



# Workplace E-Collaboration in Practice Identifying Preconditions for Successfully Implementing E-Collaboration in Organizations

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## ABSTRACT

*This paper delivers the first results of our ongoing research activities regarding workplace e-collaboration. The main objective is to identify types of application scenarios for e-collaboration within organizations which will ensure regular and extensive use.*

*We first give an overview of the current state, definitions and the need for action regarding workplace e-collaboration, list our research objectives and then give an overview of our applied research methodology approach.*

*After describing our first results focusing on the preconditions of e-collaboration in the areas of company culture, organization as well as technology, we are presenting these findings as well as the need for further research towards answering our main research question: “In which situations do people tend to use e-collaboration technologies rather than face-to-face collaboration? Where does this application of technology provide added-value to both, the organization and the employee?”*

## 1. INTRODUCTION

### 1.1 Current Situation and Need for Action

E-Collaboration has grown and is becoming an increasingly important topic, not only since 9/11. Companies are now trying to apply new means of collaboration in order to save traveling expenses and cut down air-traveling for security reasons.

In response to the current situation where tasks are becoming more complex and are requiring heterogeneous expertise, organizations are more and more implementing team based business processes with multi-disciplinary teams [Meier 2001]. Therefore, horizontal organizational structures and team-based work units have become increasingly more prevalent and experts of different geographical locations have to be put together in “cross-regional project teams”. With advances in technology, there has been an increasing emphasis on far-flung, distributed, “virtual” teams as organizing units of work [Bell/Kozlowski 2002].

And this trend is to be continued. According to Gartner Group, the following figures are predicted:

- Through 2006, workplace agility will be achieved in 30 percent of the Global 2000 enterprises adopting an explicit strategy to support a highly distributed, connected and autonomous workforce (0.7 probability) [Bell et al. 2002]
- By 2006, people will spend nearly 70 percent of their time working collaboratively – and not necessarily face to face (0.8 probability) [Bell et al. 2002]
- By 2005, 75 percent of global enterprises with a highly distributed,

virtual workforce will implement explicit strategies for creating and sustaining a robust social infrastructure within and beyond the traditional boundaries of the workplace to foster both formal and informal interaction (0.7 probability) [Krammer 2001]

To summarize, it can be said that the trend for collaboration with a rising share of virtual collaboration modes in today’s business world is greater than ever.

Therefore, we have concentrated our research activities on identifying typical scenarios that ensure the long-term, regular, extensive, efficient and effective use of e-collaboration tools and methodologies within organizations.

Typical application scenarios which are already in place, can for example comprise:

- Typical project oriented tasks, like cooperative product development (e.g. at Ford Motor Company [Shea/Aaron 2002],
- continuous management learning (e.g. at Siemens [Königes 2002], or at Novartis),
- regular (international) management meetings, or
- international help desks, etc.

### 1.2 Definition of workplace e-collaboration

The term “collaborate” stems from the Latin “laborare” which means “to work”. Literally, to collaborate means to “co-work” or work together.

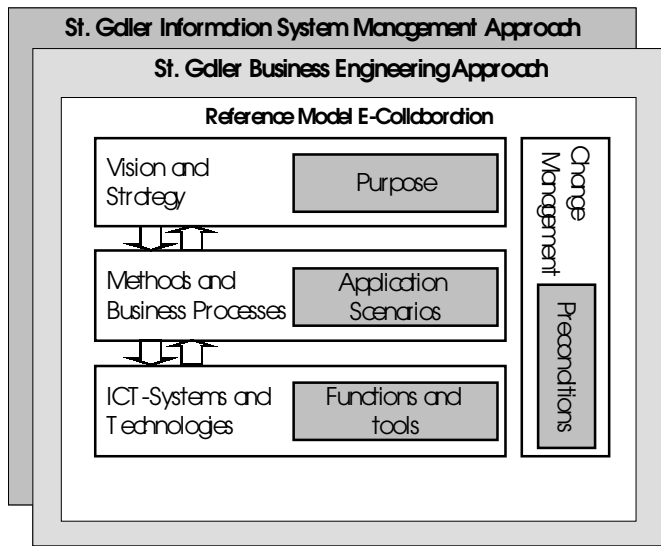
A more precise definition, derived from [Light et al. 2001] would be:

**Collaboration** is the process of two or more people working together toward a common purpose or goal, where the participants are committed and interdependent and work in a common context, physically co-located and using shared resources.

