

# Organizational innovation adoption

## A multi-level framework of determinants and opportunities for future research

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### Abstract

Organizational innovation adoption has received increasing attention in the marketing and management literature over the past two decades. Insight into adoption processes, its inhibitors and stimulators helps suppliers of innovations to market their new products more effectively. The objective of this paper is to discuss the main findings on organizational adoption and integrate them within a framework. The framework that we propose addresses the adoption decision at two levels, i.e. the organizational level and the individual adopter within an organization. We integrate research on innovation adoption and technology acceptance that have emerged in the marketing and management literature and identify several research issues that need further attention. © 2001 Elsevier Science Inc. All rights reserved.

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Innovation is generally considered to be one of the key drivers of corporate success (Cardozo et al., 1993). In marketing, innovation contributes significantly to the extent that a firm is market-driven (Manu and Sriram, 1996; Hurley and Hult, 1998). One of the important issues marketers face is how to successfully market their innovations. In the past three decades, extensive research has been conducted to identify factors discriminating between new product success and failure (e.g., Montoya-Weiss and Calantone, 1994). A central finding is that many new products fail due to a lack of customer need fulfillment or superiority over alternatives. Thus, in order for a firm to be successful in bringing innovations to the market, an understanding of potential customers and the factors influencing their adoption decision is important. Research on the adoption and diffusion of innovations offers significant contributions to such understanding.

Adoption refers to the decision of any individual or organization to make use of an innovation, whereas diffusion refers to the accumulated level of users of an innovation in a

market (Rogers, 1995). In the marketing domain, during the late 1960s and early 1970s, a number of studies of innovation adoption (e.g., Robertson, 1971; Ostlund, 1974; Rogers, 1976) and diffusion (Bass, 1969) were conducted. Consumer adoption dominated this research stream (for exceptions see: Ozanne and Churchill, 1971; Zaltman et al., 1973). The central focus of this paper is on innovation adoption by organizations and we identify and integrate the factors that have been found to influence organizational adoption decisions. Two types of organizational adoption decisions can be identified, i.e. the decision made by an organization and the decision made by an individual within an organization. We develop a model of organizational innovation adoption that incorporates both types of adoption decisions and suggest areas for further research. Our model provides a basis for new product marketing analysis and planning.

The paper is organized as follows. First, we will review the literature on innovation adoption at the organizational level. Next, we consider the determinants of the innovation adoption by individuals within an organization. Organizational adoption depends on the outcomes of both these adoption decisions, whereas in consumer markets, the individual is the primary unit of analysis. We conclude by identifying several areas that need further research attention.

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## 1. The innovation and adoption process in organizations

The adoption process is a sequence of stages a potential adopter of an innovation passes through before acceptance of a new product, service or idea (hereafter product). Rogers (1995, p. 21) defines the adoption process as “the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.” With respect to organizational adoption, two main stages may be distinguished: initiation and implementation (e.g., Zaltman et al., 1973). The adoption decision occurs between the initiation and the implementation stage. In the initiation stage, the organization becomes aware of the innovation, forms an attitude towards it, and evaluates the new product; it encompasses awareness, consideration, and intention sub-stages. In the implementation stage, the organization decides to purchase and make use of the innovation. However, this organizational adoption decision is only the beginning of implementation. The acceptance or assimilation *within* the organization now becomes important. From a supplier’s perspective, the innovation process can only be considered a success when the innovation is accepted and integrated into the organization and the target adopters demonstrate *commitment* by continuing to use the product over a period of time (Bhattacharjee, 1998). This is consistent with Rogers (1995, p. 21), who defines adoption as “... the decision to make full use of an innovation as the best course of action available.” Adoption of innovations in an organization implies that adoption also occurs *within* the organization, at the individual level. We refer to this as *intra-organizational acceptance*. When the usage of an innovation by individuals is uncertain and contingent upon a prior organizational adoption decision, it is referred to as a *contingent innovation decision* or “forced adoption” (Ram and Jung, 1991; Rogers, 1995).

## 2. Organizational innovation adoption

Studies of organizational adoption in different disciplines allow us to identify a set of factors that have been found to influence the acceptance of new products by organizations. First, we consider determinants of adoption at the organizational level.

### 2.1. Determinants of the organizational level adoption

Fig. 1 shows the factors that have been found to affect adoption at the organizational level. It should be noted that, although the adoption process consists of different stages, most studies focus on the dichotomous adoption/non-adoption decision. Hence, we know little about the effect of different factors on various stages of the adop-

tion process (Olshavsky and Spreng, 1996). Second, individual studies tend to focus on only one or a small number of factors.

The presentation of determinants differs from the frameworks commonly used (Rogers, 1995). Most studies test first-order effects on the adoption decision and most frameworks only depict the direct effects of factors. Here we include both direct and indirect effects, which requires a more comprehensive framework. Fig. 1 places the perceived characteristics of the innovation at the heart of the model. In addition to organizational adopter characteristics, these factors drive the adoption process and are, in turn, influenced by external variables i.e. the potential adopter’s environment and social network, and the supplier of the innovation. The perceived innovation characteristics can be considered as cognitive indices (or beliefs) reflected in an attitude towards the innovation (Rosenberg and Hovland, 1960; Le Bon and Merunka, 1998). There is conceptual and empirical evidence that, in organizational settings, attitudinal components mediate the influence of external variables, such as motivation, on behavioral intentions (Le Bon and Merunka, 1998). Similarly, attitude theory (e.g., Triandis 1971; Fishbein and Ajzen, 1975) hypothesizes that beliefs mediate the impact of external influences, such as persuasive communication and/or active participation on decisions. Based on this, we propose that perceived innovation characteristics mediate the supplier, social network, and other environmental influences on adoption behavior.

