

Accelerating technology transfer: thinking about organizational *pronoia*

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Abstract

Most high-technology-based organizations rely on rapid transfer of technology and effective product innovation processes for competitive survival and profits. The concept of organizational *pronoia* is offered as a sustaining basis for adapting organizations and accelerating technology transfer processes. A continuum of organizational paranoia and *pronoia*, a typology of technology-transfer-related strategies and designs, and conceptual models of organizational adaptation, are proposed for future testing. Implications that might interest scholars, as well as practitioners, are also discussed. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Technology management; Organizational adaptation; Organizational trust

1. Introduction

A new and contagious cultural virus is ripping through the British Isles... Those infected suffer attacks of optimism, strong feelings of community, lowered stress levels, and outbreaks of ‘pronoia’—the sneaking feeling one has that others are conspiring behind your back to help you (Marshall, J., 1994. Zippies, *Wired*, May 1994, p. 79).

Although metaphors from the emerging cyberculture have yet to inspire much thinking about modern organizations, the notion of *pronoia* appears to capture the essence of adaptations occurring in some leading high-technology-based firms. At the root of this adaptation is increasing levels of managerial *pronoia*, or the conviction that if people are valued and trusted, they will conspire to support each other and accelerate

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the transfer of technology, i.e., the process by which new ideas or technologies originating from R&D are moved through multiple functional groups and transformed into new products ready for market (see Badawy, 1989, 1993).

Technology transfer and the organizational form are inextricably linked because accelerated rates of the former are associated with innovative adaptations in the latter (see Brown and Eisenhardt, 1995; Takeuchi and Nonaka, 1986). In this paper, we propose that low-trust environments and organizational adaptations resulting from high paranoia *decelerate*, and that *pronoic* thinking and pronoic organizational adaptations *accelerate* transfer of technology. We propose a continuum of organizational paranoia–*pronoia*, a typology of technology-transfer-related strategies and designs, and conceptual models of organizational adaptation for future testing. Our conceptualization is rooted in an exploratory study of technology transfer (TT) processes we conducted, and the literature linking: (a) product innovation and TT effectiveness with innovative changes in organizational design, and (b) higher levels of trust with organizational effectiveness. Although we draw heavily from the practical realities and experiences managers in our study report, this paper is purely conceptual. Since our findings stimulated our thinking, and helped develop our ideas about *pronoia*, *pronoic* organizational adaptations, and accelerated technology transfer, we use our data to illustrate our arguments. Our conceptualization owes much to the writings of Bedeian (1990), Bennis (1984, 1989, 1990, 1991, 1992), Blumer (1969), Dougherty (1992), Galbraith and Kazanjian (1986), Likert (1967), McGregor (1960), and Morgan (1986, 1993) and the innovative changes and experiments some managers in our study report.

We develop the conceptualization by organizing our arguments in the following manner. First, we briefly describe the study we conducted to show how it stimulated our thinking, discuss relevant literature, and highlight how we derived the concept of organizational *pronoia*. Second, using the model of Bedeian (1990), we speculate on the nature of organizational adaptations when the level of paranoia is high, and compare and contrast them with those that result from flashes of *pronoic* thinking. We also speculate on several features likely to characterize future *pronoic* organizations that promise accelerated transfer of technology. Finally, we compare and contrast *pronoia* with similar issues discussed in the literature, and develop implications that may interest scholars and practitioners.

2. Conceptual background

2.1. The study and the notion of trust

Our thinking was stimulated by a two-stage exploratory study of technology transfer processes we conducted in ten high-technology organizations.² First, we conducted a

² Participating firms were pre-qualified as *high-technology* firms because (a) a large fraction of their employees were engineers, scientists, and technically qualified individuals; (b) R&D activities consumed a considerable portion of resources; (c) their products faced high degrees of obsolescence; and (d) the application of new technologies and new products created the best opportunities for growth (see von Glinow and Mohrman, 1990).

pilot test and depth-interviewed six managers from four high-technology industrial organizations. We asked managers to describe their TT related experiences, interactions with others, and learning. Based on a content analysis, we identified key interpersonal, group and organizational issues of TT, developed managerially relevant and understudied research questions, and developed an interview protocol to guide the second phase of the study.

In stage two, we depth-interviewed 40 managers from 10 high-technology-based industrial organizations (at least one each from R&D, production, and marketing groups). We asked managers to describe how the TT process unfolded in their organization, their TT-related actions and interactions with others, and the relevant outcomes and learning.

Two general impressions we developed while analyzing the interview transcripts prompted the conceptualization of this paper. First, regardless of their departmental affiliations and roles, managers recounted the following contingencies as *central* to their TT-related experiences: (a) managing the complex interdependencies with, and gaining the cooperation from other participants (primarily people from other functional groups such as R&D, production, and marketing, but also including lead suppliers and customers; (b) harnessing the energies and creativity of their own team members participating in the process; and (c) dealing with issues of organizational change and renewal entailed by new technologies, new products, and new users. We found managers reporting harmonious, synergistic interactions among functional groups, cooperative relationships between supervisors and team-members, and greater commitment to continuous improvements in organization associated with more effective TT processes. Second, we noted that TT processes were more effective when managers attributed higher levels of trust to other functional groups and team members, and when they placed higher trust in the notion that organizational changes would revitalize (vs. disrupt) the way they managed people and technology.³ A subsequent review of literature suggested that trust could serve as a sound basis for differentiating between organizations and TT processes, as well.

For instance, we found that organizational trust determined the effectiveness of social interactions (Gambetta, 1988) and strongly influenced interpersonal and group behaviors (Golembiewski and McConkic, 1975). Trust related to one's perception of others' integrity and openness, one's comfort with expected actions of others, and one's faith in others' reactions (see Sonnenberg, 1993). Butler and Cantrell (1984) highlighted five features of trust between supervisors and subordinates including: (a) integrity in terms of honesty; (b) competence in terms of knowing the requisite technical and interpersonal skills; (c) consistency in terms of reliable handling of problems; (d) loyalty in terms of good intentions toward others; and (e) openness in terms of willingness to share

³ Although there were no specific questions related to *trust* in the interview protocol, there were several questions about the nature of interpersonal relationships and interactions among the participants from R&D, production and marketing groups, as well as questions about managerial experiences and learning. When an organization's interpersonal relationships and interactions were characterized by *high trust*, we found them more likely to: (a) collaborate across functional groups; (b) embrace change entailed by the new technology; and (c) reach their new product development objectives.

information. Higher levels of organizational trust were linked with improved customer loyalty and profits (Sonnenberg, 1994), and managerial and organizational effectiveness (Blanchard, 1995; Miles and Snow, 1995; also, see Hosmer, 1995 for detailed review). Scholars advocated that managers must: (a) invest in building organizational trust (Blanchard, 1995; Clawson, 1989; Handy, 1995; Miles and Snow, 1995); (b) trust the competence of operating units and favor bottom-up initiatives (Ghoshal and Bartlett, 1995); (c) focus on developing high-trust cultures in organizations (Staub, 1994); and (d) build trust as a basis for two parties to have a win–win relationship (Covey, 1991). More specifically, higher levels of trust improved communication among functional groups (Souder, 1987), which in turn was linked with technology transfer effectiveness (see Badawy, 1989, 1993). Hence, our findings, coupled with the literature, highlighted the merits of differentiating between TT processes on the basis of managerial attribution of trust towards the key constituents in their TT-related cognitive environment (i.e., other functional groups, their team members, and the organization).

