

## **Collaborative Technologies for the Financial Services industry**

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### **Abstract**

Collaborations among knowledge workers are becoming increasingly important as organizations drive for globalization and innovation to demonstrate their competitive lead. Meanwhile, work has become more and more knowledge-based constantly requiring decisions to be made that are based on instant access to data from a diversity of information sources – a situation which is especially common in the financial services industry. This paper explores, both from the business and technological perspectives, the evolution of collaborative technologies and its impact on the workplace and the knowledge workers. In particular, Peer-to-Peer (P2P), when applied to managing and sharing knowledge in financial services organizations, is seen to offer distinctive advantages. Criteria for the selection of collaborative tools are also outlined.

### **Collaborations**

The nature of work is changing. Work has become increasingly “non-linear”. Autor, Levy and Murnane (2003) have identified a significant shift from routine to non-routine work from the 1960s to 1998. They have further refined today’s knowledge work to be routine (manual and cognitive) and non-routine (manual, cognitive analytic and cognitive interactive). Nonaka and Takeuchi (2000)’s SECI model (covering socialization, externalization, combination and internalization) are common activities for today’s knowledge workers.

Collaboration has been a topic of growing importance in the business world. Advancements in E-Business bring new opportunities and the drive towards globalization among firms in recent years has accelerated the need for knowledge sharing at both the intra and inter-organizational levels. In product development, for example, firms often need to partner in order to leverage on the collective expertise of the parties involved. Virtual enterprises and networked organizations are the norm. These organizations have staff in dispersed locations. They share inter-organizational work processes and are highly dependent on loosely coupled IT systems to support their daily activities. Virtual project teams are often formed; these team members are drawn from different organizations, they may have different work culture and operate on disparate IT infrastructure and in different time zones. Effective and sustained collaboration not only enable these firms to design superior products but also shorten the timeframe for product release on the market. Mayall and Neal (2004) have further defined collaborative work to involve co-development (e.g. create, edit, review, revise, share), co-ordination (e.g. locate, schedule, conduct), co-decision (e.g. create/analyze a poll, joint decision making) and commitment (e.g. summary, follow-up actions).

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More specifically, we can also identify prevalent types of collaborations in the workplace. They are

E-mail based – Employees send, receive, forward and filter messages. Attachments (e.g. documents, URL links) are used for file transfer purpose.

Message-based – Typically instant messaging, chat-rooms, SMS and voice mail.

Document-based – Document creation, routing, approval, checkin/out and version control.

Project-based – Expertise location, project planning, execution and reporting. Lessons learnt from a project are often gathered and shared afterwards.

Learning-based – Collaborative/Live learning (i.e. Web/Video conferencing).

Community-based – The use of online knowledge communities for knowledge sharing, innovation and online mentoring. Common examples are Community of Practice, Community of Interest, Know-How networks and learning communities. The platform used for community-based collaborations usually encapsulates one or more of the above capabilities e.g. document management, messaging and projects.

Process-based – Business process management tools and process portals foster collaboration and workflow among workers at the process level. Increasingly user-centric and powerful tools are being provided to knowledge workers to construct, adjust and dismantle business processes on an ad hoc basis. Business processes are becoming more and more dynamic; the average life span of a process is getting shorter.

### **Collaborations in the financial service industry**

Due to the nature of conducting business in the financial services industry, collaboration among multiple parties is especially common. Business in the financial services industry traditionally requires the input, participation and decisions of many stakeholders. For example, risk managers, actuaries, IT and marketing/distribution staff often collaborate in product development. Lloyd's of London is using collaborative technologies to cut claims cost for all the claims in the entire London insurance market (Kontzer, 2002). In motor vehicle claims processing, repairers, assessors, claims staff, policy holders and legal representatives need to provide input and make decision in different stages of the process. Financial planning is another collaborative process that constantly involves the planner, client, broker and sometimes the product provider. Despite the need, up to now firms in the financial services industry are not seen as conducive to fostering collaborations on a pro-active fashion (Dawson, 2004).

Besides collaborative work, another major area for collaboration in the financial services industry is E-Learning (Harris, 2004). Two types of E-Learning are especially popular. The first one is the use of streaming video to deliver a training session in real time (much like Video/Web conferencing). This mode of delivery training obviously yields a lot of savings in travel time and costs. The second type is learners undergoing self-paced study material in a learning environment with plenty of pedagogical support (e.g. chat rooms, bulletin boards, online mentoring, video on demand, quiz, games/simulations). Up to now, the three most popular topics are compliance, IT skills and firm-specific business knowledge.

