

Chapter 3

WHERE IS THE INNOVATION?

The Adoption of Virtual Workspaces

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Abstract: This paper reports from a case study of the introduction of a web-based groupware application – Lotus QuickPlace™ – in a large European financial organization. Our study challenges the commonly held assumption in DOI research that “all use is equal”, implied when DOI is used to study the adoption of technologies. The underlying problem is that in order to understand the diffusion of groupware, we need to distinguish between two separate innovations. The first is directly related to the DOI “innovation-decision process” – centered on the technology as the innovation. The second innovation is more related to how the technology is put to use. This has consequences for devising strategies for the diffusion, and we suggest a strategy for diffusing virtual workspaces, which combines the DOI framework’s one-way communication with the two-way communication of a participative approach

Key words: Virtual Workspaces, Groupware, Adoption, Diffusion of Groupware, Participative approach

1. INTRODUCTION

Virtual workspaces have been introduced in organizations as a successful new breed of internet-applications. They exemplify modern networked information technologies, which offer support for inter- and intra-organizational communication and collaboration through the sharing of files, joint editing of documents, shared calendar etc. A virtual workspace is an inexpensive, decentrally managed groupware application open to a lot of different settings of use. Lotus QuickPlace is a virtual workspace product offered by IBM. According to IBM, Lotus QuickPlace (recently re-named: Lotus

Team Workplace) is used by 60 percent of the Fortune Global 100 companies (IBM, 2003). This diffusion of virtual workspaces has happened in a two-three year period, which suggest characterizing it as a commercial success.

A virtual workspace is typically introduced into an already existing suite of applications for communication and collaboration such as e-mail, intranet, telephones, and LAN-drives. The introduction of virtual workspaces is rather simple from a technology point of view, but it exposes the user to a lot of complexity as (s)he attempts to integrate the technology into the existing suite of communication technologies in specific collaborative settings. Virtual workspaces are also characterized by the difficult task left to the users of establishing useful patterns of communication and collaboration based on the technology.

We have studied the adoption and use of Lotus QuickPlace in a distributed organization. Our study documents that the above characteristics of the technology challenges how we should understand its diffusion and adoption. It therefore has consequences for what constitutes a good strategy for diffusing virtual workspaces.

The theory of diffusion of innovations (DOI) is being used extensively to study the diffusion of information technologies, and is being used as a framework for understanding the adoption of new technologies in organizations (see Prescott and Conger (1995) for an overview). Using DOI as the framework for understanding the adoption of technologies in an organization implies that the technology as such is seen as the innovation. In other words, "all use is equal" in the eyes of DOI (see e.g. Prescott and Conger, 1995; Mark and Poltrock, 2001). A quote from Rogers (1995, p. 21) also illustrates the point: "The innovation-decision process can lead to either *adoption*, a decision to make full use of an innovation as the best course of action available, or to *rejection*, a decision not to adopt an innovation." Despite the attention in DOI research towards "re-invention", i.e. the degree to which an innovation is changed or modified by users during its adoption or implementation (Rogers, 1995, p. 174), we do not find that this concept fully captures our findings.

In our study of the adoption and use of Lotus QuickPlace we have found that the assumption "all use is equal" is not well suited to our results. Basically, we have found that use differed to such a degree that it is problematic to denote it as one single innovation. We suggest that to understand the adoption of virtual workspaces distinguishing between two levels of innovations is more fruitful. The first level is directly related to the "innovation-decision process" – the innovation being the technology that it is decided to adopt. At the second level however, the innovation is closely related to how the technology is put to use – not a simple question with a flexible

and open-ended technology like Lotus QuickPlace. This becomes evident when devising a strategy for the diffusion of virtual workspaces in an organization. While the DOI framework seems suitable for diffusing the use of virtual workspaces to individuals, a participative approach seems more appropriate when it comes to the diffusion of virtual workspaces in social practices of collaboration in a group of people in the organization.