According to this definition, our working definition for workplace e-collaboration, also influenced by the definitions for *telecollaboration* by [Schooler 1996] as well as for *groupware* by [Ellis et al. 1991], is as following:

**Workplace e-collaboration** is the computer mediated process of two or more (dislocated) people working together on a common purpose or goal, where the participants are committed and interdependent and work in a common context using shared resources, supported by (web-based) electronic tools.

Figure 1: Reference Model e-collaboration



Therefore, we suggest to consider e-collaboration to be an autonomous research and management topic, requiring an holistic approach consisting of several aspects like strategy, processes and technologies accompanied by a change process. Based on the *St. Galler Business Engineering Approach* [Österle/Winter 2000] we can derive the following reference model for e-collaboration:

On the level of systems and technologies, e-collaboration tools and functionalities have to be provided, being suited to application scenarios which are developed and defined on the level of business processes, accompanied by suited methodologies for e-collaborating employees. Additionally, a clear strategy for implementing e-collaboration with a defined purpose and explicit objectives has to be defined.

Finally, the whole approach has to be accompanied by managing change, developing and maintaining the organizational and cultural framework and educating the users.

### 1.3 Research Objectives

The overall objective of our research is to develop a general approach for e-collaboration and define application scenarios for e-collaboration which are able to transcend short to mid-term projects and deliver added-value for the organization. How can we support companies to successfully implement new work-media? How can they be applied throughout the whole company? And most important, how can they be integrated to the employees day-to-day work processes?

In other words, the primary research question is:

*In which situations do people tend to use e-collaboration technologies rather than face-to-face collaboration? Where does this application of technology provide added-value to both, the organization and the employee? How do they get there?*

Today, a considerable number of e-collaboration tools are already existing on the market. Some can be at least experienced almost at no cost with hosted services and tools via the Internet (e.g. Yahoo!Groups, Aimoo, AnyBoard, Boardhost, etc.) or are integrated in operating systems (e.g. Microsoft NetMeeting). But ideally the functionalities of e-collaboration tools should be rolled out to the general workplace infrastructure at every employee's desktop which is of course linked to expenses. But companies like IBM, Hewlett Packard, Microsoft or Siemens which have gone this step, report about increased usage and benefits.

Yet, other companies experience, that their licenses are used quite infrequently and the process of "technology adoption" of their employees seems rather sticky.

In order to enable users working efficiently and effectively, we assume a continuous change process, starting with the development of a mental concept of e-collaboration for the users. The next step would be developing an e-collaboration literacy, before users are able to work efficiently and effectively.

To develop a mental concept, it is necessary to identify the needs for and benefits of e-collaboration in order to show employees, what e-collaboration is all about. These needs and benefits can only be related to the users' day-to-day business and therefore can be described and implemented in several application scenarios for e-collaboration, which have to be defined (see business process layer in Figure 1). In our approach, we assume, that the change process (see change management layer in Figure 1) has to be started beforehand, identifying and implementing a general framework of cultural and organizational preconditions for e-collaboration. So we assume, that there is mutual influence between culture and organization on the one hand and application scenarios on the other. In parallel, we wanted to uncover the range of e-collaboration technologies.

Therefore, the research question to be answered in this paper is:

*Which organizational and cultural preconditions have to be fulfilled to generally enable e-collaboration within organizations?*

*Which technological functionalities do exist to support e-collaboration?*

## 2. METHODOLOGY

The present research has been conducted during a project with an European based leader in the field of pharmaceutical distribution. The aim of the project is to identify the gap between the current situation in the company and the "ideal world of e-collaboration" and finally develop an approach of how to implement e-collaboration in the organization. The corporate IT division, which is distributed to a considerable number of subsidiaries in several European countries has served as a pilot group.

Therefore, the research methodology is a concerted set of several qualitative as well as quantitative research methodologies, like review of literature and evaluation of existing e-collaboration tools, best practice study as well as a set of methods like interviews and workshops with key employees (managers of several IT departments and team members of international projects) of the company.

Additionally, we have distributed and evaluated a questionnaire throughout the whole IT division, evaluating the current situation (availability/existence) of organizational and cultural preconditions and technological functions as well as the personal need/benefit of a set of assumed preconditions for successful e-collaboration.

The chronological process of applying this set of methods and a detailed description of our experience and deliverables can be found in the following sub-chapters:

- Theoretical research of preconditions
  - delivers a theoretical set of cultural and organizational preconditions
  - as well as technological functionalities.
- Workshop with experts
  - adopts the set of preconditions and functionalities.
- Quantitative Evaluation
  - represents a roughly assessed set of preconditions and functionalities.