The framework is consistent with classical models of organizational buying behavior (Webster and Wind, 1972; Sheth, 1973; Choffray and Lilien, 1980). These models include individual characteristics, interpersonal and organizational factors, as important variables affecting the organizational buying decision process and these are largely reflected in our framework.

Table 1 summarizes the main relationships between variables and adoption decisions that have been found in previous empirical studies. The focus in the table is on explaining the adoption decision not the perceived characteristics of innovations.

#### 2.1.1. Perceived innovation characteristics

The perceptions of an innovation by members of an organization’s decision-making unit (DMU) affect their evaluation of and propensity to adopt a new product (e.g., Ostlund, 1974; Tornatzky and Klein, 1982; Holak et al., 1987; Rogers, 1995). The perceived benefits, including economic incentives, of adopting the innovation should exceed that of alternatives, if organizations are to consider adopting (Anderson and Narus, 1999). Indeed, the perceived net benefit the innovation offers has an important effect on the organizational adoption (Robinson, 1990; Mansfield, 1993). Other innovation characteristics that influence the adoption decision include perceived compatibility, complexity, observability, and trialability

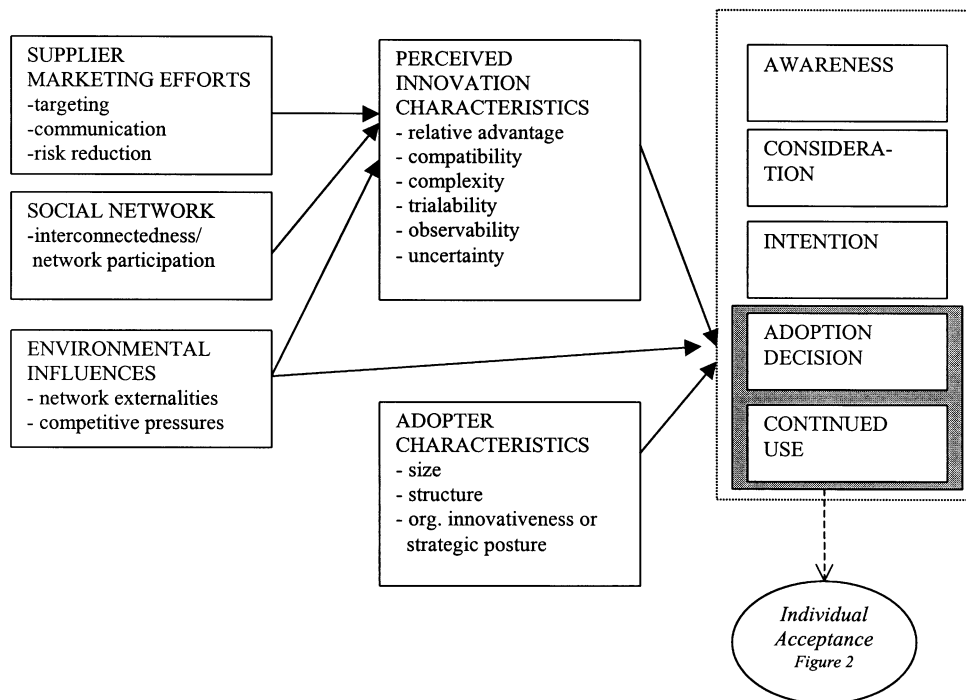


Fig. 1. A conceptual framework of organizational innovation adoption.

(Rogers, 1995), as well as perceived uncertainty (Nooteboom, 1989).

#### 2.1.2. Adopter characteristics

Organizational characteristics influence the adoption decision (Robertson and Wind, 1980; Cohn and Turyn, 1984; Damanpour, 1991). Three types of characteristics at the organizational level may be identified: organization size (Kennedy, 1983); organization structure (Zaltman et al., 1973); and organizational innovativeness (Morrisson, 1996). Size has repeatedly been found to influence the propensity to adopt. Usually, size is found to be positively related to innovation adoption. This, it is argued, is because larger organizations feel a greater need to adopt innovations in order to support and improve their performance. On the other hand, it is argued also that smaller organizations are more flexible and innovative, resulting in an enhanced receptiveness towards new products. These apparently contrary relations and results may be largely attributable to the correlation of organization size with other variables, such as structure, strategy, and culture. For example, organization structure has been found to either facilitate or inhibit innovation adoption. Zaltman et al. (1973) propose that more formalized and centralized organizations (often larger firms) are less likely to initiate innovation adoption decisions, but are better equipped to implement an innovation. The opposite holds for organizations that are highly complex or specialized. For a comprehensive discussion and meta-analysis of these effects, see Damanpour (1991).

The degree to which an organization is receptive to new products or ideas will influence its propensity to adopt new products. For example, Morrisson (1996) provides evidence that “Organization Dispositional Innovativeness” (ODI) and “Leading Edge Status” (LES) explain time of adoption. ODI and LES are conceptually distinct but both relate to a predisposition to innovate. This is related also to the strategic posture of a firm. Organizations that pursue an aggressive, innovation-oriented marketing strategy, are more likely to fuel their activities with an orientation that is open to innovation (Han et al., 1998; Hurley and Hult, 1998; Srinivasan et al., 1999).

