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RESEARCH ARTICLE

Theoretical Model of E-Business Infusion in Manufacturer-Reseller Relationships

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Abstract: Manufacturer-reseller relationships are becoming much more technology-infused as distribution managers are employing e-business tools to streamline existing channels. This paper attempts to develop a theoretical framework aimed at systematically studying e-business infusion in reseller-manufacturer interactions based on technology diffusion and governance frameworks and relevant propositions are developed. Implications of the theoretical framework for researchers and managers are discussed.

Keywords: E-business infusion · Channel relationships · Technology adoption · Governance · Technology benefits

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Introduction

Inter-organizational relationships are undergoing dramatic changes as manufacturers attempt to capitalize on the proliferation of web-based business software, commonly referred to as e-business tools (Wu et al. 2002). The Web offers a cost-effective and ubiquitous platform for manufacturers to establish new and augment existing relationships with a diverse stable of resellers (Soliman and Janz 2004). Proprietary business software is increasingly designed to function in the web environment to assist manufacturers with the management of their relationships with intermediaries. Previous research in marketing examined firm's use of information technology, such as electronic data interchange (EDI) adoption in distribution channels (O'Callaghan et al. 1992), laptop adoption by executives (Gatignon and Robertson 1989; Robertson and Gatignon 1986), sales force automation technology (Speier and Venkatesh 2002) and e-business technology adoption (Srinivasan et al. 2002; Wu et al. 2002). Lately, empirical results from Brodie et al. (2007) confirmed that e-Marketing (eM) is starting to come of age, and there has been an increase in the penetration of eM. Also, the adoption of eM is positively associated with performance (Brodie et al. 2007).

The latest research in technology infusion examines e-business adoption from a business process approach, studying the extent of use of e-business tools in various firm processes, from accounting and sales processes to business communications (Speier and Venkatesh 2002; Srinivasan et al. 2002; Wu et al. 2002). Advances have been made in investigating the various antecedents of e-business adoption in executing these business processes. For example, Srinivasan et al. (2002) study antecedents of e-business adoption in organizations such as technological opportunism, institutional pressures and ownership of complementary assets. Wu et al. (2002) examine different antecedents of the intensity of e-business adoption including firm characteristics and competitive environment factors. However, the interorganizational conditions that may affect the extent of e-business infusion are given little attention in the extant marketing literature. As the Internet opens up more options for manufacturers in terms of modifying or augmenting existing channels (Mirani et al. 2001) it is important to understand the interfirm, relationship dynamics that may have a bearing on e-business adoption. To date, various relationship factors' impact on e-business infusion in manufacturer-reseller relationships has not been systematically studied in the marketing literature.

Research Question

The purpose of this article is to draw on different perspectives on technology adoption and the business relationship literature to develop and present a theoretical framework to study interfirm e-business infusion. So, the research question we try to answer is does it make sense for researchers to explore both technology and relationship variables when studying e-business adoption in the manufacturer-reseller dyad? Do the benefits of technology accrued to the channel dyad mediate the impact of governance and technology variables on the e-business infusion? To the best of our knowledge these questions have not been explored in previous research.

Methodology

We attempt to answer our research question by employing literature research of technology adoption and business-to-business literature. This is typically a first step in researching a novel topic and the purpose is to devise a general framework for future research. This research contributes to the existing literature by both examining e-business infusion at the dyadic level and incorporating relationship factors such as governance processes as factors contributing to perceived benefits of technology.

Definitions and Perspective

For the purposes of this research we define e-business infusion as usage of web-based software tools in a manufacturer-reseller dyad. We try to examine the phenomenon of e-business from both manufacturer and reseller perspective, as this may provide a fuller picture of the interorganizational dynamics of e-business.

In the following section, we explore a set of theoretical perspectives on technology infusion and interfirm governance. These frameworks are essential to understanding the e-business infusion in the channels phenomenon. Finally, we discuss the implications of the framework for marketing theorists and practitioners.

Relationship Management

Marketing theorists and practitioners are placing a substantial emphasis on the business relationship development and its role in making strategic and tactical business decisions in the channels of distribution (Weitz and Jap 1995). There is a growing body of knowledge concerning business relationships, as well as theoretical frameworks for a systematic study of business relationship types and their outcomes (Heide 2003).

