

TRUST IN ORGANIZATIONAL ACCEPTANCE OF INFORMATION TECHNOLOGY: A CONCEPTUAL MODEL AND PRELIMINARY EVIDENCE

Nora I. Misiulek, Norhayati Zakaria, Ping Zhang
School of Information Studies, Syracuse University, Syracuse, NY 13244, (315) 443-2911

Abstract: Drawing on the existing theoretical literature, a conceptual model of trust is developed. The model suggests that trust in technology, institutional trust, and social trust are three dimensions of the overarching trust construct that should be considered in models of technology acceptance. The preliminary empirical evidence suggests that institutional trust and social trust are important factors in technology acceptance. Drawing in Rogers' model of the innovation diffusion process, we discuss how integration of this model with the technology acceptance model can inform future research on technology acceptance/adoption.

INTRODUCTION

Organizations devote considerable resources to and spend considerable sums of money on improving their information technology infrastructure in the expectation that it will help improve organizational performance (Lucas & Spitler, 1999). Baba (1999) put the figure for technology spending exclusive of the costs for employee training, technology integration, organizational restructuring and the like at more than \$400 billion in 1997 alone. However, in case after case, the anticipated benefits associated with these investments fail to be realized (Lindauer, 1995; Lucas, 1999).

Despite the evidence that organizational deployment of information technology is generally suboptimal, organizations continue to be enamored with emerging technologies of greater and greater sophistication. Observers note that in most cases, organizations fail to recognize that in order to reap these benefits, members of the organization must actually use the technology (Lucas, 1999). Technology adoption at the organizational level does not guarantee diffusion (defined in this instance as the actual use of the technology) by individuals whose work it was intended to facilitate. The problem for organizations is how to get end-users to accept new information technologies, and to integrate these technologies into current work processes.

The dominant theoretical model in the technology acceptance literature is the Technology Acceptance Model (TAM) developed and introduced by Davis and colleagues in 1989 (Davis, Bagozzi, & Warshaw, 1989) and derived from Fishbein and Ajzen's (1975) theory of reasoned action. The TAM preserves major components of the theory of reasoned action, and in particular the attitude-intention-behavior linkage which is both a major theoretical contribution and a source of criticism of the theory (Eagly & Chaiken, 1993). However, the TAM posits that two particular sets of beliefs – perceived usefulness and perceived ease of use – are of primary relevance for predicting information technology acceptance across a broad range of scenarios and users (Davis, 1989; Davis et al., 1989). Perceived usefulness is defined as “the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational setting” (Davis et al., 1989, p. 985). Perceived ease of use is defined as “the degree to which the prospective user expects the target system to be free of effort” (Davis et al., 1989, p. 985). In specifying these particular sets of beliefs as salient, however, the model effectively eliminates the influence of subjective norms, normative beliefs, and motivation from the relationship.

Recent elaborations of the TAM have focused on variables hypothesized to be associated with social influence processes such as individual differences (Agarwal & Prasad, 1999), cognitive absorption (Agarwal & Karahanna, 2000), perceived user resources (Mathieson, Peacock, & Chin, 2001), subjective norms (Venkatesh & Davis, 2000), social norms (Lukas & Spitler, 1999), and gender (Venkatesh & Morris, 2000). Not included in these elaborations are affective and cognitive constructs that are beginning to receive attention in the empirical literature, such as trust (Baba, 1999; Luftman & Brier, 1999). On the one hand, whether potential users trust the technology that an organization is implementing or considering implementing could factor into the decision by potential users to engage in trial (i.e., “a risk-free exploration of the technology prior to committing to sustained usage”) which the literature on the diffusion of innovation posits to be a crucial factor in technology adoption (Rogers, 1995). On the other hand, whether individuals trust relevant others in a networked technological environment could be expected to influence technology acceptance in that individuals are less likely to use technology to collaborate with others who they do not know and who they do not trust.