#### 2.1.3. Supplier marketing activity

Supplier marketing activity can significantly influence the probability that an innovation will be adopted by organizations (Frambach et al., 1998). An important role is played by the launch and other marketing tactics used by the supplier (Hultink et al., 1997). Although different marketing variables may stimulate or facilitate adoption, three main factors are important, i.e. the targeting of the innovation, its communication, and the activities the supplier undertakes to reduce the perceived risk of the potential customer (Easingwood and Beard, 1989).

**2.1.3.1. Targeting.** Careful and specific targeting of an innovation towards selected potential adopters can facilitate acceptance in the market. Potential adopters such as innovative organizations and individuals, heavy users of the product category, or heavy users of the preceding technology

**Table 1**

Relationships between probability of organizational innovation adoption and determinants

Independent variables	Reported relationship	Selected related research
<i>Perceived innovation characteristics</i>		
Relative or economic advantage	Positive	<i>In general:</i> Ostlund, 1974; Tornatzky and Klein, 1982; Holak and Lehmann, 1990; Rogers, 1995 Robinson, 1990; Mansfield, 1993
Compatibility	Positive	Holak, 1988
Complexity	Negative	Rogers, 1995
Trialability	Positive	Rogers, 1995; Mathur, 1998
Observability	Positive	Rogers, 1995
Uncertainty	Negative	Ostlund, 1974; Holak et al., 1987; Nooteboom, 1989; Venkatraman, 1991
<i>Adopter characteristics</i>		
Size	Positive	Kennedy, 1983
Organization structure	Varies	Influence depends on the characteristic; see e.g., Zaltman et al., 1973; Kimberley and Evanisko, 1981; Cohn and Turyn, 1984; Damanpour, 1991
Innovativeness/ strategic posture	Positive	Morisson, 1996; Han et al., 1998; Hurley and Hult, 1998; Srinivasan et al., 1999
<i>Social network</i>		
Interconnectedness	Positive	Zaltman et al., 1973; Lind and Zmud, 1991; Fisher and Price, 1992 (consumer context)
<i>Supplier marketing activity</i>		
Targeting/Communication	Positive	<i>In general:</i> Robertson and Gatignon, 1986; Easingwood and Beard, 1989; Ram and Jung, 1994; Hultink et al., 1997; Frambach et al., 1998
Risk reduction	Positive	
<i>Environmental influences</i>		
Network externalities	Positive	Markus, 1990; Katz and Shapiro, 1994
Competitive environment	Varies	Kamien and Schwartz, 1982; Robertson and Gatignon, 1986; Baldwin and Scott, 1987; Gatignon and Robertson, 1989

may be more receptive to the innovation than others. Also, targeting potential adopters that in other ways may benefit from adopting the innovation can be effective. In addition, targeting efforts need to consider the opportunity organizations have to adopt an innovation (Gauvin and Sinha, 1993).

**2.1.3.2. Communication.** As innovation adoption is largely an information-processing activity, supplier communication activities will not only create awareness, they also influence potential customers' perceptions of the innovation. In this way, marketing communications indirectly affect potential adopters' propensity to adoption.

**2.1.3.3. Risk reduction.** By reducing the risks associated with early adoption of an innovation, including implementation (use) risk, financial risk and operation risk, the adoption of an innovation can be stimulated. The innovation may be offered on trial for a certain period of time (Fisher and Price, 1992; Ram and Jung, 1994) or the supplier may absorb some of the major risks of adoption by offering the potential adopters the innovation at a low introduction price (Kotler, 1998). In high technology markets, this may even be necessary to gain market acceptance.

#### 2.1.4. Social network

The interaction, in terms of frequency and richness, between members of a social network can also enhance

the speed and rate of innovation adoption (Zaltman et al., 1973; Lind and Zmud, 1991). The participation of members of an organization in informal networks facilitates the spread of information about an innovation, which may positively influence the probability of adoption (so long as the information is positive!). Such informal networks may either connect organizations within the industry or organizations in different industries. The degree to which organizations share information with others is referred to as their degree of interconnectedness (Rogers, 1995). The higher the degree of (informal) information sharing, the more likely organizations are exposed to new ideas and products.

#### 2.1.5. Environmental influences

In addition to social influences, the business environment affects adoption behavior in different ways. First, a potential adopter may derive an intrinsic benefit from the fact that business partners within their network have previously adopted the innovation (i.e. a form of network externality). Also, competitive pressures may promote adoption.

**2.1.5.1. Network externalities.** Organizations may adopt an innovation based on the number of other interrelated organizations in their market environment that have adopted the focal innovation. In the literature, these external con-

tingencies have been conceptualized in terms of network externalities or critical mass (Markus, 1990; Rogers, 1991; Katz and Shapiro, 1994; Kraut et al., 1998). The theory is that the value of an innovation and, hence, its adoption probability, is determined by the number of other users. In the case of organizational adoption, positive network externalities exist when the intrinsic utility of an innovation increases when a firm's suppliers, customers, competitors, or other organizations (e.g., government) also use the innovation. For example, information systems investments (e.g., extranets or EDI) may generate greater value and gain importance once a sufficient number of business partners use these systems.

**2.1.5.2. Competitive pressures.** In highly competitive markets, innovation adoption may be necessary to maintain one's market position (Robertson and Gatignon, 1986). Non-adoption of an innovation that is adopted by others in such an environment may result in competitive disadvantage. This depends on the strategic importance of the innovation and its potential implications for the effectiveness and efficiency of the firm's activities. In the literature, different relations between industry competitiveness or concentration and adoption have been found. In the industrial organization literature, a positive impact has been found for both high levels of industry concentration and low levels (Kamien and Schwartz, 1982; Baldwin and Scott, 1987). In the marketing literature, Gatignon and Robertson (1989) found that higher levels of competition stimulate innovation adoption.

