

Trust Correlated with Innovation Adoption in Hospital Organizations¹

Stephen R. Herting, DPA
SYS
1721 Pacific Ave, #210
Oxnard, CA 93030

(805) 486-4444 x238
sherting@syys.com
sfherting@earthlink.net

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Abstract

The perception of trust in hospital organizational climates is correlated with adoptions of innovations. Innovation has become synonymous with survival in the current healthcare environment. Hospitals, however, tend to be rule-bound and risk-averse. The paper suggests that successful innovation adoption may be associated with perceptions of trust among administrators, professionals and employees. For individuals or groups to be willing to take necessary risks for innovation adoption, there must be a perception that the organization trusts its members with appropriate information, resources and risk acceptance.

Innovation adoption is classified into technological, administrative, human-resources, and product/service innovation categories. Organizational climate elements of trust are grouped as 1) calculus-based trust, associated with perceived benefits and consequences, 2) knowledge-based trust, relying on experience and history, and 3) identification-based trust, established in common group membership, interests and intentions.

Based on a consulting project, the paper associates perceptions of trust with observations of hospital innovation adoptions. Surveys of ten Southern California Hospitals, involving fifty organizational groups and over 800 participants, asked participants to identify the presence of organizational climate trust attributes as well as observations of innovation adoption.

Trust-related organizational climate attributes are shown to be positively associated with the adoption of specific types of innovations and negatively associated with others. The findings suggest that the presence of certain key elements of trust within organizational climates could function as predictors of successful innovation adoption and readiness for organizational change.

TRUST CORRELATED WITH INNOVATION ADOPTION IN HOSPITAL ORGANIZATIONS

Problem

For individuals or groups to assume the necessary risks of innovation, they must have some confidence that an organization will reward success and tolerate failure. I propose that successful innovation adoption is more probable in a climate of optimum trust than in either a coercive or a freewheeling environment. Trust may be an important underlying factor in the encouragement of innovation adoption in hospitals. Likewise, adoptions of innovation in hospitals may be evidence of management activities hospitals have taken to cultivate climates of trust.

This paper is based on a consulting project during which I helped to survey ten Southern California hospitals. I reported that selected organizational climate factors were related to innovations observed by hospital staff members (Herting, 2000). Upon reexamination of the data, a different theoretical construction emerged, with the organizational climate factors seen collectively as managements' efforts to cultivate climates of organizational trust and predictability. Trust seems to be a common theme infusing many organizational climate factors associated with innovation.

Trust and innovation are inevitably interlinked. Trust has been described as a fundamental ingredient for collaboration among organizations (Lewicki, McAllister and Bies, 1998). "The essential ingredient of collaborative effort is trust." (Costigan, Ilter and Berman, 1998, 303) Levels of trust in organizations can be causally related to collaborative climates that encourage innovation (Ruppel and Harrington, 2001). Innovation, in turn, results in economic advantages for one firm over another and even one nation over another (Schumpeter, 1950; von Hippel, 1998). Understanding the linkage between trust and innovation should be very important to any organization, especially to hospitals vying for survival.

Innovation, for hospitals, has indeed been equated to economic survival. Market pressure from health maintenance organizations (HMOs) and insurance companies has induced hospitals to reduce health-care costs through efficiencies. Some hospitals have reacted by merging and consolidating (Reardon and Reardon 1995). Others have attempted to be innovative, with new markets, new technologies and new services. Hospitals that have

survived have done so largely by innovating and adapting (Fuller and Scammon 1996, Lamm 1996).

Innovation provides the competitive advantage, according to Utterback (1994), who drew a parallel between innovation and long-term market advantage. Conversely, failure to innovate could equal business failure. “Failing firms are remarkably creative in defending their entrenched technologies, which often reach unimagined heights of elegance in design and technical performance only when their demise is clearly predictable.” (p. xxiv) Similarly, Haveman (1992) likened the connection between innovation and organizational survival to mutations adapting and surviving in an ecological system.

Hospitals report wide variation their ability to adopt innovations. Some hospitals innovate easily; others find such innovation difficult if not impossible. Many institutions are viewed as conservative, hierarchical, conforming, rule-bound organizations that favor stability over change (Badger 1992; Delbecq 1995). How can traditionally conservative hospitals effect creative change? How can risk-adverse organizations suddenly eschew stability and allow the inherent risk associated with innovation? Perhaps it is a matter of trust.

Bartlett and Ghoshal (1995) argued for a balance of freedom and discipline to bring organizational groups together in trusting collaboration to bring about initiatives:

The ability and willingness of people to take initiative is rooted in the tension between stretch and discipline....The combination of trust and support motivates cooperation and collaboration. Trust makes cooperation desirable; support enables individuals to convert that desire into action. Each is a necessary element in the organizational glue, but only in combination do they create a sufficient condition for integrating the disparate actions of dispersed people. (p. 19)

But the relationship between a climate of trust in hospitals and the actual adoptions of innovations is unclear. Whether or not hospital environments are indeed capable of substantially encouraging or inhibiting innovation with trust or trustworthiness is a matter of controversy. In this study, I hope to point to a relatively practical way to demonstrate the connection.

In this exploratory study, I hope to accomplish the following:

1. I will explore the literature of trust as it relates to innovation.
2. I will attempt to fit innovative climate factors into a conceptual framework of trust.

3. I will show, with survey data from a study of hospital organizations, how trust correlates with reports of innovation.
4. I will suggest a nonlinear relationship between trust and innovation.
5. I will show preliminary evidence of a curvilinear relationship between trust and innovation.
6. I will discuss the possibilities of improving upon the methodology of this study.

Literature

Trust and innovation have both attracted numerous definitions and typologies. To provide a backdrop for the methods and findings of this paper, I have selected a few from the many writings available. First, I will address some of the definitions and models of trust. I will then mention authors that have linked the two subjects, attempting to place them within the theoretical construction of three types of trust. Finally, I will focus on the subject of innovation itself, discussing some of the definitions and models predominant in the literature.

Definitions and Classifications of Trust

Trust is perceived to be valuable, attainable, necessary and destructible, but it lacks a consistent definition. The literature approaches trust from many directions: why it is necessary, how it is achieved, how it is sustained and what it produces. In the following discussion is a brief sampling of the theories and concepts of trust, illustrating the wide variation of thought on the subject.

Jones and George (1998) differentiated between conditional and unconditional trust. Unconditional trust affects cooperation and teamwork directly and through several types of social processes, including:

- (1) Broad role definitions,
- (2) Communal relationships,
- (3) High confidence in others,
- (4) Help-seeking behavior,
- (5) Free exchange of knowledge and information,
- (6) Subjugation of personal needs and ego for the greater common good, and
- (7) High involvement. (p. 540)

In contrast, conditional trust seems less viable, involving continuous reappraisal based on values or emotions. Conditional trust may, with negative behavior lapses, lead to diminished trust or even distrust. Conditional trust does not lead to the culture of synergy possible with unconditional trust (Jones and George, 1998).

Defining another dichotomy, Lewicki, McAllister and Bies (1998) distinguished trust from distrust, viewing them as completely different phenomena. The two attitudes are not on a continuum, for they may occur simultaneously. Trust involves expectations for the conduct of others within relationships. Both trust and distrust are independently embedded in an organization. Both may lead to positive or negative consequences, if applied inappropriately.

Similarly, Brien (1998) contrasted trust with reliance. Reliance is realization that the actions of another may be a condition for one's own success. Trust, however, is feeling secure that those actions will be realized.

“To trust something...is to have certain expectations that it will behave in a certain desired way that promotes, or at least does not diminish the putative truster's well-being or that of something in which she has an investment. To trust is not merely to have certain expectations, however. It is importantly to feel secure that the thing trusted will act as expected and that one's expectations about it will be fulfilled.” (p. 398)

Doney, et. al. (1998) suggested a framework of trust-building as a cognitive function based on experience with frequent transactions. With more transactions, the trustor is able to assess the trustee's capabilities and predictability. Five cognitive processes are mentioned, including calculative, prediction, intentionality, and transference processes. Nyhan and Marlow (1997) applied a conceptual model of trust, after Luhmann (1982), describing trust as “the level of confidence that one individual has in another to act in a fair, ethical, and predictable manner.” (p. 615) Trust reduces the complexity of an environment by restricting possible outcomes to a smaller set of possibilities. They also differentiated trust on a personal level from trust at a systems level.

