

Conditions for Change Related to Groupware in a Distributed Organization – a Case Study

Jesper Simonsen and Jens Kaaber Pors

Computer Science, Roskilde University
Bldg. 42-1, P.O. Box 260, DK-4000 Roskilde, Denmark
URL: <http://www.ruc.dk/~{simonsen, pors}>
E-mail: {simonsen, pors}@ruc.dk
Phone: +45 46742000
Fax: +45 46743072

Abstract

Groupware is often used in distributed organizations to support communication and coordination. Managers direct resources and set up goals for the deployment of groupware. It is however difficult to foresee the effect of groupware and many cases report that groupware is either hardly used or does not produce the intended effects. We have analyzed the deployment and use of the web-based groupware application Lotus QuickPlace™ in a large financial distributed organization that has just emerged as the result of a major merger. Based on interviews, survey, and http log-analysis, we have identified four general types of settings where the groupware has been used: Newly established organizational units, special interest groups, short term projects, and teams handling recurrent tasks. We characterize these settings and present the overall conditions that have proven to be critical to the deployment of groupware in the case. Challenges and expectations are discussed and ideas concerning strategies for change are suggested. It is concluded that change related to groupware faces conditions that challenge ambitious goals in three of the settings, while conditions in general favour successful change related to recurrent tasks.

Keywords

IS and organizational change, distributed organization, groupware, QuickPlace, deployment, challenges, expectations, strategies for change

1. Introduction:

IS and organizational change has been researched intensively in relation to large, costly, and strategic management information systems (MIS) aiming at providing information for action and drawing on available data. This paper presents a case study of change related to a standard groupware application that has spread rapidly throughout a large organization. The groupware in question is Lotus QuickPlace™ release 2 (www.lotus.com/quickplace) and is referred to as QP in the following. In contrast to MIS and related planned approaches to change (Burnes 1992), groupware is seldom to be considered as a strategic and critical IT application. Nevertheless it has for a number of years been accepted that deploying groupware in an organization is far from a trivial task, and that attention has to be given not only to the technical implementation of the technology but also to a range of organizational conditions (Orlikowski 1993, Orlikowski 1996, Grudin 1994). Managing change with respect

to groupware such as QP has to take a bottom up approach (Butcher & Atkinson 2000, Whiteley 1995), based on local improvisations and opportunities (Orlikowski & Hofman 1999, Ciborra 1996). The aim of this paper is to present and discuss practical and general conditions for managing this change experienced from a recent and thorough case study.

This case study presents empirical findings from a large financial organization where more than 100 QPs comprising in total about 3000 active users and more than 20 Gb of documents has emerged in less than 2 years. Based on our analyses of the actual practice and use of QP, we have identified four different typical settings in which QP is used, and elicited six overall conditions for change that have influenced the deployment of QP. The conditions characterize potentials as well as restrictions for change related to groupware. We relate these conditions to managerial challenges and potential strategies when deploying QP. The outcome is definitely more complex than the apparent intended goals for providing QP, and it is concluded that ambitious goals might be difficult to obtain in three out of four types of settings. In sum, the case demonstrates the kind of expectations and conditions for change that management might face when deploying groupware in a distributed organization.

The organization is a leading financial corporation in Europe, which we in the following refer to as "Beta". Beta is a result of a recent merger involving several companies based in four countries. The rapid organizational change involved with the merger has led to a wide range of IS/IT related changes. One instant need was a platform independent tool to support communication in geographically distributed settings, since Beta at the beginning had no secure mail infrastructures, no LAN to exchanges files on, and no corporate intranet. QP was chosen as the standard application to support communication within geographically distributed corporate organizational units, groups, projects, and teams. QP requires no integration with the existing IT infrastructure and offers a secure web-based workspace.

