

8-15-1997

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Recommended Citation

Slyke, Craig Van, "The Diffusion Of Technology Cluster Innovations: The Case Of The Internet" (1997). *AMCIS 1997 Proceedings*. 272.

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The Diffusion Of Technology Cluster Innovations: The Case Of The Internet

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Introduction

The Internet has exploded into the consciousness of businesses with a speed few information technology (IT) innovations can match. Although the basic ideas for the Internet were first discussed in 1973, by January 1993 only approximately 21,000 Internet domains existed. By January 1995 this number jumped to 71,000, and by January 1996, the count skyrocketed to 240,000 (Network, 1996). Understanding what can account for this accelerating pattern of diffusion may provide additional insights into the factors that impact the diffusion rate of IT related innovations.

As businesses scramble to understand how to make use of this "new" technology, researchers struggle to understand the factors that may have caused the recent explosive increase in the Internet's diffusion rate. Such understanding may help IT designers gain insight into how to develop new technologies that can enjoy even more rapid success.

Given Roger's (1995) definition of an innovation, it seems reasonable to consider the Internet as an IT innovation and consequently to study its diffusion from a diffusion of innovation perspective. The purpose of this study is to investigate the growth in the business use of the Internet from a diffusion of innovation perspective. In particular, this study examines whether the innovation of the Internet is best characterized as a cluster of technologies rather than as a single innovation, and how the addition of technologies to the cluster may impact adopter perceptions of the characteristics of the Internet innovation. These perceptions are thought to influence the diffusion rate (Rogers, 1995).

Although the diffusion of innovations, including IT innovations, is a well researched area, the Internet is somewhat of a special case--it is not a single innovation but perhaps is better viewed as a *cluster* of related technologies. Elements of technology that are seen as being interrelated are known as technology clusters (Rogers, 1995, p. 235). The same concept is also referred to as multi-product innovations (Peterson & Mahajan, 1975). The relationship among the various elements of the cluster vary. In some cases the technologies are complementary--an adopter may not realize the full benefit of adopting a particular technology without its complement (Moore & Chin, 1991). It may also be that one of the technologies is contingent on the adoption of another (Peterson & Mahajan, 1975). Other relationships, such as addressing a similar function or sharing a common platform are also possible. These technology clusters have not been extensively researched (Rogers, 1995, p. 236). This study is an attempt to gain an understanding of the diffusion of technology clusters by studying the diffusion of the Internet.

Research Questions

This study will investigate two broad research questions. First, *is the diffusion rate of the Internet better explained by characterizing the Internet as a cluster of related technologies than by characterizing it as a single technology?* If the first research question is answered in the affirmative, then a second question follows. *How does the addition of elements to the technology cluster impact the diffusion rate of business use of the Internet?* In particular, this study will investigate how additional elements impact adopters' perception of several innovation characteristics, including complexity, trialability, observability, compatibility and relative advantage (Rogers, 1995).

Methodology

This study will consist of two phases. In the first phase, mathematical modeling techniques will be employed to investigate whether the addition of elements to the Internet cluster impacts the diffusion rate. The second phase, which examines the second research question, will survey firms which have recently adopted advanced email client software to replace less sophisticated email front-ends. This new client software can be considered a new cluster element.

Expected Contributions

This research is important in at least two ways. First, it adds to our understanding of the diffusion of innovations by adding to what we know about technology clusters, as called for by Rogers (1995, p. 235). Second, the research will help us better understand the diffusion of a particularly important technology cluster, the Internet.

References are available on request.