In summary, the TAM is a useful but incomplete model of technology acceptance (Agarwahl & Prasad, 1997). The role of trust in technology acceptance was chosen as the topic for this paper because trust is an under-investigated construct despite the recent attention that it has been receiving in the theoretical literature (cf. Kramer & Tyler, 1996). Despite the appearance of Kramer and Tyler's (1996) volume on trust in organizations and the publication of a special topic forum in *The Academy of Management Review*

in 1998 on trust in organizational environments (Rousseau, Sitkin, Burt, & Camerer, 1998), there has been little subsequent empirical work in the published literature that builds on the conceptual frameworks developed to date. This is one attempt to do so.

BOUNDING TRUST

As was noted, trust and, to a lesser extent, distrust are beginning to receive attention in the theoretical and empirical organizational literature as organizations seek to substitute collaborative and facilitative processes for deterrence-based practices based on assumptions of opportunistic human behavior and interorganizational relations (Baba, 1999; Barney & Hansen, 1994; Dyer, 1997; Ciancutti & Steding, 2001). This has led to the emergence of several conceptual articles dealing with trust, but little in the way of empirical evidence. Examination of the existing conceptual literature on trust is a starting point for “bounding” the construct; that is, for mapping its conceptual boundaries in order to develop an understanding of how it might function in technology acceptance.

There is no universally agreed upon scholarly definition of trust (Rousseau et al., 1998). Ring and Van de Ven (1994, p. 93) define trust as “faith in the moral integrity and goodwill of others, which is produced through interpersonal interactions that lead to social-psychological bonds of mutual norms, sentiments, and friendships in dealing with uncertainty.” Barney and Hansen (1994, p. 176), discussing trustworthiness as a source of competitive advantage, define it as “the mutual confidence that no party to an exchange will exploit another’s vulnerabilities.” Synthesizing the different conceptualizations of trust that exist across academic disciplines, Rousseau and colleagues (1998) define it as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions and behavior of another” (p. 395).

The concepts contained in these definitions – faith, moral integrity, goodwill, uncertainty, confidence, lack of opportunism, vulnerability -- are characteristic of how trust is described in the theoretical literature. In general, that literature suggests that there are five essential characteristics of trust:

1. Trust is conceptualized to be a multidimensional construct that consists of a cognitive, affective, and behavioral component (Cummings & Bromiley, 1996; Lewicki & Bunker, 1996; McAllister, 1995). The cognitions of an individual or group reflect beliefs about the intentions, capabilities, and qualities of the other individual or group (Cummings & Bromiley, 1996). Although cognition is not necessarily independent of affect, it is assumed that some observable or demonstrable characteristics, traits, or other evidence that can be used to substantiate or validate observations are the basis for trust’s cognitive dimension. In other words, cognitions accurately reflect some objective reality.

Trust’s affective component reflects the subjective, emotive perceptions of an individual or group of individuals about another individual or group of individuals (Cummings & Bromiley, 1996). Affective perceptions (which might also include beliefs) are highly subjective, and to some degree interpretive, having been linked to emotive responses evoked by the other individual or group. In other words, affect may or may not reflect “objective” reality.

The behavioral component encompasses both behavioral intentions and the actual behavior of an individual or group of individuals toward another individual or group of individuals (Cummings & Bromiley, 1996). It is assumed in the literature that both behavior and behavioral intentions are a product of, and are reinforced in subsequent interaction by, cognition and affect. As such, behavior is assumed to be a manifestation of cognition and affect.

2. Trust is process-based (Dodgson, 1993; Lewicki & Bunker, 1996; McAlister, 1995; Nooteboom, Berger, & Noorderhaven, 1997; Ring, 1996). Lewicki and Bunker (1996) have proposed that trust evolves over the course of a relationship, and that different types of trust characterize each stage of the relationship as it evolves over time. The types of trust that characterize each stage are based on the outcome(s) of repeated interaction between parties in the relationship beginning with calculus-based trust (i.e., “an ongoing, market-oriented economic calculation whose value is derived by determining the outcomes resulting from creating and sustaining the relationship relative to the cost of maintaining or severing it,” p. 120), progressing through knowledge-based trust (i.e., trust based on generalized expectations concerning the behavior of parties involved in a relationship), and culminating in identification-based trust (i.e., trust based on empathy and identification such that a collective identity that transcends individual or other-group identity emerges). Of these three types of trust, knowledge-based is thought to be the most common, identification-based the least.