2.2. Thinking about TT and organizational adaptations

The literature is clear in the notion that innovative changes in organizational structures, systems, and workflows are keys to higher levels of TT effectiveness. Scholars note that: (a) functional–hierarchical organizations and mechanistic mindsets hinder innovation and the transfer of technology (see Brown and Karagozoglu, 1993); and (b) linear–sequential, ‘relay-race’-type TT workflows, where one functional group completes its assigned tasks and passes its output to the next group, must be abandoned in favor of organic, concurrent, collaborative workflows (see Brown and Eisenhardt, 1995; Takeuchi and Nonaka, 1986). Organic designs are preferred over the mechanistic because TT processes become more effective when: (a) all major functional groups are involved from the initiating stages of the process; (b) functional groups are engaged in high levels of communication and can effectively coordinate their tasks; and (c) cross-functional teams are used for addressing TT-related decision-making and workflows (Gupta and Wilemon, 1990; Kahn, 1996).

This line of thinking fails to address, however, two somewhat interlinked problems that concern managers and scholars. First, for instance, *most* managers from high-technology firms know that supportive, collaborative, organic and decentralized organizations, and empowered employees working in cross-functional teams promote innovation and accelerate technology transfer. Additionally, there is much in the literature to stimulate the imagination of managers interested in developing the *ideal* organizational form, including the *Theory Y* of McGregor (1960), the *organic structures* of Burns and Stalker (1961), the *System 4* organization of Likert (1967), the *jelly molds* of Weick (1979) and the notion of *holograms* of Morgan (1986) (see Dougherty, 1992). Clearly, managers are challenged not so much by the absence of ideas that make intuitive sense or promise-accelerated technology transfer, but by the prospects of translating abstract concepts into effective actions. Practitioner reports of innovative changes in their organizations often reflect ideas proposed by Likert (1967) and McGregor (1960) over three decades ago, and suggest that *implementation* of ideas and affecting actual adaptations in organizations is a major challenge (see Smith, 1996). Moreover, *why* only notably few organizations have harnessed TT-related improvements, despite the collec-

tive wisdom of scholars, and the proliferating ‘self-help’ books in the practitioner press, remains poorly understood. Second, although the literature is unequivocal in its view that organizations must adapt in pursuit of challenging TT-related objectives, there is little information on *how* they must adapt. Few studies have traced the differentiating features of managers’ interpretative processes, learning, and environmental management strategies, i.e., the fundamental processes by which organizations adapt (see Bedeian, 1990), and become efficient managers of innovation and technology transfer.

3. A conceptual framework of *pronoia* and technology transfer

The findings from our exploratory study, coupled with the notions in the literature, form the basis for our conceptualization. In this discussion, we: (a) conceptually differentiate TT processes based on managerial attribution of trust and develop a paranoia–*pronoia* continuum; (b) propose a typology of TT-related strategies and designs implicated by a firm’s position on the paranoia–*pronoia* continuum; and (c) present conceptual models of organizational adaptations for TT when the extent of trust is low (high paranoia), and when the extent of trust is high (high *pronoia*).

3.1. The paranoia–*pronoia* continuum

Fig. 1 portrays the paranoia–*pronoia* continuum we propose, and serves as a guide for the following discussion. Briefly, we derive the continuum by examining the level of trust managers place in others (including key functional groups, customers, suppliers), their team members, and the organization’s ability to embrace change.

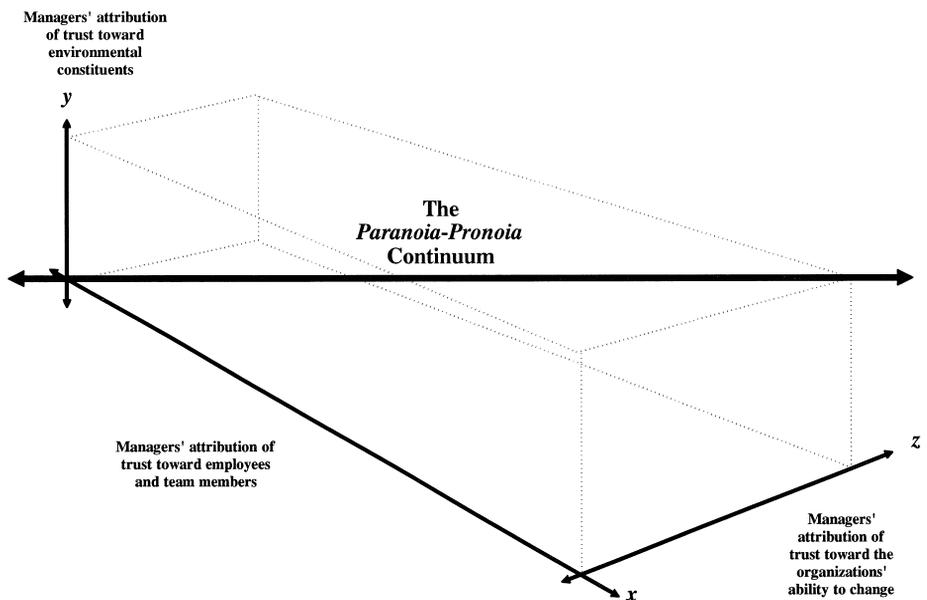


Fig. 1. Dimensions of managerial trust: emergence of the paranoia–*pronoia* continuum.

