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Abstract:

Globalizing organizations, outsourcing, mobile work, inter-organizational teams, innovation, and reaching out to suppliers and customers are driving today's need to improve collaboration within firms. And information technology (IT) is at the center of these trends. Businesses are also experimenting with different *types* of collaboration. While IT functions provide the "heavy lifting," such as connectivity and information integrity, without which most collaboration efforts would not be effective, *how* new applications are implemented is often as important as the technology itself in delivering business value. This article explores IT's role in enabling collaboration in organizations, and at the same time, what IT's role *should not be* (i.e., what responsibilities and accountabilities should properly be the function of the business). It presents the results of research with a focus group of senior IT managers, looking first at why collaboration is becoming so important and the business value it enables. Next, it examines some of the different characteristics of collaboration and the key components of a collaboration program and at IT's role in one. It concludes that effective collaboration will *not* result from implementing more collaboration software. Instead, this will require a proactive and holistic strategy that integrates business goals and technology potential.

Keywords: business collaboration, collaboration software, effective collaboration

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I. ENABLING COLLABORATION WITH IT

Our increasing connectedness is driving new ways of working together to deliver business value. Globalizing organizations, outsourcing, mobile work, innovation, inter-organizational teams, innovation, and reaching out to suppliers and customers are driving today's need to improve collaboration within firms. And, of course, information technology (IT) is at the center of these trends. A study on what makes widely-dispersed virtual teams effective found that, contrary to expectations, technology was a significant factor in facilitating their success [Majchrzak et al., 2004]. However, there are literally hundreds of software packages being promoted for improving collaboration. These technologies, such as virtual worlds, Web 2.0 applications, social networking, content management, and new ways of communicating (e.g., blogs, wikis, instant messaging, twitters) appear almost daily and are being adopted and adapted rapidly in the wider society. They are challenging many of the traditional conventions of how work is done and the role of IT functions themselves.

As the menu of available technologies widens, becomes virtually free, and employees clamor to use them anywhere, anyplace, and anytime, IT managers are asking many questions including:

- What is the business value of these technologies?
- What is the best way to assess them and make decisions about their use?
- How can these technologies best be managed and adapted for organizational purposes?

Furthermore, as new technologies appear, businesses are experimenting with different *types* of collaboration, such as those listed above, and IT functions are often expected to *make collaboration happen* through the implementation of technology, even though technologies are only one piece of any collaboration initiative. Certainly, IT functions provide the "heavy lifting," such as connectivity and information integrity, without which most collaboration efforts would not be effective and a well-designed IT architecture is a key enabler of collaboration [Johansen, 2007]. And, at the most basic level, IT also protects the privacy and security of information and users. But *how* new applications are implemented is often as important as the technology itself in delivering business value. As one IT manager stated, "We sometimes jump directly to the tool without thinking through the strategy and tactics involved." As a result, IT managers can sometimes feel that the deployment of collaboration is less than optimal.

To explore IT's role in enabling collaboration in organizations, and at the same time, what IT's role *should not be* (i.e., what responsibilities and accountabilities should properly be the function of the business), the authors convened a day-long focus group of senior IT managers from a variety of organizations. To prepare for the session, they were given a series of questions to consider about collaboration in their organization. The questions included identifying the principal forms of collaboration used and the primary business drivers involved in them; how business value is measured; and the roles of IT and the business in enabling collaboration.

This article presents the results of the focus group, combining them with information from academic research on collaboration and relevant practitioner articles. It first looks at some of the reasons why collaboration is becoming so important in organizations today and the business value it enables. Next, it examines some of the different characteristics of collaboration in various organizations. Then it looks at the key components of a collaboration program and how these influence its effectiveness and, following this, at IT's role in promoting collaboration. Finally, it presents a series of recommendations for IT managers as a guide for how they can best facilitate collaboration in their organizations.

II. WHY COLLABORATE?

There is no doubt that information and communications technologies are enabling different ways of working—within organizations and between them. Who could imagine life without e-mail? Without Google? Without cell phones? These technologies and others have changed forever how we interact with others, both personally and professionally, how we share information, and *where* work gets done. Thus, it should be no surprise that there is strong interest in collaboration among business practitioners and academics alike. A simple Internet search on this topic yields literally thousands of articles. And it is no secret that what we are seeing now is just the tip of the technology iceberg. Whether or not we actually use the *next* generation of collaboration/social networking technologies in our work as yet, everyone has heard about such technologies as instant messaging, Twitter,

Facebook, webcams, and others, and speculation about how they are going to change the face of organizations yet again.