3. Trust is relational (Ciancutti & Steding, 2001; Lewicki & Bunker, 1996; Nooteboom et al., 1997; Ring & Van de Ven, 1993). As the preceding discussion suggests, trust is most often conceptualized as characterizing relationships between individuals or groups of individuals. However, there is evidence that suggests that humans also perceive themselves to be in relationships with technologies with which they interact (Reeves & Nass, 1996). This suggests that humans may also attribute additional characteristics like trustworthiness to technologies, and that the process by which trust develops in human-computer interaction could be similar to the way in which it develops and evolves in interpersonal relationships between individuals or groups of individuals.

4. Trust reduces uncertainty (Dodgson, 1993; Dyer, 1997; Larson, 1992; Nooteboom et al., 1997; Powell, 1996). Trust reduces uncertainty by reducing (but not completely eliminating) reliance on formal governance structures and mechanisms for monitoring, control, and enforcement of contractually-based relationships (Powell, 1996). “Self-enforcing safeguards” such as

established relational norms, behavioral expectations, and reciprocal obligations are used as governance mechanisms much as membership in a professional community (e.g., a community of physicians, scientists, academicians) establishes a set of expectations about acceptable and unacceptable behavior (Dyer, 1997; Larson, 1992; Powell, 1996). Reliance on self-enforcing as opposed to contractual safeguards minimized the transaction and agency costs incurred by individuals or groups involved in the relationship (Dyer, 1997; Nooteboom et al., 1997). It also reduces the risk and uncertainty that one party will engage in behavior detrimental to the other.

5. Trust reduces risk (Baba, 1999; Luhmann, 1988; Nooteboom et al., 1997; Powell, 1996). Luhmann (1988) hypothesized that the trust underlies the decisions of parties to enter into relationships in which a risk exists that one party will engage in a way that is detrimental to the interests of the other. When entering into a relationship, the presence of trust between the parties reduces the risk that one party will behave opportunistically toward the other. This lessens perceptions of the risk inherent in entering into the relationship, the perceived vulnerability of the parties to opportunistic behavior, and the need to rely on formal contractual governance mechanisms.

6. A note on distrust. Distrust historically has not received much attention in either the theoretical or the empirical literature. There is growing recognition that distrust is not simply the absence of trust; these are not simply two ends of a “trust continuum” (Baba, 1999; Lewicki, McAllister, & Bies, 1998; Sitkin & Stickel, 1996). Baba (1999) defines distrust as “not only the absence of trust, but the active expectation that others will behave in ways that do not ensure... safety and security” (p. 334). This is similar to Lewicki and colleagues’ (1998) conceptualization of distrust, which they define as “confident negative expectations regarding another’s conduct” (p. 440).

Examination of the conceptual literature on distrust suggests that its dimensionality is similar to that of trust – it is a multidimensional construct that is process-based, that is relational, and that reduces risk and uncertainty (Lewicki et al., 1998; Luchmann, 1988; Sitkin & Stickel, 1996). Drawing on the work of Luchmann (1988), Lewicki and colleagues (1998) posit that trust and distrust can coexist in “quasi-stationary equilibrium of force” that “sustain trust or distrust at a specific level” (p. 445), a state that has called “optimal trust.” Their conceptual model of trust and distrust suggests that conditions of high/low trust and high/low distrust can be characterized by different cognitive and affective states, which suggest the existence behavioral predispositions based on those states.