Governance Theory

Governance is a method for managing relationships. Synthesizing theoretical frameworks such as transaction cost economics (Williamson 1985), Macneil's (1978) relational contracting theory, and others, Heide (1994) delineated a taxonomy of governance archetypes and governance processes associated with them. Heide (1994) explains that there are three 'generic' modes of governing a relationship: market governance and two types of non-market governance: unilateral/hierarchical and bilateral. Such taxonomy matches previous work in governance that distinguished among price, authority and trust (Bradach and Eccles 1989). Heide (1994) contends that in maintaining a business relationship, six governance processes take place: enforcement, role specification, planning, adjustments, incentives, and monitoring. By observing how these processes are carried out by channel partners, we can classify a relationship into one of the three modes of governance (Heide 1994):

> Three governance forms differ in their general approach to managing relationships. Market governance relies primarily on the design of an incentive structure for obtaining certain behaviors, whereas hierarchical and bilateral governances rely on a combination of rules and monitoring and socialization efforts, respectively (p. 82).

Although theoretically we may make the distinctions among these different processes, Heide (1994) concedes that in practice various methods could be combined based on idiosyncrasies of the relationship or problem at hand. Importantly, firms may use various mechanisms outlined as substitutes for each other, depending on their effectiveness in a certain relationship (Cannon et al. 2000; Heide 2003). The mode of relationship management plays a critical role in the adoption of interorganizational information, including e-business infusion. The governance processes provide guidance on how a relationship is managed between the channel parties. By examining these processes we can derive implications for e-business adoption phenomenon within a given manufacturer-reseller relationship.

Technology Adoption

Innovation diffusion theory (Moore and Benbasat 1991) provides a rich framework and a number of variables to study in technology adoption context, both in individual and organizational setting. Information science scholars outline five major factors of technology that influence its adoption: relative advantage, compatibility, complexity, triability and divisibility. Among these, relative advantage and compatibility are considered to be the most significant factors (Tornatzky and Klein 1982). Interestingly, compatibility is not narrowly defined as the compatibility of an innovation with existing technology but broadly as compatibility with existing routines, procedures and processes. Research in information systems (Moore and Benbasat 1991) suggests additional explanatory variables such as image, visibility and results demonstrability, are all important in an organizational setting. Technology Acceptance Model (TAM; Davis et al. 1989) and the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al. 2003) incorporate psychology theories and variables to explain the use and acceptance of technology at the individual level. Additionally, Sykes et al. (2009) extend our understanding of technology adoption by incorporating social network variables such as network density and network centrality.

Other broad factors such as firm capabilities, institutional pressures and competitive factors have been studied before in the marketing literature (Wu et al. 2002; Srinivasan et al. 2002; Robertson and Gatignon 1986), as well as individual salesperson factors (Speier and Venkatesh 2002). The only study in marketing that examined technology adoption in a channel of distribution setting is O'Callaghan et al. (1992), which explores EDI systems used by insurance companies and their agents. In addition to the above mentioned variables of technology diffusion, they examine the effects of the influence of a channel partner on adoption decision.

E-Business Infusion

For the purposes of this research, e-business infusion is defined as the extent to which a manufacturer-reseller dyad uses e-business tools (i.e., web-based business software tools). E-business infusion is distinct from both information technology (IT) infusion (Ahearne and Schillewaert 2001) and technology infusion (Bitner et al. 2000; Winston and Dologite 1999) in two important ways. First, whereas IT infusion is conceptualized on a salesperson level and technology infusion is conceptualized on a firm level, e-business infusion is conceptualized on a dyadic level, as a characteristic of a particular manufacturer-reseller dyad. For instance, Xerox is driving to implement e-business tools in their internal and external operations. IT infusion and technology infusion would refer to their internal operations, whereas e-business infusion would refer to their external operations with resellers and suppliers. Xerox uses a similar term, "e-business injection." Second, our conceptualization and measurement differs from IT infusion and technology infusion as it focuses on business tasks, both supply and demand, that are more managerially relevant in the channel context. Our definition is consistent with Wu et al.'s (2002) process and domain based definition of e-business adoption intensity. Specifically, e-business infusion relates to the domain of supplier relationships and processes of performing demand and supply tasks.