### 3. Intra-organizational acceptance: individual innovation adoption in organizational contexts

Organizational innovations that have to be incorporated in the work processes of an organization are of little value if they are not used or complied with. Its target "user" group to realize the intended benefits must accept an innovation. Hence, it is important to examine the acceptance of innovations within organizations because, if there is no acceptance among the target group, the desired consequences cannot be realized and the organization may eventually discontinue the intended adoption.

Fig. 2 shows a general framework for understanding individual acceptance or adoption that builds on theories from innovation adoption, information systems, and organizational science literature. Each model of individual acceptance is somewhat idiosyncratic in terms of the innovation as well as the environment under study. Hence, the proposed model is a simplified and generic nomological framework that needs adaptation according to the specifics of the innovation and organizational situation. The factors explaining individual acceptance and their interrelations parallel the model of innovation adoption at the organizational level shown in Fig. 1. In the following, we discuss differences from the organization-level model (Table 2 summarizes major findings).

#### 3.1. Attitude toward the innovation

A recurrent theme in models explaining individual acceptance of innovations is that acceptance is based on

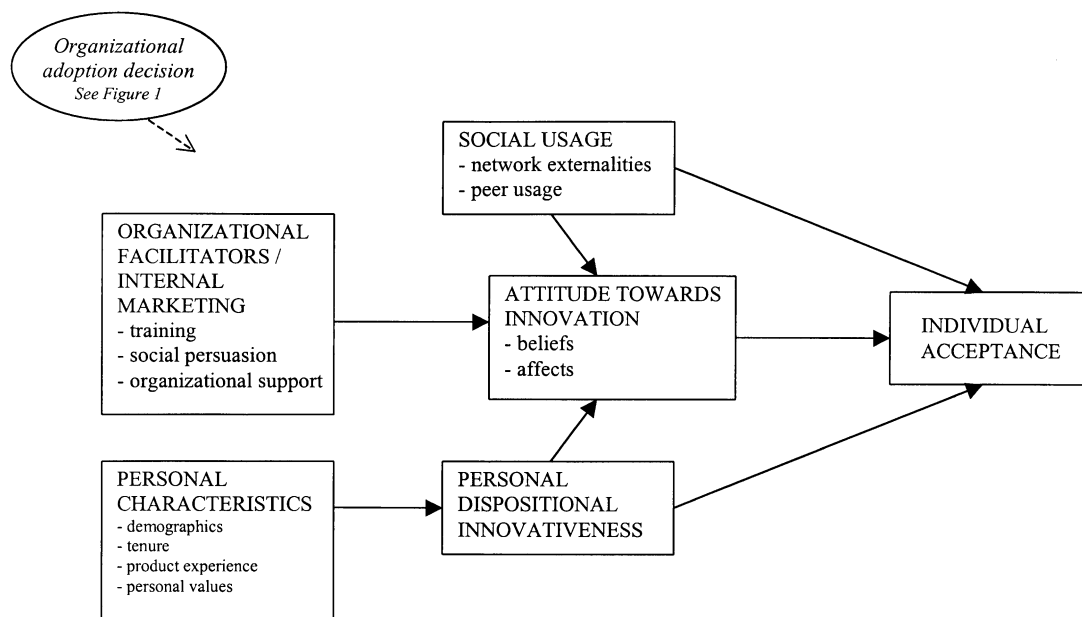


Fig. 2. A conceptual framework of individual innovation acceptance in organizations.

**Table 2**  
Summary on intra-organizational acceptance

Study	Description of study	Acceptance variables	Major findings, relevant to intra-organizational acceptance
(1) Leonard-Barton and Deschamps, 1988	<p><i>Nature of innovation:</i></p> <p><i>Research objective:</i> Investigate the role of end-users' individual characteristics in interaction with managerial behavior</p>	<p>(1) Acceptance</p> <ul style="list-style-type: none"> <li>• Usage capturing previous experience and current use</li> </ul> <p>(2) Organizational facilitators</p> <ul style="list-style-type: none"> <li>• Perceived authority messages urging use</li> <li>• Perception of M support</li> <li>• Training</li> <li>• Interpersonal communication</li> </ul> <p>(3) Social influence</p> <ul style="list-style-type: none"> <li>• Acquaintance with users</li> </ul> <p>(4) Personal attributes</p> <ul style="list-style-type: none"> <li>• Personal innovativeness</li> </ul>	<ul style="list-style-type: none"> <li>• Direct effect of Training on Usage</li> <li>• No significant effect of PI on use</li> <li>• Interaction effect between perceived management (M) support and PI</li> </ul>
(2) Davis et al., 1989	<p><i>Nature of innovation:</i> Word processing</p> <p><i>Research objective:</i> Empirical examination to predict and understand managerial acceptance of computer-based technology, rooted in Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM).</p>	<p>(1) Acceptance</p> <ul style="list-style-type: none"> <li>• System usage (intentions and actual)</li> </ul> <p>(2) Innovation attitudes</p> <ul style="list-style-type: none"> <li>• Perceived usefulness (PU)</li> <li>• Perceived ease of use (PEU)</li> <li>• Affect (A)</li> </ul> <p>(3) Social influence</p> <ul style="list-style-type: none"> <li>• Social norms (SN)</li> </ul> <p>(4) Organizational facilitators (proposed, not tested)</p> <ul style="list-style-type: none"> <li>• Educational and training programs</li> <li>• User support</li> <li>• Feedback</li> </ul>	<ul style="list-style-type: none"> <li>• PU is a major determinant of intention to use computers. PEU is a significant secondary determinant.</li> <li>• Partial mediation of the effects of PU and PEU on acceptance, through A</li> <li>• SN do not significantly explain acceptance</li> </ul>
(3) Igbaria, 1990	<p><i>Nature of innovation:</i> End-user computers</p> <p><i>Research objective:</i> Investigate factors related to the effectiveness of end-user computing</p>	<p>(1) Acceptance</p> <ul style="list-style-type: none"> <li>• Daily use</li> <li>• Frequency of use</li> </ul> <p>(2) Innovation attitudes</p> <ul style="list-style-type: none"> <li>• Attitudes/beliefs towards end-user computing</li> </ul> <p>(3) Organizational facilitators</p> <ul style="list-style-type: none"> <li>• Organizational support: information center (IC) and M</li> <li>• Computer experience and training</li> </ul>	<ul style="list-style-type: none"> <li>• End-user training, computer experience and IC support have strong direct effects on attitudes/beliefs towards computers</li> <li>• End-user training, computer experience, IC support, M support, and attitudes/beliefs have significant direct effect on usage</li> </ul>