BUILDING THE CONCEPTUAL MODEL

Extrapolating from the attitude change literature (Eagly & Chaiken, 1993; Fishbein & Ajzen 1975), the literature on technology acceptance (Agarwal & Prasad, 1997; Davis et al., 1989; Lukas & Spittler, 1999; Mathieson et al., 2001; Venkatesh & Davis, 2000) and the literature on trust and distrust reviewed above, we propose that trust in technology acceptance takes three forms:

- **Trust in technology.** It is clear from the literature that very little is known about trust in technology. Reeves and Nash’s (1996) research does suggest that human beings attribute human characteristics to technology. The implication is that human beings may view technology in relational terms (e.g., as a friend, as reliable, as dependable, as trustworthy). However, their research was conducted in an experimental laboratory setting. Little is known about how trust in technology functions in real-world organizational environments.
- **Organizational trust,** which we alternatively called institutional trust. Institutional trust appears to embody elements of trust in managerial competence and trust in organizational support of information technology (Lewicki & Bunker, 1996; Tyler & Degoey, 1996).
- **Trust in others in the organizational environment,** which we have labeled social trust. The third dimension reflects trust of both relevant others who might be opinion leaders or lead users of technology or others with whom one would interact using the information technology (Lewicki & Bunker, 1996; Powell, 1996; Tyler & Degoey, 1996).

We chose to begin our investigation by attempting to bound the first of these three forms of trust suggested by the theoretical literature, “trust in technology.” We conducted a series of focus groups on trust in technology with staff members employed at a large northeastern university. The staff members were university employees (exempt and non-exempt), and did not include faculty or technical support staff responsible for maintaining information systems. The participants routinely used information technology (i.e., personal and laptop computers) as part of their work, although they exhibited considerable diversity in their assessment of their personal proficiency with information technology. As such, we attempted to select as participants individuals who fit the profile of the “typical” office/staff employee in contemporary organizations.

Transcripts from the focus group sessions were content analyzed to extract common themes that emerged. From our analysis, we were able to construct a conceptual model of what individuals who routinely use information technology in organizational contexts construe the notion of “trust in technology” to encompass. Our findings suggest that technology is simultaneously construed as: (a) “Box” (i.e., hardware), (b) Software, (c) System (i.e., connectivity), and (d) People (i.e., the individuals responsible for providing

data/information or technical support over the system to the technology user). Of these four elements, respondents were in agreement that the fourth is what they think of when asked to consider what it means to “trust in technology.”

Respondents indicated that technology as “box,” software, and system are viewed largely as standard office equipment – in other words, as commodity. They did not view technological failure of these elements as anything more than what is expected of equipment; failures (i.e., violations) did not alter their trust in the technology. However, the failure of individuals responsible for providing data and information to provide accurate and reliable information was viewed quite differently. These violations were viewed as promoting distrust. In addition, respondents indicated that the degree of institutional support available (e.g., presence of dedicated technical staff to help with problems, training programs with ongoing mentoring in technology usage when needed) also contributed significantly to their trial and usage of new information technology.

This preliminary evidence suggests that trust in technology is not independent of institutional and social trust. In fact, it suggests the opposite: that trust in technology is dependent on the degree to which individuals believe that they can trust the people behind the technology, whether these individuals are support or content providers. It also suggests that human psycho-social dynamics bear more strongly on whether or not individuals “accept” information technology than attitudes toward technology per se.

A direct implication is that the exclusion of such factors from the technology acceptance model limits the utility of that model in explaining the dynamics of technology acceptance in organizational contexts. If perceptions of information technology in organizational contexts are indeed changing such that computers, local area networks, and other information technologies have come to be viewed by users as nothing more than “standard office equipment,” it is likely that resistance to technology has its locus in other environmental factors like organizational norms, trust in co-workers or information providers, and the like. For that matter, recent empirical findings that perceived usefulness (as opposed to ease of use) might better be explained by examining psycho-social factors in the organizational environment rather than by restrictively focusing on attitudes toward technology.