Almost any business or IT journal these days contains speculative "think pieces" or case studies about how essential it will be to collaborate more effectively (in various ways) in the future and how failing to do this will result in the organization becoming a dinosaur [Romano et al., 2007; Lynch, 2007; Amabile and Khaire, 2008]. The implications are (1) that we must collaborate more intensively than we have done in the past and (2) that we must do it differently. And it is certainly without question that there are hundreds of new technologies—including hardware, software, applications, and services—currently being promoted to businesses as enabling collaboration and all the benefits it will bring. Yet business and IT managers are struggling to cut through the hype to get at the real value collaboration will bring. They have seen this before in both the "Internet bubble" and the knowledge management fad and know from bitter experience with previous generations of groupware, knowledge management, and collaboration investments that achieving positive results is not as easy as plugging in a piece of technology [Iandoli, 2009a]. Many have a long history of deploying collaboration technology and seeing it gather dust [McAfee, 2006].

It is, therefore, no surprise that the focus group reported a great deal of conflicting feelings in their organizations about collaboration, from wildly enthusiastic to highly skeptical. One company has invested substantial amounts of time and money in collaboration technologies and in adapting its organizational culture and behaviors accordingly and believes that they have become more productive, effective, and successful as a result. On the other hand, another manager reported his company's senior executives were grumbling that no one has yet given them a real business need for collaboration. Some members reported that there's a lack of business push for collaboration in their organization, while others stated that their business units were "coming around in some areas because they feel they need to be where their customers are." Most agreed that virtual interaction is becoming increasingly commonplace and that the percentage of time employees work virtually (and, therefore, need collaboration technology) is increasing [Romano et al., 2007; Drakos et al., 2009]. One study found that spending on collaborative software represents one-fifth of most organizations' technology budgets, but business leaders are still uncertain if these investments are improving either collaboration or the quality of work [Cross et al., 2005]. This sentiment was reflected by most of the focus group participants. "We're still experimenting with collaboration," explained one. "We don't have a business project, but we're developing a collaboration strategy."

Because collaboration is evolving so rapidly, it's difficult to definitively articulate the business drivers and benefits involved. However, there appear to be five main categories of potential business value:

1. *Top-line value.* A great deal has been written about the importance of collaboration in improving and/or increasing creativity and innovation in organizations. One study found that collaboration technologies play a critical role in improving knowledge creating and sharing practices and in developing new processes, products, and services [Fink, 2007]. Another noted that "great ideas can come from anywhere and IT has dramatically reduced the cost of accessing them" [Pisano and Verganti, 2008]. The expectation is that collaboration both across an organization and with customers, suppliers, and other third parties will strengthen an organization's ability to identify new business opportunities and formulate creative solutions [Fink, 2007]. The goal is "real time, rich, location independent collaboration" by creative teams that can rapidly process and assimilate knowledge from many different sources and apply it in practical ways [Gordon et al., 2008]. This type of value is especially important in highly dynamic and competitive industries in which the generation of a large number of new, good ideas is critical to competitive advantage. Within the focus group, most organizations were just beginning to recognize how technology, collaboration, and innovation could be harnessed to change their business models, products, and services. "We're beginning to see our executives more open to these concepts and how changing how we work together and with our customers can make a difference," said one. One firm has included collaboration and innovation in its performance review criteria. Nevertheless, these appear to be the exceptions and focus group managers mainly commented that their business leaders were not yet really thinking about how technology could help them in this area.

2. *Cost savings.* In a number of focus-group companies, collaboration is seen as having real cost savings potential in such ways as reducing travel costs through virtual meetings, improving communication, and enabling remote access to documents. Participants noted that collaborative technology facilitates the work of global and virtual teams by compressing work flow, reducing development costs, increasing communication, minimizing misunderstandings, improving coordination between groups, and enabling linkages with vendors, suppliers, and customers which speed up the supply chain and other work processes.

3. *Effectiveness.* There is wide recognition that collaboration technology, used properly, can make group work more effective. This is particularly true for virtual teams. For example, one focus group company uses social networking technologies (behind its firewall) to enable team members from around the world to learn about each

other, have fun events, and understand each others' customs and culture. "This has been really useful for us in building strong global teams," said the manager involved. Collaboration technology, particularly unified communications, is especially useful in integrating remote and mobile workers seamlessly into team or project activities. It enables them to "touch down" in an office and plug into the applications and information they need, wherever they are in the world. Increasingly too, for many professionals, whose work consists of participation in a number of ad hoc projects, collaboration technology enables them to more effectively juggle a variety of commitments. One firm uses it extensively for its multidisciplinary projects, such as pandemic planning. Finally, online education is a big application of this technology, allowing employees to participate from a variety of locations, have virtual and real time discussions, and incorporate learning into the demands of their workday.