Similarly, Hosmer (1995) framed organizational trust as mutually productive exchanges of resources that depended upon personal trust, as well as formal social mechanisms that are designed to ensure trustworthy conduct. Organizational trustworthiness is evidenced in the likelihood of unfair advantages or broken promises. Hardin (1993) proposed a rational theory of trust that also incorporates trust and trustworthiness as important variables. Trust contributes value to the extent that it is linked with objects worthy

of it or able to maximize the benefit of it. Hardin's Bayesian model postulates that the combination of trust and trustworthiness can be optimized to the benefit of both parties, while sub-optimal combinations could result in misplaced or withheld trust, each with less satisfactory results.

To organize my discussion of trust literature, I have relied on three stage² model, from Shapiro, et. al. (1992) and Lewicki and Bunker (1995). The three stage construction incorporates many of the concepts discussed above: conditional and unconditional trust, trust vs. distrust, trust as a product of expectations, trust as security, and trust on a personal as well as a systemic level. Each stage will be discussed and related to examples of trust literature.

Calculus-Based Trust

Lewicki and Bunker (1995) described calculus-based trust as being based on perceived benefits and consequences, balanced by the costs of continuing in the relationship. It is a trust based on deterrence or the balance of consequences perceived by the trustor and trustee. Behavior control and manipulation of the other are its hallmarks. Consistency is assured by making inconsistency undesirable. Defections may be tolerated in a continuing relationship if positive consequences outweigh negative ones. Similar to the conditional trust of Jones and George (1998), calculus-based trust is often reappraised or recalculated, depending on the willingness of the parties to assume risks of exploitation or betrayal.³

Doney, et. al. (1998) similarly incorporated a calculus-type trust within their cognitive framework, describing behavior of the trustee that can be predicted by the trustor, based on the assumption that individuals tend to act opportunistically. People act trustworthily because it is in their interest to do so. Similarly, Lorenz (1993) suggested that interorganizational trust is associated with a learning process of successive risk-taking. Cooperation is achieved incrementally, by continuous reevaluation. The potential partners' behaviors are observed and tested along the way, eventually perhaps leading to assessment of consistency.

² Shapiro, et. al. regarded the stages as independent types of trust; while Lewicki and Bunker (1995) described them as three progressive stages of trust, one stage leading to the next. For this paper's purposes and for simplicity's sake, I will consider them as independent phenomena.

³ As entrepreneur Jim Johnston often said: "People are honest if you help 'em!"

Calculus-based trust is characterized by short-term expectations and circumstantial contingencies. The relationships are fragile and recalculated based on violations. The parties trust each other as long as their respective interests are served (Lewicki and Bunker, 1995).

Knowledge-Based Trust.

While exercise of control characterizes calculus-based trust, exchange of information fuels knowledge-based trust. Calculus-based trust relies on deterrence; knowledge-based trust is conditioned upon how well the trustor can understand and predict the trustee's actions.

“The better I know the other, the better I can trust what the other will do because I can accurately predict how they will respond in most situations” (Lewicki and Bunker, 1995, p. 149). With available information, this form of trust also detects untrustworthiness and the limits of trust. Trust that is cultivated in courtships and long-term business relationships, for example, is often knowledge-based, with the parties mutually understanding the extent and limits of their trust (Lewicki and Bunker, 1995).

Several aspects of the cognitive model described by Doney, et. al. (1998) align with knowledge-based trust, with one facet of trust depending on experience and knowledge for a sense of predictability. The more the trustor could know about trustees, the more effectively their behaviors could be predicted or anticipated. The known experiences of the past are relied upon to predict the future. These writers also described a cognitive trust that is based on perceptions of intentions and competencies that provide assurance that expectations would be fulfilled.

Costigan, Ilter and Berman (1998) discussed cognitive and affective trust as two dimensions of “dyadic” or interpersonal trust. Cognitive trust, by their definition, is trust formed as rational choice based on knowledge. However, “affective” trust is more concerned with the quality of the relationship, with emotional concern and caring of one for the other. The latter dimension seems to fit with identification-based trust, a trust based on personal affinity.

Identification-Base Trust

Lewicki and Bunker (1995) noted identification-based trust as a product of mutual understanding. Each party understands the other and also understands what is required to maintain the relationship of trust. “At this...level of trust, trust exists because the parties

effectively understand, agree with and endorse each other's wants; this mutual understanding is developed to the point that each can effectively act for the other." (p. 151) The parties are bonded by common identities, locations, goals or values.

In the cognitive framework described by Doney, et. al. (1998), trust could also be transferred, based on referral or association. If a known person could be trusted, a person with similar affinity could also be trusted. They identified this type of trust as being more prominent in cultures with more faith in institutions and other individuals.

Similarly, Atwater (1988) demonstrated that attitudes of trust and loyalty among subordinates and superiors were predictors of supportive and demanding supervisory behaviors, noting that "...the more trust and loyalty expressed by subordinates toward their supervisor the more positively the supervisor was perceived to behave." (p. 305) Trust in this model seems to be based on communication of values.

Ruppel and Harrington (2000) found a clear relationship between an ethical work climate and communication. Principle-oriented cultures, influenced by an ethical tone set by management, may promote open communications, which is further linked to trust. Conversely, ethical climates emphasizing parochial interests or organizational interests subsuming individual consequence tended to inhibit communications and, thus, trust.

Witteck's (2001) model of trust also seems to be identity-based. He proposed that reduction of uncertainty may be a function of 1) positional trust behavior, where individuals trust others in similar network positions as themselves, 2) memetic trust behavior, where individuals trust others who are already trusted by individuals like themselves or 3) advisory trust behavior, where individuals trust others who function as network third-party intermediaries.

Herzog (2001) described how the trust necessary for collaboration is built over time, as perceptions of self and others change through collaborative sharing. Trust is built as collaborating teams share perceptions and interact around motives, goals, problems, decision-making, team pride, social events and expressions of values. "Successful projects are delivered in environments where high levels of trust exist among the collaborators, and in which they may openly share their problems, concerns, and opinions without fear of reprisal." (p. 32)

Summary

There are many models and definitions of trust, a few of which I have described above. The three-stage model from Shapiro, et. al. (1992) seems broad enough to include many specific concepts from other models. Therefore, I have selected the three-stage model as a convenient framework for linking the literature of trust to the literature of innovation.

Trust Related to Innovation

There is considerable literature that specifically associates trust with innovation. Using the three-stage framework of trust from Shapiro, et. al. (1992), I will describe some of the writings that have linked trust, or subsets of trust, with various forms of innovation, hoping, in the process, to demonstrate the viability of that framework for discussing the trust-innovation relationship.

Calculus-Based Trust Related to Innovation

Calculus-based trust is associated with deterrents and incentives that enable or coerce predictable behavior on the part of the trustee (Lewicki and Bunker, 1995). I propose that the existence (or lack of) organizational climate factors of risk acceptance, financial discretion and autonomy from management control may constitute an atmosphere of calculus-based trust that provides impetus for (or inhibition of) innovation.

Risk Acceptance. Trust involves risk—often calculated risk. An organizational environment of distrust may result in a culture of risk aversion among employees. Inhibitors of innovation are reported to be such factors as fear of failure, reluctance to change, fear to commit finances or organizational inertia. Risk acceptance means purposefully allowing experimentation and removing deterrents to variation. If employees are to experiment, innovate, and adapt, there must be an acceptance of a margin of error by management. Kanter (1984) noted that “innovating companies provide the freedom to act, which arouses the desire to act” (p. 142).