CONCLUDING COMMENTS

Our preliminary results, although based on qualitative data, suggest that trust in technology is less a factor in technology acceptance than social or institutional trust. Investigations of technology acceptance in organizational contexts have focused largely on factors related to technology (e.g., ease of use, perceived usefulness) to the exclusion of psycho-social factors such as social norms, trust, risk, and related constructs. The conceptual model derived from our review of the interdisciplinary literature on trust led us to propose that trust in technology acceptance consists of three elements – trust in technology, institutional trust, and social trust. Based on that model, we sought to develop a better understanding of the first of these three, trust in technology. However, these preliminary results suggest that trust in technology is very much dependent on the degree of institutional and social trust present in the organizational context.

In his discussion of adoption and diffusion of new communications technologies (of which information technology is a part), Rogers (1986) notes that “most individuals evaluate an innovation that they are considering adopting, not on the basis of scientific research by experts, but through the subjective evaluation of near-peers who have previously adopted the innovation. These near-peers thus serve as social models, whose innovation behavior tends to be imitated by others in their (social) system” (p. 118). He contends that it is the social and communication structure of the system in which the individual is embedded that either facilitates or impedes the diffusion of an innovation in that system.

Both the technology acceptance model and Rogers’ (1995) model of the diffusion of innovation attempt to identify factors that predict what is in essence a decision to adopt or reject some form of technological innovation. If the two models are examined side-by-side (Figure 1), it appears that the technology acceptance model focuses in detail on the second stage of the innovation-adoption decision process (i.e., persuasion), and, in particular, on two perceived characteristics of an innovation, ease of use (complexity) and usefulness (relative advantage) as a function of trial. In Rogers’ model, social and institutional trust are prominent aspects of the persuasive process as individuals both engage in trial and solicit the opinions of relevant others in their organizational environments while forming attitudes and reaching their own conclusions about whether or not to adopt (accept) an innovation.

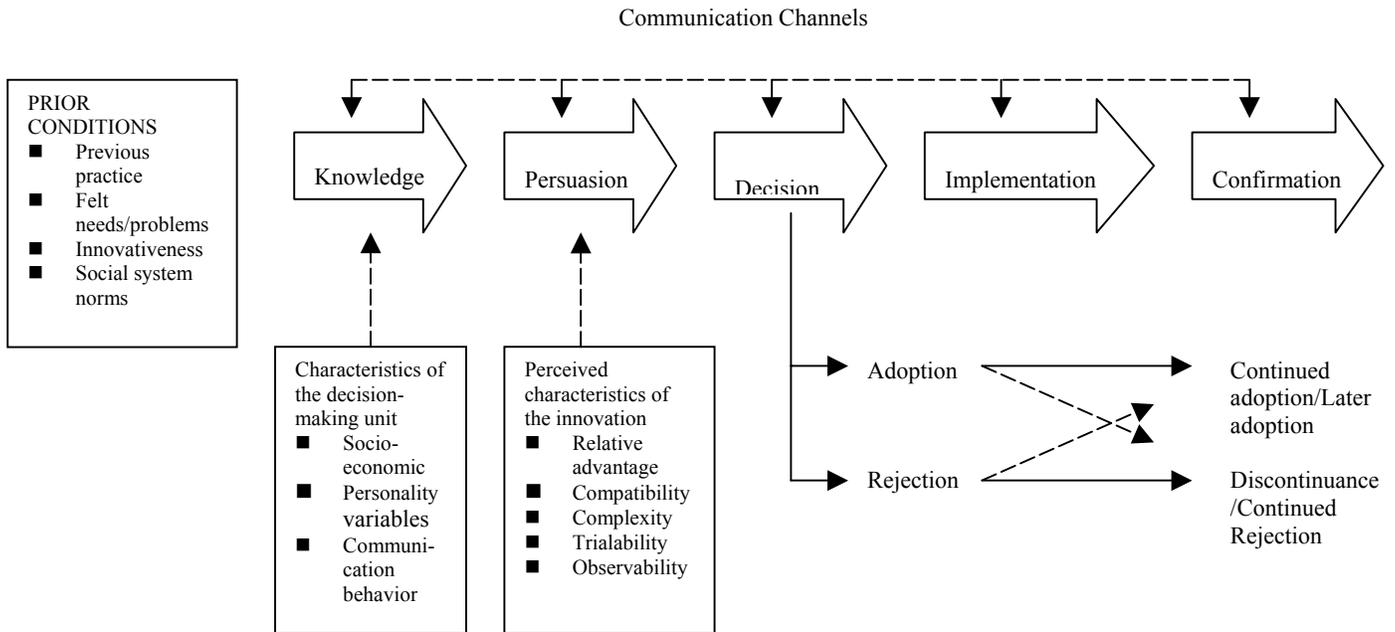
While we are far from integrating these two models – one from the information-based literature and one from the communications research/management literature, it would appear that each can inform inquiry on organizational acceptance of information technology. Neither has explicitly addressed the role of trust to date, however, Rogers’ model provides a conceptual framework by which we can attempt to better understand the dynamics of psycho-social variables such as trust in adoption/acceptance decisions. In particular, it suggests that extensions of the technology acceptance model that attempt to integrate constructs like trust might well focus on the degree of social and institutional trust in the organizational environment as antecedents to trial, and hence as antecedents to characteristics of the technological innovation investigated to date such as perceived usefulness and perceived ease of use.