(4) Thompson et al., 1991	<i>Nature of innovation:</i> Personal computers	<ul style="list-style-type: none"> <li>(1) Acceptance <ul style="list-style-type: none"> <li>• Intensity of use</li> <li>• Frequency of use</li> <li>• Diversity of applications used</li> </ul> </li> <li>(2) Innovation attitudes <ul style="list-style-type: none"> <li>• A (Affect)</li> <li>• Complexity</li> <li>• Beliefs of near-term consequences — job fit</li> <li>• Beliefs of long-term consequences</li> </ul> </li> <li>(3) Organizational facilitators <ul style="list-style-type: none"> <li>• Facilitating conditions — technical support</li> </ul> </li> <li>(4) Social influence <ul style="list-style-type: none"> <li>• Social factors</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Social factors, complexity, job fit, and long-term consequences significantly affect PC utilization (The authors tested only direct effects)</li> </ul>
(5) Trevino and Webster, 1992	<i>Nature of innovation:</i> e-mail and voice mail	<ul style="list-style-type: none"> <li>(1) Innovation attitudes <ul style="list-style-type: none"> <li>• Affective attitudes</li> <li>• Ease of use</li> </ul> </li> <li>(2) Organizational facilitators <ul style="list-style-type: none"> <li>• M support</li> </ul> </li> <li>(3) Social usage <ul style="list-style-type: none"> <li>• Partners' medium use</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Direct effect of ease of use on A</li> <li>• Effect of M support on A is partially mediated by ease of use</li> <li>• Effect of M support on A is partially mediated by ease of use</li> <li>• Partners' medium use does not influence A</li> </ul>
(6) Igarria, 1993	<i>Nature of innovation:</i> Acceptance of microcomputers  <i>Research objective:</i> Test integrated model of user acceptance of microcomputer technology among managers	<ul style="list-style-type: none"> <li>(1) Acceptance <ul style="list-style-type: none"> <li>• Perceived daily use</li> <li>• Perceived frequency of use</li> <li>• Number of software packages used</li> <li>• Number of business tasks used with system</li> <li>• Behavior intentions (BI)</li> </ul> </li> <li>(2) Innovation attitudes <ul style="list-style-type: none"> <li>• PU</li> </ul> </li> <li>(3) Organizational facilitators <ul style="list-style-type: none"> <li>• A</li> <li>• User training</li> <li>• IC support</li> <li>• M support</li> </ul> </li> <li>(4) Personal attributes <ul style="list-style-type: none"> <li>• Demographics: age, gender, and education</li> <li>• Computer experience</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• PU important mediator between acceptance and organizational and individual characteristics</li> <li>• User training influences PU</li> <li>• Computer experience strong effect on PU, A, and acceptance</li> <li>• Direct effect of M support on behavioral intentions</li> <li>• IC support direct effect on PU, A, intention, and acceptance</li> <li>• Low but significant effects of demographics</li> <li>• Strong direct and indirect effects of computer experience on PU, A, intentions, and acceptance</li> <li>• PU and A influence acceptance</li> </ul>

(continued on next page)

Table 2 (continued)