Lyytinen and Damsgaard (2001) have questioned the value of the DOI framework for understanding the diffusion of inter-organizational, complex technologies exemplified by the diffusion of EDI. We argue that even with technologically simple, intra-organizational systems, we need alternatives to the DOI framework to understand the diffusion. We suggest that detailed studies of usage might inform the process of understanding and devising strategies for the diffusion. We suggest a strategy for the diffusion of virtual workspaces that is partly based on DOI, partly based on a participative approach, which can facilitate the innovation of new social practices of use in a group. In the area of research on the communication of development e.g. on AIDS to the developing countries (Tuftte, 2001), the need to combine these strategies has been identified. We suggest that this insight could inspire the diffusion of virtual workspaces and other networked information technologies for collaboration and communication in organizational settings.

The paper is structured as follows. After presenting the research setting and methodology we first present the results of our case study relevant for challenging the “all use is equal” assumption and the assumption that we are dealing with one innovation. We then discuss the implications of our findings for how implementation efforts should be approached and suggest a strategy for the diffusion of virtual workspaces in organizations.

2. RESEARCH SETTING AND METHODOLOGY

A few years ago, a large financial company was formed by a merger involving financial companies (private, corporate, and investment banks and insurance companies) in four European countries. The company, which we call Summa in this paper, produced a 2001 net profit of app. 1,500 MEUR. Following the merger Summa needed a solution that could support the collaboration and communication in post-merger projects and reduce travelling costs after the merger. Summa formed several organizational units spanning across the four countries, including core business areas as corporate banking as well as support functions like IT, human resources, and communications, and projects were defined to merge operations. Lotus QuickPlace was chosen as the solution based on previous experience with Lotus products, and the technology was introduced approximately 1 month after the merger. In

line with the way Lotus QuickPlace presents itself on the web – “create a Team Workspace on the Web instantly” and “A QP is a place that you can create on the Internet in 30 seconds to communicate with your team, share resources, and keep track of your project” (IBM, 2003)- the efforts to diffuse the technology in Summa were limited. Neither formalized education nor guidelines for the usage were offered. The only educational resource available was the built-in help function in the software package. The availability of the technology was announced through e-mails and oral presentations to selected groups of people – typically middle managers at headquarters.

2.1 Data Collection and Analysis

This paper is based empirically on data from a case study of Lotus QuickPlace, hereafter QP, in Summa. Based on contact with the Communication Section, one of approximately 15 headquarter sections with a staff of 50 employees, we have studied its adoption and use intensively over a 10-month period. Our case study used different empirical sources:

- semi-structured interviews with managers and users in three selected QPs, and with persons involved in the implementation processes;
- an analysis of the technology and central documents related to the implementation in Summa.
- a web-based questionnaire among managers of all QPs;
- an analysis of the QP server’s http-log using data mining techniques.

The interviews were all conducted in a three-month period in spring 2001, one year after the introduction of the technology. They involved managers and users in three selected QPs: one used by a post-merger technological infrastructure project and two used in the Communication Section. The interviews used an interview guide, were tape-recorded, and transcribed ad verbatim.

The document analysis comprised documents describing the intended aim of using QP for all QPs resident on Summa’s QP-server at the beginning of our study (90 email documents in total), and an analysis of the structure and contents of the three QPs from which we interviewed users.

In fall 2001 an online questionnaire was carried out. We sent out invitations to 123 managers of 77 QPs identified as active in the first round of studies. 57 managers from 45 QPs responded – corresponding to a response rate of 46 % of the managers, covering 58% of all QPs. The questions were all related to the use of QP – who are the users, what is the QP used for and how is it used.

The logging of all http transactions to and from the QP server was initiated at the beginning of our study and lasted 10 months. The log file docu-

ments all users' actions on the QP-server such as when documents are created, read, or edited and by whom. The log file data were cleansed and a number of data mining techniques were used to analyze the user operations, i.e. create document, read document, edit document or open an attachment. An important analytical unit used for the analysis was the "document life cycle", which characterizes the life of a document on the QP server by the operations performed on it from its creation. Please refer to (Bøving, 2003) for a thorough discussion on the use of log analysis as a method for providing insight into the use of web-based applications.