QP is a browser-based groupware application of the 'virtual workspace' type offering a workspace with facilities for sharing and co-authoring documents, exchanging files, and supporting discussions, calendar, email-notifications etc. A QP is structured with folders that contain documents, web pages, files, etc. QP is a generic system (Bansler & Havn 1994), which means that it needs to be configured and customized to the specific need of the group of users. The person(s) with manager rights of a newly installed QP must start by designing an initial structure, setting up a home page, and creating and naming document folders. They also have to invite users and grant them access rights either as manager, author or reader. When a QP is used, new needs arise for changing the initial setup, configuration, structure of information, as well as for agreeing on how to use QP. We refer to such ongoing changes as 're-design' of the QP. Browser-based groupware applications similar to QP are for example eRoom (www.eroom.com), ProjectPlace (www.projectplace.com), and BSCW (bscw.gmd.de), where the latter is especially known within academia (Bentley et al. 1997).

Beta has deployed QP with an overall improvisation strategy (Ciborra 1996). A specific QP is initiated on the server by request from the manager of a distributed setting to IT operations. The manager of a setting is fully in charge of how to utilize QP. Users initially learn to use QP from the built-in tutorial and Beta offers no further formal training in using QP.

In the next section, we outline the research method. This is followed, in section 3, by a description of the four identified typical distributed settings. Section 4 describes and characterizes the six overall conditions that have influenced change related to the deployment of QP. The article concludes with section 5, where we discuss the challenges that managers face given the identified conditions and the expectations and realistic goals they might apply. We also present some ideas concerning strategies to stimulate change related to each setting.

2. Research Method

The study is part of a larger research program investigating the design and use of web-based applications supporting geographically distributed work practices. The research has been conducted with a grounded and interpretative approach (Golden-Biddle & Locke 1997) drawing on experiences from several initiatives in Beta during 2000-2002:

- An initial investigation of needs and strategies for intranet applications (6 interviews);
- An analysis of strategies and practices for Beta's organizational change support and special interest groups (6 interviews);
- Analyses of three development projects (based on interviews and observations);
- Document analysis of 90 requests for a QP from managers to IT operations stating the intended aim of using QP;
- An analysis of specific use of QP in newly established organizational units, projects, and teams handling recurrent tasks (7 interviews);
- A survey reporting from 53 QPs (see table 1);
- An analysis based on a log of all http transactions to and from the QP server during a 10-month period. The http log documents all QPs with respect to various operations concerning the content of QP, such as when documents are created, read, or edited and by whom.

The interviews lasted between 1 and 2 hours, where an interview guide was used and sent to the informant ahead of time. Interviews were tape-recorded, and later transcribed ad verbatim.

Setting	# of QP	% of QP
Newly established organizational units	20	38
Special interest groups	6	11
Short term projects	17	32
Teams handling recurrent tasks	7	13
Other	3	6
Total	53	100

Table 1. Distribution of the four identified settings in Beta. The survey was sent 18 months after initial deployment to 123 QP administrators, who were in charge of a total of 77 QPs. 56 (45%) of the administrators responded to the survey representing 53 (65%) of all QPs. 6 months later (24 months after initial deployment), the number of active QPs had risen to above 100.

The interview-based investigations lead to the identification of the four typical settings where QP was used and to some of the conditions critical for the deployment of QP. This was followed up by the survey that confirmed the general distribution of the identified settings. Open-ended questions from the survey gave additional information on the conditions presented in section 4.

All of our analyses of this multi-faceted material were reported on and discussed with management and other informants from Beta. This includes seven more or less independent

investigations. The investigations constitute the basis of the research presented in this paper, from which we have analytically elicited the six conditions presented in section 4.

3. Four Types of Settings

This section briefly describes the four types of distributed settings in Beta where QP was used. Also included here is the goal for using QP, an example of a setting and its character of work, the typical structure and information in QP, and the general and primary use of QP.

3.1 Newly Established Organizational Units

Following the merger, new organizational units were established. Units from the former organizations with overlapping functions were merged into corporate units. Several of the first QPs in the organization were initially used for the purpose of distributing information of common interest (in general), distributing management information (in particular), supporting synergy by sharing documents, and offering them opportunity to "see what others were doing" in a distributed environment.

As an example, a new corporate department was formed and made responsible for establishing the new name, corporate identity, media relations, etc. The department was staffed with 80 employees distributed in four countries. This unit had to be established more or less "from scratch". The staff did not know each other (across countries), they spoke different languages, and together they span multiple different organizational and domestic cultures. The starting point was typically the appointment of a top manager and the production of a charter (in the form of a PowerPoint presentation), consisting of the overall areas of responsibility, an organizational chart, and the names of the managers and employees allocated to each section in the unit.

