Chapter 12
Collaborative Technologies and Innovation in SMEs: An Empirical Study

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ABSTRACT
This study seeks to assess the impact of collaborative technologies on innovation at the firm level. Collaborative technologies' influence on innovation is considered here as a multi-stage process that starts at adoption and extends to use. Thus, the effect of collaborative technologies on innovation is examined not only directly, the simple presence of collaborative technologies, but also based on actual collaborative technologies' use. Given the fact that firms can use this technology for different purposes, collaborative technologies' use is measured according to three orientations: e-information, e-communication and e-workflow. To achieve these objectives, a research model is developed for assessing, on the one hand, the impact of the adoption and use of collaborative technologies on innovation and, on the other hand, the relationship between adoption and use of collaborative technologies. The research model is tested using a dataset of 310 Spanish SMEs. The results showed that collaborative technologies' adoption is positively related to innovation. Also, as hypothesized, distinct collaborative technologies were found to be associated to different uses. In addition, the study found that while e-information had a positive and significant impact on innovation, e-communication and e-workflow did not.

INTRODUCTION
Emerging powerful Information technologies (ITs), such as the Intranet, allow people to collaborate and share their complementary knowledge (Bhatt et al., 2005). These technologies are responsible for e-Collaboration, which can be defined as the collaboration among individuals engaged in a common task using electronic technologies (Dasgupta
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et al., 2002). As an Intranet evolves, it increases in sophistication and complexity and can be used for advanced applications such as collaborative design, concurrent engineering and workflow support (Duane and Finnegan, 2003). Thus, Intranets are diverse and can integrate different collaborative technologies (CTs).

CTs can be oriented to different, but compatible, uses. These are related to the offering of information online, communications and exchange of information and the automation of internal business processes. Hamel (2002) emphasizes the role of IT as an enabler of product and process innovation. Innovation process requires the support of CTs since they help in the efficient storage and retrieval of codified knowledge (Adamides and Karacapilidis, 2006), get different people together to innovate (Bafoutzsou and Mentzas, 2002), enable the formation of virtual teams to execute the innovation process (Kessler, 2003; Adamides and Karacapilidis, 2006) and create an organizational climate favourable to product innovation. Thus, e-Collaboration is expected to have a positive impact on firm innovation. The reverse direction of causality could exist as well, that is, causality may flow also from innovation to CTs’ adoption. However, this paper focuses on analyzing the impact of CTs on innovation.

Computer systems cannot improve organizational performance if they are not used (Davis et al., 1989). Recently, Devaraj and Khobi (2003) showed that actual use may be an important link to IT value. Thus, we need to view CTs’ impact on innovation as a multi-stage process that starts at adoption and extends to use. Since knowledge will not necessarily circulate freely firm-wide just because accurate IT to support such circulation is available (Brown and Duguid, 2000), actual CTs’ utilization may be a critical phase. In an attempt to address this issue, this research examines the effect of CTs on innovation not only directly, the simple presence of CTs, but also based on actual CTs’ use. In this regard, this study will explore the direct relationship between CTs’ adoption and innovation, as well as the indirect relationship from CTs’ adoption, through CTs’ use, to innovation.

The paper consists of six sections and is structured as follows. The next section offers a classification of CTs and a framework differentiating three CTs’ uses. In section 3, the theoretical model is proposed and hypotheses are stated. Following that, the methodology used for sample selection and data collection are discussed. Then, data analysis and results are examined. Finally, the paper ends with a discussion of research findings and concluding remarks.

LITERATURE REVIEW

Collaborative Technologies

Collaborative Technologies are applications where ITs are used to help people co-ordinate their work with others by sharing information or knowledge (Doll and Deng, 2001). They are critical in KM programs (Alavi and Leidner, 2001; Marwick, 2001; Skyrme, 1998). Different technologies are used in e-collaborations (Dasgupta et al., 2002). A review of the literature reveals several CTs’ classifications. DeSanctis and Gallupe (1987) discuss a taxonomy based on group size (smaller, larger) and task type (planning, creativity, intellectual, preference, cognitive, conflict, mixed motive). According to Pinsonneault and Kraemer (1990), there are two categories of group support systems: group decision support systems and group communication support systems. Ellis et al. (1991) describe a taxonomy based on application-functionality and Coleman (1995) also provides twelve categories of CTs in the same domain. Mentzas (1993) classifies CTs’ software based on four major criteria: co-ordination model characteristics, type of processing, decision support issues and organizational environment.

This study focuses on a classification of CTs based on the work of Nunamaker et al. (1997), DeSanctis and Gallupe (1987) and Pinsonneault