Risk acceptance may diffuse with innovations themselves. Greve and Taylor (2000) studied the effects of innovations in radio station markets. Innovations in one organization may be impetus for imitation or reactive changes, based on managerial decision-making or propensity to take risks. Shane (1995) connected reduced innovation with uncertainty,

insecurity, and change avoidance. In spite of inertia, innovation came through champions-- individuals who were willing to risk failure and to counter organizational hierarchies. O'Neill, Pouders, and Buchholtz (1998) related the speed of innovation adoption to an accumulation of past experiences with experimental failures. However, Dougherty and Hardy (1996) noted product innovation occurring in spite of, and in resistance to, the risk-averse hierarchies and associated values of organizational stability and constraint.

Silver and Mitchell (1990) observed a strong tendency among many decision-makers to cling to the status quo in spite of the perception of better alternatives, holding to marginal processes and policies, rather than venturing out, and even redeploying resources from innovative programs to save failing enterprises. Only when the status quo began to clearly fail were imaginative alternatives seriously considered. Ryan and Oestreich (1991) observed incidences where a risk-averse attitude became the organizational norm due to an atmosphere of perceived fear, resulting in decreased innovation.

Ironically, the ignorance of upper management may provide an inadvertent climate of risk tolerance. Kanter (1984) associated innovation with "benign neglect" of managers who allowed subordinates to experiment (p. 96–97). In another case, a wide separation between potential innovators and the core functions of the organization created a permissiveness that allowed innovation to occur.

Financial discretion. Financial discretion implies resources to risk and trust in the discretion to spend them. Nohria and Gulati (1996) found both positive and negative relationships between organizational "slack" and innovation. They defined slack as resources in excess of the minimum necessary for routine output. An optimum amount of slack encourages experimentation, while too much slack may indicate a lack of organizational discipline. Delbecq (1995) also identified centralization of slack funds for experimentation as being detrimental to the promotion of innovation.

Examining the controversy of whether small entrepreneurial firms or large incumbent firms were more innovative, Chandy and Tellis (2000) found that, contrary to established wisdom, large firms with R&D investments were at least as innovative as smaller, more flexible firms. Small firms, spending less, capitalized on research spillovers and active partnering with the larger firms. These same writers looked at the willingness of firms to "cannibalize" assets from existing products and services, concluding that risking existing

assets is a key to radical innovation (Chandy and Tellis 1998). Similarly, Chandrashekar et al. (1999) suggested that the lack of innovation may be related to the unwillingness of an organization to divert from investments in current products. Coyne (1999) also attributed part of 3M's success in innovation to substantial R&D investments and Albert (1995) considered existence of R&D departments as an indication of an organizational commitment to innovate.

Management autonomy. Some writers proposed that management by its excessive control (or deterrence) or multiple bureaucratic layers can inhibit innovation. Jansen and Chandler (1994), for instance, argued that punishment and disapproval as motivation tends to increase fear and conformity, thus lessening innovation. According to Qian and Xu (1998), centralized bureaucratic prescreening of projects may increase delays, elevating the costs of innovation. At a higher organizational level, centralized national economies tend to start fewer innovation projects than decentralized economies. Amburgey, Kelly, and Barnett (1993), Taylor (1992), Damanpour (1991), and Schon (1971) all found formalization or rigidity in organizations tending to inhibit innovation.

Centralized strategic planning within an organization encourages inertia rather than innovation. Delbecq (1995) advocated decentralization of planning to effect an environment of innovation. Bartlett and Ghoshal (1995) observed that the broad strategic-planning efforts that defined constraints and boundaries eventually translated into obstacles to innovation. Repeated elaboration of strategic goals, visions, and priorities tended to encourage managers to become more passive, risk averse, and resistant to innovation.

Paradoxically, organizational stability is associated with innovation in some research. Hitt et al. (1996), for instance, found that innovation within companies was negatively affected by activities of acquisition and divestiture. The innovative climate of an organization may be dependent upon continued operation in a balanced manner with basic assurance that the organization will continue to exist with reasonable employee turnover.

Knowledge-Based-Trust Related to Innovation

Knowledge-based trust is linked to the knowledge and information. The sharing and gathering of information through meetings, networking and information exchange may function to promote an atmosphere of knowledge-based trust. Information enhances predictability. In the literature, innovation has been linked with socialization and the

exchange of information. According to many writers, without considerable information and collaboration, innovation cannot be diffused and adopted. The strength of innovation seems to be closely tied with the benefits of collaboration, teaming and social interaction.

Fairtlough (2000) described an innovative organization where "...information is freely shared, there are high levels of trust, and everyone is bound together by a deep understanding of and commitment to organization goals. (p. 271)." Fairtlough further suggested that even such mundane measures as the layout of the workplace or the locations of restrooms can encourage exchange of information, thus encouraging the necessary idea sharing necessary for innovation.

The awareness and knowledge of an innovation occurs more rapidly than its adoption, according to Rogers and Shoemaker (1971). Further, if an innovation is perceived by members of a social system to be compatible with existing ideas, even more rapid adoption could be expected. Therefore, information sharing and networking plays a large role. Ahuja (2000) associated direct and indirect ties with the generation of innovation, noting that disconnected relationships tended to be mitigating factors for innovation.

Powell, Koput, and Smith-Doerr (1996) argued that innovation is often dependent upon broadly dispersed interorganizational relationships. No single organization has sufficient information to keep pace with all the technological advances. Goes and Park (1997) found that technical and product information-exchange in hospitals led to increased diffusion of innovations among individual facilities. Hitt, Hoskisson, and Kim (1997) described a relationship between the international diversity of companies and increased innovation, due to more information exchange from a wider array of sources.

The necessity of information sharing in solving innovation-related problems was explained by von Hippel (1988). Required information tends to be difficult to transfer from one situation to another. As information becomes harder to transfer, iteration of information increases and the costs associated with the innovation rise accordingly. Other linkages between information exchange and innovation were also found by Daft and Becker (1978), Tsai and Ghoshal (1998), Utterback (1994), and others. Knowledge and information, linked to trust by Shapiro, et. al. (1992), were also found necessary for innovation by the writers above.

Identity-Based Trust Related to Innovation

Identity-based trust is associated with the sharing of values and vision among the participants of a trusting relationship (Lewicki & Bunker, 1995). With an empowered and enlightened leadership, organizations promote a climate of identity-based trust, where partners act upon one another's behalf. By empowering subordinates, leaders say, "You are one of us." Leaders, promulgating elevated goals, clear visions and strong values, are associated with sustained innovation in an organization.

Empowerment. Empowerment means dispersing the power more widely in the organization. Linden (1994) defined effective empowerment as "greater authority and control, with greater responsibility for results" (p. 211). Randolph (1995) described empowerment creating autonomy in the organizational hierarchy and allowing teams of employees to become the new hierarchy. Bartlett and Ghoshal (1995) observed innovation occurring in independently-empowered skunk works in spite of the bureaucratic restraints of the larger organization.

Formality of empowerment may not be as important as the reality of empowerment. Thorlakson and Murray (1996) found that formal implementation of empowerment measures do not necessarily yield the predicted innovation-encouraging effects such as perceptions of improved communication, work-group cohesiveness, or management styles with the needed flexibility. According to Kanter (1984), monetary rewards do not motivate entrepreneurial behavior as much as the perception of being empowered to act. She wrote that, "...people tackle innovative projects because they have finally received the go-ahead for a pet idea they have always wanted to try, or they feel honored by the organization's trust in them...or they simply want to solve a problem that will remove a roadblock to something else they want to do" (p. 153–154).

Maccoby (1991) also found that the creation of a sense of team empowerment and purpose is more effective than monetary reward in motivating innovation. He analyzed motivating factors of individual innovators, proposing that satisfaction is attained in the process of understanding and creating, rather than in receiving intrinsic rewards. Further, empowerment and management commitment can theoretically reinforce and sustain innovative behavior. Delegation of power is an investment in commitment that is necessary for innovation.