QP for the new organizational units was initially structured according to the organizational chart, representing the unit's basic (and initially only) shared common denominator. Each section was given their own entry (a folder in QP) along with a few (or no) stated guidelines for how to use it. The primary use of these QPs was distributing management information such as meeting schedules, agendas and minutes, strategies and goals for different sections. QP was also used as an archive where users uploaded documents that they felt might be useful for others to access. But it is problematic to find specific information browsing a structure that reflects the organizational chart and not the content of the documents, and the log-analysis had proven that very few (less than 5%) uploaded documents were read by others than the author. Users thus seldom experience if at all a dialogue mediated by QP.

3.2 Special Interest Groups

An important part of a merger is knowledge sharing and achieving synergy. Special interest groups are networks of practitioners sharing a professional interest in the same topic. Examples on such groups are project managers, change consultants, and experts within specific technologies such as Oracle, Java, and Notes. Members of the special interest groups are distributed organizationally as well as geographically to different projects and physical settings.

The overall aim of supporting special interest groups was argued in knowledge management terms, for example by enhancing their possibilities for exchanging experiences and by building up a kind of "professional handbook" where their knowledge would be represented and eventually broadly accessible within Beta.

The typical structure of QPs is arranged according to topics and a bulletin board with news and events of interest, an archive with profession specific articles, and a frequently asked questions list (FAQ).

Using QPs is a secondary function compared to the daily work of the members. The groupware (focusing on general issues of interest) does not offer "tools" supporting the member's daily work practice. No functions are found that are used frequently as an integral part of work procedures. Being a member of the interest group, and using the groupware supporting this, is a detached activity compared to the daily tasks and deadlines, and thus it has a low priority.

3.3 Short Term Projects

The merger initiated an instant need for a number of "cross-organizational" projects: A new internet portal presenting the merged organization, establishing a new internal email system, etc. In Beta all organizational change projects (including IT projects) are organized aiming at an overall 6 months "time box". Most projects present a highly complex work setting that might be both geographically distributed and managerially heterogeneous. The goals of using QP in the distributed projects have primarily been to support project documentation, but attempts have also been made to use QP to support coordination, problem solving, and negotiation.

One project had the purpose of evaluating the possibility of creating a shared customer security architecture across the countries involved in the merger. The structure of QP was related to specific issues and deliveries that were the subject matter of the project. Examples of these are documents describing issues like 'Security' and 'Infrastructure' or deliverables like a 'Project Charter'. Working on the subject matter of the project requires a great deal of coordination and negotiation of the means and the goals of the project itself. To the members, representing several IT-sections, such negotiations can be a delicate matter of strategic disclosure and nondisclosure. When trying to use QP to support negotiating different solutions to problems all members may not wish to lay all the cards on the table straightaway. Thus attempts to use QP for problem solving and negotiation has failed and also attempts to ease coordination have proven to be difficult.

QP in development projects typically resembles a project archive, where the results of the projects are developed and maintained in a 'post hoc' manner.

3.4 Teams Handling Recurrent Tasks

This setting denotes tasks that routinely must be carried out within certain periodical intervals. Teams handling frequent recurrent tasks are often organized as sections (within departments) For example, there is a section responsible for the weekly updating of the credit evaluation for large customers. Some teams however consist of members that for the most part are organized in different units. For example there are information providers and translators handling the quarterly translation of the financial reports of Beta. Recurrent tasks are typically performed intensively over a short period of time, requiring a high degree of coordination and critical predefined procedures. The aim of using QP is mainly to support coordination within the team when performing the task.

Consider Beta's quarterly task of producing financial reports. This comprises a translation of an English master into four different languages. The completed financial reports are to be released simultaneously to the stock exchanges and to the press. The translation is initiated about one week before the release deadline. At this time, the master is not in its final state

and corrections occur several times up to the deadline. These changes to the English master must be coordinated very tightly. The translators work in parallel on the texts and usually in different geographic locations. When each translator has completed a part of the documents, he or she uploads it to QP with a specifically versioned name. It then becomes available to all others and the status and progression of the work becomes visible in QP.