As the figure shows, continuum y reflects the varying levels of trust managers place in the motives of constituents in their environment (other functional groups, customers, market intermediaries, suppliers and competitors). Managers located towards its lower end view external constituents (i.e., competitors, suppliers, market intermediaries, competitors) as *outsiders*, hostile and engaged in a zero sum game of profits. They exhibit low tolerance for environmental ambiguity. They seek instant solutions to complex problems, rush to evaluate and *figure out* others' motives and agenda, and take action based on hasty, untested conjectures. The attribution of distrust and hostility to others characterizes relationships within the firms, as well. Although TT processes require high levels of interfunctional interaction, paranoid managers view other functional groups with high degree of suspicion, expect them to withhold cooperation, and act in ways that promote their personal agenda. Hence, interactions among managers create an environment of distrust and paranoia, and hinder cross-functional communication and coordination of activities.

At the *pronoic* end are managers who view external constituents partly as *insiders*, and reflect their belief that others can be creatively engaged in a collaborative enterprise. Notable among these managers is high tolerance for environmental ambiguity. They hold the strong conviction that others do not necessarily hold adversarial positions and that mutually beneficial agenda can be co-created and opportunities jointly explored. Lead customers, suppliers and market intermediaries are invited to participate in the firm's product development processes. Similarly, boundaries between functional groups, if they exist at all, are highly fluid and permeable. Information exchange between functional groups is viewed favorably and promoted, and cross-functional communication is notably high.

Continuum x depicts the varying nature of trust managers place in their team members' ability to make decisions independently, take initiative, and act responsibly. Those located towards the left believe that people should be tightly managed via directives, rewards and punishments, and control over information and resources. Managers believe that the inherent malevolence of people will emerge when it can, and that they will conspire with each other to hurt broader organizational interests. Hence, most organizational problems are addressed at higher hierarchical levels. Employees lower in the hierarchy are viewed as implementors and enactors of managers' decisions. At the *pronoic* end, managers display the belief that people can draw on their inherent benevolence and are naturally predisposed to act towards the mutual advantage of others, when the right organizational climate exists. Problem-solving responsibilities are pushed downwards in the hierarchy. Managers are involved in reducing their own power, shedding control over others and acting as suppliers of information and resources to promote employee creativity and initiatives.

Managers located at the lower end of continuum z distrust the organization's ability to change without requiring inordinately disruptive changes in their own performance expectations, and without the loss of control over their personal environment and power over others. Although these managers often engage in the rhetoric on change, there is a stubborn refusal to believe that the world has changed substantially enough to require new strategies and actions on their part for improved technology and people management. The structures and systems employed for managing TT and developing new

products are held rigid and seldom changed. All changes are strongly resisted, and if they occur, are mostly incremental. On the other hand, we locate managers towards the upper end of continuum z when they display strong trust in the notion that the organization will permit only those changes that energize, revitalize, and strengthen their technology management initiatives. Experimentation and improvisation in organizational processes, systems, and structures for managing TT and developing new products are viewed as desirable and strongly promoted.

The paranoia–*pronoia* continuum emerges from the complex interaction between managers' perception of trust towards environmental constituents, people within the firm, and organizational change (see horizontal axis, Fig. 1). Managers located at the paranoid end view the environment as threatening, employees as malevolent, and change as enervating and disruptive. Managers located at the *pronoic* end view environmental constituents as worthy of collaborative engagement, employees as capable of creativity and taking initiative, and change as invigorating. We propose that a firm's position on the continuum is indicated by the aggregate of managerial paranoia or *pronoia*.

Two conceptual issues raised by Fig. 1 bear further clarification. First, we recognize that organizations are often in a state of flux, and can display varying levels of paranoia. The literature is replete with examples of organizations presumably effective because of high levels of paranoia.⁴ Therefore, several points along the continuum appear to represent viable locations at which firms can develop a state of dynamic equilibrium with the environment, and for varying periods of time. We propose that a firm's shift toward the *pronoia* end of the continuum depends not only on the disruption of the equilibrium due to environmental changes, but also on what managers, based on their interpretations of their situation, define as the appropriate response, and the adaptive changes they affect in their organizations. Therefore, a host of factors in the manager's cognitive environment, including market and competitive forces, and the firm's internal culture, ultimately influences managerial attributions, as well as the eventual changes in the organization of TT-related activities.

Second, although Fig. 1 portrays the three continua as independent dimensions of managerial interpretations, statistical independence is not implied. For instance, it remains a matter of future testing to determine whether managers who view the environment as hostile are equally likely to resist as they are to favor organizational change. Similarly, the relative differences in the lengths of the continua in Fig. 1 are in no way indicative of the differences in their variability. The figure does not imply, for instance, that managers' perceptions about people vary more than their perceptions of organizational change. Next, we propose the link between a firm's position on the paranoia–*pronoia* continuum and the strategies and designs for managing TT.

3.2. A typology of technology transfer strategies and designs

Table 1 shows four types of TT-related strategies and designs relevant to a firm's position on the paranoia–*pronoia* continuum. By *strategy*, we refer to a firm's historic

⁴ See description of Intel and the CEO in Business Week, January 16, 1995, p. 57.

Table 1
A typology of technology-transfer strategies and designs

The paranoia– <i>pronoia</i> continuum ← High paranoia—High pronoia →				
Features	Command and control	Technological laggard	Retro-fitted firm	Cross-functional firms
Key features of TT strategy (i.e., market position, TT objectives and pattern of resource deployment to TT activities)	Defensive technological strategy	Reactive posture	High product obsolescence rates. New products are key to competitive survival.	Organizational culture promotes:
	New products are exceptions made for some customers	Concern with introducing products to match competitors	TT processes are customer-focused. Lead customers are often included in CFTs, and sales are staff trained to spot product opportunities.	Continuous improvement in technology and products
	Meager interest in TT	Relatively low product obsolescence and few loyal customers		Strong customer-driven product development Creativity and entrepreneurship
Key features of TT design (i.e., structures, systems, processes for managing TT-related decision making and work flows)	Rigid interfunctional boundaries exist.	Rigid boundaries exist between functional groups, but extent of IFC is higher.	IFC and CFC become notably higher. Boundaries between functional groups become permeable.	Organization flat and delayed

TT is viewed as R&D's responsibility.	Merits of CFC become apparent, senior management sparks discussion and faces resistance.	Some adopt concurrent engineering (i.e., teams/partnerships between firm's technical functional groups). Most adopt CFTs (i.e., including representatives from most functional groups, including R&D, production, and marketing).	Autonomous cells incorporating the repertoire of skills necessary for TT are included. Managers hand-picked for their ability to build collaboration among functional groups.
No formal structure for addressing TT-related decision making and work flows exists.	Increased frequency of dyadic communication among people from different functional groups. More frequent meetings between R&D, marketing, and production heads.	CFT leaders are permitted to improvise in order to accelerate TT and new product introductions.	CFT members hold low or no functional affiliations.
CFC is notably low. Results are either from senior management mandates, or due to the personal relationships developed by managers.			Lead suppliers and customers included in CFTs

CFC = TT-related cross-functional information sharing and cooperation.