Leadership. The sharing of values is an aspect of identity-based trust (Lewicki & Bunker, 1995). Visionary, value-oriented leadership is also often mentioned in conjunction with innovation. Tsai and Ghoshal (1998) found shared vision to have an indirect effect on innovation through its promotion of a sense of trust. Howell and Higgins (1990) studied leaders considered to be innovation champions and non-champions and compared their behaviors and levels of effectiveness, suggesting that the innovative success of champions depended upon their capacity to articulate vision, express confidence in others, and model innovative actions. Delbecq (1995) and Dougherty and Hardy (1996) also recognized the contribution of power-wielding and committed champions.

Several researchers emphasized the motivational benefits of appealing to the value systems of potential innovators. Innovative organizations are known for having evident and pervasive value systems. Schneider, Gunnarson, and Niles-Jolly (1994) described the innovative climate of 3M Corporation as reflecting the priorities of management for change, customer focus, and employee entrepreneurship. Kanter (1984) described organizations with innovative cultures as having a pride in the company and a sense that innovation is one of the core values. Leadership that promotes innovation is not limited to leadership from the “upper rungs” of the organizational hierarchy, according to Shane (1995). He defined the following four championing roles as valuable to the innovation process: (1) the organizational maverick, (2) the transformational leader, (3) the organizational buffer, and (4) the network facilitator. Each of these roles is instrumental in providing power, information, and resources at different stages of the innovation process. In addition, these roles are valued differently by different cultures, depending upon the degree of uncertainty acceptance.

Summary

Using the three stage framework of trust (Shapiro, et. al., 1992), some example articles from the innovation literature have been associated with atmospheres of trust. Trust can be seen as a general principle that links interrelated stimuli to innovation, such as risk acceptances, slackened management control, sharing of information, empowerment and visionary leadership. Stretching a bit farther, perhaps we could say that many of the current techniques of enlightened management could be construed as efforts to provide a balance of trust and discipline, the by-product of which is innovation.

Definitions and Classifications of Innovation

Like trust, innovation also inspires a broad range of theory and research, with many definitions and models. Wolfe (1994) described three streams of research in organizational innovation including (1) diffusion of innovation, (2) organizational determinants of innovation, and (3) avenues of adoption and implementation of innovation within organizations. I have chosen not to distinguish among inventions, radical innovations, innovation adoptions, organizational changes or innovation diffusions. I will consider them all as being on a continuum of “newness,” following Van de Ven (1986), who argued strongly against any inappropriately fragmented classification of the innovation process.

There are many taxonomies of innovation. Becker and Whisler (1967) differentiated inventions—creative acts of individuals—from innovations, defined as collective actions of groups. Daft and Becker (1978) distinguished between early adoption, innovation and imitation. Mohr (1969) also made a distinction between innovation and invention, invention being a new creation and innovation a new application. New skills applied by workmen to practical situations, according to Nilsson (1995), also constituted a kind of innovation, being the experimentation necessary to render new technology practical.

Other scholars have taken a broader view. O’Neill, Poudier, and Buchholtz (1998) extended the definition of innovation to include unique corporate strategies. Watkins and Marsick (1993) referred to innovation as an end product of an organizational learning process. Kanter (1984) went even farther:

Innovation refers to the process of bringing any new, problem-solving idea into use. Ideas for reorganizing, cutting costs, putting in new budgeting systems, improving communication, or assembling products in teams are also innovations. Innovation is the generation, acceptance and implementation of new ideas, processes, products, or services (p. 20).

Just as innovation has many definitions, it also has many classifications. Kleinknecht (1987) partitioned product innovations into the following six categories: (1) pure product innovations for final consumers; (2) new medical procedures, apparatuses, and drugs; (3) new investment goods; (4) new technical devices or technological materials; (5) scientific instruments; and (6) pure process innovation. Chesbrough and Teese (1996) distinguished between autonomous and systemic innovation; Henderson and Clark (1990) differentiated “radical,” “incremental,” and “architectural” innovations. Kim and Mauborgne (1997)

described innovation in terms of creating value for the company, further distinguishing product, service, and delivery innovations.

Ziman (2000) characterized innovation as an evolutionary process analogous in many ways to Darwinian and Lamarckian biological evolution models, driven by natural selection, random variation and inheritable traits. Haveman (1992) also discussed innovation in similar terms. Innovations go through a selection process by which the fittest or most survivable variations are selected from a set of possibilities. Organizations in competition with one another may follow natural selection and blind variation patterns leading to survival or extinction. Altschuller (1984) also discussed inventive solutions in terms of evolution. Somewhat related to the classification of innovations, he classified inventive solutions at five levels of complexity: a standard solution involving common processes, a solution involving a change of system, a solution crossing industries, a solution crossing scientific disciplines, and a solution based on a completely new scientific discovery.

Drazin and Schoonhoven (1996) pointed to a lack of consensus among scholars, commenting that researchers generally agree on the benefits of innovation, but not on definitions or classifications of innovation. They commended Daft (1986) for his innovation typology, which included technological, administrative, human-resources, and product/service innovations. Technological innovations are defined as those that would increase production or quality of products or services. Administrative innovations concern organizational structures, goals, or performance systems. Human-resources innovations would improve or change employee attitudes or behaviors including communication, group interaction and problem solving. Product/service innovations are changes in the organizational output to customers, involving new products or new markets. Taking my clue from Drazin and Schoonhoven, in this paper I will use Daft's (1986) scheme to classify narrative reports of innovation adoption in hospitals.

Summary of Literature

Clearly, the literatures of trust and innovation overlap. But both subjects suffer from the lack of precise definitions and consistent, clear typologies. Nevertheless, if organizational climate factors are viewed as attempts by management to create atmospheres of trust, then perhaps a way opens to more clearly connect trust with innovation in organizations. The

remainder of this paper will explore ways that trust/innovation relationships can be empirically demonstrated.

Methodology

I draw on a previous study where I related organizational climate factors to the reports of innovation in hospitals (Herting 2000). Upon reexamination of that study, I felt less than satisfied with the findings and interpretations. I had merely related the study's findings to a cacophony of theories from many writers, but could offer no general theory to explain how such a myriad of organizational climate factors could be associated with innovation. For this paper, I hope to remedy that shortcoming by examining the same data through a more singular theoretical lens, viewing the organizational climate factors all as evidence of organizational trust. The overall purpose of this paper is not to present empirical findings (the data do not adequately support them) but to suggest the feasibility of using its methodology, with some adaptation, for future research in trust and innovation.

Population

The previous study was based upon secondary data drawn from a consulting project sponsored by the Center for Health Services Management Research (CHSMR) and the University of La Verne in La Verne, California. The study was conducted over a two-year period, using self-administered surveys of five organizational groups in each of ten Southern California hospitals. A total of 870 survey instruments, from approximately 1,500 distributed, were collected by the ten hospitals and provided to CHSMR. The hospitals were advised to use a random stratified sample to survey their respective populations, but no assumptions could be made as to the control or randomness of their distribution. The results were analyzed at the group level; forty-five organizational groups were queried and forty-four responded. Two groups with very low individual response rates were removed from the data set, leaving forty-two responding organizational groups out of forty-five queried (Herting 2000).

Instrument

The “Environment for Innovation” instrument was developed, piloted and modified by Badger (1992), based on a query of 150 California hospital CEOs (1992). The instrument is composed 41 Lickert-scale questions (strongly agree, somewhat agree, somewhat disagree, strongly disagree, don’t know) to measure perceptions of organizational climate factors. There were also two essay items requesting respondents to provide narratives of observed innovations that had been adopted by respective hospitals (Herting 2000).

1,846 narratives were received from the 870 questionnaires, of which sixty-four inappropriate responses were discarded. The remaining 1,782 narrative responses were each counted as individual reports of innovations, using Daft’s (1986) classification framework. The innovation reports were classified into 606 technical, 374 administrative, 426 human-resources, and 440 product/service innovations, using pattern matching as prescribed by Yin (1994). I weighed all reports of innovation equally. Innovations were not evaluated for originality or importance, assuming that each innovation was new and important to the person reporting it (Herting 2000).