QPs for recurrent tasks are organized according to the deliveries and reflect typically also the task workflow. QPs main function is as a coordination mechanism supporting the coordinating work by mediating mutual dependencies (Schmidt & Simone 1996, Pors & Simonsen 2003). In addition QP provides an overview of the process as well as performing some of the tedious footwork that the collaboration entails.

4. Conditions

From our investigations in Beta, we have identified six overall conditions that characterise the four settings with respect to managerial potential for initiating, managing, and implementing change related to the deployment of groupware, such as QP in a distributed organization. These overall conditions are summarized in table 2 and characterized below.

Setting Condition	Newly established organizational units	Special interest groups	Short term projects	Teams handling recurrent tasks
Management position and role	Hierarchical (personnel mgr.)	Network driver (among peers)	Project manager (among experts)	Team manager (personnel mgr.)
Administration of QP	Egalitarian, multiple administrators	Highly organized	Project manager or deputy	Team manager
Membership	Growing and heterogeneous	Continuous and homogeneous	Transient and temporary	Continuous and congenial
Evaluation and re- design of QP	Occasionally	Continuous maintenance	Difficult (due to short life cycle)	Regularly (between tasks)
Integration with work practice	Low	Low	Medium	High (critical)
Dependency of QP	Nice to have	Nice to have	Need (mgr.), nice (others)	Need (all)

Table 2. Comparison of conditions for change related to the groupware application QP in the four types of settings identified in the case.

Management position and role. An obvious condition related to organizational change in general is the position and role of the management. Organizational units in Beta have a well-known hierarchical management structure, where managers take on the traditional role as personnel managers. Beta initiated a very ambitious organizational initiative in order to support the special interest groups. Every special interest group was allocated a "network driver". This person was 100% committed to alone supporting and maintaining the group. The network driver is the initiator, administrator, and main contributor to the group's groupware facilities. All drivers from the different groups are themselves organized in a special interest group for network drivers. However this effort has not changed the management role of this setting, where the drivers are among peers when considering the practitioners participating in the group. A somewhat similar situation is found in the projects. The project manager is of course in charge of the project, but the members of the project

team are IT-specialists themselves and might even also be managers: In the customer security architecture project mentioned in section 3.3, the team members were managers of the IT-sections from each company that went into the merger. The teams handling recurrent tasks are comparable to the new organizational units: The teams might indeed be an organizational unit or the manager of the team is typically a personnel manager within a team where the other members have the status of employees.

Administration of QP. Administrators of QP are responsible for customizing the technology to fit intended goals and requested needs, including setting up the QP, changing the structure of QP, user access rights, etc. In the newly established organizational units, this task was usually egalitarian and distributed to the actor, who had suggested using QP, or (in larger units) to several actors, who by chance were interested and had the resources to take on this job. Even though QP might have an important signal effect (in fact the only shared visible part of the distributed unit), the manager's involvement in shaping QP had a secondary role. In the other three settings, this role was taken on by either the manager himself or was delegated to a deputy in close cooperation with the manager. Network drivers are also QP administrators. The QPs in the projects were typically initiated by the project managers themselves and introduced as part of the project establishment. In the teams handling recurrent tasks, QPs take on the roles of strategic IT and a workflow mediator and thus have a role closely related to that of management.

Membership. The users of a QP constitute a condition of 'membership' that varies across the four settings. The new organizational unit is characterised by a growing number of actors that are allocated to the unit as it is being established. Their membership might be viewed as heterogeneous since the sections within a distributed unit often are physically located only in one place (e.g. in one country) when possible. Thus sections within a unit are organized in such a manner as having few mutual dependencies. The members of a special interest group constitute a relatively stable and homogeneous network of specialized practitioners. The short-term projects have a transient and temporary membership, since the project ends after 6 months or less, and members change then from one project to the next. Teams handling recurrent tasks have the most stable membership. The fact that these members share the same aim, and that they typically perform the task under stress, contributes to the often seen congenial relationships among team members.

