

# Levels of Adoption in Organizational Implementation of E-Collaboration Technologies

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## INTRODUCTION

While the e-collaboration term only dates back a few years, its roots can be traced back at least two decades to the research and development in areas such as groupware, computer supported cooperative work (CSCW), group support systems (GSS), and computer-mediated communication (CMC). As defined by Kock (2005), the e-collaboration term can be seen to encompass a wide range of technologies supporting collaboration among individuals engaged in a common task. In this article, the e-collaboration term thus incorporates previous research and practice within the areas mentioned above. The term organizational implementation is used to denote the process of introducing the technology in an organizational setting (Walsham, 1993).

Ever since the first organizational applications of e-collaboration technologies, such as videoconferencing and group decision support systems, there has been a focus on the process related to how organizations and user communities adopt these technologies. Early research pointed to how adoption of e-collaboration technologies may be more challenging than other types of IT, as the effects and benefits from its use are dependent on the common adoption and use among all members of a group or user community (Grudin, 1989). Over the years, a rich base of empirical studies has developed, illustrating the complexity often involved in the process of organizational implementation of e-collaboration (see Munkvold, 2003, for a review of this research). Examples of issues influencing this process include the potential disparity in work and benefit among different adopters (Grudin, 1989), the users' mental models of the technology (Orlikowski, 1992), the need for a supportive technological and behavioral infrastructure (Palen & Grudin, 2003), and user training that also emphasizes the collaborative nature of the technology (Orlikowski, 1992).

A problem with accumulating and comparing the findings from the research on organizational implementation of e-collaboration technologies is that these studies may include adoption at various levels: individual, group, organizational, and even interorganizational. As such, e-collaboration practices may cover the whole span from two persons collaborating on a joint document, collaboration in teams and projects, enterprise-wide collaboration, and interorganizational collaboration as in virtual supply chains. Illustrating this problem, an analysis of 36 studies of e-collaboration published in seven information systems (IS) journals during the period 1999-2003 found that over two-thirds of the studies contained one or more problems of levels incongruence related to the level of the theory, the level of the data analysis, and the unit of analysis (Gallivan & Benbunan-Fich, 2005). Adding to this complexity is also the wide range of e-collaboration technologies and applications possibly incorporated within the e-collaboration term (Munkvold, 2003), and the potentially inherent flexibility in use of these. Finally, the multi-disciplinary nature of the e-collaboration area also implies challenges in developing a common terminology for describing phenomena related to e-collaboration adoption and use.

This article defines and discusses key concepts related to implementation of e-collaboration technologies in organizations, with main focus on the different levels of adoption that can be identified in this process. The aim is thus to contribute to a shared vocabulary and understanding of different adoption levels in organizational implementation of e-collaboration.

## BACKGROUND

The term implementation is used differently in different research communities. In areas such as com-

puter science, human-computer interaction (HCI), and software engineering, this term basically refers to the actual coding of the system, while in IS research and practice the term denotes the process of introducing the technology in an organizational setting. Grudin (1993) discusses how differences in terminology may constitute a barrier to effective communication between these communities.

In the research on information technology (IT) implementation, one of the most influential perspectives has been the Diffusion of Innovations (DOI) theory (Fichman, 2000; Rogers, 1995). Diffusion is here defined as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 1995, p. 5). In the context of e-collaboration technologies, this refers to the process by which the adoption and use of the technology spreads throughout an organization, both as a result of planned distribution as well as emerging social mechanisms such as peer pressure. According to DOI theory, different attributes of an innovation may affect the rate of adoption. Examples of such attributes are relative advantage (the degree to which an innovation is perceived as better than the idea it supersedes), and compatibility (the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters) (Rogers, 1995, p. 15). Another important term related to adoption and diffusion of e-collaboration technologies is critical mass, denoting the number of users that have to adopt a technology before the adoption of the technology becomes self-sustaining (Markus, 1987). Before a critical mass of users is reached the benefit from the system for the individual user will be limited, thus implying a risk that the early adopters may discontinue its use.

Based on the DOI perspective, Cooper and Zmud (1990) introduced a model for the IT implementation process covering all stages from project initiation and acquisition of a new technology (through purchase or in-house development) to the final stage where the technology is “internalized” in the daily work practices and full benefits from the technology may be realized. In this model, the term adoption is used at the organizational level, referring to “the decision to make full use of an innovation” (Rogers, 1995, p. 21). The adoption by individual users, referred to as acceptance in the model, takes place after adaptation of the technology in the organization, with adaptation including the following

activities: acquiring and/or developing the technology, installing it, training the users, and developing routines for use. According to this perspective, organizational adoption does not necessarily imply adoption by the individual users. In other words, an organization may decide to invest in a technology and make it available for use throughout the organization, while the individual users for various reasons may still decide not to adopt the technology. Research on implementation of e-collaboration technologies in organizations includes several examples of adoption failing at the individual level (Munkvold, 2003).

While IS research refers to adoption as taking place both at the organizational and individual level, the more “user-centric” communities such as HCI only use adoption in the meaning of an individual’s decision to use a technology (Palen & Grudin, 2003). The organizational decision to implement a technology is instead referred to as deployment of the technology, in the sense of making it available for use (op. cit. Palen & Grudin, 2003). While this can be seen as another example of the potential for misunderstanding among these different communities (Grudin, 1993), it also illustrates how both the IS and the HCI communities acknowledge that IT implementation involves adoption decisions at both the organizational and the individual level.

In addition to issues related to adoption at different organizational levels, the scope of application also affects the implementation process. Earlier classifications of the DOI-based IT implementation literature have used concepts such as locus of adoption (individual/organizational) (Fichman, 1992) or locus of technology impact (internal to the IS unit, intraorganizational, and interorganizational) (Prescott & Conger, 1995). In characterizing different contexts of adoption and diffusion, Leonard-Barton (1990) introduced the concepts of technology span (few users vs. many users) and technology scope (diverse applications vs. homogeneous applications).

## **ADOPTION LEVELS AND SCOPE IN E-COLLABORATION**

The former sections introduced key concepts related to adoption levels and scope in organizational IT implementation. This section briefly summarizes research on e-collaboration implementation related to these concepts, including examples of empirical studies.

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