Study	Description of study	Acceptance variables	Major findings, relevant to intra-organizational acceptance
(7) Igarria et al., 1996	<i>Nature of innovation:</i> Micro-computers  <i>Research objective:</i> Test of integrated model of motivation to use computers extending TRA and TAM	(1) Acceptance: Daily usage and frequency of use (2) Innovation attitudes <ul style="list-style-type: none"> <li>• PU</li> <li>• Perceived complexity (PC)</li> <li>• Perceived enjoyment/fun (PE/F) = affects</li> </ul> (3) Organizational facilitators <ul style="list-style-type: none"> <li>• Organizational support (OS)</li> </ul> (4) Social influence <ul style="list-style-type: none"> <li>• Organizational usage (OU)</li> <li>• Social pressure (SPR)</li> </ul>	<ul style="list-style-type: none"> <li>• PU strongest direct effect on acceptance. Contributions of PE/F and SPR, significant but substantially lower</li> <li>• PC significant direct effect on acceptance and indirect through PU, SPR, and PE/F</li> <li>• OS influences PC, PU, PE/F, and SPR; OS small direct effect on acceptance</li> <li>• OU small direct effects on PU, PC, PE/F, and SPR; direct effect on acceptance</li> </ul>
(8) Agarwal and Prasad, 1998	<i>Nature of innovation:</i> World Wide Web  <i>Research objective:</i> Developing a measure of innovativeness and establishing nomological validity	(1) Acceptance <ul style="list-style-type: none"> <li>• Usage intentions</li> </ul> (2) Innovation attitudes <ul style="list-style-type: none"> <li>• Usefulness</li> <li>• Ease of Use</li> <li>• Compatibility</li> </ul> (3) Personal attributes <ul style="list-style-type: none"> <li>• PI in IT</li> </ul>	<ul style="list-style-type: none"> <li>• Significant correlation between innovativeness and usage intentions</li> <li>• Significant interaction effect between innovativeness and compatibility on usage intentions</li> </ul>
(9) Kraut et al., 1998	<i>Nature of innovation:</i> Video telephone systems  <i>Research objective:</i> Examine how behavior of other people influences individuals' adoption and use of a new communication medium	(1) Acceptance <ul style="list-style-type: none"> <li>• Computer-monitored system usage</li> </ul> (2) Social usage <ul style="list-style-type: none"> <li>• Total number of others using the system</li> <li>• The proportion of a focal individual's work group using the system</li> </ul> (3) Personal attributes <ul style="list-style-type: none"> <li>• Demographics: gender, age</li> <li>• Organizational level</li> </ul>	<ul style="list-style-type: none"> <li>• Organizational level: significant influence on adoption</li> <li>• Age and gender no significant influence on adoption</li> <li>• Increased total number of subscribers in one period led to greater system use in subsequent period</li> <li>• Increased number of subscribers within a work group in one period led to greater system use in subsequent period</li> </ul>
(10) Venkatesh and Davis, 1999	<i>Nature of innovation:</i> Computer systems  <i>Research objective:</i> Identify the key determinants of TAM's belief components	(1) Acceptance <ul style="list-style-type: none"> <li>• System usage</li> <li>• Intention to use</li> </ul> (2) Innovation attitudes <ul style="list-style-type: none"> <li>• PU</li> <li>• PEU</li> <li>• Image</li> <li>• Result demonstrability (RD)</li> </ul> (3) Social influence <ul style="list-style-type: none"> <li>• SN</li> </ul>	<ul style="list-style-type: none"> <li>• Relationships from TAM supported: U–Intention; PEU–Intention; PEU–PU</li> <li>• Effect of SN on intention is significant when moderated for voluntariness and experience with using the system</li> <li>• Significant effects of SN on PU and moderated for experience with the system</li> <li>• Image and RD significantly influence PU</li> </ul>



perceived beliefs and affects held towards the focal innovation (Tornatzky and Klein, 1982; Davis et al., 1989). These cognitive beliefs and affects are reflected in an individual's attitude towards a particular innovation (Rosenberg and Hovland, 1960; Triandis, 1970; Le Bon and Merunka, 1998). Fishbein and Ajzen's (1975) theory of reasoned action is a useful model for explaining individual acceptance behavior. In the information systems literature, the theory was successfully used to develop a model of technology acceptance (Davis et al., 1989) and many follow-up studies have been reported (e.g., Thompson et al., 1991; Trevino and Webster, 1992; Igbaria et al., 1996). The model posits that the beliefs, 'perceived usefulness' and 'perceived ease of use,' and an individual's 'affects' are central to computer acceptance (Davis et al., 1989). These beliefs are similar to those proposed in the innovation adoption literature discussed above (e.g., Moore and Benbasat, 1991).

Attitudes can change and be influenced and there is evidence, as already noted, that a person's attitudes mediate the influence of external variables and stimuli. For instance, the technology acceptance model hypothesizes that the beliefs are affected by external influences (Davis et al., 1989). Therefore, we show the effect of external influences, such as organizational facilitators, personal innovativeness (PI), and social usage, as indirect, working through attitudinal components.

### 3.2. Organizational facilitators

Organizational facilitators are the equivalent of supplier marketing activities in the organization adoption model. Several studies indicate that individual usage of innovations not only depends upon attitudes but also on management strategies, policies, and actions (Lucas, 1978; Ives and Olson, 1984; Leonard-Barton and Deschamps, 1988). Depending on the relevance for the innovation, these factors include internal marketing variables such as *training* and *education* (Igbaria, 1993; Igbaria et al., 1989; Mirvis et al., 1991; Clegg et al., 1997), *organizational technical support* (Davis et al., 1989; Thompson et al., 1991; Igbaria et al., 1996), and *incentives* and *control structures* (Bhattacharjee, 1998). These influences affect individual's awareness of the functioning and application of innovations, their usefulness and fit with the job.

### 3.3. Personal innovativeness

Organizations will try to influence subordinates' attitudes towards adoption of an innovation and some individuals more readily accept certain innovations while others do not. To our knowledge, Leonard-Barton and Deschamps (1988) and Agarwal and Prasad (1998) are the only two studies of intra-organizational acceptance that have used the concept of PI. PI refers to the tendency of a person to accept an innovation within a product class, independently

of the communicated experience of others. PI, as has been used in a consumer setting by Midgley and Dowling (1978) and Morrisson (1996), has developed as equivalent concept for the organization (see above). Here, innovativeness relates to the individual member of an organization and is a characteristic they bring to the job. A similar construct, the degree to which members of an organization are receptive of change, has shown to be an important determinant of innovation success (Zaltman et al., 1973; Zmud, 1984) and hence, we propose that PI in the domain of a specific innovation is important in explaining innovation acceptance.