Evaluation and re-design of QP. The generic nature of groupware, such as QP, along with the continuous changes in the organization, necessitate a periodical evaluation and re-design of QP in order to align the configuration and structure of information in QP with the agreements and practices related to its use. In the organizational units this seems to happen only occasionally and can be triggered by a restructuring of the unit, by a detection of QP use as being very low, or by a sudden managerial initiative, such as making the QP calendar become the default intro-page in order to make the QP members aware of the upcoming meetings and arrangements. By contrast, the special interest group, having a full time network driver who is responsible for administrating each QP, view evaluation and re-design as part of the overall maintenance and is conducted in a continuous manner. Re-design within projects is difficult simply due to the short life cycle of the projects. The initial 'setup' of QP is thus usually a one-shot trial. The teams handling recurrent tasks have a naturally occurring opportunity for reconsidering the use of QP where former experiences can be incorporated in the future routines. The recurrent task has an advantage in this respect, since it provides such frequent occasions for evaluation and re-design, and because the character of work is well defined and has been tried several times before.

Integration with work practice. Integrating groupware with work practices is in general problematic and demands, among other things, being able to see the benefits from its use and choosing it instead of other well established alternative technologies such as email (Grudin 1994). QP's integration with work practices in the organizational units is low and reflects the overall aim of offering QP as an information distribution channel and as a shared archive. This is also the case for special interest groups, where the focus on general issues of interest leads QP to have a secondary function when compared to the daily work for the members. The integration varies in projects. A few projects do succeed in integrating QP with the project work by for example using QP as a working library for object oriented use cases. In most projects, though, the main use of QP is as an archive for project documentation with little integration with work practices for others than the project manager. On the other hand, the teams handling recurrent tasks show a very tight integration. The ways of coordinating work are well defined and shared among the members, giving an effective basis for using QP as a coordination mechanism. Any changes to established agreements on using QP have to be carefully prepared in advance, enabling the necessary coordination to happen smoothly and avoiding any misunderstandings or other disruptions that may cause sudden halts in the completion of the task.

Dependency of QP. The dependency on having access to QP in a given setting reflects the above-described condition regarding integration with work practice. For the organizational units and the special interest groups, it is generally a nice-to-have facility, and work will continue (with only a few irritations) even if the QP server (theoretically) should crash and be out of use for days. This would also be the case for most projects, where the typical situation is a project manager that needs QP when managing the issues and deliverables and where QP mostly is viewed as a nice-to-have service for the project members. In order to get their work done, other means for coordinating work such as e-mail and phone calls might even be more immediately gratifying. Dependency on QP is highly critical when considering teams handling recurrent tasks. When the team producing financial reports starts the quarterly translation task, the QP server and central network facilities in Beta enters a 'frozen zone mode' restricting all from certain services in order to minimise the risk of a server crash.

5. Conclusion

What challenges do managers in Beta face concerning the intended goals for using QP within the four types of settings? What kind of expectations and realistic aims can managers in Beta have considering change related to the deployment of QP? And which strategies might they eventually apply to stimulate change?

The overall situation in Beta concerning deployment of QP is characterized by a rapid spread of the technology in an overall and rather 'uncontrollable' way, since the configuration and customization of QP is distributed to the users of the application. QP might in this way be considered as a non-strategic generic IT application that spreads "bottom-up" and develops into different local guises. This makes the first three mainly organization oriented conditions (management position and role, administration of QP, and membership) hard to challenge without the need for investing resources (e.g. into major managerial and organizational restructuring) that exceed the perceived returns of such an investment. For example, we consider that the role of management within special interest groups and projects is a stable condition that prevents them from relying on authority (alone) to push specific uses of QP: This must be related to actual needs, as experienced by the users of QP, in order to be successfully adopted. Thus it is not considered realistic to initiate changes within these basic organization oriented conditions solely in order to obtain a more efficient use of QP. The

latter three rather work practice oriented conditions (evaluation and re-design of QP, integration with work practice, dependency of QP) might in this respect be upfront more potential to consider. Each of the four settings are discussed below with regard to challenges, realistic expectations and aims, and strategies for change regarding use of QP. This discussion is summarized and concluded on in table 3.