3. THE ADOPTION OF QUICKPLACE IN SUMMA

Lotus QuickPlace is a flexible technology, which offers its users a web-based shared workspace with a folder structure, notification functions, support for custom document types and support for simple workflows. It was originally developed as an Application Service Provider (ASP) application where either the software developer or a third party hosts the application and rents it to the customer on a per-use basis. This background gives the application some basic characteristics:

- It is very open and flexible in terms of which kinds of collaboration it supports. There is no suggested workflow inscribed in the application for example to support projects, recurrent tasks, interest groups, etc.
- It is integrated with e-mail and it is typically introduced in settings where supplementing and competing technologies are already in place (e-mail, Intranet, telephone, LAN-drive, etc.).

These characteristics make the software both inexpensive to purchase and – so it seems – inexpensive to adopt in an organization. Once the QP-server is installed, a person with QP-manager rights can set up a particular QP. This includes inviting members to the QP, defining the structure of rooms, folders and document types, as well as defining access rights to each room and folder. Each QP thus consists of a number of rooms with folders containing documents that can be reached by a single URL. However, with the open-ended and flexible character another characteristic is implied: It is based on the assumption that the users themselves define for what purposes and how they wish to use the QP. The members of a QP need to agree on how to work together using the tool in a specific context, e.g. using the tool as a shared archive, or as a coordination mechanism for collaborative work.

3.1 The Successful Diffusion

The decision to introduce the QP technology to support the post-merger projects in Summa was taken without thorough studies of needs and possibilities. QP was a “quick and dirty” solution, which fulfilled some technical requirements: it was web-based, needed no integration with the existing security infrastructures of the pre-merger companies. It could thus be implemented very quickly seen from an IT Operations point of view. One month after the merger the Communication Section was commissioned to distribute QP in Summa. Some resources were spent on customizing the look of the application, but apart from that the only formal means of communication from the change agents in the Communication Section to potential adopters was an email and oral presentations. Adopters could apply for opening a new QP by sending an email to IT Operations. The original idea was that the application e-mail should contain a business justification, but in practice all applications were approved. Our study of all application emails sent to IT operations shows that the rule of thumb for granting an application for a QP was that the group should have geographically dispersed members. Attempts at providing business justifications hardly occurred.

The number of active QPs had been growing steadily in the first year at Summa before we entered the organization. In the first month of our log-period there was activity in 80 QPs by 805 different users. The growth continued during the 10-month log-period with 126 QPs and 1618 users active in the last month. Table 1 shows the development in activity over the 10-month period.

Table 1. Development of QP activity in 10 month period in Summa

Activity measure	Development in activity
No. of active QPs	+58%
No. of active users	+101%
No. of operations	+275%
No. of operations pr. QP	+138%
No. of operations pr. user	+87%

The table shows that the use of the QP technology expanded significantly in the 10-month period. More users in a growing number of settings used it more. Also, the technology was diffused in other settings than the ones intended by the change agents. Initially the technology was only meant to support the merger projects. Figure 1 shows the responses in the questionnaire to the question: “What group of people is using your QP?”

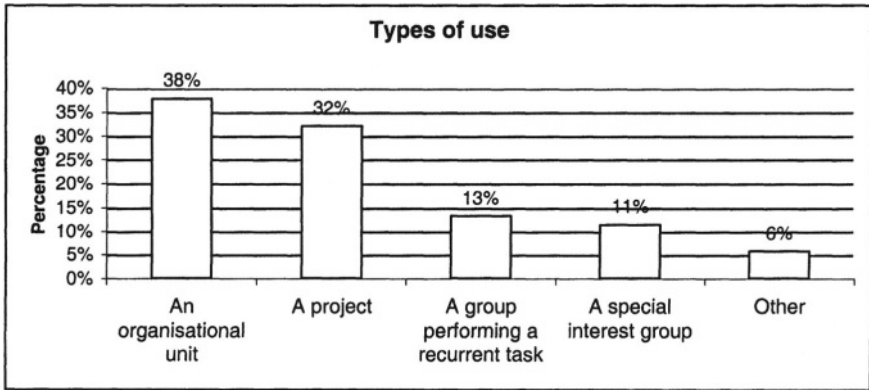


Figure 1. Distribution of Use Context for QP in Summa

The following examples derived from the questionnaire illustrate the diversity of use:

