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Factors Affecting the Planning and Implementation of Emerging Telecommunications Technologies

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Abstract

This paper outlines an ongoing empirical research project to identify a set of factors affecting the proliferation of emerging telecommunications technologies in organizations. Organizations (educational institutions, businesses, etc.) need to understand telecommunications technology from both planning and implementation perspectives to achieve quality high performance networking in the future. The research will consist of four stages: formulating a conceptual framework, gathering data from organizations using computer networks, analyzing the data to determine trends and opportunities in telecommunications deployment, and determining an optimal strategy for organizational migration to an emerging telecommunications technology.

Introduction

The advantages and strategic importance of effective use of telecommunications in organizations has been well documented in IS literature (Clemons and McFarlan, 1986; Grover and Goslar, 1993). Surprisingly, however, few works have attempted to investigate issues that are specific to the nature of telecommunications in contrast to issues of information systems in general. In addition, there has been a lack of research in IS surrounding issues specific to new, or emerging, technologies and the complications that they present for organizations. Our research aims to simultaneously make contributions towards filling these two gaps in the IS body of knowledge. Specifically, we aim to answer the following research questions.

1. Does the nature of telecommunications technology give rise to issues that are not problematic or important in other types of technologies?
2. What factors affect the planning and implementation of an emerging telecommunications technology?

In this paper, we outline the current status of this research project and explicate potential results to be presented at the AIS conference. We begin by describing our conceptual model, and then we shall discuss the current status of our research.

A Model for Telecommunications Technology Planning and Implementation

A comprehensive model showing the factors that affect telecommunications technology planning and implementation is given in Figure 1. There are five general categories of factors that directly affect the planning and implementation of telecommunications technology diffusion and migration. Also, some additional factors that have an indirect impact are shown to impact two of the five major categories. The five primary categories are explained briefly in the following paragraphs.

- IT Maturity — IT maturity refers to (1) the capability of the organization to accept and adopt new information technologies, based upon the capability maturity model for software process improvement (Herbsleb, et. al., 1997) and (2) the extent to which the organization has a mature information technology infrastructure.
- Business and Telecommunications Interdependence — In investigating the impact of any new technology on an organization, one must examine how that technology will affect the firm's core business processes. If a change in infrastructure is critical to the business, the transition will have to be approached in a completely different manner as opposed to the case of a non-critical system. For example, the impact of telecommunication on a firm's value chain and market position are crucial factors that will influence the planning and implementation of the new system (Clemons and McFarlan, 1986).
- Human Factors—The influence of human factors on planning and implementation decisions has been well documented in both IS and management literature. What has not been examined rigorously, however, is the dichotomy of opinions that is typically present in emerging technologies management. For example, in many organizations there is an ongoing debate over the future of the wide-area network. Our initial studies have shown that in a typical organizations there are two "camps." Each of these groups has its own view of the proper emerging technologies to implement.
- Economic Factors—Although environmental uncertainty and other market factors have indirect impacts on diffusion and migration (Grover and Goslar, 1993; Chau and Tam, 1997), a certain class of economic factors can have a direct influence. For example, cost tradeoffs can doom a project even if the project appears outstanding in all other facets.

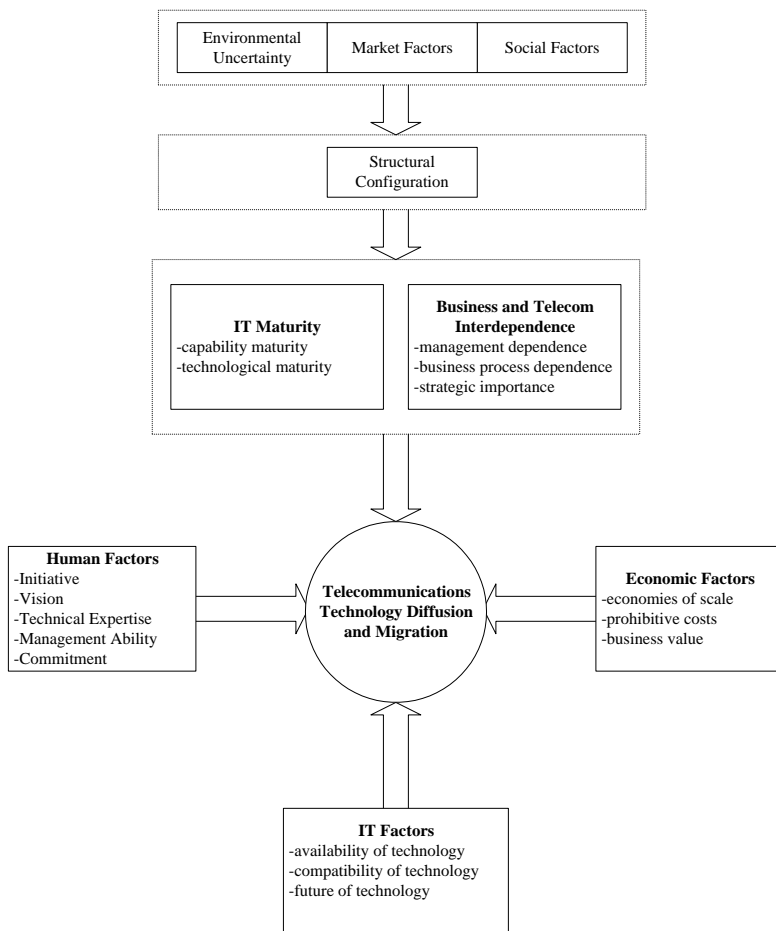


Figure 1. Factors Affecting Telecommunications Technology Planning and Implementation

to emerging telecommunications technologies. The proposed research is the first step towards accomplishing this goal. The research will attempt to demonstrate a proven, validated set of factors for organizations to consider as they face the daunting task of establishing an information infrastructure.

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- *IT Factors*—The final category consists of purely technological factors. For example the availability, compatibility, and future progress of technologies are important considerations for adopters (Chau and Tam, 1997). Planning considerations must be made such that the needed technology is available, the new technology is compatible with legacy systems, and that the technology will have an acceptable position in the future market.

Current Research

We have completed the first phase of our research, the theoretical model of factors affecting telecommunications planning and implementation. We are currently in the process of collecting data from various organizations to empirically validate the theoretical model. We have selected a set of four organizations to examine in detail. We plan to visit these organizations and interview managers and end users to validate the proposed factors in the conceptual model. In addition, we will examine network installations and infrastructures to evaluate the completeness of our implementation approach.

Conclusions

With the advances in multimedia technologies, the need for high performance networking is greater than ever before. Many technical issues have been addressed, and now all that remains is for organizations to determine the best ways to plan for and implement computer networking technologies. In order for these advances to occur, much research must be done to determine the best way for an organization to upgrade existing computer networks