4. *Accessibility of people.* A key feature of collaboration and its associated technology is that it provides a company with access to a much broader range of skills, capabilities, resources, and services than have been traditionally available. Collaboration technology significantly expands the number of potential partners and expertise available to a company [Pisano and Verganti, 2008] and, in recent years, different types of inter-organizational alliances—from supply chain integration to design coordination to innovative partnerships have become commonplace [Attaran, 2007]. However, it is the ability to access *internal* expertise that is currently of most interest to the focus group companies. Only one firm had successfully implemented a comprehensive enterprise directory, including phone book, expertise location anywhere in the organization, reporting structures, and connection with social networking information. Yet, even this firm recognized how difficult building such a capability can be. "Over the years, it has been a huge stumbling block for us," he said. Other members were envious. "We're trying to build this facility," said one "because right now it's really hard for us to find people in our organization." Ideally, this type of accessibility also enables the development of communities of interest within the organization—either work-focused or built around personal interests. In our virtual, networked world that is rapidly losing the "human touch" and characterized by "ephemeral relationships," these communities can help build staff morale and create a sense of belonging [Tebutt, 2009; Thomas and Bostrom, 2008].

5. *Accessibility of information.* One of the biggest benefits of collaboration and its associated technology is that it makes information much more accessible than in the past. Information repositories, such as the Intranet, enable the management and sharing of digital content on an as needed basis [Chin et al., 2008]. Other technologies, such as wikis, support the creation of new content and its publication. These tools enable information and knowledge sharing across time and space in ways that were unheard of a mere decade ago [Fink, 2007]. Many focus group members believe that portal and content management applications will be the biggest value of collaboration. But they also feel it will take a lot of work to get there. "Our Intranet is just a garbage scow of information," sighed one manager. "The same document can exist in literally hundreds of places." Another noted, "While our corporate level content is well-managed, it gets messier and messier the lower down in the organization you go. We need much more information management and filtering to make our Intranet really useful." Finally, while everyone agrees that collaboration will only be successful if more information is made more widely available, there is still a great deal of fear that "someone will do something bad with it," which explains why, in many organizations, the default position is *not* to share.

6. *Flexibility.* The world is becoming increasingly volatile, uncertain, complex, and ambiguous, and this is creating a highly dynamic business environment for many companies [Johansen, 2007]. Flatter, more networked and collaborative structures create the right work and leadership environment facilitating fluid workforces and speedy decision-making, and providing transparency of information and capabilities while retaining clarity around the organization's beliefs, values, and responsibilities [Reeves et al., 2008]. A networked organization, with less structure, and situational leadership, and with the ability to create new capabilities through its networks will be much more able to cope with these challenges. Flexibility will involve space, technology, and protocols for working in networks and will exist at the intersection of real estate, HR, and IT [Johansen, 2007]. It underlies many of the reasons why focus group members are interested in collaboration. While most are still seeing this as a need *within* a more traditional, hierarchical organizational structure, some recognize that their structure and governance practices will have to change substantially.

III. CHARACTERISTICS OF COLLABORATION

Although there is much talk about the benefits of collaboration and the need for more of it in organizations, there is a significant lack of clarity about what collaboration actually *is*. As one focus group member put it, "If you asked 100 people to describe collaboration, you would get 100 different answers. There's a huge disparity in understanding about this topic." There is also significant confusion about *collaboration*, which is a human activity, and *collaboration technology*, which is the hardware, software, and applications that *enable* the work of collaboration [Camarinha-Matos et al., 2009]. Finally, the group noted that collaboration is often used interchangeably with such terms as *networking, social networking,* and *cooperation.* It is, therefore, important to be clear about the range and scope of collaboration in organizations these days, including *who* is involved in collaboration, *what* type of work is being done,

and *where* it is being done, since these have a direct bearing on *how* the IT function can best support collaboration with technology (see Figure 1).