Channel interactions can be divided into demand and supply tasks (Frohlich and Westbrook 2002; Hekkila 2002). *Demand tasks* are activities that occur between the manufacturer and reseller and are intended to stimulate orders for the manufacturer's products. Such demand-generation tasks cover promotional activities that are often performed by both reseller and manufacturer and thus constitute a relationship connector between them. Another such connector is the performance of *supply tasks,* activities intended to ensure adequate supply of manufacturer's products to end users. These supply-fulfillment tasks include logistical and supply management activities. This fundamental separation between tasks has been reflected in the scholarly discussions of Supply Chain Management (SCM) and Demand Chain Management (DCM) concepts (Frohlich and Westbrook 2002; Hekkila 2002). Essentially, the discussion centers on the perspective of management when crafting interorganizational linkages. SCM concept emphasizes total cost reduction or efficiency aspect in the interorganizational chain, whereas DCM concept focuses on the customer satisfaction and improvements in demand generation and monitoring (Hekkila 2002). Demand and supply tasks in a channel also have been referred to as transaction creating services and physical fulfilling services respectively. Even though both categories of tasks can and have been handled through traditional methods (i.e. telephone, fax, mail, EDI), web-based e-business tools can potentially streamline demand and supply tasks (Frohlich and Westbrook 2002).

Reunis et al. (2004, 2006) pioneering work on e-ordering adoption at the individual level provides great insights into the process. For example, Reunis et al. (2004) discovers that e-ordering system adoption by individuals is sped up by frequent interventions that could 'align' individual and company benefits. Reunis et al. (2006) establishes nine determinants of technology dissemination: perceived advantage, demonstration, risk reduction, communication, involvement, training, reward, enforcement and disposition. Interestingly, the first four determinants broadly resemble variables studied in the tech-

nology adoption literature and the last five resemble governance processes suggested by Heide (1994). Although, Reunis et al. (2004, 2006) studied e-business infusion on an individual level, we propose these findings would provide guidance and prove to be similar in the interorganizational setting. So, a source company (either a manufacturer or a reseller) may use a combination of rewards, enforcements, monitoring etc. to affect change in the target company. So we propose:

P1: Governance, in the form of six governance processes, will impact e-business infusion (both supply and demand) in manufacturer-reseller relationships.

As discussed in the technology adoption section, technology variables explain a large amount variance in adoption of technology and this would probably apply to e-business infusion in the manufacturer-reseller context. So, we propose:

P2: Technology variables of relative advantage, compatibility, complexity, triability and divisibility will have a major impact on e-business infusion (both supply and demand) in manufacturer-reseller relationships.

So far, we have suggested that e-business infusion determinants may be very similar to adoption of technology on an individual level. However, as mentioned before, resellers and manufacturers may have different benefits as they may have different business goals (Kim et al. 1999). Therefore, e-business infusion in both supply and demand tasks is impacted by the nature of the existing relationship (i.e. how parties manage these tasks) as well as the technology in question. However, rational firms would not necessarily adopt technologies that are perceived to be detrimental to their operational or strategic interests, so the next section examines benefits that e-business infusion may accrue to manufacturers and resellers.

Benefits of E-Business Infusion

Previous research suggests significant operational efficiency effects of information technology (Downing 2002) as it improves the firm's capabilities in terms of time to complete a task as well as consistency. Operational efficiency of information technology has been studied extensively in the past both in marketing and non-marketing literature (Downing 2002; Sawhney 2001) and firms consider using new technologies primarily to improve their operational efficiencies (Kalakota and Robinson 1999). Inherently, e-business infusion may be perceived by the firms as accruing these operational efficiencies to both the manufacturer and reseller. However, since the inception of channels research, scholars have recognized the differing strategic goals between resellers and manufacturers: the manufacturers are sales growth oriented entities, whereas the resellers are trying to achieve the end-user satisfaction . Often resellers perceive manufacturers as less knowledgeable about the idiosyncratic needs of specific end-users, for instance in the case of Caterpillar and its dealership network (Fites 1996). For resellers, their end-user base relationships constitute one of their most important market-based assets (Srivastava et al. 2001). From

a reseller's point of view, customer relationships, which are based on customer information, are one of the levers to balance their dependence on manufacturers (Heide and John 1988). It may not be surprising that when it comes to interorganizational information technology manufacturers and resellers may seek to achieve different benefits beyond the overall operational efficiency of the channel (Clemons and Row 1992).