### 2.1 Theoretical research of preconditions

A lot of research has already been done concerning e-collaboration and virtual teams (e.g. [Holton 2001], [Kimball/Eunice 2002], [Lipnack/Stamps 1993], [Poltrock/Engelbeck 1999], etc.) and a lot of software tools are already sold under the label of "e-collaboration" (for details see [Bafoutsou/Mentzas 2002]), but none of these provide detailed information about possible application scenarios, except the term of "geographically distributed teams". For us, this explanation of where to use e-collaboration is unsatisfying.

Firstly, we reviewed existing literature in order to gain information about preconditions and barriers for e-collaboration

Secondly, we combined these preconditions with the results of evaluating a (small) number of documented case studies reporting about implementation of e-collaboration to identify success factors.

Thirdly, we evaluated several software tools (e.g. Lotus Quickplace, Centra One, etc.) to analyze the basic functionalities and features of such tools.

The result of these steps was a list of what we called “technological functions” on the one hand and “soft facts” (see Table 1) on the other, which was the basis for an in-depth review with several experts from the company in a first workshop.

1.1.1 Culture and organization

Regarding soft-facts, [Light et al. 2001] suggest four pillars of successful collaboration:

- the participants have embraced a common purpose, where the relationship must be grounded in the principles of trust (for details see below)
- participants are committed to achieving specific goals and objectives supporting that common purpose
- participants are interdependent because they rely on each others’ roles, talents, resources, expertise, knowledge and other contributions
- participants are individually and collectively accountable for the results of the collaboration

In research, trust is often mentioned as the most critical success factors for effective collaboration (e.g. [Holton 2001]).

[Moser 2002] focuses her article on cooperation with the aim of knowledge exchange. Employees will be likely to cooperate, if they can benefit in the long run, if cooperation contributes to their daily work and is interesting to them. Therefore she lists a number of conditions for successful cooperation:

- Culture of reciprocity, means that employees expect others to also share their knowledge in order to achieve a balance in the long run
- Employees and the organization have to trust in a long term perspective, because benefits of collaboration are likely to be achieved in the long term
- Knowledge has to be interchanged within and between different levels of hierarchy and therefore a high degree of autonomy of employees as well as participation in decisions are required.

All these success factors and preconditions of collaboration can analogously be applied for e-collaboration, but additionally some details have to be taken into consideration due to the lack of informal personal contact and lower frequency of interaction.

Therefore [Mongoose 2002] proposes a total of 12 principles of e-collaboration. These are based on sociological principles, but focused on web communities. To some extent, they can be applied to what we define as workplace e-collaboration. These 12 principles are:

Purpose, identity, reputation, governance, communication, groups, environment, boundaries, trust, exchange, expression and history.

Bringing all theoretical recommendations and findings from several case studies together, we are deriving the following five key success factors for workplace e-collaboration:

Table 1: Soft facts found in literature

Key success factor	Description
Purpose and commitment	The purpose of the team, its vision, objectives and strategies are clear and communicated. The participants are committed to achieving these specific goals and objectives supporting that common purpose
Trust	Relationships between participants must be grounded in the principles of trust.
Identity and group affiliation	Members can identify each other. They know their roles, responsibilities, expertise and interests. They know what’s going on within the team.
Team style	Member behavior is regulated according to group/team values, habits, rules and standards.
Communication	Members must be able to interact with each other (in multiple ways). Virtual as well as physical.

1.1.1 ICT Systems and Technology

Regarding the ICT Systems and Technologies layer in the e-collaboration reference model (see Figure 1), we have identified the following technological functions for e-collaboration to be relevant (by alphabetical order):

Audio-/Video conferencing, Awareness Utilities, Bookmark Archive, Bulletin & Discussion Boards, Chat / Instant Messaging, Contact Management / Team Address Book, Document Management, E-Mail, File sharing, Meeting Minutes/Recording, Meeting scheduling tools / Agenda building tools, Presentation capabilities, Screen Sharing, Surveys/Polling, Synchronous Work on Documents / Application sharing, Task lists, Team calendars, Web-tours, Whiteboard, Workflow Management Support.

2.2 Workshop with experts

The theoretical results listed above, have been the basis for the workshop with key employees from the company.

The goals of the workshop were awareness shaping, developing a common understanding and defining a specific “landscape” of e-collaboration for the company.