Independent Variables: Organizational Climate Elements of Trust

In the prior study, for the independent variables, I attempted, with some difficulty, to construct a five stage framework for Badger’s (1992) forty-one organizational climate factors. As already explained above, for this paper, I will reframe those factors into a theoretical construct based on the three stages of trust from Shapiro, et. al. (1992). The forty-one organizational factors are grouped into the three stages as described below:

Calculus-Based Trust

Calculus based trust questions includes management incentives, deterrents, policies, formalities or organizational structural features that would suggest increasing (or decreasing) predictability of actions. These include questions in the questionnaire that suggested such factors as direct management intervention, management risk acceptance, formal suggestion programs, formal training, formal recognition processes, allowed time, rules suspension and the flattening of the organizational structure. These items were categorized as such for their

deterrent or motivating characteristics, clueing in on characteristics of formality, policy or direct management intervention.

Knowledge-Based Trust

Questions were categorized as knowledge-based trust questions depending on their information and networking content, suggesting evidence of management activities to encourage (or inhibit) the flow of information and perceptions. Factors in this category included routine information gathering, product evaluation processes, environmental scanning, strategic planning, perceptions of hospital stability, communications of hospital expectations, use of attitude surveys, promotion of networking, frequency of meetings, frequency of workshops, and other information-loaded climate factors.

Identity-Based Trust

Identity-based trust questions were selected for their teamwork and organizational affinity characteristics. Items selected included evidence of vision sharing, values sharing, attitudes of commitment, interest in innovation, excitement in the workplace, feelings of job security, a sense of community contribution, and inclusion of stakeholders. These suggested actions or behaviors that furthered a sense of organization affinity within the hospitals.

Dependent Variables: Reported Instances of Innovation

Dependent variable items were classified in a manner identical to the previous study (Herting 2000). Innovations were counted from narrative descriptions and classified into one of Daft's four categories by pattern matching. There were some questionable entries that were discarded and some minor overlapping of innovation classification that had to be adjudicated. The working assumption was that the more innovations reported per respondent in a group, the more innovative the environment of that group. Reported innovations were classified as follows:

Technical Innovations

Technical innovations were classified as those innovations that render the production process more efficient or productive. These were selected as they related to procedures, processes, equipment, techniques, or technology. In hospitals, these included such items as

new computer systems, new medical procedures, new record-keeping methods, process improvement initiatives, new equipment, etc. The selection criteria was process or technology-focused.

Administrative Innovations

Administrative innovations involve the management processes of the organization, including examples of innovation that relate to organizational structures, organizational relationships, hospital membership, and administrative policies. Innovative items that fell into this category included reorganizations, mergers, organization restructuring, hospital partnerships, hospital board changes, staffing plans, strategic plans, etc. The classification criteria focused various aspects of the organizational infrastructure.

Human Resource Innovations

Human resource innovations were defined as those innovations that influence changes in the attitudes, skills, beliefs, expectations, or behavior of employees, including items that relate to human-resources policies, teamwork, motivation, leadership, team membership, and employee relations. Examples selected included new training events, promotional possibilities, recognition systems, cross-training programs, gain-sharing programs, equal opportunity programs, etc. Items were classified in this category based on their leadership, motivational or educational content.

Product/Service Innovations

Product/service innovations were outputs of the hospital organizations--related to new products, services, or new features that were made available to customers and end users. Examples of these were new hospital services, community outreach programs, hospital events, shifts to out-patient care, treatment programs, marketing campaigns, care units, etc. The emphasis for this category is on the customer. In general, innovations in the other three categories involve processes or structures internal to hospital organizations; product/service innovations are outputs of the hospital.

Findings, Recommendations and Conclusions

Trust Correlated with Innovation

The table of correlations (Table 1) suggests that the stages of trust (calculus, knowledge and identity-based trust) appear to positively correlate with administrative innovations only. Calculus-based trust was negatively associated with product/service innovations. No significant association is found with either technical or human-resource innovations. It should also be cautioned that, because of the unknown degree of randomness in selection of respondents from the hospital populations, that the confidence values (p) must be considered illustrative.

The association of trust with administrative innovations tends to confirm some of the literature, if narrowly applied to administrative innovations. Socialization determinants of innovations seem apparent in these findings. Connections of innovation with group cohesion and trust, as proposed by Rogers and Shoemaker (1971), Lewis and Seibold (1993), and Tsai and Ghoshal (1998) are also corroborated.

Table 1. Correlation Coefficients among Variables of Trust and Innovation

Innovation Types	Calculus-Based Trust	Knowledge-Based Trust	Identification-Based Trust
Technological	.156	.205	.082
Administrative	.457**	.480**	.385*
Human Resource	.155	.187	.126
Product/Service	-.379*	-.232	-.220

n=42 (**p<.01, *p<.05)

The correlation between the trust stages and administrative innovations may be partly explained by the selection of the survey items themselves. These items tend to refer to administrative types of initiatives such as management actions, goals, objectives, policies, processes, assessments, reviews, meetings, and plan formations. These factors could be considered administrative innovations in and of themselves. It may be that past

administrative innovations are good predictors of future administrative innovations. Amburgey, Kelly, and Barnett (1993) suggested that organizations with a history of change and innovation can be expected to continue to innovate and, conversely, those with a history of inertia are likely to cling to the status quo. O'Neill, Poudier, and Buchholtz (1998) discussed the idea of "organizational memory," in which past experiments precondition future innovation activities. Lewis and Seibold (1993) viewed innovation as habitual within organizations.

However, the three-stage trust construct does not fit as well to the other three types of innovations. Some of this dissonance can be attributed to the design of the survey instrument, the relatively small population and the limitations of the study. The significant negative association between calculus-based trust and product/service innovations raises serious questions. Could it be that too much trust and openness would work against the discipline needed to bring a new product to market or to establish a new service? It may be that organizational-climate factors commonly associated with trust only enable certain types of innovation and are inert, or even obstructive, toward other types. In any case, the correlative approach still does not appear to yield satisfactory results. Perhaps the error is in assuming a linear relationship, where maximum trust is associated with maximum innovation. I will suggest an alternative approach.

A Nonlinear Theory of Trust and Innovation

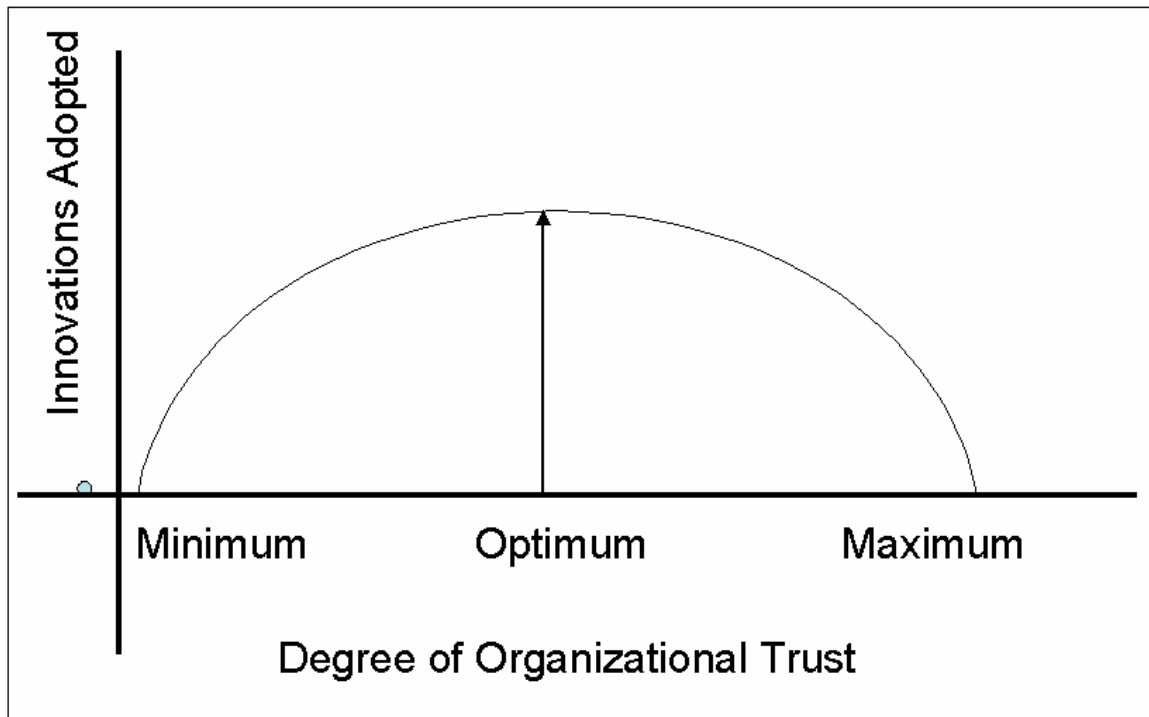
I propose a nonlinear theory of organizational trust and innovation adoption. I postulate that organizational trust is a collective confidence of organizational members in the predictability of behaviors within the organization. To enable that predictability, organizational managers routinely set in place a wide variety of measures, including deterrents and incentives (calculus-based), information exchange systems (knowledge-based), and value systems (identity-based), all with the underlying motive of reducing variation, thus making the organizational environment more predictable, more manageable, or more trustworthy.