IFC = interfunctional communication.

CFT = TT-related cross-functional project teams.

pattern of technology-related resource deployment and action choices which, whether intended or not, result in its current technological skills and products, and its current technological position in its chosen market(s). By *design*, we refer to a firm's historic pattern of resource deployment choices which, whether intended or not, result in its current configuration of processes, systems, and structures for managing TT, and its current ability to implement its technological agenda.

We use Table 1 to portray our typology and propose the following notions: (a) the firms included in each type represent a common managerial and organizational mindset, and a unique configuration of TT-related strategies and designs; (b) higher incidence of *pronoic* thinking among managers is associated with more effective TT-related strategies, and more efficient designs for managing TT-related decision making and work flows; and (c) without a significant shift in managerial thinking and attribution of trust, firms are less likely to adopt new designs for managing the TT process, and regardless of their intent, less likely to succeed in implementing innovative strategies that promise accelerated transfer of technology.

3.3. Organizational adaptations based in paranoia

Both the secret of his success and the source of his current dilemma is an anxious management philosophy built around the motto, 'Only the paranoid survive' (Business Week, January 16, 1995, p. 57).

We propose that paranoia, the systematized delusions and projection of personal/organizational conflicts on the supposed, conjectural hostility of others, afflicts not only a few successful industry leaders, but all organizations to some degree. As Fig. 1 suggests, by organizational paranoia, we refer to the enactment of a collective organizational view that external constituents and other functional groups are hostile, employees are naturally predisposed to act against the interests of the firm, and that all changes are threatening. We argue that: (a) historically, paranoia was an effective managerial mindset that produced results and helped organizations reach a high degree of production efficiency; (b) paranoia is characterized by a unique set of managerial learning, symbolic processes and environmental management strategies, and by virtue of its association with past success, has gained a life of its own; and (c) paranoia strongly inhibits creativity and decelerates TT processes in intensely competitive environments.

Organizations have enjoyed a high degree of success by viewing their world as hostile, developing an *us vs. them* mentality, and using militaristic problem-solving approaches that emphasize "reductionism and mechanical thinking" (Kofman and Senge, 1993; p. 10). Paranoid organizations not only believe that their personal welfare and profits occupy large parts of the consciousness of others, but also that the media, the general public, the government, competitors, suppliers, and customers are adversaries and highly likely to behave in ways that hurt their interests. The organization's approach to managing TT reflects a deep-seated managerial conviction that the world consists of *insiders* and *outsiders*. Strategies for managing the environment include: (a) the view that encounters with contingencies and problems are abnormal; (b) the attempts to find instant solutions by dividing complex tasks into simplistic, linearly connected steps; (c)

the assignment of disjointed tasks to narrowly specialized and trained individuals located in disconnected functional groups that engender division and distrust; (d) the emphasis on coordinating the end result of people's activities, who operate in relative isolation from one another, via directives, control mechanisms, and rewards and punishment; and (e) under the guise of forward thinking, deploying innovative mechanisms, such as liaison roles and interface management processes, concurrent engineering, product, project and cross-functional teams, to accelerate TT processes.

The paranoid manager expects team members to act in ways that promote their personal agenda, and implicitly or explicitly conspire to hurt each other. This is noteworthy because despite their distrust of others, a high degree of loyalty is expected from team and organizational members (see Baillie, 1995). Several managers' descriptions of their experiences with the TT process in our study closely resemble the writings of Argyris (1990) on the universality of defensive routines, the basic distrust that exists in organizations, as well as the strong propensity to control and change others' behaviors by relying on unclear, convoluted, and conflicting messages. The paranoid mindset and the pattern of decisions related to training, motivations, rewards and punishments exert inordinate pressure on people to think and act alike. Even if managers intend to promote employee initiative, their decision making and control over information and resources create a bastion of like-thinking organizational *clones*, somewhat diametrically opposed to the notion of *empowered* employees.

The paranoia is reflected in the organization's design as well. Despite the literature's rhetoric that mechanistic organizations are *passé*, and the recent wave of reengineering and restructuring, functionally divided hierarchical organizations designed for command and control are the norm rather than the exception. *Most* firms are designed not so much for integration of multiple skills, developing new products, or meeting customer needs as they are for mechanistic production efficiencies based on the principals of specialization and differentiation. The thinking in the popular press and scholarly literature has paralleled the paranoid, command and control organizational mindset. The literature is replete with military metaphors such as strategies, tactics, conflict, training, intelligence, combat, attack, and trade and market wars. The unmitigated adulation of political/military strategists such as Sun Tzu and Machiavelli has hardly helped. Paranoia survives in the current corporate ethos when it views strategies as indistinct from warfare, people as indistinct from robots and cannon fodder, and organizations as indistinct from psychic prisons (see Morgan, 1986). Moreover, WW II flying ace *genre* mavericks (Bennis, 1992) who overcome insurmountable odds acting alone are revered as organizational heroes despite the rhetoric on *empowerment* and *collaboration*. The literature affirms that most corporate leaders are authoritarian, elitist, and male-dominated (Whitty and Butts, 1989), and that crazy bosses characterized by neurotic pride, paranoia, and childishness are admired, if grudgingly, because they appear to accomplish seemingly impossible tasks (see Bing, 1992). Managers sensitive to divergent views and orientations and refusing to rule via dictates and edicts, on the other hand, are frequently labelled as soft, and 'unable to lead'. Our study suggests that paranoia, the organizational *bete noire*, lives at least in part because the validity of the fundamental premises and beliefs that shape an organization's adaptive behaviors are rarely questioned.