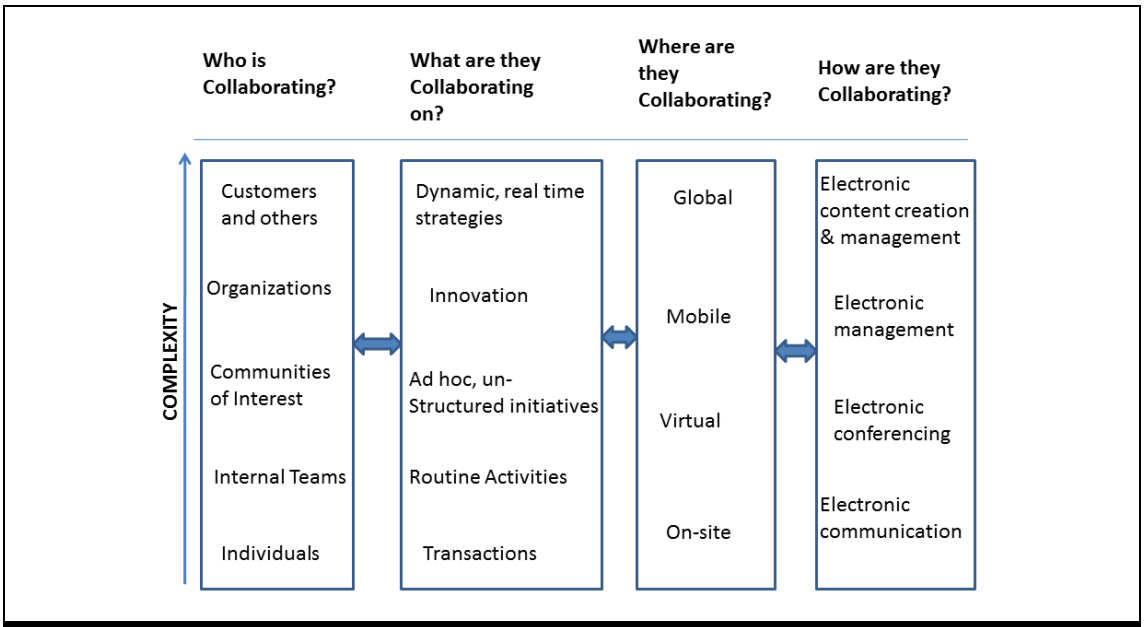

Figure 1. The Range and Scope of Collaboration

- *Who is collaborating?* At its simplest, *collaboration* describes work that is done jointly with others [Wikipedia, 2009]. In modern organizations, this covers a lot of territory. Sometimes collaboration can be as basic as two people working together to achieve a goal, but it also refers to a wide spectrum of different types of collaborative participants. In organizations, there can be collaboration within teams (both formal and ad hoc), between business units, and within communities of interest. Collaboration can also occur beyond a firm's boundaries, including between an organization and its customers; between one or more organizations (as in a supply chain or an innovative partnership); and, as we are beginning to see, with the world at large (also known as "mass collaboration"). As organizations have become more comfortable with collaborative work, they are extending it in new ways and to more and more types of participants. While most focus group organizations still focus on internal collaboration, there was general agreement that the trend is toward opening up collaboration beyond organizational boundaries. At present, most organizations are fairly "locked down" but have practices in place to enable key suppliers and trusted third parties to access internal company data and to work collaboratively with internal participants.

- *What are they collaborating on?* Collaboration can take many forms. The early wins in organizations, according to the focus group, were simple transactions. These included e-mails, conferencing, extranets with partners, and basic workflow. Next came collaboration around routine activities, such as access to information and its reuse, ease of information creation and publishing; coordination of experts to solve common problems and to reduce the work involved in mundane tasks, such as coordination and planning [Fedorowicz et al. 2008; Edmonston 2008; Cross et al. 2005]. Most organizations in the focus group have substantial initiatives in this area, although they believe there's more work to be done, especially in such matters as improving content management and creating enterprise directories. A third type of collaboration is more unstructured in nature and includes: the development of communities for various purposes; creating collaborative work environments where innovation can occur; and collaboration for issue and information management. Most focus group members had only just begun to understand how best to leverage this type of collaboration, and their efforts in this area are still mainly experimental. However, one firm has created a new technology adoption environment, where any technology innovation can be shared and where others can use and provide feedback about its utility and effectiveness. The most challenging form of collaboration is probably best epitomized at present by the online gaming community. Here, various participants work together in real time to achieve structured goals under rapidly-changing conditions. Dynamic collaboration is characterized by: speed of decision-making with incomplete information; the ability to modify decisions in response to changing conditions; trial and error; the continual need to address and deal with risk; hyper-transparency of information; and situational leadership [Reeves et al., 2008]. None of the organizations in the focus group had achieved this type of collaboration but all recognized that this is increasingly the way members of the younger generation expect to work and felt that, as business challenges become more complex, organizations will have to find better ways of collaborating in this way.

- *Where are they collaborating?* Increasingly, collaboration needs to take place on an anywhere, anytime basis. Inside organizations, members noted the need for more meeting spaces and meeting rooms, as well as "touch down" areas where contractors and outside staff can temporarily set up office. Almost all focus group organizations already support virtual and mobile work, at least to some extent. Several members of the focus group also routinely utilize international or global teams where collaboration takes place across time zones, national boundaries, cultures, and language groups. Some were also beginning to experiment with different forms of collaboration with individuals and enterprises beyond their organizational boundaries, which requires dealing with different organization cultures, practices, processes, systems, and data.