The consequences of these management measures fall on a continuum ranging from perfect predictability at one end to total unpredictability at the other. Perfect predictability produces perfect conformity; 0% predictability equals arbitrary confusion. Useful innovation

is unlikely at either end of that continuum. I suggest that innovation and conformity are, by definition, almost exact opposites. However, with an optimum degree of organizational trust—balancing rigor and slackness, predictability and randomness, empowerment and oversight, confidence and caution, risk and reward, vision and practicality—a by-product of organizational trust may be maximum innovation.

The relationship may be curvilinear. Intuition tells us that minimum trust would certainly end in minimal innovation. In a coercive, suspicious environment, innovation that occurs is likely to be self-serving. However, maximum trust may not result in maximum innovation. In a completely free-wheeling, unregulated environment, randomness and innovativeness may spiral into chaos. Hardin (1993) is helpful in this regard, suggesting an optimum balance between trust and trustworthiness. In the case of innovation, there may be a point of optimization, where there is sufficient trust to enable the maximum innovative effects, but where, beyond that point, innovation decreases.

Figure 1. Yerkes-Dodson Curve (1908) adapted to show a theoretical relationship between trust and innovation



For instance, Coyne (2001) stated that 3M employees are allowed 15% of their work time to be devoted to individual projects of their choice, a successful policy to encourage innovations. Would entrusting employees with more time result in more innovation? Would 30% work time result in double the innovations? If employees were allowed 100% of their work time for innovative products, would innovative products go up 600%? Or could it be that 15% is the optimum amount of work time entrusted to employees to enable the maximum innovative products for 3M? Finding the optimal level of trust, if there is such a thing, would seem to be beneficial to hospitals or any public organization.

A curvilinear relationship between trust and innovation, depicted in Figure 1, is suggestive of the classic Yerkes-Dodson curve (1908), where performance increases with increased stimuli but reaches an optimum point, thereafter decreasing, even though stimuli continue to increase. I theorize that innovation likewise increases with organizational trust to an optimal point, after which innovation levels off and decreases even as trust is continuing to increase. With excessive trust, roles and rules may become so ambiguous that rigor and discipline are diminished, and new ideas are never realized.

Using the 3M example, if employees were entrusted with no time for innovative work, the result might be very few innovations produced. If the employees were allowed to work, free of all constraints, for 100% of their work-time, there would likely be a wide variety of unstructured efforts, including personal agendas, the results of which might be a number of innovations, but very little production or implementation needed to keep the company alive. The optimum time allowed is perhaps the 15% chosen by the 3M management for the company's innovation policy. Figure 1 illustrates a hypothesized nonlinear relationship between trust and innovation.

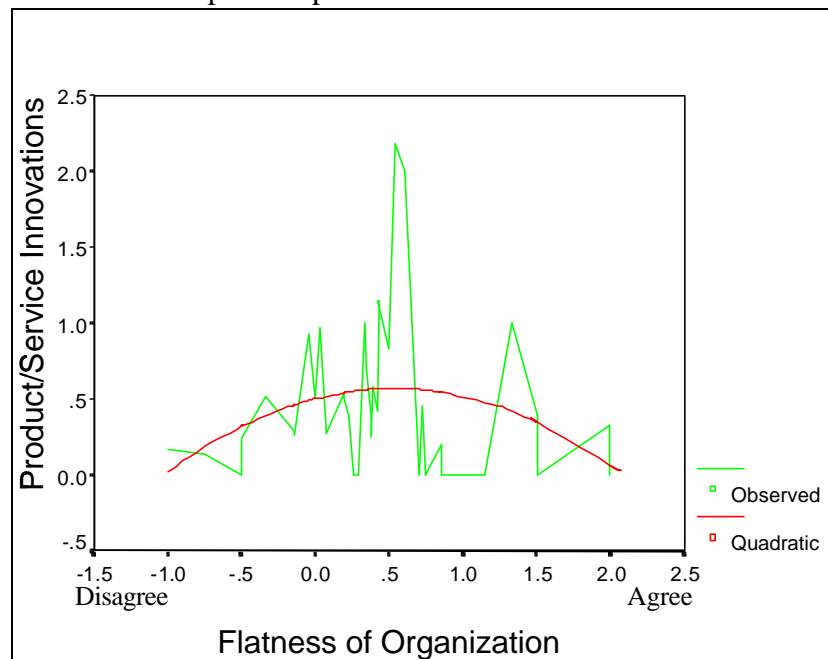
Evidence of a Trust-Innovation Curve

The CHSMR study described above provides some scattered evidence for a Yerkes-Dodson effect in regards to trust and innovation. Using curve fitting software, many of the trust factors in the study showed curvilinear relationships. A few are included in this paper to illustrate the feasibility of the nonlinear approach. For instance, flatness of organization, classified as a calculus-based trust element, appeared to relate in this way to reports of

product/service innovations. Although the fit of the quadratic equation is significant only at $p=.19$, Figure 2 pictorially illustrates the possible non-linear relationship.

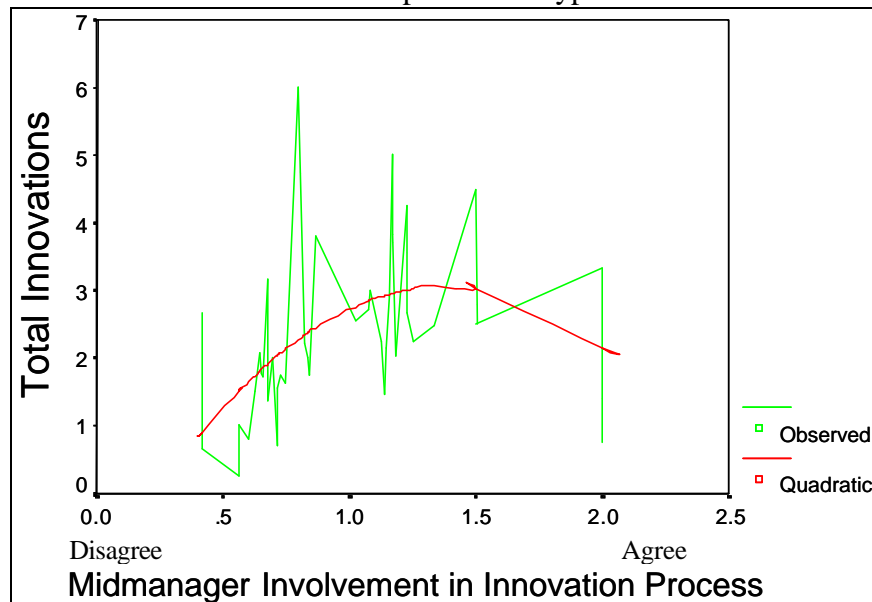
As depicted in Figure 2, if the organization is perceived (“strongly disagree”) not to be flat, then there are also few reports of innovation. Conversely, if the organization is emphatically (“strongly agree”) perceived to be flat, there also appear to be few innovations reported. However, at some point in the middle of the continuum, where the data imply there may be either disagreement or lack of knowledge about the flatness of the organization, maximum product/service innovations are reported. As is apparent, the R^2 for the model is not significant, partly because of the small population.

