Investigating healthcare professionals' decisions to accept telemedicine technology: an empirical test of competing theories

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Abstract

The proliferation of information technology (IT) in supporting highly specialized tasks and services has made it increasingly important to understand the factors essential to technology acceptance by individuals. In a typical professional setting, the essential characteristics of user, technology, and context may differ considerably from those in ordinary business settings. This study examined physicians' acceptance of telemedicine technology. Following a theory comparison approach, it evaluated the extent to which prevailing intention-based models, including the technology acceptance model (TAM), the theory of planned behavior (TPB) and an integrated model, could explain individual physicians' technology acceptance decisions. Based on responses from more than 400 physicians, both models were evaluated in terms of overall fit, explanatory power, and their causal links. Overall, findings suggest that TAM may be more appropriate than TPB for examining technology acceptance by individual professionals and that the integrated model, although more fully depicting physicians' technology acceptance, may not provide significant additional explanatory power. Also, instruments developed and repeatedly tested in prior studies involving conventional end-users and business managers may not be valid in professional settings. Several interesting implications are also discussed. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: IT acceptance and adoption; Telemedicine; Technology management; Structural equation models; Professional users

1. Introduction

Recent information technology (IT) developments have expanded into areas that can be broadly characterized by their technology applications and targeted users. To excel, or even survive, most businesses continue to rely on, and indeed accelerate, heavy investment in IT. Concurrently, various IT applications designed to support highly specialized tasks and services by individual professionals have also proliferated. A case in point is telemedicine technology for healthcare professionals. Understandably, physicians are among the principal users of this technology and have profound influences on its success. Physicians may exhibit interesting or fundamental differences from ordinary business user groups, in part because of their professional training, etc.

Most telemedicine research has focused on the technology developments and clinical applications

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essential to its success. Consequently, there has been limited discussion of managerial issues that are arguably equally important. This study investigated user technology acceptance in healthcare organizations already providing or planning to provide telemedicine-enabled patient care and services. Thus, examining the validity and explanatory (or predictive) utility of prevalent theories or models in a professional setting is particularly interesting and timely.

Specifically, this study examined and compared the technology acceptance model (TAM) [14,15] and the theory of planned behavior (TPB) [1,2]. Both TAM and TPB are leading theoretical models for such research and have accumulated fairly strong empirical support involving various end-users and business managers. We also examined a model integrating elements derived from both TAM and TPB. In a nutshell, theory testing follows replication logic and hence makes theory comparison an attractive approach, i.e. generating support for a theory (or some theories) and, at the same time, singling out the potential limitations of others. Using the responses from a survey study that involved more than 400 physicians, the research effort evaluated and compared the extent to which the respective models could explain individual physicians' intention to use telemedicine technology. The causal paths specified by each model were also examined.

2. Telemedicine and its technology adoption

Recent advances in telemedicine technology are an important form of IT-enabled delivery and decision support for healthcare professionals. Persistent problems plaguing contemporary health care, including access, quality, resource distribution, and cost containment, have contributed to telemedicine's economic, social, and political appeal. A fast-growing number of telemedicine programs have been established (or are under way) around the world [21]. In a fairly comprehensive review of telemedicine and its clinical applications, Perednia and Allen [34] suggest that the ultimate success of telemedicine requires that an adopting organization address not only technological but also managerial challenges, including user technology acceptance. Payton [33], in her study of three inter-organizational health care information systems

(IS), also concludes "physicians clearly played the most significant role in the implementation process" (p. 315). Given the potential impact of telemedicine technology, it is therefore important to investigate factors essential to its acceptance by individual physicians.

Compared with end-users and business managers commonly studied in prior research, physicians may make technology acceptance decisions differently. For instance, many physicians are not particularly technology literate, in spite of their general competence and learning capacity. Having experienced highly demanding educational and specialized training, physicians are experts in their own profession and accustomed to practice in a particular way or style similar to that in which they were trained. Findings from prior studies suggest that physicians are reluctant to give a positive response to implementation of an IS that interferes with their traditional routines [4,5]. In addition, physicians usually practice with relatively high autonomy.

Several previous studies have examined physician acceptance of telemedicine technology [3,18,26,27, 30]. However, most of them were limited in scope and scale and, more importantly, tested hypotheses that lacked adequate theoretical foundations. Examinations of user technology acceptance have been fairly abundant, particularly involving conventional end-users and business managers. TAM and TPB have emerged as two dominant models and together provide a theoretical foundation upon which an integrated model was developed and examined.

3. Research scope and investigated models

In this paper, telemedicine refers to the use of IT to support healthcare services and activities via electronic transmission of information or expertise among geographically dispersed parties, including physicians and patients, in order to improve service effectiveness and resource allocation/utilization efficiency [7]. Technology acceptance is defined as "an individual's psychological state with regard to his or her voluntary or intended use of a particular technology" [17]. Collectively, findings from most prior research suggest that an individual's intention to use a technology can sufficiently approximate or measure his or her