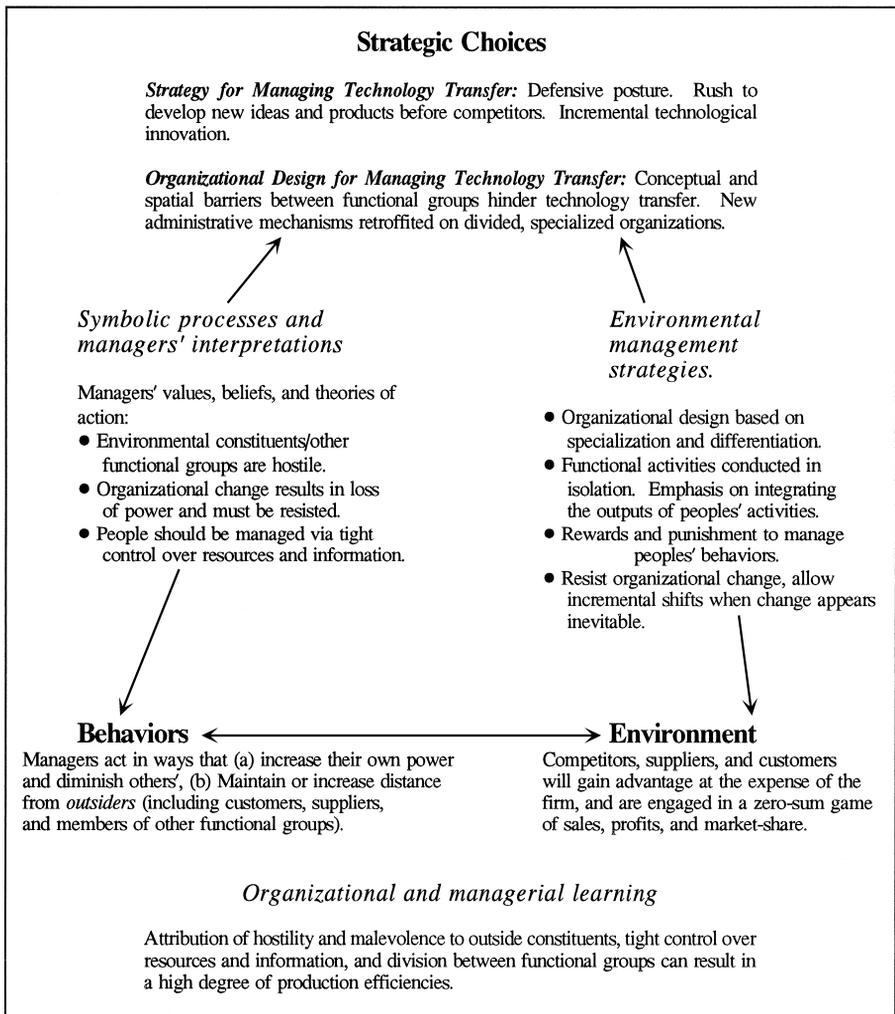
The hallmarks of paranoid TT processes in the organization are: (a) distance from

customers; (b) an emphasis on creating organizational clones and tight control over people via constricted resources and information; and (c) rigidity and adherence to out-dated ideas, resource deployment and organizational design choices. The result of paranoia is the loss of flexibility and innovation and high human costs resulting from politics, stress, demotivation, and alienation. True innovation and creativity, and rapid movement of fundamental technology into a new product is uncommon to the extent that the practitioner press reports them as noteworthy anomalies in a world otherwise characterized by mediocre and slow TT processes.

There has been no dearth of innovative thinking, or of innovative practices in organizations that promise significant progress beyond organizational paranoia. *Theory Y* (McGregor, 1960), System 4 organization (Likert, 1967), total quality management (Fuchsberg, 1993; Sashkin and Kaiser, 1991), cross-functional teams (Donnellon, 1993; Lutz, 1994), empowerment (Staples, 1990), transformational leadership (Bass, 1985), collaboration (Davidow and Malone, 1993), cross-functional interface management (Gupta and Wilemon, 1990), and networked organizations (Handy, 1990), are but a few of the innovative developments that have produced positive results in organizations. For instance, in eight of the 10 firms in our sample, cross-functional teams (CFTs) are employed as the principal administrative mechanism to promote cross-functional collaboration and accelerate TT processes. Our study suggests, however, that innovative administrative mechanisms retro-fitted on paranoid, functionally compartmentalized organizations do not make a quantum leap in TT effectiveness. Our study shows that CFT effectiveness is severely dampened by participants' suspicion of outsiders, resistance to change, and refusal to loosen control over information and resources. After the initial spur in cross-functional cooperation, our study suggests that CFTs are afflicted with the problems frequently associated with retro-fitted mechanisms attempting to overcome fundamentally out-dated organizational designs. Among the types of behaviors that CFT members reportedly exhibit are: (a) attempting to ensure that *others* see the world *their* way, without making a similar attempt to understand others; (b) emphasizing their functional group's position on TT-related matters, and drawing the metaphorical *line in the sand* beyond which they will withhold cooperation; (c) participating in the teams primarily to ensure that their functional turf is protected, and their access to resources and information is maintained or increased; and (d) putting brakes on team activities that in any way threaten their functional group's power. Eventhough the installation of innovative administrative mechanisms promise improved cross-functional collaboration vital for accelerated TT, its efficacy is severely tested by the deeply entrenched organizational paranoia in *practice*. While most practitioner press laud CFTs as the structural answer to an organization's complex problems, their efficacy appears questionable when the underlying organizational *paranoia* is high (see Donnellon, 1993; Sinclair, 1992).

Fig. 2 portrays the process of self-affirming organizational adaptations we propose when managerial learning, theories of action, and strategies for managing their environment are strongly characterized by paranoia.

We next speculate on the nature of managerial thinking and organizational adaptations that can emerge when paranoia is abandoned in favor of *pronoia* as the fundamental basis for managing people and technology.