- Organizational unit: the QP supports an organizational unit spanning four countries as well as all other countries where Summa is present. The QP is used for holiday lists, to support credit projects, distribute credit limits and related information on issuing credits to large customers, and for marketing materials.
- Project: The QP is used as a project repository for an IT infrastructure project, including project deliverables, information on technology, meeting minutes and documentation of decisions taken.
- Recurrent tasks: the QP is used to support the translation of financial reports, press releases and an internal magazine into five languages.
- Special interest group: The QP is used to support communication in a cross-functional and cross-organizational group of experts working with the same technology. The QP is used for “*Discussions, experiments, programming, documents. All relevant topics that have to do with the Domino platform within Summa*”, (questionnaire quote).

In sum, the use of the technology has been growing during our study, and it has spread to serve other purposes than the ones originally intended. The QP technology was introduced to support merger projects and new distributed organizational units, but our study clearly shows that the technology has diffused into other areas. On this level of analysis, the diffusion and adoption thus seems a success. Without large efforts in terms of communication the technology has spread.

The study of the adoption of QP as we have presented it here does not answer *how* the technology has been diffused or identify factors for the successful diffusion. It merely documents a successful diffusion of a technol-

ogy. Our presentation of the case has used the “all use is equal” assumption inherent in the DOI framework. We have reported on the activity level and number of users and discussed the settings in which the technology is used. However, if we take a closer look at the kind of usage and thus skip the “all use is equal” assumption, a rather different picture emerges.

3.2 The Not so Successful Adoption

As part of the analysis of the log files, we used “document life cycle” as an analytical unit for understanding the use of QP. A document life cycle is the trajectory of all operations on a document in a QP. The document life cycle analysis shows a pattern, which is rather disappointing. Firstly, the typical lifecycle of a document in a QP in Summa is that someone publishes a document which is then never touched again. No subsequent operations like edits, reads, moves or deletions are performed on the document, and we have therefore denoted them “dead” documents. This life cycle is observed for 70% of the documents. Secondly, for the remaining 30% of the document life cycles the typical pattern is that a document is published by someone and then subsequently read by a number of people. The QP technology offers support for the collaborative production of documents by a locking mechanism, which prevents multiple persons editing the document concurrently. This feature is only very rarely used (0,3% of all document life cycles).

Both when we use the document life cycle as analytical unit and when we use the individual QP as the analytical unit, the use of the QP technology is characterized by a large number of unsuccessful attempts. We studied 37 QPs, which were all started during the log-period. By analyzing the weekly number of users, document reads and document edits, we portrayed the activity in each new QP. This analysis showed that 14 of the 37 QPs, or 38%, only showed very fragmented use, or no use at all. While all 37 were based on a conscious decision to start using a QP, it did not result in a sustained use of the technology in more than one third of all QPs started in the logging period.

Another characteristic of the use of QuickPlace is that the use is intertwined with the use of other media, sometimes in a competing, sometimes in a supplementary manner. There is not at all a clear distinction between the situations when the QP is used and when e-mail or telephone is used. In most cases they are combined. Responding to the inclusive question “Which other media do you use to communicate or exchange files with the other members of the QuickPlace?”, 95% of the respondents selected “e-mail”, and 60% selected “telephone” as well as “face-to-face”.

As an example of the intertwined use of QP we studied in detail, based partly on interviews, partly on log analysis, how a QP supported the process of translating a press release. The QP studied was used to collect the translated documents and make them available for proofreading and review. The analysis showed that a mix of strategies for using the QP was adopted. In general, the e-mail system was used in parallel with the QP and actually served as the primary means of routing the translations from the translators to the people responsible for the publishing of the press releases in the different languages. The primary role for the QP was that reviewers and other stakeholders could access the translations from the QP. Another observation was that some translators did not upload their translations directly. Instead they e-mailed the documents to people that would then upload them to the QP, thus acting as “proxies”. This intertwined use of e-mail and QP sometimes makes sense given the functionalities provided by both systems, but in some cases it is clearly dysfunctional given the superiority of QP in terms of handling various versions of documents and controlled access to documents. Lack of trust that receivers of information will act appropriately to the documents distributed via the QP was the typical explanation given by informants for the dysfunctional or “irrational” use.