Newly established organizational units. This setting is characterized by management (concerned with strategies, organizing, and establishing practices in the new unit) that does not leave much room for considering QP as a primary area of interest. A growing and heterogeneous user group constitutes the members. These conditions do not support any ambitious expectations regarding collaborative use of QP. The focus is on clarifying and establishing new processes and collaboration, rather than supporting existing work practices by integrating QP. Thus groupware will probably maintain a nice-to-have dependency on the daily work practice for a considerable period of time. QP will serve a function comparable to an intranet or LAN and a specific need for groupware concerning the unit, as a whole, is questionable. Potential strategies for change could include aiming for a comprehensive shared archive (established by regular evaluations and re-designs) and aiming for potential sub-structures with “private” folders specialized for sections and teams within the unit as they are established. The latter could over time evolve and end up resembling teams handling recurrent tasks.

Special interest groups. Even though considerable resources have been put into an ambitious organization of management and administration of the special interest groups, the integration with work practices and the need to use QP is very modest. In Beta, the members within a special interest group potentially do share a professional interest, but this does not entail any specific collaboration or mutual dependencies. Expectations for using QP to reach beyond a ‘nice-to-have’ facility depend on the possibilities for a higher integration of QP within the daily work practices of the members in the group. We see two potential strategies for reaching this aim, a ‘tool’ strategy and a more ambitious knowledge management strategy. Developing the technology into an indispensable tool requires that it provides functionality that is more closely integrated with daily work practices, e.g. by offering resource management services for the projects managers, by creating mutual commenting and editing procedures for the change consultants, by providing facilities for software configuration management for the java developers, etc. If management aims for a more ambitious use of QP, e.g. to promote and establish ‘best practices’, it will require an organizational transformation of the groups, where they constitute single, uniform entities, or coherent “communities of practice” as suggested by Bansler & Havn (2001). The necessary long-term knowledge management strategies involved are beyond the scope of this paper.

Short term projects. The immediate challenge related to projects is the risk of investing in QP, in a situation that can be characterized as a temporary endeavour ending within 6 months, and involving project members that are too busy to overcome much threshold, and hereby gain advantage of the investment. Thus transient and temporary memberships combined with short life cycles are conditions that seriously restrict successful use of generic technologies such as QP. Initiating QP, as a coordination mechanism within a specific project, requires both that the collaboration between mutual dependent project members has been established, and that a general need to reduce the complexity within the collaboration is recognized (Bjørn & Simonsen 2003). Adding to this the fact that QP then should be designed to support the coordination, makes it almost impossible within an overall 6 month period of time. A realistic expectation for a project is using QP on a relatively low ambition level as an information distribution channel and archive for project documentation. Strategies for a more ‘aggressive’ use of QP, such as using QP as a coordination mechanism, should

take into consideration elements that project members recurrently face in every consecutive project. This could include support for concepts, project models, selected tools and techniques, and deliveries that in general are required in all projects. In this way, QP could be viewed as a strategic application that supports using and coordinating shared (mandatory) elements across projects. In the long run consecutive projects might in this way resemble teams handling recurrent tasks.

Teams handling recurrent tasks. In contrast to the other settings, this is the only setting where QP has evolved into a critical coordination mechanism having the effect of seriously reducing the complexity involved in collaboration within a geographically distributed team. All conditions are in favour of using QP based on the special characteristic of this setting: Recurrent routine work that naturally opens for opportunities to reflect on and further develop procedures and practices for using QP. The strategies for an ambitious and successful use of QP for recurrent tasks include a full commitment to the technology and a dramatic change in work practices in order to achieve a tight integration of the technology. Supporting the mutual dependencies imbedded in a coordination mechanism also differentiates this setting from the other three by establishing a situation where QP develops into a local strategic application.