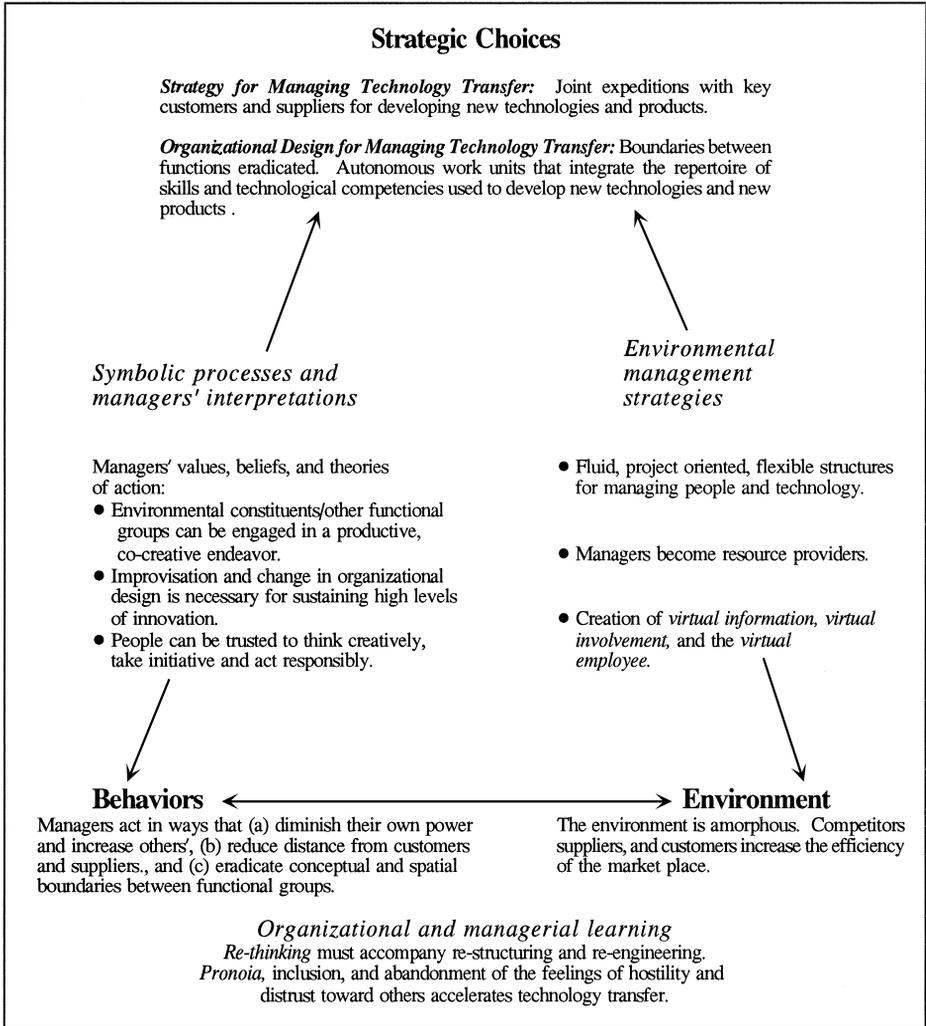


Adapted from: Bedeian, A. G. 1990. Choice and Determinism: A Comment. Strategic Management Journal. 11: 571-573.

Fig. 2. A conceptual model of organizational adaptations when levels of paranoia are high.

3.4. Pronoic organizational adaptations

As Fig. 3 shows, by organizational *pronoia*, we refer to the enactment of an organization's collective view that people are naturally predisposed to act towards the mutual advantage of others, organizational change is non-threatening and necessary for effective TT, and environmental constituents must be engaged in a co-creative endeavor. *Pronoia* also refers to a managerial/organizational condition of health and the projection of group and organizational cohesiveness ascribed to the veritable effectiveness and



Adapted from: Bedeian, A.G. 1990. Choice and Determinism: A Comment. Strategic Management Journal, 11: 571–573.

Fig. 3. A conceptual model of pronoic organizational adaptations.

reliability of others. In Fig. 3, we propose the nature of organizational adaptations resulting from *new* managerial learning, theories of actions, and environmental management strategies.

We propose that *pronoic thinking* emerges when managers confront demanding customers, technologically adept suppliers, well-organized market intermediaries, and a lean work force, *as well* as the need for accelerated TT processes to counter aggressive competitors. To some, the symbolic interactions with these contingents, and the subjec-

tive interpretations of the situations in which they find themselves, suggest that paranoid views of the world must be abandoned in favor of new thinking. *Pronoic adaptations* are triggered by managerial learning that people can be trusted to participate in a creative TT process, without the emphasis on control.

Hence, pronoic managers consciously de-emphasize their control over others, and view themselves as suppliers of resources and information to people directly involved in TT processes. It is important to recognize that *pronoic* ways of thinking about people represent thinking significantly beyond current conceptions of employee empowerment which essentially relates to providing unprecedented levels of resources, information and support to employees (see Shelton, 1991). We propose that *pronoic* managers are likely to *seek out* people's innate skills and unique capabilities and place inordinate emphasis on finding and developing talent. Instead of creating organizational clones who think alike and respond predictably to directives, *pronoic* managers value challenges from team members. *Pronoic* managers view conflict situations as opportunities to learn about alternative opinions, and to allow hidden motives and agenda to emerge. Instead of playing the role of the primary decision maker, director of work, controller of resources, or the linking pin in divided organizations, *pronoic* managers become mentors, educators, and coaches focused on tapping people's talents. They emphasize open display of trust towards others, and show a renewed interest in listening to and acting on the ideas originating from lower levels in the organization. They also appear to assume the role of guardians and focus on ensuring an uninterrupted supply of information and resources to participants in the TT process acting closest to customers, and protecting their teams from detrimental, bureaucratic forces of the larger organization.

Pronoic adaptations also occur when managers begin to view co-creation and collaboration as the most viable options for developing new products, and when new theories of action begin to emphasize *inclusion* of customers and suppliers in the TT process. Interfunctional boundaries are dissolved to create cross-functional organizations that are based less on the notion of division of labor for production efficiency, and more on the basis of organizing the entire *repertoire* of organizational skills and competencies in ways that accelerate TT. We developed this view from a manager who notes that,

We have three basic cells (manufacturing units), and each of these cells has the members of all the primary functions (R&D, marketing, and production) dedicated. So we have a design engineer (R&D), a manufacturing engineer (production), and contracts administrator (sales) who will sit next to each other and they will work together as a team to control existing production... this nucleus of the team works together on a day-to-day basis.

Pronoic strategies for managing TT include an emphasis on virtual information, virtual involvement, and the virtual employee. *Pronoic* managers recognize that tight control over information can feed distrust and paranoia, and that sharing excessive information with organizational and team members promotes innovation (see Nonaka, 1990). *Pronoic* managers abandon tight control over information in favor of *virtual information*, i.e., an environment where all employees have open access to *any*

Table 2

Paranoid vs. pronoic organizations

Organizational adaptations based on paranoid thinking are characterized by the following

Future organizational adaptations based on pronoic thinking are likely to be characterized by the following

Definition

Paranoia: a managerial/organizational delusion and the projection of inter personal and organizational conflicts that are ascribed to the conjectural hostility of others.

Pronoia: a managerial/organizational condition of health and vibrancy and the projection of interpersonal, group and organizational cohesiveness that is ascribed to the general, veritable effectiveness of others.

Theories of action

Principle of exclusion: the enactment of a deep-seated suspicion that inclusion of others, and sharing one's personal domain with others will distract, diffuse, and dilute one's (and the organization's) effectiveness.

Principle of inclusion: the enactment of a deep-seated belief that inclusion of others in one's personal domain will enrich and reinforce the organization's focus and commitment, and accelerate progress toward complex organizational objectives.

