, if a vendor finds that people encountering a problem with their product use a search engine to find solutions on the web and do not go to the vendor’s site for help, should the vendor double down on their help site, focus on improving the prospects for search engine users, or let the crowd handle it?

An organization could focus on improving internal tools or assist employees using external sites. Microsoft took the latter approach with externally facing blog servers and their new Social Connector, which enables access to Facebook, Twitter, and LinkedIn from within Office. This could impede a shift to internal tools—but for what organizations should or will such a shift take place?

Information threads—streams or rivers might be more apt metaphors—include not only communication with other people, but also meta-data and compilations of traffic from people, organizations, and objects, including video, sensor data, and other sources. No one has time to track everything in their work and personal lives that is potentially of interest. As the proportion represented digitally grows and the costs of displays, bandwidth, and computation drop, we can monitor more of it. Tools will enable faster access and better display, and new interaction models will enable us to scan information quickly and expand it as desired.

In this time of uncertainty and opportunity, enterprises that find solutions that fit their needs could do very well. The choices may be difficult. For example, tools for monitoring employee activity are improving rapidly. They could help but can create dilemmas for managers or IT staff who use them. Casual banter in a workplace probably increases social capital and strengthens ties in ways that enable employees to work more effectively; it probably builds skills and expands contacts that can later be drawn on for work purposes, but it also distracts people from their principal tasks. How much should managers support? Benefits are difficult to measure. Managers rarely have detailed enough knowledge of their subordinates’ jobs to confidently draw lines, being too strict could be counterproductive if it drives employees to use personal devices to communicate during work hours.

Organizations that for legal or competitive reasons must restrict communication among employees or with the outside world face greater challenges as technology continues to dissolve boundaries. Any website open to posting creates a simple bridge between people who might otherwise have had great difficulty finding one another.

Another thorny issue is information preservation. It is cheap to record and archive just about everything. The cost of archiving video communication may currently be noticeable, but the trend is toward effectively free storage. Archiving has benefits—it is not always possible to know what will later be of use. Information can be mined to find ways to help people work more effectively. It also has risks—not only clutter and difficulty finding what is useful, but also in potential personal or organizational liability for what is said or done, especially when retrieved out of context. For example, excerpts from years of recorded conversations and meetings could be used to build a case for poor performance or for a hostile work environment.
Historically organizations have preserved essential information in structured documents vetted by managers. Most communication was ephemeral. Today much more is saved, and it could all be saved. Tools are available that automatically delete information on a set date; we can anticipate struggles over where to draw boundaries among individual workers, managers, legal staff, and IT staff. The decisions may differ according to the nature of the activities involved—the legal restrictions, potential for liability, and evolving case law.

Despite these complexities, on balance, new communication and collaboration technologies represent astonishing tools for living and working more productively and pleasantly. It is tempting to imagine that it will be easy to get there. It will not be. The record of the past decade is that we are moving forward; new tools are being picked up, tried, and improved. Many are proving useful in workplaces. A learning curve is behind us; the benefits, along with new challenges, lie ahead.

References


Using Information Systems and Technology to Support Individual and Group Tasks