Figure 2. Nonlinear regression model depicting relationship between perceptions of organizational flatness and reports of product/service innovations



Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2
Product/Service Innovations	QUA	.088	36	1.74	.190	.5000	.2462	-.2319

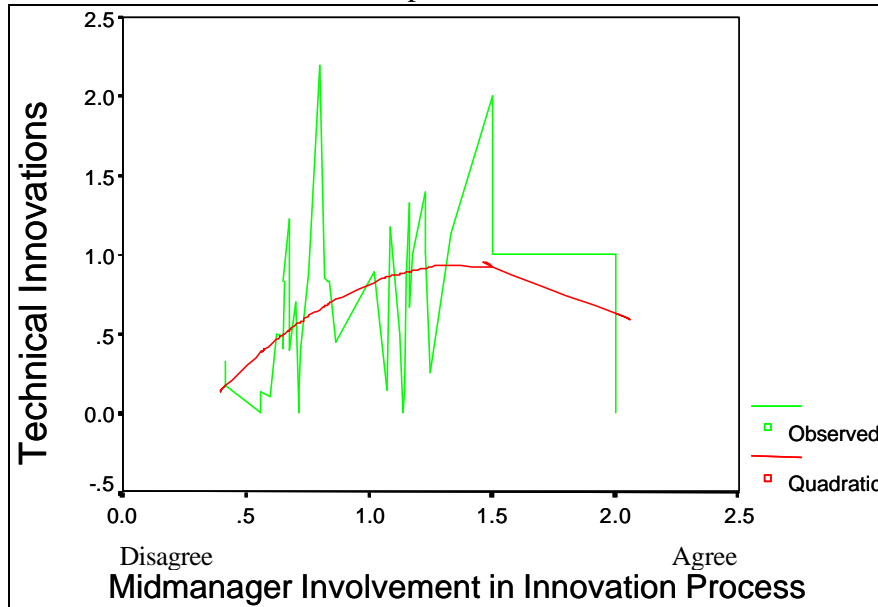
Figure 3. Nonlinear regression model depicting relationship between perceptions of midmanager innovative involvement and reports of all types of innovations



Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2
All types of Innovations	QUA	.242	36	5.75	.007	-1.373	6.438	-.339

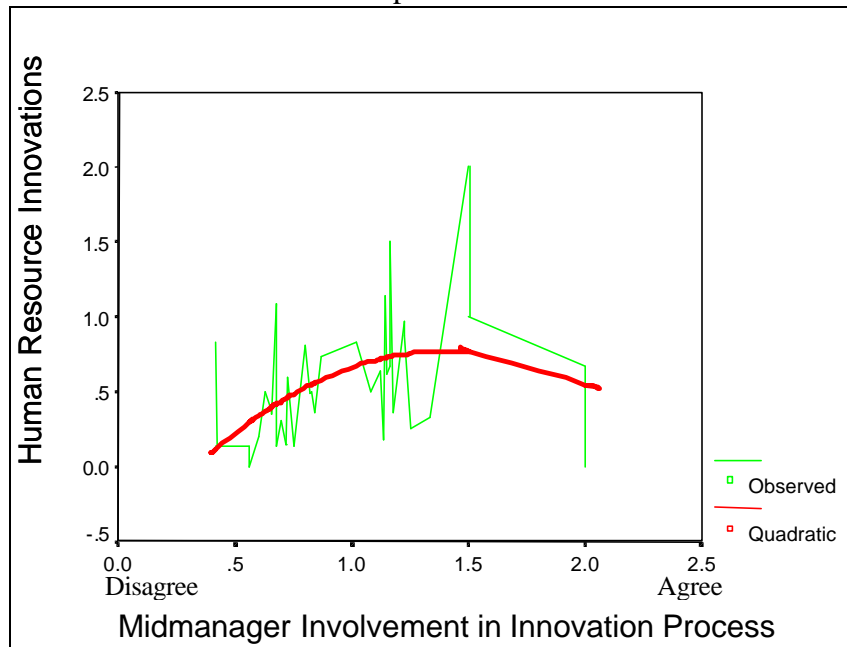
Similarly, Figure 3 displays a non-linear relationship between involvement of midmanagers in innovation and reports of all types of innovation in hospitals. The quadratic equation suggested by these data is significant at $p < .01$. Interpreting this figure, when midmanagers are uninvolved with innovation, few innovations are reported by organization members. However, perhaps when midmanagers become intrusively involved, also few innovations are reported. In between is the “Golden Mean,” where there is an optimum involvement by midmanagers, resulting in the greatest number of innovations reported. Similar non-linear relationships are displayed between midmanager involvement and technical innovations (Figure 4) and with human resource innovations (Figure 5).

Figure 4. Nonlinear regression model depicting relationship between perceptions of midmanager innovative involvement and reports of technical innovations



Dependent	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2
Technical Innovations	QUA	.167	36	3.60	.038	-.635	2.264	-.817

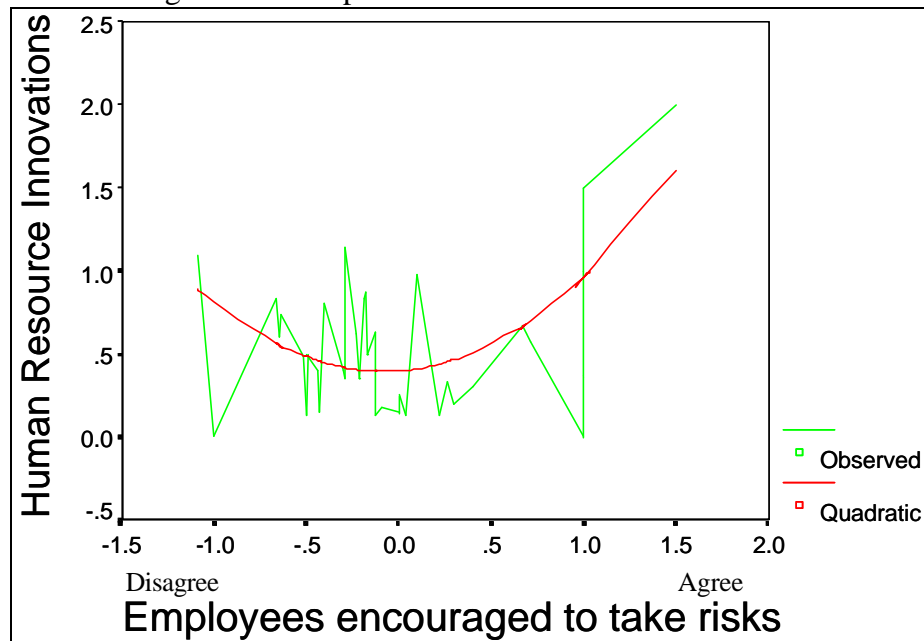
Figure 5. Nonlinear regression model depicting relationship between perceptions of midmanager innovative involvement and reports of human resource innovations



Dependent Variable	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2
Human Resource Innovations	QUA	.194	36	4.33	.021	-.547	1.869	-.661