Organizations and rewards

Organizations are psychic prisons. Work, personal life and play are clearly differentiated. One is rarely confused with the other. Rewards are means to eliciting organizationally desired behaviors from employees.

Organizations are hermitages and intellectual playgrounds. Work, personal life and play are frequently interlinked. Emphasis on existential meaningfulness. Emphasis on total self-actualization.

Organizational routines

Defensive routines: people want to change other people's minds but are afraid of upsetting them, and therefore send covert, convoluted messages. Others act similarly and lead to self-sustaining, anti-innovation defensive routines.

Supportive routines: people want to understand each others' domains and issues, and feel free to request help and collaboration. Explicit expression of agendas, total availability of information to support innovation and creativity.

Strategies for managing people

Development of organizational clones that perform and respond similarly to directives.

Development of a virtual employee, a creative dynamo. An emphasis on self-development and growth through participation in education and work.

Managers' role

Managers think, workers do. Managing people is about getting people to do what is expected of them. Behavior controlled via directives, rewards and punishment.

Managing people is about creating an environment where they find meaning and rewards in their self-expression, personal development and growth.

Managers' roles include: (a) the controller of information and resources (that are doled-out as and when deemed appropriate, particularly upon the performance of desired behaviors); (b) the strategist, or the sole person with a gestaltic view of the world. Organizational members are expected to do as they are told without being privy to the big picture; (c) the decision maker solely in charge of all major decisions; and (d) the chief liaison, or the linking pin between functional

Managers view themselves as: (a) an educator concerned with convincing organizational members that collaboration, co-creation are more effective ways of meeting organizational objectives; (b) a coach concerned with capitalizing on people's natural talents; (c) a resource facilitator concerned with creating an environment which encourages individual initiative and creativity; (d) a guardian concerned with shielding the innovative, creative,

Table 2 (continued)

Organizational adaptations based on paranoid thinking are characterized by the following	Future organizational adaptations based on pronoic thinking are likely to be characterized by the following
groups. Managers of functional areas make decisions on coordinating organizational activities.	energetic people working toward organizational goals from all other detrimental forces within and outside the organization; and (e) a change agent concerned with precipitating continuous improvements.
<i>Scape goats and whistle blowers</i> Creation of Escape goats that embody the dark side of the organization's psyche; 'Let us pick one person (or a group), ascribe them the darkness and evil we possess in order to cleanse ourselves.'	Creation of heroes that embody the positive side of the organization's psyche; 'Let us pick every person and conspire behind their back to support them and participate in their personal development and growth.'
Organizational adaptations based on paranoid thinking are characterized by the following	Future organizational adaptations based on pronoic thinking are likely to be characterized by the following
<i>Managing information</i> Tight control over information. Development of specialists and fonts of wisdom that provide expert advise that exert inordinate influence on organizational actions. Weaknesses are never displayed to subordinates. Subordinates are encouraged to report good news. Messengers of negative news are killed, and whistle blowers are condemned. Pseudo esprit-de-corps. People ought to operate on a need-to-know basis. Limited involvement of people in decision situations that do not directly concern them.	Creation of virtual information. The emphasis on sharing information, knowledge, expertise so that all have equal access. Few experts, redundancy of knowledge and skills. All information sharing are encouraged. Messengers of negative news and whistle blowers are encouraged, and viewed as opportunities for reexamining and rethinking the basis for actions. Emphasis on creating virtual involvement. Flexible organizational structures attempt to create virtual involvement of people in all organizational decision areas.

information. Information sharing and explicit expression of agenda are encouraged to prevent anti-innovation defensive routines. We developed the notion of *virtual information* from a manager who notes that,

... If we are really going to be team members... they (the production employees on the shop floor) really need to know all those business details. So how much do you tell people? I would rather tell them too much. Because... after they get through the hard spots they are going to trust you more, because they know you are telling them everything. Good news and bad.

Similarly, *pronoic* managers abandon tight job descriptions in favor of *virtual involvement*, i.e., an environment where people possess and have access to the means necessary to involve themselves in a variety of TT activities. The hallmark of *pronoic* organizations, however, is the *virtual employee*, i.e., the person who possesses sufficient skills, cross-functional knowledge, and the ability to collaborate with and access

information and skills from others, as well as participate in and take total responsibility for the outcomes of TT processes. We developed the notion of a *virtual employee* from a divisional head who describes an effective team member the following way,

... I took him out of design engineering, made him manufacturing team leader, and put him on a negotiating team with our union... and handed him some difficult customer issues. All within the last nine months. And he has been successful at all of them.

To sum up our discussion, we speculate on several features likely to characterize *pronoic* organizations, and contrast them with those that afflict the paranoid organization (see Table 2).

4. Implications and directions for research

The arguments underlying our continuum, typology, and conceptual models are: (a) paranoia, as a basis of thinking and doing, has outlived its usefulness as a driver of innovation and creativity; and (b) substantial gains in TT effectiveness are possible when fundamentally flawed beliefs about others, theories of action, and strategies for managing the environment are abandoned in favor of new thinking. In this section, we discuss the major implications of our conceptualization and identify areas that deserve empirical analysis.

4.1. *Pronoia and the literature*

Many component concepts of *pronoic* organizations we describe resemble extant views. For instance, the continuum x in Fig. 1 essentially portrays *Theory X* and *Theory Y* of McGregor (1960). Similarly, our references to organic structures, participative leadership, emphasis on openness and trust, and cross-functional integration are previously discussed in the literature (see Burns and Stalker, 1961; Likert, 1967). However, to view the notion of *pronoic* organizational adaptations as an insignificant extension of *Theory Y* and *System 4* organization is to miss two critical contributions we make.

First, the literature offers few views on *why* practitioners have failed to harness much of the wisdom generated by academia, and is notably silent about *why* organizations are more challenged by the prospects of *implementing* new ideas that promise improvements in technology management. Even the tenets of McGregor's *Theory Y* and Likert's *System 4* organization, widely regarded as meaningful ways of thinking and doing in modern organizations, are yet to be universally adopted. We speculate on the key processes by which managers adapt their organization, and harness the advantages of the *pronoia* concept. We use the model of Bedeian (1990) to propose that: (a) a manager's subjective, symbolic interpretations and attribution of trust strongly shape organizational adaptations; and that (b) paranoid views of the world can prevent managers from implementing new ideas even when they are highly aware of their advantages. We argue

that new management techniques advocated by scholarly literature and practitioner press, including the tenets of *Theory Y* and *System 4* organization, can fail to see light of day and have little influence on actual TT processes unless they are accompanied by: (a) new ways of thinking about employees, customers, competitors, and the environment; and (b) an adapted organization, i.e., a new configuration of organizational structures and systems that fit the TT objectives and strategies. For instance, the difficulties many managers in our study describe in implementing new structural arrangements (i.e., cross-functional teams) when the concern for protecting departmental turf is high and the level of cross-functional *thinking* is low, highlight this predicament.