To sum up, both the large percentage of dead documents and the QPs, which are started but never get into momentum during the 10-month log period, indicate a lot of unsuccessful attempts to use the technology. The uses of QP in the remaining 30% of the documents studied shows a simple life cycle, while in other situations (the translation of press releases) the potentials of the technology are not fully utilized. The result is a portrait of the adoption, which is quite different from our initial picture.

4. DISCUSSION

The two perspectives on the adoption of QP produce two very different conclusions. The first perspective shows a successful diffusion of a technology. The first perspective also exemplifies a traditional approach to studying the diffusion and adoption of a technology. Our detailed study of the actual use patterns shows, however, that the assumption that “all use is equal” causes blindness to aspects, which in our case turn out as being essential for assessing the adoption of the technology. While the technology has been diffused, our study shows that the potential of the technology for developing new patterns of coordination and communication has not been realized.

As suggested by Newell et al. (2000) it might be useful to turn away from the diffusion of the technological artifact and focus on the spread of the ideas and knowledge underpinning the technology. If we observe the

diffusion of QP in Summa with the eyes of Rogers-inspired DOI research, the technology has diffused quickly and successfully given the very limited focus on communicating about the technology and its advantages. If we instead focus on the spread of the ideas and knowledge underpinning the technology, the diffusion seems more disappointing. Most users and groups of users do not seem to have grasped the potential of collaborating in new ways supported by QP, at least they have not yet changed their way of working together using the features of the QP accordingly. The question arising at this point is: why don't the users use the technology in ways, which utilize its potential? We think there are two interrelated and supplementing approaches to account for this.

The first approach focuses on the individual user and his understanding of the technology. As Orlikowski and Gash (1994) have shown in their study of the adoption of Lotus Notes, users' different understandings of what a technology is affects the adoption of a technology. Their concept of "technological frames" (a species of cognitive frames) is used to capture the understanding of the technology. It seems plausible that the lack of diffusion of the potential of the technology is due to the technological frames with which the individual users approach the technology.

The second approach focuses on the group of users trying to establish use of a technology to support their communication and collaboration. In the field of CSCW it is generally acknowledged that the coordination of collaborative work is a social and difficult activity. Also, it is well known that the introduction of technology to support coordination requires re-negotiation and re-creation of protocols (Schmidt and Bannon, 1992; Schmidt and Simone, 1996). The theory of genre of organizational communication (Yates and Orlikowski, 1992; Yates et al., 1997) suggests that the introduction of new technology will initially support existing genres and that change in genres requires a redefinition of these over time by the participants themselves. This approach thus focuses on a social activity of re-negotiation, re-creation and re-definition of social structures in the group of users of a QP. In other words, people actually need to agree on how to use the system, and to establish trust that actions and reactions are appropriate.

On the one hand, we have an approach that suggests that people's cognitive frames define their adoption of the technology. On the other hand we have an approach that suggests that the users through peer-to-peer interaction and negotiation define the use of a collaborative technology.

We agree with DOI theory that the QP technology constitutes an innovation in the sense that it offers new potentials for collaborative work and communication. The DOI framework – when applied to the diffusion of a collaborative technology – overlooks, however, a second innovation process. This second innovation process does not come from a central source, but is

based on local, situated actions. It is the innovations produced when groups of people agree on using the technology to support novel protocols (in the words of CSCW) or genres (in the words of genre theory).

Bøving (2003) has suggested – in line with Yates et al. (1997) – that the analytical unit of usage in virtual workspaces should be a genre of communication. If the genre of communication is suggested as the unit of analysis of use, a genre of communication captures the result of an innovation, which is just as important as the innovation of the technology. Both approaches are important in the understanding of the diffusion and adoption of virtual workspaces.