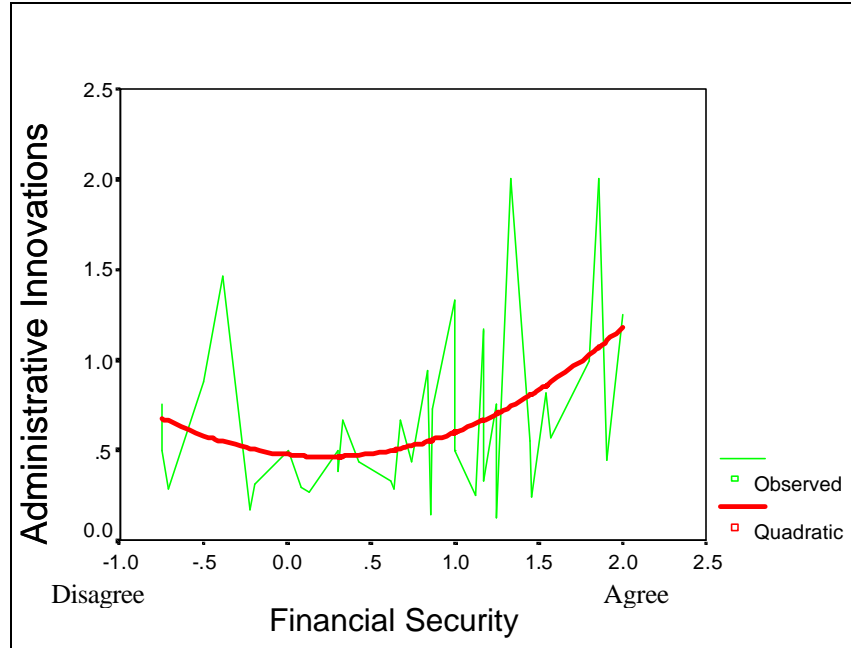
An interesting variation on the curvilinear theme may be its converse. Consider Figure 6 below, showing a non-linear relationship ($R^2=.341$, $p<.01$) between employee risk taking and reports of human resource innovations. In this case, the equation predicts two optimum levels of innovation occurring at both ends of the trust continuum, while the mid-point in the continuum shows fewer reports of innovation. The curve appears to be the inverse of the Yerkes-Dodson model. Perhaps the interpretation in this case could be that risk encouragement distinctly spelled out results in innovation. Employees know how much or how little risk is tolerated, and act accordingly. However, if a risk tolerance policy is ambiguous or uncertain, employees would assume the worst and therefore be less innovative. Similarly, figure 7 may imply that clear perceptions of financial stability (or the lack thereof) may be more associated with innovations than mixed perceptions.

Figure 6. Nonlinear regression model depicting relationship between perceptions of employee risk encouragement and reports of human resource innovations



Dependent	Mth	Rsqr	d.f.	F	Sigf	b0	b1	b2
Human Resource Innovations	QUA	.341	36	9.32	.001	.398	.074	.487

Figure 7. Nonlinear regression model depicting relationship between perceptions of hospital financial security and reports of administrative innovations



Dependent Variable	Mth	Rsq	d.f.	F	Sigf	b0	b1	b2
Administrative Innovations	QUA	.173	36	3.77	.033	.474	-.104	.228

Conclusions

To conclude, I reflect back to the stated objectives of this paper, and offer comments on each one:

1. I will explore the literature of trust as it relates to innovation.

From the literature review, it can be seen that both streams of literature—innovation and trust—are conceptually broad and diverse. Many writers have already related aspects of trust to various concepts of innovation. A major hindrance to empirical study is the variation in definitions and classifications. Many people are talking about many different things. As others have urged before, particularly Drazin and Schoonhoven (1996), both areas of research beg clear definitions, distinct taxonomies and useful models. Refinement of the Daft (1986) classification scheme would be helpful. Another possibility might be an adaptation of Altschuller's (1984) five levels of inventive solutions, mentioned above in the literature review.

2. I will attempt to fit innovative climate factors into a conceptual framework of trust.

I also attempted, from the literature, to fit some of the organizational climate factors associated in innovation literature into a three-stage framework of trust, borrowed from Shapiro, et. al. (1992). I feel that this construction works very well, providing a useful classification system for the various ways that organizational managers may encourage climates of trust in their organizations. Further, in my attempt to categorize the survey questions from the “Environment for Innovation” survey instrument developed by Badger (1992), I found that most of the questions fit into the framework without much ambiguity. I feel this conceptual framework has potential usefulness for further research in trust and innovation.

3. I will show, with survey data from a study of hospital organizations, how trust correlates with reports of innovation.

Empirical findings from the survey data suggest the possibility that organizational trust may correlate with innovation, particularly administrative innovation, depending upon the degree and categories of trust. The findings also suggest the possibility that different types of innovation are encouraged by very different climates of organizational trust. Product/service innovations especially seem to be found in distinctly different trust climates from technical, administrative or human resource innovations. Some of the product/service innovation findings suggest limitations to a linear relationship model. These findings, of course, are very preliminary and subject to the limitations of the study. Hopefully, future research using well-controlled primary data will uncover clearer relationships.

4. I will suggest a nonlinear relationship between trust and innovation.

The visual pattern of data points suggests that a nonlinear model may also be useful in looking at the relationship between trust and innovation. The Yerkes-Dodson curve may be a good starting point for future research. Intuitively, there could be too much trust in an organization, inappropriate to the degree of trustworthiness of members, as suggested by Hardin (1993). When the trust levels exceed appropriate levels, then side effects could overcome innovative benefits, in the same way that excessive doses of vitamins could be detrimental to health. Much of the innovation literature implies a linear regression model with a regression line heading off to infinity (analogous to the homily, “the more, the

merrier”—the more trust, the more innovation). It would seem to me, from a practitioner’s point of view, that it would be more useful to know the optimum balance between organizational trust and management control that would produce the maximum benefits of innovation.

5. I will show preliminary evidence of a curvilinear relationship between trust and innovation.

The use of a nonlinear regression model to study the trust/innovation relationship shows promise. Taking into account the limitations of the data, the feasibility of identifying a binomial regression model similar to the Yerkes-Dodson curve is clear from the few examples shown above (Figures 2-5). The inverse model suggested in Figures 6 and 7 is intriguing and merits more examination. Larger populations and better control of data could demonstrate the benefits of this approach more distinctly.

6. I will discuss the possibilities of improving upon the methodology of this study.

The relationship between trust and innovation can be a fruitful way of viewing hospitals and other organizations as they adapt to survive. Many organizations desire or require more innovation and change. With a revised survey instrument, a randomized survey, a larger study population, and development of hypotheses based on nonlinear models, much more could be learned about the trust/innovation connection. A great improvement would be in the observation of innovations. Evidence of innovations themselves should be more closely examined and more carefully classified, not only according to type of innovation, but also by degree of “innovativeness,” perhaps following Altschuller’s (1984) levels of solution approach. This paper focused on hospitals, but I also recommend that future research could be applied to industries beyond health care. Another approach may also involve studying the relationship between trust and organizational conformity--the “flip side” of the innovation question.

Limitations

As emphasized in the beginning, empirical findings of this study should be viewed as exploratory and illustrative, for several reasons. Using a research design and data collection instrument that was developed for a different purpose than that of this paper has been somewhat of a handicap. The project involved essentially secondary data, aggregated to the

group level with no assumption about randomness or control of the survey responses. The population was substantial, but membership in the population was probably arbitrarily determined by the participating member hospitals. Each innovation was classified at face value with no attempt at verification. Taken together, the empirical findings cannot be generalized, although the general approach holds promise for future research.

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About the Author

Stephen R. Herting is a senior management consultant for SYS, a engineering and management consulting firm with offices in Washington DC, Norfolk VA, San Diego, CA and Oxnard, CA. He works primarily with the United States Navy, consulting in strategic planning, economic modeling, organizational design and operational training systems. He is an adjunct professor of Public Administration at the University of La Verne and a part time instructor of Project Management at the University of California at Santa Barbara (UCSB). Herting has earned a B.A. in Chinese from California State University at San Francisco, an M.S. in Management Sciences and a Doctorate in Public Administration (DPA), both from the University of La Verne. He is currently helping in a project studying the influences of organizational trust parameters on combat systems team training effectiveness for the U.S. Navy.