Manufacturer Benefits. E-business infusion is bound to increase the transparency of the reseller's actions to the manufacturer since the software enables the manufacturer to observe reseller behavior regarding activities related to the manufacturer's products (Bello et al. 2002; Mirani et al. 2001), and collect relevant information about the reseller as well as end-users. Prior research in the area of interorganizational information technology suggests that interorganizational IT may facilitate the extension of the manufacturer's control over the reseller's activities (Konsynski 1993) and increase manufacturer's bargaining power with resellers (Clemons and Row 1992) since the information transfer facilitated by e-business tools may increase the manufacturer's informational bases of power. For instance, using e-business tools for demand tasks, the manufacturer may have the capability of assigning a sales lead to the reseller and closely monitoring the follow up activities of the reseller on that particular lead with increased precision and scale that would be impossible without e-business infusion. Also, eBusiness tools may enable the manufacturer to precisely control the disbursement of financial incentives to downstream partners, theoretically making more efficient use of the manufacturer's promotional budget.

Reseller Benefits. Resellers also may perceive various benefits associated with e-business infusion. More available inventory information, configuration help and ordering capabilities have the potential to enable a reseller to be more responsive to end-user needs, thus enhancing the reseller's essential resources and capabilities. The reseller may hope to enjoy improved information flow which enables it to deliver superior service to the end-user and reduce the devastating effect of exaggerated order swings, referred to as "bullwhip effect" (Chen et al. 2000). With more available information resellers may inform end-users about incoming inventory or parts with more precision to the satisfaction of end-users. Often, manufacturers hold seminars for resellers where the benefits that accrue to the resellers through the new e-business system are highlighted (Weber 2000).

Thus, both resellers and manufacturers may perceive various benefits from infusing their relationships with e-business. Both anticipate to gain operational efficiency benefits as their day-to-day interactions are performed in a more automated, convenient and organized manner. However, the additional benefits beyond operational efficiency gains could be different for the dyadic partners. Manufacturers traditionally are concerned with the amount of control they may have over the marketing of their branded products and the feedback from the marketplace on their marketing activities. Resellers' main concern with e-business infusion is whether they will be able to provide higher service levels to their end customers. Our contention is that these anticipated benefits are the primary drivers of e-business infusion in supply as well as demand activities between a manufacturer and reseller. If e-business infusion is not anticipated to accrue benefits to a dyad, it is not likely that they will infuse their relationship with e-business tools or any other information technology. Thus, the anticipated perceived manufacturer and reseller benefits are a necessary condition that will lead to higher levels of e-business infusion in a

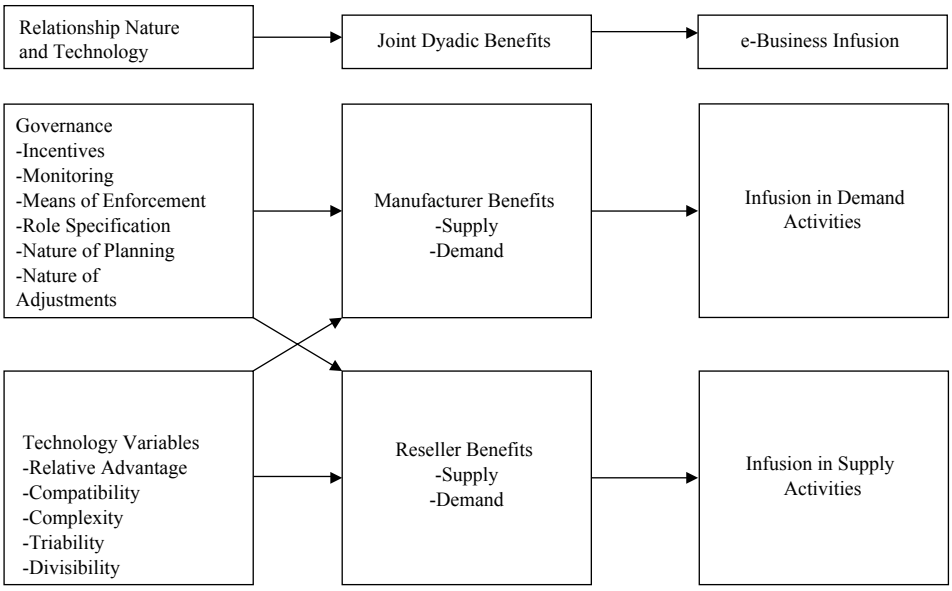

Fig. 1: Theoretical Framework for E-Business Infusion in Manufacturer-Reseller Relation