In our framework, PI influences individual acceptance both indirectly, through attitudes, and directly. Members of an organization, who are innovative in a specific product area, will exhibit more positive attitudes towards using the innovation. However, inherently innovative individuals may habitually use certain types of products, which implies that PI may influence usage directly, over and above attitudes (Triandis, 1971).

We further propose that PI is determined by various personal characteristics, e.g., demographics, company and job tenure, and experience within the product class. Previous research also suggests that socio-demographics (Venkatraman and Price, 1990; Steenkamp et al., 1999) as well as personal values affect innovativeness (Steenkamp et al., 1999).

### 3.4. Social influences

Individual acceptance of innovations is driven also by the usage of a focal innovation within their social environment. Such social network influences may stem from two sources. First, network externalities may increase the value of the innovation as discussed above for organization adoption. For example, many authors have emphasized the importance of a critical mass of users for the acceptance of interactive information and communication technologies (e.g., Markus, 1990; Rice, 1990; Rogers, 1991; Katz and Shapiro, 1994; Kraut et al., 1998). The rationale is that the utility of a communication medium *increases* with the total number of users connected to the medium, such as video conferencing, video telephone, and faxes. In organization science (Markus, 1990; Rice, 1990; Kraut et al., 1998), studies show that network externalities are important when there is a critical mass of users within a person's reference or work group, and innovation usage by others in an individual's social environment is likely to play an important role in all types of innovations. The acceptance of an innovation by an individual's peers, e.g., superiors, colleagues, and customers, may signal its importance and advantages and motivate the individual to imitate. For example, if significant others rely on the Internet for research, an individual may decide to do likewise in order to keep up with his peers. In the information systems literature, Trevino and Webster (1992) and Igbaria et al. (1996) found evidence that usage levels within

an organization influence computer acceptance. In our framework, we posit that organizational members will exhibit more positive attitudes if people in their *social environment* also use the focal innovation. These usage levels may be so compelling that the opportunity cost for a focal individual of not complying becomes too high and may even overcome otherwise negative attitudes.

Finally, social norms have been proposed as determinants of acceptance behavior (Davis et al., 1989). These relate to “a person’s perception that most people who are important think that he should or should not perform the behavior in question” (Fishbein and Ajzen, 1975, p. 302). The effects of social norms may be direct as when a person feels the need to go along, or indirect through its affects on a person’s attitudes, as a result of internalization or identification processes (Warshaw, 1980; Davis et al., 1989). Several studies have investigated the role of social norms. Davis et al. (1989) and Mathieson (1991) found no significant direct effect, Thompson et al. (1991) and Igarria et al. (1996) found significant direct effects, and Venkatesh and Davis (1999) found support for both direct and indirect (through beliefs) effects. Social persuasion and communication from peers has been suggested also as factors influencing acceptance (Leonard-Barton and Deschamps, 1988; Schultheiss, 1988; Mirvis et al., 1991).

#### 4. Current issues and opportunities for future research

In the past decade, our knowledge about potential determinants of innovation adoption has increased significantly. We have provided two comprehensive frameworks for understanding and analysing organization and intra-organization adoption, comprising both direct and indirect effects. Based on our discussion, we believe there is a need of further research to refine and test the relationships depicted. Studies need to be carried out in different organizational settings and for different types of innovations. By identifying the determinants of innovation adoption and how they are interrelated, such models are of use to practitioners, including both marketers and managers, in marketing innovations to organizations and in gaining acceptance and use of innovations within an organization.

Our review of past studies indicates that there are some important issues that require further research. These include the following:

- The *non-adoption* of innovations, i.e. why do some people *not* adopt an innovation?
- The factors influencing different *pre-adoption stages* within the adoption process, rather than the adoption or non-adoption decision itself;
- The *adoption process within organizations* and the factors affecting the use and *continued use* of innovations;
- The influence of *network externalities* or critical mass on innovation adoption;

- The influence of *supplier activities* on innovation adoption within the organization as well as at the organization level of analysis;
- The factors influencing innovation adoption in an *international context*; and
- The role of the *Internet and electronic commerce* on innovation adoption.

##### 4.1. Non-adoption

Most research focuses on the factors that enhance adoption rather than the factors that inhibit it. However, based on a study on the adoption of laptop computers by sales force departments, Gatignon and Robertson (1989) concluded that “non-adoption is not the mirror image of the adoption decision.” Some studies have focused on non-adoption (e.g., Stevens et al., 1989) but the phenomenon is complex, because the reasons for non-adoption may lie at earlier stages of the adoption process. Potential adopters may have actively decided to reject the innovation, they may have passively decided to reject, or they may have not progressed through certain stages of the adoption process yet (Nabih et al., 1997). As most adoption studies do not follow a process approach, little is known about the factors that affect the process prior to actual adoption (Olshavsky and Spreng, 1996). Research in health psychology shows that the decision processes in adopting a certain behavior is dependent on a person’s decisional balance (Velicer et al., 1985). This refers to the extent to which perceived positive attributes outweigh negative ones. Negative decisional balances in the early stages of the adoption process prevent potential adopters from considering adoption (Prochaska et al., 1994).

In a study of the adoption of medical instruments by hospitals, Meyer and Goes (1988) found that organizations in later stages of the innovation process perceived the innovation as having lower risk and being less complex. Such innovation characteristics are likely to play a more important role in the early stages, whereas perceived relative advantage is more important in later stages (Labay and Kinnear, 1981). Research in marketing on the influence of perceived innovation characteristics on the stages of the adoption process is scarce and indicates the need for more studies.

