Identifying collaborative technology impact areas

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A B S T R A C T

Collaborative technologies such as wireless/handheld technologies can be critical to the success of an organization. Such technologies can be very helpful for problem solving, communication, computing, collaboration, and improving industries as a whole. Measures of impact of collaborative technologies on organizations narrowly focused on communications impacts. This study recognizes that assessing the impact of collaborative technologies is complex and should be viewed from a variety of perspectives. The purpose of this research is to identify and to investigate the multiple impacts of collaborative technologies on organizations at the level of the individual end-user.

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1. Introduction

Various forms of collaborative technologies such as wireless/handheld technologies can be important to the success of a decentralized organization. Such technologies can be very helpful for problem solving, computing, collaboration, and improving industries as a whole.

Such technology can take many forms: a notebook, smart phone, worldwide web, and PDA. Many collaborative technologies have been deployed in recent years, particularly in organizations seeking to enhance individual and organizational performance in distributed settings.

Despite the proliferation of decentralized organizations and collaborative technologies, however, little empirical research has been undertaken to evaluate the impact of such technology on the individuals and organizations utilizing them. Yet questions associated with the impacts of these new technologies abound.

This research proposes to investigate the impacts of various forms of collaborative technologies. The results could be expected to provide insight as to the technical performance of collaborative technologies in the organization under study, as well as the impacts of the different technologies that create the mobile network on the performance, efficiency, effectiveness, and value provided to the organization by the individuals who use them. Thus, the aim of this study is to develop an understanding of how collaborative technologies affect organizations.

2. Background

The Merriam-Webster Dictionary [44] defines collaborative "to work jointly with others or together especially in an intellectual endeavor" and technology "the practical application of knowledge especially in a particular area." Thus, collaborative technology may be defined as a tool/application that enables individuals to jointly engage in active production of shared knowledge [52], which may support a synchronous communication where users are engaged in a tightly-coupled, same-time effort or an asynchronous communication where participants work independently for periods, and then join together to integrate their efforts [28]. If surveying several people of their definition of collaborative technologies, it might very well be a notebook, smart phone, email, instant messaging, interactive whiteboards, video/audio/conferencing, worldwide web, and PDA — and they all would be right. Users

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may rely on anything from the use of a smartphone to an intranet that connects team members across continents. Thus, there are many such technologies that fall into the realm of collaborative. These examples are directly related to the business world and can be employed by themselves or in any combination to build off of each other. Companies that embrace such technologies will find themselves prepared for the ever-changing horizon of business. These technologies may have a profound impact on the future of businesses, how they share information, and how they communicate with other companies.

Some of the many specialized types of applications for collaborative technologies found in organizations serving different end-users include group meetings [51], supply chain management [35], project management [34], distance learning [42,50], human resources management [41], corporate learning and training [47], knowledge management [3], remote presentations [9], research and development [2,60], sales and marketing [26,54], and customer relationship management [66]. These applications for collaborative technologies have been particularly useful for companies seeking to improve organizational performance in distributed business environments. For example, project managers across the world are continually faced with long distance collaborative projects. The benefits of a collaborative product development process to a firm can be extensive. Since in a production support environment, every minute counts and every piece of information communicated must be clear, concise, and consistent, a collaborative product development process can enable interdisciplinary teams that are not located in the same physical location to work together efficiently. In addition, outside experts, suppliers and partner firms can be tied into the product development process through collaborative technologies and aid in development, cost reduction and cycle time reduction.

Video/audio conferencing, live chat, instant messaging, program sharing, and remote desktop sharing are just a few powerful uses contained within one collaborative technology. For example, in 1999, when collaborative technologies were first being introduced, Boeing used Microsoft NetMeeting to connect designers, engineers, managers, supervisors and machinists on a design project to create two military jet fighters [5]. The challenge of this effort was that people involved with this project were located in Seattle, WA, Palmdale, CA and St. Louis, MI. "If people need to see any detail, such as wires that might be frayed, it is much better than what we used to get - either a written description of the problem or a fax," comments Walt Cannon, technical team lead for assembly. "This is so much better. We can actually see the problem while we're talking about it" [5]. This is a powerful example of collaborative technologies at work. One tool, integrating several different technologies solved a communication problem that might have drawn out for months, costing the company thousands of dollars in travel and expenditure costs.

Over the years, collaborative technologies have evolved significantly. Firms are moving from messaging-oriented technologies to network-centric and wireless/handheld technologies, and today parts of these solutions are becoming core elements of the enterprise infrastructure [14]. The emerging forms of collaborative technologies revolving around wireless/handheld technologies have implications for internal and external collaborative efforts. Ernstrom (2002) [27] states that users move to wireless collaborative technologies and solutions as these solutions offer more convenience and greater productivity. Similarly, mobile networks and Wi-Fi technology have made data portable and removed the physical boundaries of the traditional workspace. These technologies represent an opportunity for global firms to leverage communication and information sharing to new heights. Where a sales manager once had to travel to a client and/or use a video-conferencing medium to obtain "face-to-face" communication; he or she is now on the verge of doing so from their wireless phone.

Despite the proliferation of collaborative technologies, however, employees may hesitate to use and work together using collaborative technologies in a knowledge-sharing environment due to cultural and organizational factors [29,38]. Similarly, some firms may hesitate to collaborate over the Web due to lack of security since they want to protect their intellectual property [40]. Worse yet, companies may not have metrics in place to quantify benefits from utilizing collaborative technologies. To further complicate matters, it may be difficult to assess the impact of these technologies over a short period of time. Finally, other barriers include user behavior and resistance to change.

2.1. Theoretical foundations

This study and the proposed model has its origins in theories relating to IS Success Model, Technology Acceptance Model, Coordination Theory, and Group Cognition.

The Information Systems Success Model proposed by Delone and McLean (1992), (2003) [18,19] focuses on how information systems generate values and benefits for individuals and organizations. The model has been widely used by IS researchers for understanding and measuring the dimensions of IS success [49]. The variables describing success of an information system include: systems quality, information quality, service quality, system use, user satisfaction, and net benefits [49].

Various collaborative technologies such as computer-mediated communication systems are employed by organizations as such technologies are perceived to generate individual and organizational benefits. For instance, using the IS success model, Abdul-Gader (1997) [1] found a significant correlations between perceived productivity and user satisfaction of computer-mediated communication systems. A study done by Burton–Jones and Straub (2006) [11] found a strong relationship between an information system usage and task performance. Similarly, Kositanurit et al. (2006) [39] suggest that there is a strong correlation between an information system usage and net benefits to the organization. Venketash et al. (2003) [63] argue that a significant relationship exists between performance expectancy, perceived usefulness of an information system and actual use. Torkzadeh and Doll (1999) [62] suggest an information system may be employed to improve management control.