REFERENCES

- Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24(4), 665-694.
- Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences*, 28(3), 557-583.
- Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new technologies? *Decision Sciences*, 30(2), 361-391.
- Baba, M.L. (1999). Dangerous liaisons: Trust, distrust, and information technology in the American work organizations. *Human Organization*, 58(3), 331-346.
- Barney, J.B., & Hansen, M.H. (1994). Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15, 175-190.
- Ciancutti, A., & Steding, T.L. (2001). Built on trust. Gaining competitive advantage in any organization. Chicago: Contemporary Books.
- Cummings, L.L., & Bromiley, P. (1996). The Organizational Trust Inventory (OTI). In R.M. Kramer & T.R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 302-330). Thousand Oaks, CA: Sage Publications.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). User acceptance of information technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Dodgson, M. (1993). Learning, trust, and technological collaboration. *Human Relations*, 46(1), 77-95.
- Dyer, J.H. (1997). Effective interfirm collaboration: How firms minimize transaction costs and maximize transaction value. *Strategic Management Journal*, 18(7), 535-556.
- Eagly, A.H., & Chaiken, S. (1993). *The social psychology of attitudes*. Orlando, FL: Harcourt Brace.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Kramer, R.M., & Tyler, T.R. (Eds.) (1996). *Trust in organizations*. Thousand Oaks, CA: Sage Publications.
- Larson, A. (1992). Network dyads in entrepreneurial settings: A study of governance of exchange relationships. *Administrative Science Quarterly*, 37, 76-104.
- Lewicki, R.J., & Bunker, B.B. (1996). Developing and maintaining trust in work relationships. In R.M. Kramer & T.R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 114-139). Thousand Oaks, CA: Sage Publications.
- Lewicki, R.J., McAllister, D.J., & Bies, R. (1998). Trust and distrust: New relationships and realities. *The Academy of Management Review*, 23(3), 438-458.
- Lindauer, T.K. (1995). *The trouble with computers*. Cambridge, MA: The MIT Press.
- Lucas, H.C., Jr. (1999). *Information technology and the productivity paradox*. New York: Oxford University Press.
- Lucas, H.C., Jr., & Spitler, V.K. (1999). Technology use and performance: A field study of broker workstations. *Decision Sciences*, 30(2), 291-311.
- Luftman, J., & Brier, T. (1999). Achieving and sustaining business-IT alignment. *California Management Review*, 42(1), 109-122.
- Luhmann, N. (1988). Familiarity, confidence, trust: Problems and alternatives. In D. Gambetta (Ed.), *Trust: Making and breaking cooperative relationships* (pp. 94-108). New York: Basil Blackwell.
- Mathieson, K., Peacock, E., & Chin, W.W. (2001). Extending the technology acceptance model: The influence of perceived user resources. *The DATA BASE for advances in information systems*, 32(3), 86-112.
- McAllister, D.J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38(1), 24-59.
- Nooteboom, B., Berger, H., & Noorderhaven, N.G. (1997). Effects of trust and governance on relational risk. *The Academy of Management Review*, 40(8), 308-338.
- Powell, W.W. (1996). Trust-based forms of governance. In R.M. Kramer & T.R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 61-67). Thousand Oaks, CA: Sage Publications.
- Reeves, B., & Nass, C. (1996). *The media equation. How people treat computers, television, and new media like real people and places*. New York: Cambridge University Press.
- Ring, P.S. (1996). Fragile and resilient trust and their roles in economic exchange. *Business & Society*, 35(2), 148-175.
- Ring, P.S., & Van de Ven, A.H. (1994). Development processes in cooperative interorganizational relationships. *The Academy of Management Review*, 19(1), 90-118.
- Rogers, E. (1986). *Communication technology. The new media in society*. New York: The Free Press.
- Rogers, E. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