Our findings thus suggest that the adoption of virtual workspaces like Lotus Quickplace can only be understood as related to two different innovations. This has practical consequences for the strategy one should use for the diffusion of virtual workspaces in an organization.

4.1 A Strategy for the Diffusion of Virtual Workspaces

In the field of communication for development, i.e. changing the behaviour of people in Africa facing the threat of AIDS/HIV, two strategies have dominated. On the one hand strategies based on the DOI framework, and on the other hand strategies based on a participatory communication framework (Servaes et al.,1996; Servaes, 1999). As for example Tufte (2001) argues, these strategies should be combined so that the one-way communication approach based upon a DOI framework is used in conjunction with a participatory communication approach. Table 2 summarizes the key points of a combined approach.

Table 2. Key Features of Tufte's Integrated Communication Approach

	DOI approach	Participative approach
Change agent	The management deciding to implement the technology in the organization	Users are the agents of change
Means of communication	One-way mass media approach	Dialogue, community based action

We suggest using the insights from the communication of development to propose a strategy for the diffusion of virtual workspaces and other collaborative technologies in organizations. While the DOI approach should address the (change of) users’ technological frames, the participative approach should address the need for groups of users to establish new genres of communication through peer-to-peer interaction.

The one-way communication approach should deal with the following aspects of diffusion and adoption of the technology:

- the goals of introducing the technology in the organization.

- the basic functionalities of the technology.
- guidelines for usage related to the existing technology landscape.
- best practices on how the technology can be utilized.

Several media could be relevant for communicating these aspects of technology diffusion and adoption. In the case of Summa, some of this communication stems from software vendors who communicate the wonders of the technology to the market. They also produce the basic tutorials for using it. Other relevant media of communication originating centrally in the organization could be Intranet, feature articles in employee magazines or e-mails. The efforts should be aimed at individuals in the organization and contain information aiming at changing the technological frames of users and managers who wish to initiate the adoption of a technology.

The participatory approach should deal with the following aspects:

- the establishment of practices related to single QPs.
- facilitation of the establishment of roles in the group.
- facilitation of establishing new genres of communication, which utilizes the technology.

The role of the change agent in the participatory approach is not to communicate an innovation. The role is rather to facilitate that the group invents new ways of collaborating and communicating utilizing the potentials of the technology. The means of providing facilitation could be start-up workshops for groups. The purpose of the workshop is to brainstorm ideas about usage of the technology as well as establishing agreements on the use. One important aspect of adopting virtual workspaces is the agreement on a structure and processes to maintain it (Bøving, 2003).

This two-fold strategy of diffusing collaborative technologies like virtual workspaces addresses two kinds of learning: one directed towards using the system and communicating the strategy for using the system, and one directed at establishing genres of communication in the group that chooses to use the system.

5. CONCLUDING REMARKS

The study of the adoption of Lotus QuickPlace in Summa has shown that using the DOI framework as the only vehicle for understanding the adoption of a collaborative technology is problematic. The basic problem is that the adoption of collaborative technologies cannot be grasped by the diffusion of the technology. If we equal the technology with the innovation, it creates a problematic assumption that “all use is equal”. In our case it turned out that all use is not equal, and we suspect that this is the case with other collaborative technologies in other settings. The DOI framework thus only captures

some aspects of the adoption of collaborative technologies in an organization.

The results from our study showed that while the technology was diffused and adopted, the innovation – which could be captured in a statement like “to use the QP to create novel ways of communication and collaboration” – was not diffused in Summa.

The conclusion in terms of future research in the diffusion and adoption of collaborative technologies is that detailed studies of use can inform the study of the diffusion process and inform the development of strategies for the diffusion of collaborative technologies. We do not question the DOI framework in itself, rather we have showed that it should be used cautiously in the study of diffusion and adoption of collaborative technologies in distributed organizations. The basic argument is that we are dealing with multiple innovations. And the technology is only one of them.

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