What influences ERP beliefs — Logical evaluation or imitation?

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ABSTRACT

Various models have been proposed to explain information technology (IT) adoption behavior. However, these models are based primarily on logical deliberation. In reality, it is impossible to obtain perfect information for a logical evaluation of new or emerging IT. In this situation, sometimes the "best alternative" is imitation. This study proposed an integrated model (based on diffusion of innovation and imitation models) that examines the effect of these two opposing forces on the beliefs of enterprise resource planning (ERP). This study also explored how these relationships were affected by the temporal effect of adoption, as well as the extent of implementation. Our findings indicate that imitative forces, along with logical evaluations, are shown to have a consistent direct effect and significant indirect effect on beliefs. Our study also indicates that ERP adoption time and extent have different effects on imitation and logical evaluation behaviors. Hence, imitative forces play a crucial role in the decision-making process, which opens up a new avenue for research into technology adoption.

1. Introduction

In the last two decades, various well-tested approaches, including the technology adoption model [14], diffusion of innovation (DOI) theory [56], theory of reasoned action [17,30], theory of planned behavior (TPB) [4], and the Triandis model [64], have been applied to explain information technology (IT) adoption behavior. Many researchers (see, e.g., [10,42]) have attempted to expand and/or modify the original models to make them more theoretically complete. However, by nature of their assumption – that all adoption processes are systematically conducted and follow a rational path – these models still focus primarily on logical deliberation.

In reality, we believe that there are two opposing forces influencing the beliefs of an individual or organization when IT adoption decisions are being made: logical evaluation and imitative forces. Belief is the psychological state in which an individual holds a proposition or premise to be true. A belief about an IT is the subjective psychological state regarding the potential of that IT [36]. Extant explanations of why users behave in particular ways toward ITs have tended to focus predominantly on beliefs as the driver [2,4], thus confirming the importance of belief in understanding IT behaviors. In the last two decades, belief has been an underlying theme among many popular models in the information system (IS) field even though these models diverge widely in their objectives and focuses. However, research into belief (see, e.g., [3,5]) has focused only on the explanation of the logical causation and formation of belief, leaving the non-logical factors unexplored. Moreover, belief from an individual perspective has been investigated whereas few studies have addressed IT adoption initiated at a committee level. Therefore, research is needed to explore belief formation from diverse perspectives, with evaluation of both logical and imitation forces in the same setting at the group or committee level.

Of the ITs adopted at the organizational level, enterprise resource planning (ERP) systems have been widely researched and adopted. An ERP system is a business support system that maintains in a single database the data needed for a variety of business functions, such as manufacturing, supply chain, financial, project, human resource, and customer relationship management. In the last decade, companies are increasingly utilizing ERP systems because these systems are believed to be effective in reducing costs and increasing profit margins [57]. In practice, however, assimilation of an ERP system is complex, and ERP success is even harder to achieve [68]. Often, a steering committee, which includes representatives from many departments and functional groups, will be formed to gain a better understanding of the constraints and requirements of the company in adopting an ERP system. The beliefs of these committee members about the system then affect their subsequent psychological states and adoption behavior, as theorized in TRA, TPB, TAM, DOI, and other adoption models. Hence, the forces that shape such beliefs, which can be manipulated through various interventions [66], must be investigated.

The purpose of this study is to fill this research gap by examining how logical and imitation forces impact the beliefs of ERP steering committee members and studying the interaction of these two types of forces on ERP beliefs. This study will also explore how these

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relationships are affected by the temporal effect of adoption, as well as the extent of ERP implementation. In this study, DOI is chosen as a reference model for logical ERP adoption forces because of its maturity and theoretical completeness, along with its capacity to investigate organizational ERP systems. The imitation model [24] is chosen as a reference model for illogical adoption forces because of its comprehensive classification of imitation modes.

2. Theoretical background

2.1. Imitation theories

Organizational theorists have frequently investigated the phenomena of inter-organizational imitation of business practices and structures, using several theories of organizational action [23]. Theories of organizational learning, for example, argued that organizations imitate other organizations so that they could adapt to the changing environment for survival and competitiveness. Learning also allows imitators to enjoy second-mover's advantages, particularly in cost savings and risk avoidance associated with experimentations [34,35]. Theories of institutionalization, however, argued that imitation is one of the processes through which organizations change over time to resemble other organizations that face the same set of environmental conditions [16,25]. These theories identified three basic mechanisms through which isomorphism occurs: coercive mechanism that stems from political influence and the need for legitimacy, mimetic isomorphism resulting from standard responses to uncertainty, and normative isomorphism associated with professionalism [16,28]. March [41] called the mimetic isomorphism an obligatory action, which suggests that organizations mimic actions of other organizations without thinking when such actions were endorsed by a critical number of organizations. Evidence of inter-organization mimetic behaviors have already been confirmed in a wide range of institutionalism investigations (such as [18] and [62]).