- *How are they collaborating?* Collaborative technology comprises the tools that are used to facilitate the work of collaboration. These fall into four main categories: electronic communication (such as e-mail, instant messaging, blogs); electronic conferencing (e.g., video conferencing; meeting software); electronic management (e.g., file sharing, activity assignment, task management); and electronic content creation and management (e.g., publishing tools, enterprise directories). However, newer collaborative technologies, such as social networking applications, tend to fall into multiple categories depending on how they are used (e.g., for communication or information creation). As a result, the boundaries between the categories are blurring with the rapid evolution of this technology.

IV. COMPONENTS OF SUCCESSFUL COLLABORATION

Understanding what collaboration is and its potential benefits are important to achieving an awareness of how collaboration can be effectively used in an organization, but the high failure of collaboration projects suggests that successful collaboration requires mastering how to implement and manage it [Schuh et al., 2008]. The key challenges for managers (both business and IT) are to create a supportive working environment and motivational conditions and to develop the skills and organizational arrangements within which collaboration can flourish [Fedorowicz et al., 2008; Thomas et al. 2007]. There are four components of collaboration which must work together to ensure successful collaboration of any type [MacCormack and Forbath, 2008]:

1. *People.* Collaborative work requires different skills than more traditional forms of work. In particular, strong communication skills are essential. This is especially true the more work is: mediated through technology; virtual; and across organizational and cultural boundaries [Romano et al., 2007]. Cultural differences around social expectations, the need for more openness, flexibility, and interdependence in work assignments; the need to develop trust in an "opaque" environment (i.e., one that lacks many traditional social cues); and differences in organizational practices all add up to a requirement for managers to rethink how people will work together in this new world of work [Evans and Wolf, 2005; Fiore et al., 2008]. Inexperienced teams, lack of management attention, and different expectations of partners are some of the major reasons why collaboration initiatives can fail [Shuh et al., 2008]. Thus, when implementing collaboration, managers should be aware that it is not "business as usual" and pay more attention to the social and behavioral changes that will be necessary [Thomas and Bostrom, 2008; Edmonston, 2008]. One focus group manager noted, "You cannot overemphasize the importance of culture. It will make or break you." Finally, as the complexity of the tasks involving coordination increases, so does the need for management attention to coordination [Shuh et al., 2008]. In short, creating the working environment within which collaboration occurs becomes the primary role of the manager, rather than monitoring individual productivity or performance. Signs that these efforts have been successful are: engaged, satisfied, and committed staff who fully participate in collaborative processes [Nohria et al., 2008]. Conversely, managers who cultivate a fear of failure or who do not protect their staff from what is often a larger, hostile corporate environment, are likely to see collaborative initiatives fail [Amabile and Khaire, 2008].

2. *Program.* Collaboration needs to be part of a coherent program to create and capture value, not a series of standalone efforts [Shuh et al., 2008]. It is highly unlikely that collaboration initiatives will achieve an organization's goals unless they are holistically managed [MacCormak and Forbath, 2008]. Furthermore, it is essential that managers understand the strategic tradeoffs involved in collaboration and make conscious decisions about how to structure and govern it. This is especially true when external partners are involved [Pisano and Verganti, 2008]. Most importantly, organizations need to comprehensively understand how to use their knowledge and information assets. Focus group members stressed that well-organized, searchable information is the foundation for any type of collaboration and this resource requires a significant investment to develop and maintain. As a result, many companies are working primarily on content management strategies. In addition, high level decisions need to be made about how to develop new collaboration capabilities, determine what types of collaboration the organization seeks to engage in, what policies are needed, and how to create an environment where the desired collaboration can thrive. Two key principles of any collaboration program are: *emergence*, i.e., the recognition that we don't always know who will make the greatest contribution to a problem

in advance, and *planned serendipity*, i.e., designing a working environment where under-explored relationships among people, data, and applications can become visible [Majchrzak, 2009].

3. *Processes.* Within a strategic and holistic approach to collaboration, it is important to develop processes that support or help manage this type of work. Since collaboration is a moving target in the modern enterprise, managers need ways to rapidly learn what is working and what isn't and to make changes as the work unfolds [Edmonston, 2008]. They also need a process to take advantage of successful innovations and a way of recognizing failures and killing them off quickly [Amabile and Khaire, 2008]. Effective processes are also required to support collaborative teams and partnerships to help them know what they know and coordinate their thinking [Johansen, 2007]. Specific processes that the focus group identified as being supportive of collaboration include administrative practices that recognize the convergence of many different types of communication (the management of which is often separated), content management processes, the ability to identify a "single source of truth" (i.e., the official documents pertaining to any topic), and the creation of parameters to help staff understand how and under what conditions they can collaborate. Conversely, a siloed focus and an emphasis on process efficiency above all else will likely stifle collaboration [Kleinbaum and Tushman, 2008].

