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Client/Server Technology Adoption in Organizations: An Innovation Diffusion Approach

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Introduction

Global competition is forcing many of today's organizations to find new ways to manage their operations in order to survive. Client Server (C/S) technology refers to an architecture in which an application (client) asks for and receives data and information services from another application (server) (Lile 1993).

IDC estimates suggest there will be 100 million C/S networks by 1998. Corporations worldwide are charging ahead with their plans to scrap traditional mainframes in favor of C/S networks (Jander 1994). However, migrating to C/S from traditional mainframe systems has often been riddled with technological and management problems (Schultheis and Bock 1994). In addition, the potential benefits of C/S technology can only materialize if it is widely adopted within the organization. Widespread adoption, in turn, contributes to the continued viability of C/S technology (Nickerson 1994).

Literature Review

Client/Server technology is more than just a technology; it provides a foundation to build better relationships with end-users and make organizational changes (van Kirk 1993). Organizations find C/S technology compelling for a number of reasons such as improved customer satisfaction, reduced computing cost, increased organizational productivity, and rapid application development (Nickerson 1993).

Based on the premise that innovations diffuse because of perceptions of using innovations (Moore and Benbasat 1991), this study focuses on new and potential adopters. Although intention does not always lead to actual adoption, it is significantly related to adoption and is the best available measure for products that are in the early stages of their life cycles (Morrison 1979).

Research Model and Questions

Innovation diffusion theory (Rogers 1983) posits that perceived innovation attributes that influence adoption include: relative advantage, compatibility, complexity, observability, and trialability. In addition, these factors have been observed to predict future rates of innovation adoption in many instances (Ostlund 1974; Teo et al. 1995). It has also been suggested that the perception of innovation attributes may have an impact on the outcome of implementation success (Brancheau and Wetherbe 1990).

Two important research questions that merit investigation include:

1. What are the factors that significantly influence the adoption intention of C/S technology in organizations?

2. Given the importance of some of these factors, which factors are critical for the successful deployment of C/S technology in organizations?
Operationalization of the Research Constructs

**Relative advantage** is the degree to which using an innovation (C/S technology) is perceived as being more advantageous than using its precursor (some other technology). It leads to increased efficiency, effectiveness, and increased economic gains (Davis et al. 1989; Rogers 1983). Relative advantage was also found to be an important factor influencing adoption in a meta-analysis of innovation studies (Tornatzky and Klein 1982). The importance of relative advantage as a predictor of adoption intention was confirmed in a study of C/S technology adoption in financial markets (Holland et al. 1994) and in marketing channels (O'Callaghan et al. 1992). Hence, we hypothesize

**H1a**: The greater the perceived relative advantage of using C/S technology, the more likely the present intention of an organization to adopt it.

**H2a**: The greater the perceived relative advantage of using C/S technology, the more likely the successful adoption of C/S technology in organizations.

**Complexity** is the degree to which using and understanding an innovation (C/S technology) is perceived as a difficult task. Researchers have suggested that a complex innovation reduces likelihood of adoption because it requires more skills and effort in order to adopt (Cooper and Zmud 1990; Dickerson and Gentry 1983). Complexity has been widely recognized as an inhibitor of adoption (Grover 1993; LaBay and Kinnear 1981; Rogers 1983). Hence, we hypothesize

**H2a**: The greater the perceived complexity of using C/S technology, the less likely the intention of an organization to adopt it.

**H2b**: The greater the perceived complexity of using C/S technology, the less likely the successful adoption of C/S technology in organizations.
**Compatibility** is the degree to which using an innovation (C/S technology) is considered as consistent with existing organizational values, experiences, and needs. In the context of C/S technology, it can be assessed in terms of technical compatibility (with existing hardware and software) and organizational compatibility (with current objectives, culture, and functioning) (Yourdon 1994; Nickerson 1993). Grover (1993) found that compatibility was a predictor of information technology innovations. Also positive empirical association between compatibility and adoption behavior has been found (Holak and Lehmann 1990; Ettlie et al. 1984). Hence, we hypothesize

H3a: The greater the perceived compatibility of using C/S technology, the more likely the intention of an organization to adopt it.

H3b: The greater the perceived compatibility of using C/S technology, the more likely the successful adoption of C/S technology in organizations.

**Trialability** is the degree to which using an innovation can be carried out on a limited basis prior to adoption. Rogers (1983) argues that potential adopters are likely to feel more comfortable with innovations that can be experimented, thus increasing the likelihood of adoption. In the C/S technology context, there have been calls made to adopt the technology at the individual unit level (Borkovsky 1993), while some others have suggested that C/S technology must be implemented at an enterprise-level in order to be successful (Martin 1994; Yourdon 1994). However, given the overwhelming anecdotal evidence of the criticality of enterprise-wide adoption for successful C/S adoption, we hypothesize a negative association of trialability with adoption intention and adoption success.

H4a: The greater the perceived trialability of using C/S technology, the less likely the intention of an organization to adopt it.

H4b: The greater the perceived trialability of using C/S technology, the less likely the successful adoption of C/S technology in organizations.

**Observability** is the degree to which using an innovation (C/S technology) generates results that are observable and can be communicated to others. Demonstrability of an innovation in the form of results has a strong impact on adoption decision (Zaltman et al. 1973). Similarly, Rogers and Shoemaker (1971) suggest that ease and effectiveness with which results of using an innovation can be communicated to others have a significant influence on adoption decision. In the context of C/S technology, the need for tangible results is more critical because of the high risk and level of investment involved in the effort (Jander 1994; Martin 1994). Though several studies have reported no significant relationship between observability and adoption behavior (Bouchard 1993; Holak and Lehmann 1990), given the nature of the C/S environment and the technology we hypothesize that observability will vary positively with adoption intention and adoption success.

H5a: The greater the perceived observability of using C/S technology, the more likely the intention of an organization to adopt it.

H5b: The greater the perceived observability of using C/S technology, the more likely the successful adoption of C/S technology in organizations.

**Research Methodology**

There has been substantive and diverse research on innovation diffusion (Brancheau and Wetherbe 1990; Rogers 1983; Tornatzky and Klein 1982). All questions were phrased from the perspective of both actual and potential adopters (Moore and Benbasat 1991) and anchored on a 7-point scale from extremely disagree (1) to extremely agree (7). Items on relative advantage were based on C/S literature (Yourdon 1994; Jander 1994). Questions on compatibility were adapted from Grover (1993) and O'Callaghan et al.
(1992). Questions on complexity were adapted from Bouchard (1993), Grover (1993), and Dickerson and Gentry (1983). Questions on observability and trialability were modified from Moore and Benbasat (1991).

The survey methodology was adopted to conduct this research. The target respondents are key IS employees from Fortune 500 organizations. Pilot-testing of the survey instrument was carried out to strengthen construct validity and to ensure unambiguity in the questions.