Drawing on institutional and learning theories, Haunschild and Miner [24] distinguish three distinct modes of inter-organizational imitation — frequency based, trait based, and outcome based. In frequency-based imitation, if there are enough social actors carrying out a particular action, then this action will be taken for granted and other social actors will take similar action [41]. Trait-based imitation can be seen as a more selective form of imitation [39]. Organizations often identify themselves with other organizations that they view as more legitimate or successful, because this is what they are all striving to achieve. In doing so, the former mimic the course of action of the latter based on the belief that actions taken by successful organizations will be more likely to yield positive outcomes. Outcome-based imitation is based primarily on the perceived consequences of practices; therefore, organizations will tend to adopt the practices of other organizations that yield positive or successful outcomes.

In the past decade, researchers in IS discipline had devoted more effort to assess the role of mimetic pressures in the adoption and diffusion of ITs. Tan and Teo [60], for example, investigated financial EDI technology and found imitation to be critical to its adoption intention. Similarly, Ang and Cummings [6] found peer practices to have significant impact on outsourcing decisions in banking industry. Along the same line of research, Son and Benbasat [59] have validated two types of mimetic pressures – the extent of adoption by competitors and the perceived success of competitor adopters – to have significant impact on the adoption intention of B2B electronic marketplace. Liang et al. [36] also found imitation pressures to have direct effect on top management belief in the assimilation of enterprise systems.

2.2. Diffusion of innovation theory

DOI research generally focuses on evaluating the relationship between innovation characteristics and success in adoption and diffusion, and adopts either an adoption or a diffusion perspective. The adoption perspective evaluates the organizational characteristics that create a culture receptive to innovation and change [33], whereas the diffusion perspective investigates the innovation characteristics that lead to the widespread acceptance of IT [52]. DOI research has been conducted in many different disciplines, including sociology, economics, marketing, management, operations management, and information systems. Much of the research conducted has been related to innovations adopted by individuals. Research of DOI at the organizational level is still limited, probably because of the methodological complexity in identifying the decision-making unit and devising measures for data collection.

The success of innovation adoption and diffusion, to a great extent, is dependent upon the characteristics of the innovation as perceived by the organization [15,61]. Consequently, many DOI studies in the past few decades have investigated the effect of innovation characteristics on its adoption and diffusion. This line of research indicates that a large number of innovation characteristics are critical to the adoption and diffusion of various types of innovation [56], including compatibility, relative advantage, complexity, cost, communicability, divisibility, profitability, social approval, trialability, and observability. Of these characteristics, compatibility, relative advantage, and complexity were consistently found to be significant [63].

In this study, DOI represents the technical evaluation of an ERP system in a systematic and logical manner. Committee members go through the evaluation process together, analyzing the features, functions, capacities, costs, and benefits of the ERP system intended for adoption. Sometimes the evaluation process is assisted by ERP vendors, who may provide statistics and experience on ERP adoption, usage, and implementation. Such information affects the beliefs of ERP committee members resulting in a more informed scientific and logical evaluation process.

3. Research model

The three research models examined in this study are the imitation, DOI, and proposed integrated model (shown in Fig. 1). In the imitation part of our model, we have included Haunschild and Miner's [24] three forms of imitative behavior – frequency based, trait based, and outcome based – to attempt to evaluate their effects on the beliefs of ERP steering committee members. In the DOI section, only three variables – relative advantage, complexity, and compatibility – were considered for testing because they were found to be the most significant factors in Tornatzky and Klein's [63] meta analysis and are widely accepted. In the integrated model, we believe that imitative adoption behavior will have a direct effect on logical DOI behavior in the ERP evaluation process because of bounded rationality. These two types of behavior will subsequently impact the beliefs of ERP steering
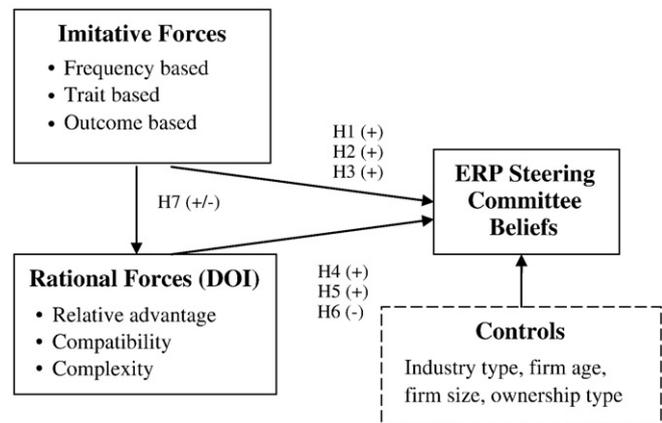

Fig. 1. The research model.