### **Peer-to-Peer (P2P) Computing & P2P Knowledge Management**

Peer-to-Peer (P2P) tools are a radical departure, both in the architectural sense and the utilities of the applications, from the tools discussed above. Collaborations in the new

economy are rapidly changing from intra-organizational to across organizational boundaries. The absolute majority of systems, both commercial systems and research prototypes, are enterprise-based network-centric systems. These systems/tools require a corporate infrastructure and/or a proprietary network to operate and, as such, are generally inflexible in supporting instant, ad hoc but intensive collaborations. One of the major drawbacks of client server systems is their inability to capitalize on the information and resources available at the edge of a network.

While there is plenty of research published on P2P computing and its applications (and more recently several major IT suppliers are advocating the concept of grid computing), the impact of P2P on Knowledge Management has been largely under-explored (Tsui, 2002a). On the whole, P2P applies the concept of decentralization to several KM-related functions. In particular, P2P Knowledge Management can be summarized into the following areas:

- File Sharing and Distributed Content Networks (DCN) – Utilizing unused/spare capacity in the network, the storage of a file (or even parts of a file) is stored/duplicated in multiple locations of a P2P network. The ultimate benefits of distributed storage are to decrease the time and cost for transferring large files as well as not having a single point of failure in the network. One should also note that P2P file sharing does not necessarily serve multiple peers (persons) on the network; an individual can set utilize P2P file sharing to help keep all of his/her personal files in synchronization across multiple machines.
- Collaboration – P2P supports ad hoc, unstructured but intensive collaborations, both at the intra and inter-organizational levels (Barkai, 2002). At times when firms need to form virtual teams (members from different organizations and in different locations) to pursue opportunities offered by a short strategic window, P2P collaboration tools are especially suited. P2P collaboration tools should also be considered in a mergers and acquisition situation where, on many occasions at least during the initial stage(s), there is no single point of hosting all the material. In particular, Groove ([www.groove.net](http://www.groove.net)) is a P2P collaboration tool that supports rapid deployment and comes with a comprehensive set of customizable components (e.g. contact management, project management, instant messaging, voice chat, Web browsing, discussion, file area etc.) for users to build “shared spaces” as collaborative areas.
- Search – P2P search (Halepovic and Deters, 2002) is a paradigmatic shift to the Web and enterprise searches that are so prevalent these days. Instead of search the Web or an enterprise’s document management or back end systems, a P2P search relies on all the (online) peers’ machine(s) as the search space (i.e. the total area to be searched). When a search is initiated on one computer, it is passed to other (immediate) peers on the (P2P) network. Depending on whether the required material is found or not, there is potential to spread the search further to more peers on the network. Obviously, this kind of search can impose a significant increase in the system load of the network hence needs to be monitored and contained. However, it does have the advantage of not needing a central point of storage and more in tune with the social computing (user-centric) paradigm.

Among others, Deloitte and Touche uses a P2P technology (provided by NextPage, [www.nextpage.com](http://www.nextpage.com)) to deliver content to its auditors (McCue, 2001). In 2001, Reuters was reported to be working with SUN to explore the use of P2P computing to support its

retail brokerage business using all Web-based systems and JPMorgan Chase was investigating the use of P2P to support collaborative computing (Hayward, 2001). Chubb has deployed a P2P knowledge repository to support its underwriting department (O'Donnell, 2003). Bielski (2001) and O'Brien Coffey (2002) outlined the P2P technology, applications and major vendors in the banking industry. Travelers and Visa are relying on P2P technology to provide up to date information to 30,000+ agents and support file sharing and collaboration for workers in the regional offices and the headquarter respectively. PayPal ([www.paypal.com](http://www.paypal.com)) is a P2P payment system operating on the Internet.

As mentioned above, while P2P KM offers distinctive advantages and has its uniqueness (Zhuge, 2002) in fostering knowledge sharing both with an organization and between organizations, there are also some significant issues to be addressed before such networks can be deployed. Among others, such issues include security, system load, control, and privacy.