Finally, the result of the workshop was the definition of the general framework for e-collaboration within the company, based on our reference model for e-collaboration (see Figure 1). Together with the participants of the workshop, the following aspects have been adopted to the company specific settings:

- Cultural preconditions (see Change Management layer in Figure 1)
- Organizational preconditions (see Change Management layer in Figure 1)
- Technological functions and features (see ICT Systems and Technology layer in Figure 1)
- Strategic issues

2.3 Quantitative evaluation

Finally, the theoretical preconditions and functions as well as the insights, gained from the workshop with practitioners have been put together into a set of key success factors and indicators for soft-facts regarding company culture and organizational aspects as well as technological functions and features, which have been put into a questionnaire to be evaluated by employees of the IT division according to their existence within the company and their potential to serve as a precondition for e-collaboration.

Therefore the questionnaire had 6 possible answers for each indicator / function or feature in order to provide a rough assessment of availability (exists / does not exist) and requirement/benefit:

- exists, and is very useful to serve as an enabler
- exists, and is useful to some extent
- exists, but is useless
- does not exist, but would be very useful to serve as an enabler
- does not exist, but would be useful to some extent
- does not exist and is not required.

This quantitative analysis should only provide a rough assessment of the current situation and the basic requirements. The IT division of the company, which is distributed to several subsidiaries in a number of different European countries has been chosen as a pilot group and the questionnaire has been distributed to a total of 41 employees. 16 answers have been returned (return rate 39,02 %).

3. RESULTS

Due to the fact, that we have conducted a quantitative analysis only with a small and focused pilot group (IT division), it is not possible to provide reliable results about the potential of e-collaboration preconditions and functionalities in general. Nevertheless, we can give some statements about the relevance of application areas, were we will have to conduct further research in order to identify application scenarios. Next, we can assume that the defined preconditions are quite important for the success of e-collaboration. Finally, we can make assumptions

about the relevance of technological functions to business needs. But all these results have to be reviewed in a further quantitative analysis:

*The results of our qualitative and quantitative evaluation showed, that e-collaboration has its highest potentials in the application areas of communication, meetings and information sharing as well as project work and documentation across geographical boundaries.*

Regarding cultural aspects it has to be said, that most of our suggested preconditions are currently not in place satisfyingly, but are strongly required. Especially cultural aspects regarding purpose and commitment, trust and identity have been evaluated most important. Therefore, the most required cultural aspects to be fulfilled were (sorted by relevance, average subjective availability in brackets):

- Commitment and Purpose (availability 18.98%), indicated by
  - existing purpose and commitment and
  - leadership by example
- Trust (36.11%), indicated by
  - trust within distributed teams and
  - freedom in accomplishing tasks
- Identity (27.27%), indicated by
  - identification of each other and relationship building

Concerning organizational aspects, each of our proposed preconditions has been rated important, and most of them are existing to some extent. The “most required” were (sorted by relevance):

- Identification (availability 26.67%), indicated by
  - know members and their roles, responsibilities and expertise
- Communication (52.70%), indicated by
  - the possibility to meet face-to-face
  - have regular team conferences and
  - guidelines for communication
- Team style (31.25%), indicated by
  - have team norms, standards and templates

Against the background of having employees from several subsidiaries in a number of different countries with a different degree of involvement in geographically distributed work, the results regarding availability are quite heterogeneous and may allow the assumption that there are local differences.

Finally the “most wanted” technological functions are e-mail, file sharing and document management, team calendars, team address books, yellow pages, task lists, some workflow functionality as well as awareness utilities.

### 3.1 General Discussion

The research project showed that – at least in Europe – workplace e-collaboration is still a relatively young research and management topic and a lot of work has still to be done.

Currently, we are at a point, where tools are existing and can be experienced (at low cost), but research has not yet identified a general approach for e-collaboration, providing a set of strategic issues, application scenarios and cultural aspects. Furthermore, companies have neither yet experienced the “big need” nor discovered the high potential of implementing workplace e-collaboration as a topic, but are using existing tools and technologies – even quite infrequently, inefficiently and ineffectively. So it can be assumed that they are lacking a mental concept and literacy of using e-collaboration in their daily work and cultural as well as organizational preconditions – so called soft facts – are not in place.

### 3.2 Conclusion

Our research showed that – even if we have created a basis for e-collaboration – there is still a far way to go in order to establish an holistic approach for workplace e-collaboration.

Regarding our reference model for e-collaboration (see Figure 1) we have already defined possible functions and tools at the technology layer and we know the most important cultural and organizational as well as some strategic issues which have to be validated on a broader basis. Nevertheless, the key element of defining application scenarios on the business process layer is still pending and has to be defined in further research. According to these first results and the existing literature we assume typical and easy to implement application scenarios in the area of electronic meetings. In meetings we suppose that cultural and organizational preconditions have only to be fulfilled to a certain extent because it is not only teams that meet. Furthermore the need is given due to the load of (international) meetings being already in place.

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