##### 4.2. Intra-organizational acceptance: disposition and the acceptance of innovations

Although a tradition of individual acceptance models exists in the information systems literature, research on individual innovation acceptance in organizational environments remains limited. The most influential model of intra-organizational acceptance is the technological acceptance model of Davis et al. (1989). But this does not include the influence of external or managerial actions and many follow-up studies do not test for second-order effects or integrated models. Furthermore, relatively little is

known about organizational dynamics with respect to innovation acceptance. Hence, further research is required regarding the role of personal characteristics, and organizational and social processes occurring after the organizational adoption decision.

A particularly interesting area, from a practical and theoretical point of view, is the development of better measures of the PI factor construct (Agarwal and Prasad, 1998). When introducing an innovation in an organization, it is critical to reach the right people as early as possible in order to avoid an innovation being underused. People in the organization with a high PI in the relevant domain may be the allies of the innovation. Identifying and targeting them may facilitate the innovation process. Leonard-Barton and Deschamps (1988) used the concept in a study of software acceptance by sales representatives and Agarwal and Prasad (1998) used it in a study of MBA students about the use of the Internet. However, the scales used in both studies have less than ideal psychometric properties. Research must also assess the individual and organization culture antecedents of PI.

We already suggested that the assessment of acceptance should be done with a comprehensive model, including second-order relationships. This is especially important for assessing the influence of the managerial activities. Furthermore, existing studies of these factors are cross-sectional (e.g., Leonard-Barton and Deschamps, 1988; Igarria et al., 1989, 1996; Thompson et al., 1991) or single site case studies (see Klein and Sorra, 1996 for an overview). Studies with an experimental research design and longitudinal data collection are required to provide us with a deeper understanding of the factors at work.

#### 4.3. Network externalities

With the introduction of interactive information and telecommunication technology, attention for the so-called ‘critical mass effect’ has increased. A critical mass of users is often seen as necessary for these technologies to succeed. Future research should build on existing theory (e.g., Markus, 1990; Rice, 1990; Katz and Shapiro, 1994; Kraut et al., 1998), provide further evidence of the presence of such network effects, and assess its role in the acceptance or rejection of these technologies.

Previously, research on network externalities has implicitly assumed the presence of positive network externalities. Although Kraut et al. (1998) do not include *negative* network externalities in their study, they do mention that the extent to which others use a communication system may also *decrease* the worth of the technology for a focal individual. The reason is that extensive media usage by others (e.g., of a groupware system) may lead to information overload and system congestion. In the case of interactive communication media, assessing the role of negative network externalities appears to be an interesting avenue for future research.

The advent of new media such as video conferencing, real-time Internet chat, groupware and newsgroups, provide interesting settings to enhance our knowledge on this topic.

#### 4.4. Marketing activities

Research has, to a large extent, neglected the role of supplier activities in the innovation adoption process (Gatignon and Robertson, 1989). Most research has been biased towards adopter side variables in explaining the acceptance of innovations. However, studies have shown that supplier marketing activities have a significant effect on the adoption decision (Sultan et al., 1990; Frambach et al., 1998). Diffusion studies that examined the effects of different marketing variables on aggregate diffusion processes (Mahajan et al., 1990) and Granovetter and Song (1986) have developed models of the interaction between adoption and supplier activities that indicate the potentially complex dynamics that can result. More research on the role of supplier activities in the organizational adoption decision is needed, including intra organizational effects and the effects on different stages of the adoption process.

#### 4.5. International adoption

Some studies have examined international new product diffusion (e.g., Takada and Jain, 1991; Kumar et al., 1998), but still relatively little is known about cross-national differences in the determinants of innovation acceptance. Studies of international diffusion patterns show that these processes differ significantly by country (e.g. Kumar et al., 1998), and therefore, we expect that such differences will exist in adoption processes. For example, a recent study of cross-national differences on consumer innovativeness found significant cultural effects (Steenkamp et al., 1999). Research is needed to validate existing results in other contexts in order to examine their generalizability across cultures as well as across types of innovations (e.g., symbolic innovations vs. technological innovations; services vs. goods; ideas vs. products).

#### 4.6. The role of Internet and electronic commerce

The final area for further research that we suggest relates to the Internet and e-commerce applications. The organizational use of the Internet, together with numerous electronic commerce innovations and applications, provides important research opportunities (Rangaswami and Gupta, 1999). The adoption process is largely an information-processing activity and the Internet can play a major role in information provision and dissemination. Hence, the role of new media on information acquisition and processing, and the adoption process in organizations will be an important area for future research. Rangaswami and Gupta (1999, p. 4) note that

“information, namely, anything that can be digitized, diffuses faster, cheaper, and to more people on the Internet than by most other media.”

Second, the factors affecting the adoption of these new media by organizations merits further attention as a topic in innovation studies. The post-organization adoption stages deserve specific attention. Firms adopt commercial Web initiatives, but there is substantial variation in the degree to which they integrate and use these applications in their business processes, marketing communication and distribution channels (Srinivasan et al., 1999). Some firms' e-commerce platforms are limited to a marketing communication tool, while others carry fully integrated electronic transaction capabilities.

Third, network externalities are likely to play a key role in the adoption of Internet-based media by and within firms. Here, not only positive network but also negative externalities may be relevant, and the conditions under which such externalities occur needs further study.

Many of the research issues mentioned are interrelated. For example, network externalities relate to the role and impact of new media; and the new media affect the availability and accessibility of information on an international scale in important ways, which has implications for international adoption processes. The intra-organization adoption and continued use of innovations is closely connected to factors affecting the non-adoption of innovation. These interrelations and interactions among factors indicate the complexity of the research area as well as the many interesting and valuable research opportunities that exist.

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