4. *Platforms.* These are the tools, technologies, and standards that enable people to share data and to work together seamlessly from a variety of locations. The advent of cheap connectivity has been the driving force behind many new ways of collaborating in recent years [Smith and McKeen, 2008], yet efforts to promote collaboration have focused largely on connectivity with little recognition of the other factors that make it effective [Cross et al. 2005]. While technology is a key resource in enabling collaboration, it must be designed to achieve the organization's goals and fit with its culture and practices. As with the other components of collaboration, the objective of a platform is to create an environment *within* which collaboration can take place, rather than the traditional systems approach of hardwiring specific information and work processes [Iandoli, 2009b]. An effective technology platform should support plug and play communication, provide access to information, and enable the transformation of information into knowledge. It should also provide tools for the rapid creation of communities, teams, and networks; be based on open standards; and be flexible and adaptive [Iandoli, 2009b; Camharina-Matos et al., 2009]. However, most focus group organizations are nowhere near creating such a platform. Most are still questioning whether they should invest in collaborative technologies rather than look for ways to coherently manage a set of business tools for collaborative work [Drakos et al., 2008]

V. THE ROLE OF IT IN COLLABORATION

Clearly, the IT function alone cannot make collaboration happen, even *if* it provides robust collaboration technology. The business plays a critical role in determining its strategy and creating processes and a working environment that makes it possible to collaborate for business value. That said, there is still no answer to where an organization's collaboration strategy "belongs," according to the focus group. In most companies, IT still owns it because it is perceived as a technology, rather than a behavior, and, as a result, the whole field of collaboration is an opportunity for IT managers to demonstrate real business leadership [Mann, 2008; Lynch 2007]. CIOs can work with business executives to identify and orchestrate collaborative capabilities, coordinate enterprise services, and educate leaders about opportunities and possibilities.

In addition, IT leaders have some very specific technology responsibilities which must be put in place to enable collaborative work to occur. There are four major technology areas at present which must be addressed iteratively and concurrently. These are merely the fundamentals however. Since this field is evolving rapidly, IT leaders must be prepared to continually reassess all aspects of collaboration technology, its governance, and policies and to rebalance these as necessary [Smith et al. 2007].

1. *Communication.* A significant and growing area of collaborative technology is enabling a wide spectrum of communications options, from voice mail to video and everything in between. "Users increasingly see communications and collaboration not as separate activities but as a smooth continuum of modalities where the difference between talking on the phone and posting on a wiki becomes a matter of choice and preference." [Mann and Elliot, 2007]. As such, unified communications become a technological reality. IT leaders will need to develop an architecture that supports them as a single technology spectrum rather than as separate components. Gartner Group predicts that phone directories, e-mail, voicemail, instant messaging, presence awareness, computer telephony, and conferencing technologies will increasingly converge over the next five years, leading to serious organizational challenges in how these services are managed [Mann and Elliot, 2007]. However, other types of communication and collaboration software, such as voice, call centers, mobile, team workspaces, and social software will *not* be part of this convergence and will have to be appropriately managed as they too evolve. Ultimately, communications technology will be embedded in all business applications, and will need to be ubiquitous, reliable, secure, and integrated [Andriole, 2006].

2. *Information access and management.* Developing an improved information processing capability, including accurate and visible information, manipulability, exchangeability, and ease of information transfer, is a primary goal for all IT functions in supporting collaboration. One focus group member explained his mandate as follows: "We want to make it easy for anyone to share information via the Intranet, to support collaboration with information, and to link people to documents and vice versa." In order to accomplish this goal, it is important for organizations to reduce the number of data bases and data management platforms they maintain and to develop the Intranet into a robust information sharing platform. Typically, organizations also need a document management system with proper versioning and access controls, although these systems are notoriously difficult to integrate with other information management tools. We're finding it really hard to upload and share documents," said one manager. "It's a big headache for us." Content management, particularly at the business unit and team levels is also challenging, as the use of many separate tools tends to replicate information in a relatively unmanaged fashion. At present, in most companies, attention needs to be paid to integrating fragmented information resources, improving information visibility, filtering and navigation, and establishing principles for information access [Cain, 2008; Thomas et al., 2007].

   Several focus group companies commented that there is still a widespread perception in their organizations that if information is made more widely available, "bad things will happen." "We instinctively don't want to share," said one manager. Managing the tension between the need for information availability to facilitate collaboration and protecting the organization from the associated risks is an area where IT managers should be working proactively to ensure they deliver the optimal value [Smith et al., 2007; Gordon et al., 2008].