### **Convergences**

There are also convergences in the other technologies that are already impacting the way and ease of which collaborations are formed. These convergences can be summarized into three areas:

Handheld communications devices – Convergence is most noticeable in this area. The capabilities of mobile phones, Symbians, Blackberries, Palms and other PDA devices are overlapping. Nowadays, the high end handheld devices can be used for phone communications, web browsing, video and photo taking, and a reasonable degree of office productivity work. No doubt as time progresses, such devices will only become more powerful in terms of speed, storage and capabilities. Such advancements have enabled instantaneous collaborations for mobile workers.

IP Networks – Advancements in networking and communications technologies have made it possible for IP networks to carry voice, data and multimedia at a fast rate to support real time communications and collaborations. Many of the commercial collaboration tools already provide VoIP communications. Presence Management will become an increasingly important topic as the power and flexibility of an IP network continue to be exploited. For example, with presence management, one can find out whether the receiver is engaged and/or routed incoming calls to another location or voice mail. Similarly, one can set up “personal business rules” to filter and action on the various types of incoming calls. Collaborative learning (i.e. delivering live training via streaming video) becomes not just a reality but business as usual in the workplace.

Enterprise applications – (Straightly speaking, this is not so much a convergence but alliances and amalgamations of software vendors) In the last 3 years, there has been significant consolidation in the enterprise application product marketplace. Search, taxonomy, instant messaging, e-mail, groupware, where once seen as separate software, are being absorbed into collaboration and portal suites. There have been a high number of mergers and acquisitions among content management, search, portal, document management and collaboration vendors. Increasingly, differentiations among these vendors are not so much in the technical and features areas but in the areas of local presence, support and services, vision and investments into R&D.

## Evaluation and Evolution of collaborative tools<sup>1</sup>

Although it is not the aim of this article to discuss in detail the selection criteria for collaboration tools and there is no short of literature on this topic (Chang, 2004), nevertheless the following (non-exhaustive) list serves as a guiding principle for the selection of such tools by an organization (adapted from (Foti, 2004)):

- Synchronous, Near-synchronous, Asynchronous use
- E-Mail integration into a collaboration platform or portal
- Repository (Search, Push/Pull, Document Routing, approval and version control, taxonomy tools)
- Server-based or Peer-to-Peer
- Security considerations
- In-house or third party hosted
- Agility especially support for offline use, rapid deployment, easy to install/uninstall, supports ad hoc, intra and inter-organizational collaborations
- Social Networking, Community Building and Development e.g. tools that track knowledge flow, support the creation and knowledge sharing in online communities
- Personal Information Management e.g. Blogging and RSS feeds to be configured by individual users
- Overall richness and appropriateness of the environment in support of collaborative culture, work and processes

Traditionally, collaboration tools are proprietary developed or licensed Web-based client-server systems. In the last five years or so, due to changes in work pattern, information sources, decision making requirements, advancement in technologies, standards, and market pressure, there have been some significant changes to the functionality, packaging and distribution, hosting and the alignment of these tools (with other enterprise systems). These changes are summarized below:

- **From standalone to embedded tools** – Collaboration tools in the late 90s were standalone systems. Each tool offers its own set of functionality (e.g. search, categorize, discussion space etc.) and is not integrated with other KM-related or collaborative-centric tools on the desktop. Nowadays collaboration tools are seen as features that are commonly available in major enterprise applications e.g. as integrated collaborative project management tools (Groove's Virtual Project Office, IBM's Activity Explorer) and knowledge communities in enterprise portals (Plumtree's Portal).
- **Support of both intra and inter-organizational collaborations** – Recent collaboration tools begin to support collaborations across organizational boundaries (as well as the traditional intra-organizational collaborations). Some of the critical issues in supporting inter-organizational collaborations are the compatibility of the technical infrastructure, adaptability and complexity of the

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<sup>1</sup> This section is on the evolution of collaboration tools. Collaborative tools is merely one kind of Knowledge Management technologies. For a broader discussion on the evolution of Knowledge Management technologies, please refer to Tsui (2002b).

tools being offered and, as mentioned earlier, trust and variations in work pattern and group culture.