given relationship (See Fig. 1) mediating the link between relationship governance and technology adoption variables to e-business infusion. Proper channel governance processes and advantageous technology will impact e-business infusion through the dyadic benefits that the parties are anticipating in obtaining from e-business infusion. A closer examination of reseller benefits in the manufacturer-reseller dyad may help to lead to a more clear explanation e-business infusion. Information science research suggests that the benefits or usefulness of information systems usually intervenes between exogenous organizational, personal or technology specific variables and the actual use of the system (see Venkatesh et al. 2003 for a comprehensive review). For instance, Karahanna and Straub (1999) posit that the impact of such variables as social presence, social influence, accessibility, perceived ease of use, and support and training is mediated by perceived usefulness variable in the context of examining the use of an email system. Therefore, we offer the following proposition:

P3: Dyadic benefits will mediate the impact of governance and technology variables on e-business infusion (both supply and demand).

Discussion

This research builds on previous research in technology adoption/diffusion (Venkatesh et al. 2003), by introducing governance theory as an additional factor that would influence technology use in the channel dyads. If tested empirically by future research, this could be an important addition to our knowledge of technology adoption in business relationships. Gov-

ernance processes are thought to be pervasive in all aspects of business relationships (Heide 1994), including technology adoption. Therefore, the major implication of this research is that any technology adoption model viewed in the context of a business to business relationship may be incomplete without the inclusion of governance variables. Essentially, we propose that e-business infusion in a dyad is achieved primarily because channel members perceive certain benefits will accrue to them due to e-business infusion, and those expectations will compel them to infuse more of their interactions with e-business tools.

We attempted to identify two primary groups of variables that would affect the level of e-business infusion in manufacturer-reseller relationships that originate from disparate streams of literature and bring them together to provide a more comprehensive theoretical perspective on technology infusion in a channel in general using the example of e-business infusion. In contrast with much of the existing marketing literature that tends to posit direct relationships among relationship and technology antecedents and technology infusion outcomes, we view dyadic benefits as crucial factors determining the fate of deployment of strategic channel management innovations. We suggest that reseller perceptions regarding germane benefits brought about by e-business infusion play an important intervening role between relationship governance and technology variables and the dyad's actual deployment of that technology.

This research also contributes to the emerging literature on e-business technology (Srinivasan et al. 2002; Wu et al. 2002; Reunis et al. 2004, 2006) by providing an explanation of the e-business infusion phenomenon in the interorganizational setting. The study builds on governance theory (Heide 1994; Heide 2003) and extends it into the domain of technology infusion in buyer-seller relationships. The major contribution of this research vis-à-vis information systems models of explaining technology adoption is our focus on the dyadic variables of governance and relationship-technology fit. We incorporate governance theory and relationship marketing work to uncover additional insights on factors that may have a major bearing on e-business infusion in channels of distribution. Recent research in marketing (Osmonbekov 2009) provides some empirical validation of the theoretical framework provided in this study.

Managerial Implications

Several implications of this study are germane to the manufacturer in a channel dyad. First of all, as manufacturers attempt to migrate their reseller networks to online interfaces they should consider segmenting resellers based on their perceptions of the benefits that the *resellers* may derive from such migration. Additional segmentation bases may include whether the type of interactions with resellers is suitable to the migration to an online platform, such as existence of six governance processes and their nature. These factors may to impact e-business infusion indirectly, through reseller benefits.

For supplier firms of e-business tools, the implication of the study suggest a slight change to their current marketing strategy. Currently, the software companies market their e-business packages designed for channel management, directly to the big manufacturers emphasizing the benefits that the *manufacturer* will derive. The suppliers may complement such sales pitches by informing the manufacturers about various benefits that the

resellers will be deriving from e-business tools because ultimately, e-business infusion is driven by both sides of a channel dyad. Consequently, the design and upgrades to the software should be made with the interest of the both sides in mind.

Limitations and Future Research

Although the idea of technology benefits driving technology adoption has been around for a long time, in our review of the literature we found no reference to considering the costs of the technology to balance the benefits. Perhaps this is why researchers rarely find a significant impact of technology adoption on performance (Downing 2002). Future research could examine the costs of technology as balancing the benefits obtained by the firm. The difficulty arising from such research would be the great variability of the costs of implementation, training and updated the technology among various software and hardware configurations to fit individual firms' business processes and preferences. This factor may limit generalizability of such research.

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