3. *Security and risk.* It is a primary responsibility of the IT function to protect the integrity of its systems and data. This is becoming increasingly more challenging as both internal and external organizational boundaries break down and new forms of collaboration are introduced [Smith et al., 2007]. IT managers recognize that removing the traditional layers of separation between departments and enterprises makes the organization more vulnerable and their job more difficult. Therefore, IT departments can often be viewed as obstacles to collaboration [Gordon et al., 2008]. There is no easy answer to this dilemma. Companies need safe and secure communications, but it is no longer possible to use "stovepipe" security to ensure this. Instead, IT functions must improve security architectures and infrastructures and continually assess the balance between the openness required by collaboration and the risks involved. Focus group members noted that security must become more granular and principles-based. "We are beginning to develop a policy for how we as a company use social networking tools," said one manager. "The broader the team, the greater the risks involved." Another added, "we need better authentication tools, and we must be clearer about the types of information that can be shared." Others noted that security must be commensurate with the risks involved. "We must use the most appropriate tools for the particular task at hand." Finally, they pointed out that this task is about to get much more difficult as companies begin to open themselves up to collaboration with their end customers. "This is a huge challenge that we have not yet faced up to," said one.

4. *Technology integration.* The more IT can achieve integration of data, applications, hardware, and software, the easier it will be to provide the information and tools needed to facilitate collaboration. Thus, focus group members recommended the massive simplification and rationalization of applications, data bases, and software as a precursor to any significant collaboration initiative. The drive to collaboration is also behind the increasing interest in industry neutral and global IT standards of all types [Chituc et al., 2009]. "Technology should be a facilitator of collaboration, not an obstacle," said one manager. "Our users want to plug and play in this area and we can only achieve this through standardization." Some organizations in the focus group provide "canned" collaboration tools, such as blogs, personal websites, team sites, and wikis that allow the rapid formation of ad hoc teams and ease of social networking. These can then be tailored to particular needs requiring just enough information so they can be effectively managed and decommissioned in the longer-term.

   In addition, centralized and integrated structures within IT for developing enterprise-wide communication and collaboration capabilities can facilitate synergistic interactions between these tools and create useful cross-technology opportunities that might not have previously been obvious [Sanders, 2007]. Focus group organizations varied widely in this area. While some assigned IT a leading role in delivering collaboration technology, others are implementing it on a more piecemeal basis. All agreed however, that without centralized support for this technology, it is unlikely to deliver enterprise-level value.

These four collaborative technology building blocks are the most critical elements to which IT should pay attention at present. However, new technologies are already on the horizon, and these will require continual assessment from IT managers as to their usefulness and how they can be integrated into the existing organizational infrastructure and collaboration architecture. Some of these technologies include dynamic modeling tools, simulation engines, visualization tools, data reduction and summarization applications, and intelligence gathering tools. In short, IT

managers are going to have to keep their eyes open in this very rapidly changing market and be willing to adapt quickly to changing conditions. Paying attention to these four fundamental building blocks now will enable them to do this more easily and effectively in the future.

VI. FIRST STEPS FOR FACILITATING EFFECTIVE COLLABORATION

Given the multifaceted nature of collaboration and its many potential, but as yet unproven, benefits, IT managers could understandably adopt a "wait and see" approach. In fact, this is what many members of the focus group are doing—talking about strategy and planning small pilots to test the waters. However, amid all the confusion, they also had some practical ideas for ways that organizations could begin to approach this complex and dynamic new way of working and using technology.

1. *Develop a coherent vision.* Effective collaboration requires a multidisciplinary approach and a shared business-IT vision [Lynch, 2007]. It is essential that such a vision begin with understanding the organization's values, legal requirements, and core intellectual property. From this, a strategic perspective can be developed about what the business wants to accomplish with collaboration and what types of technology would best support it. Focus group members suggested that developing a vision for collaboration must be carefully approached because "the judgment line is shifting rapidly" and our static paradigms of work are rapidly becoming much more dynamic. These factors will change business models and strategies and affect how companies will need to manage the complex business environment of the near future. Ideally, a vision for collaboration should include a unified strategy and business models, tools, and experiments to help the organization gain further insights. Its ultimate goal should be to nurture an internal working environment (and in the longer term, a broader business ecosystem) that will enable productive collaboration to emerge. At this early stage, both business and IT leaders should play a key role in articulating a collaboration vision and in connecting it to the right people who can make it happen.