Setting Conclusion	Newly established organizational units	Special interest groups	Short term projects	Teams handling recurrent tasks
Challenges	Most conditions do not support effective use of QP	Low integration with work practice (no specific collaboration among members)	Transient, temporary membership combined with short life cycle	No serious challenges: All conditions support effective use of QP
Realistic expectations and aims	QP as (intermediate) substitute for intranet with low effect on collaboration	QP as information distribution channel and 'information of interest' archive	QP as information distribution channel and post-hoc project documentation archive	QP as coordination mechanism effectively reducing complexity in collaboration
Strategies to stimulate change	1. <i>QP as shared archive</i> developed by regular evaluations and re-designs 2. QP use <i>reflecting teams handling recurrent tasks</i> (as such teams evolve)	1. <i>QP as indispensable tool provider</i> integrated with daily work practice 2. <i>QP as KM-system</i> , e.g. promoting 'best practices'	1. <i>QP as strategic application across projects</i> , e.g. by supporting (mandatory) concepts, models, tools, techniques, and deliveries	1. <i>QP as local strategic application</i> , requiring full commitment to using QP and aligning work practices to obtain tight integration

Table 3. Challenges, realistic expectations and aims, and strategies to stimulate change regarding use of QP in general and as related to the four types of distributed settings identified in Beta.

Acknowledgements

We would like to thank the informants in Beta, who provided opportunities for studying groupware in practice, our colleagues, Keld Bødker and Kristian Billeskov Bøving, for collaborating on this study, and the anonymous reviewers for useful comments. The DIWA research programme is sponsored by the Danish Research Councils and the IT-University of Copenhagen has also partly sponsored the research.

References

- Bansler, J. and Havn, E. (1994), Information Systems Development with Generic Systems, *Proceedings of the Second Conference on Information Systems*, pp. 707-715.
- Bansler, J. and Havn, E. (2001), Sharing Best Practices: An Empirical Study of IT-support for Knowledge Sharing, *Proceedings of the 9th European Conference on Information Systems*.
- Bentley, R. T., Horstmann, T. and Trevor, J. (1997), 'The World Wide Web as enabling technology for CSCW: The case of BSCW', *CSCW: The Journal of Computer-Supported Cooperative Work*, vol. 6, no. 2-3, pp. 111-134.
- Bjørn, P. and Simonsen, J. (2003), Negotiation of Joint Enterprise: Critical Conditions for establishing Global Virtual Teams as Teams of Practice, *26th Information Systems Research Seminar in Scandinavia, IRIS'26: Scandinavian approach to IS research? Haikko Manor, Finland, August 9 - 12 2003*.
- Burnes, B. (1992), *Managing Change*, Pitman Publishing.
- Butcher, D. and Atkinson, S. (2000), 'The bottom up principle', *Management review*, January.
- Ciborra, C. U. (1996), Improvisation and Information Technology in Organizations, *Proceedings of the Seventeenth International Conference on Information Systems*, pp. 369-380.
- Golden-Biddle, K. and Locke, K. D. (1997), *Composing Qualitative Research*, Sage Publications, Thousand Oaks, CA.
- Grudin, J. (1994), 'Groupware and social dynamics: Eight challenges for developers', *Communications of the ACM*, vol. 37, no. 1, pp. 92-105.
- Orlikowski, W. and Hofman, D. (1999), 'An improvisational model for change management: The case of Groupware technologies', *Sloan Management Review*, vol. 38, no. 2, pp. 11-22.
- Orlikowski, W. J. (1993), 'Learning from Notes: Organizational Issues in Groupware Implementation', *Information Society*, vol. 9, no. 3, pp. 237-250.
- Orlikowski, W. J. (1996) 'Evolving with Notes: Organizational Change around Groupware Technology' in *Groupware and Teamwork. Invisible Aid or Technical Hindrance?* (Ed, Ciborra, C. U.) John Wiley & Sons, Chichester.
- Pors, J. K. and Simonsen, J. (2003), Coordinating Work with Groupware: The Challenge of Integrating Protocol and Artefact, *Proceedings of IFIP WG 8.2 & WG 9.4: IS Perspectives and Challenges in the Context of Globalization, 15.-17. June 2003, Athens, Greek*.
- Schmidt, K. and Simone, C. (1996), 'Coordination mechanisms: Towards a Conceptual Foundation of CSCW Systems Design', *Computer Supported Cooperative Work. The Journal of Collaborative Computing*, vol. 5, no. 2-3, pp. 155-200.
- Whiteley, A. (1995), *Managing Change: A Core Values Approach*, Macmillan Education Australia.