- Rousseau, D.M., Sitkin, S.B., Burt, R.S., & Camerer, C. (1998). Not so different after all: A cross-discipline view of trust. *The Academy of Management Review*, 23(3), 393-404.
- Sitkin, S.B., & Stickel, D. (1996). The road to hell. The dynamics of distrust in an era of quality. In R.M. Kramer & T.R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 196-215). Thousand Oaks, CA: Sage Publications.
- Tyler, T.R., & Degoey, P. (1996). Trust in organizational authorities. The influence of motive attributions on willingness to accept decisions. In R.M. Kramer & T.R. Tyler (Eds.), *Trust in organizations: Frontiers of theory and research* (pp. 331-350). Thousand Oaks, CA: Sage Publications.
- Venkatesh, V., & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Venkatesh, V., & Morris, M.G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24, 115-139.

Rogers' Diffusion of Innovation Model



The Technology Acceptance Model

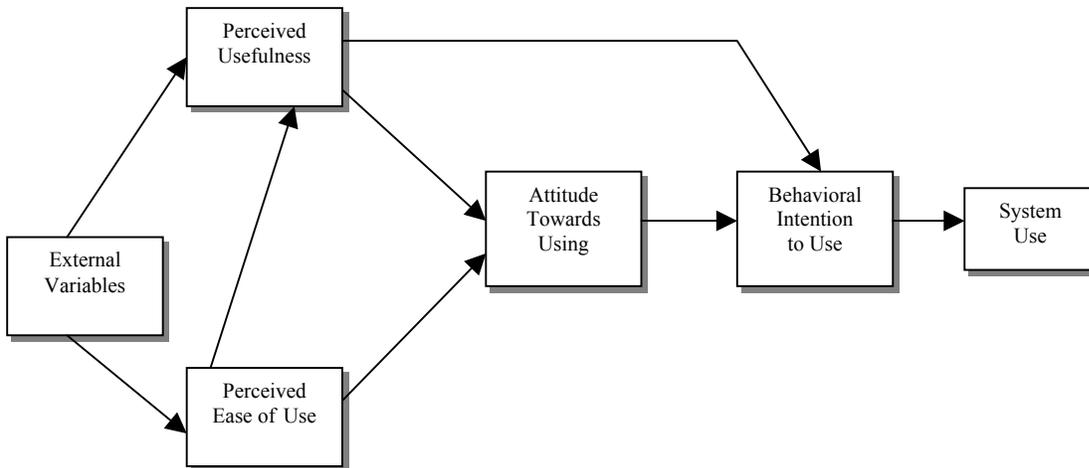


Figure 1: The Diffusion of Innovation (Rogers, 1995) and Technology Acceptance (Mathieson et al., 2001) Models