2. *Plan for adaptation.* If there's one aspect of collaboration about which everyone agrees, it's that collaboration is evolving and complex and will require significant and ongoing management attention [Shuh et al., 2008]. Organizations, and particularly IT functions, therefore, need to develop the "flexing skills" needed to cope with the rapid development of collaboration and its associated technologies [Iandoli, 2009b]. Focus group members noted that their organizations are already becoming flatter and more complex as collaboration and networks emerge. "Business is speeding up, and we will need new skills for coping and adapting rapidly," said one. It is, therefore, essential that organizations develop processes for learning what is working with collaboration and what isn't and mechanisms for sharing these lessons. Above all, the management of collaboration needs to be multidisciplinary and responsive to change.

3. *Start with specific fundamentals.* Facilitating effective collaboration will take time—both to build a strategy and to get the technology fundamentals in place. Many organizations have specific "pain points" which could be worthwhile places to start putting energy into collaboration. In the focus group, these were clearly around information management and access. "Our Intranet is unmanaged and not relevant," complained one manager. Another noted that it was very hard finding people in his organization. "We'd love to have a 'blue pages' to enable us to start internal social networking," he said, referring to one firm's internal company directory. In addition, several participants noted that their office space doesn't support collaboration. "We need to have many more collaborative workspaces," she noted. A simple assessment of these gaps and some management attention to them could lead to a great improvement in how people are able to collaborate.

4. *Establish principles of behavior.* As noted above, much of the governance of collaboration is based on principles rather than rules. The most basic principle is transparency, not only of information but also of behavior [Majchrzak, 2009]. Some focus group companies have already established a code of conduct to govern electronic communication and collaboration, while others are working on one. A big fear is that providing improved communication will enable employees and customers to post negative comments about the organization. One important way of allaying these fears is to eliminate online anonymity. "Anonymity results in bad behavior," said one manager. "With a clear online identity, negativity is quickly found out and is usually self-policed by others in the community." Another noted, "In a business environment where all posts are traceable, abuse is unlikely." As social networking takes hold in our culture, and organizations explore ways they can use it to connect with their customers, they are realizing that establishing rules of etiquette for how to do this is important. "We have a hard and fast rule that if you are using social networking to do business, you *must* state your company affiliation," said a manager.

   Cultural and behavioral practices are changing as a result of collaboration, and there is widespread agreement that these will require serious management attention. For example, as staff become empowered to innovate and make real-time decisions, organizations will need to foster increased psychological safety so people don't fear

being penalized if they make a mistake [Edmonston, 2008]. Similarly, work will need to be done to align work management and human resources practices, as well as incentives, if collaboration is to really make a difference [Cross et al., 2005]. Finally, as connectivity becomes more pervasive and global, companies will have to develop policies and practices that enable staff to achieve an effective work–life balance. For example, one global firm has developed a small scheduling application to determine the least invasive time to have a meeting across different time zones. Tools can also be used to assist staff with controlling their accessibility and protecting their privacy [Mann, 2008].

5. *Gradually move beyond the firewall.* None of the focus group companies was comfortable with extending collaboration beyond their firewalls, unless in very tightly controlled circumstances, e.g., with vendors or third-party service providers. There are still major concerns about risk, privacy, and corporate liability. These issues need to be discussed and managed so that the power of collaboration can be realized. For example, one firm's Privacy Officer is now involved in determining what information can be shared and what cannot. Some initial external target groups will include retirees, clients, and business partners. "We are gradually working through our concerns because of the unbelievable power of these tools," one manager said.

VII. CONCLUSION

Collaboration is a complex concept with uncertain benefits and requiring major organizational change. The drive to adopt collaboration is being accelerated by the possibilities enabled by information technology, which support real-time global communication and anytime–anywhere access to information. In addition, companies are feeling considerable pressure to adopt collaboration technology because of their increasingly widespread use among individuals, many of whom are becoming their employees. There is no question that collaboration will play a major role in how we work and live in the future. However, as we move into this new era, companies are taking their time to determine how best to take advantage of what collaborative technology has to offer. This article has identified the major ways companies might want to collaborate and the benefits that are anticipated from each. It has also explored some of the major characteristics and components of collaboration in order to clarify concepts and to distinguish between the work of collaboration, which is a human activity, and collaboration technology, which facilitates it. It has shown that effective collaboration will *not* result from simply implementing more collaboration software. Instead, it will require a proactive and holistic strategy that integrates business goals and technology potential. At present, all aspects of collaboration and collaboration technology are in their infancy, so it is understandable that many companies are proceeding cautiously into this new world. Nevertheless, the speed with which both technology and practice are moving strongly suggests that it is time for managers to put some collaborative fundamentals in place. Furthermore, IT managers have an opportunity to provide business leadership around collaboration if they can clearly articulate its business potential and benefits, rather than focusing on the technology itself.

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