- **Just-in-time collaborations** – There is a growing need for ad hoc collaborations to be formed instantaneously. For example, this can be setting up an environment to support the due diligence in a Mergers and Acquisition. Another example is when a cross organizational team is formed to pursue a business opportunity that only has a short strategic window. In both situations, there is no centralized location to host the application and the data. P2P collaboration tools, due to their decentralized nature, are very applicable for such situations. In collaboration, decentralization can mean the transfer of power, tools and content ownership to people who are located on the edge of the network. P2P collaboration tools are slowly gaining attention, both in academic research and in commercial development. These tools enable ad hoc but intensive collaborative workspaces to be created (and archived) instantaneously. For example, using Groove, a “shared space” can be created from an e-mail message in Lotus Notes. Groove users can continue to work on their shared space(s) even when they are offline.
- **Public collaborative groups** – Requiring the least set-up (only an Internet browser is needed), these groups continue to be a major source of collaborations on the Internet. Any person can set up a collaborative space equipped with tools like membership directory, document management, bulletin board, discussion forum(s), E-mail broadcasts/announcements etc. Any interested party may be able to join the group instantly or via approval from a moderator. Yahoo Groups is an excellent example of collaborations via the Internet. Intranets.com, a chargeable service, is another example. In fact, Intranets.com offers a suite of generic tools (e.g. task manager, database manager, discussion forum, document manager etc.) for users to configure their collaborative environment. One drawback of this kind of groups is that the hosting and the content of the group material belong to a third party which, by this very nature, may be seen as a deterrent for organizations to use.
- **Hosting** – Early collaboration tools are hosted in-house by the organization that owns them. Reason being these tools was almost exclusively for intra-organizational use. However, in recent years, with the advancement of the outsourcing concept for IT infrastructure and services, some of the proprietary or licensed enterprise collaboration tools are being hosted by third party organizations (providers). Typically, these providers not only host the collaborative space and tools but also help in the configuration of the space/tools, alignment with information sources, systems upgrade and problem resolutions. eRoom is an example in this area.
- **Alignment with other enterprise systems** – Alongside with the first observation above, recent collaboration tools are increasingly become part(s) of a larger enterprise system. Such tools, or component of these tools, can be invoked as APIs (Applications Program Interface) or Web Services-compliant objects. This is most evident in the areas of Business Process Management Systems (BPMS) and process portals. In the last few years, there have been major consolidations and alliances between portal, content management, document management and collaboration tool vendors. In an integrated environment, for example, project

managers can configure a document review procedure, identify the subject matter experts and add links to the discussion forums of the various relevant communities into a process portal.

True but rarely addressed, the use of collaborative tools also has an impact on the work culture. There are two driving forces for this impact – advancement in the technologies and the approach taken to implement the tools. In essence, collaboration involves relationship and trust building among people. People need to relate contextual information and knowledge to one another in order to better comprehend, build trust and create new knowledge collectively. Up to now, a considerable proportion of the literature on collaborations focuses on the technological aspects. In the authors' experience, recent advancements and changes in the collaborative technologies as outlined above have profound implications on future collaborative work and work practices. In particular,

- Enhanced collaboration expedites the allocation/distribution of tasks in the knowledge value chain
- Access to data and information, both from systems and input from other participants, is becoming more instantaneous
- Knowledge workers are being offered increasingly sophisticated tools to personalize their information sources
- Increased leverage on knowledge leads to enhanced quality of decisions being made
- Intermediate step(s) in common business processes can be simplified or even eliminated by one of more of above improvements

By allowing users to create processes and select the tools directly to support their collaboration, virtual teams and organizations have a purpose-driven environment for developing relationship and trust. It is also interesting to note that, through scenario planning, the European Commission has identified social complexity as one of the future scenarios for KM in 2010 (IBM, 2004). Under this scenario, the emphases are on providing an environment for individuals and teams to perform knowledge work, focus on the interaction of the players, and understand the scope and limitations of the systems operating in the environment. This is in stark contrast to the engineering, mathematical programming and human-centric approaches in designing KM systems that have been prevalent up to now.

### **The Future**

In “Collaboration in the Financial Services Conference” held on 29<sup>th</sup> September 2004 in New York, participants from over 100 financial firms worldwide agreed on a six point framework to create an industry roadmap for collaborations and collaborative technologies (Dawson, 2004). They are Vision, Foundations, Roadblocks, Paths, Collaboration and Action. Among others, the group is investigating the missing or needed standards, processes, culture, and business models to fully leverage the power of collaboration and collaborative technologies in the industry. The expectation is that there will be definitely a shift to synchronous collaborations and collaborations at the industry level are largely under-explored. Another interesting observation from the conference is that the working groups stated that “One of the biggest impacts of collaborative technologies is in shifting buy-side/sell-side relationships, with value creation increasingly focused on firm interaction rather than execution of internal business

processes.” (loc. cit.) – a step towards the above-mentioned projected KM scenario (on social complexity) identified by the European Commission?

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