Second, current management literature says much about the correlates of new product development success (Dougherty, 1992), but rarely explains *why* TT processes unfold the way they do, *why* differences exist in the way the process is deployed, or *why* firms experience varying levels of success in their TT and new product development endeavors. Addressing these questions, we propose that the differences in TT processes exist because of the systematic differences in the ways managers: (a) attribute trust to others based on their symbolic, subjective interpretations of their environment; and (b) adapt the organization based on their interpretations, learning, and environmental management strategies (see Figs. 2 and 3).

In summary, while the literature, as well as most managers from high-technology organizations, may be clear that a *happy* and trustful organization is creative and innovative, our conceptualization links managerial thinking and attribution of trust to others, and subjective interpretations of their environment with actual organizational adaptations and accelerated TT processes. In so doing, we offer a way of thinking about *why* TT processes unfold the way they do in different organizations, and *why* some are more successful than others in implementing and translating sound theories of management into accelerated TT processes.

4.2. *Pronoia vs. conventional views*

It is important to note that our notions of *pronoia* and *pronoic adaptations* are not claims that: (a) *all* organizations are becoming, or are equally likely to become *pronoic*; or (b) other drivers of innovation and accelerated TT do not exist; or (c) *pronoia* can replace inherently human forms of expressions such as power play, conflict, politics, or subversion; or for that matter; and (d) *pronoic* thinking and *pronoic* adaptations are simple to implement.

For instance, scholars and practitioners may question how some organizations are innovative and effective, even though they exhibit high levels of paranoia. Similarly, managers fresh with experiences with competitive battles, downsizing, skyrocketing unpleasantness in organizations may be chagrined at our notion of *pronoia* and question, ‘How can we trust in a climate brimming with distrust?’ Managers can also contend that paranoia, anxiety, fear, discomfort, all too common features of the modern organization, are drivers of innovation and TT, as well.

We propose that while paranoia effectively drove innovation and TT in the past, in fast-changing, highly competitive environments, organizations are innovative *despite* of

and not because of paranoia. *Pronoic* thinking emerges when managers find that paranoia dampens the creative spark of individuals, and offers an ineffectual basis for adapting to a new generation of customers, competitors, and technological changes. Even in otherwise paranoid organizations, we propose that flashes of *pronoic* thinking result in the adoption of new administrative mechanisms and environmental management strategies that accelerate TT processes.

Recent views in the literature only reinforce the importance of thinking about *pronoia* and *pronoic* adaptations. At few other times have high-technology-based organizations, including the ones in our sample, been so challenged by a growing culture of distrust and disloyalty. While the recent wave of restructuring and reengineering, aided by the proliferating *consulting* businesses, have undoubtedly produced results by shedding excess weight under the auspices of *job enrichment*, fewer people are doing the work of more and job-related anxiety is at an all time high. Employee cynicism has burgeoned in a climate of organizational meanness and contentiousness (see Mirvis and Kanter, 1991). Recent literature provides alarming evidence of brutality in organizations (e.g., Hornstein, 1996), and the growing passive aggression in the society (e.g., Morrow, 1996). This chain of events clearly challenges *every* manager's ability to display trust towards others.

While evidence of high levels of organizational paranoia and its past association with effective product innovation is plentiful, the new growing evidence of its negative impact on the human and creative spirit of the organization, and its deep toll on the quality of work life, is equally compelling. We propose that while paranoia was a useful way of viewing the world, and fear and anxiety drove innovation in the past, the high human cost, in terms of dwindling loyalty and increasing resentment, can cascade on organizations and severely restrict innovation. We suggest that without adoption of *pronoic* views, restructured, right-sized organizations are likely to become, not only leaner and competitive, but also meaner, litigious, and cynical. We question whether an anxious and overwhelmed workforce in a paranoid, cynical corporate America can sustain high levels of creativity, and accelerate TT processes in the long run. Along with structural changes currently being implemented in organizations, as several leading scholars note, it is time to *rethink* the fundamental thought processes and perceptions that lead to adaptive choices (see Keidel, 1994). At this juncture, we propose that new thinking that can heal the scars of organizational distrust and paranoia, and function as a sustaining basis for accelerated TT processes over the long term, is sorely needed.

4.3. Future research

The continuum, typology, and conceptual models of adaptation we propose deserve confirmatory analysis in the future. A mail survey of a random sample of managers from R&D, manufacturing, and marketing groups in high-technology organizations can be used in the future to develop the paranoia–*pronoia* continuum based on their attribution of trust, and determine whether a firm's position on the continuum is indicative of its TT-related strategy and design. Such a study can also test whether the symbolic processes, managerial learning, and environmental management strategies of firms

characterized by high degrees of *pronoia* are: (a) significantly different from those characterized by high degrees of paranoia; and (b) more likely to accelerate TT processes. Similarly, empirical tests of relationships between a firm's position on the paranoia–*pronoia* continuum and: (a) rates of new product introductions; (b) nature and extent of organizational adaptation for TT; and (c) the psycho-social environment, including employee creativity, risk-taking, initiative, and productivity, is also likely to provide useful information about the impact of *pronoia*.

The conceptual models of organizational adaptations we propose, and the differences we draw between paranoid and *pronoic* organizations (see Table 2) aimed to stimulate thinking. Considerable formalization is necessary before they are empirically validated. It is also important to note that our conceptualization is based on how managers attribute trust towards others (i.e., functional groups, team members, and the organization), because managers most knowledgeable about TT processes recount them as central to their TT-related experiences. Hence, our continuum and typology speak to managers concerned with managing technology, and our notions of *pronoic* adaptations speak to organizations concerned with accelerating TT processes. To extend this conceptualization and speak to the issues of organizational effectiveness, in general, will require several additional steps including the identification of: (a) additional constituents/contingencies central to the experiences of managers charged with such a responsibility; and (b) key differentiating features of managerial interactions with such constituents/contingencies, in addition to trust. Additional exploratory research in this area is necessary before our conceptualizations are extended to draw implications for organizational effectiveness.

Technology-transfer research remains in its infancy, and the human, interpersonal, and organizational implications for accelerating TT remain largely unexplored. This is problematic because most high-technology organizations view TT as central to their competitive success, and expect *implementable* insights from academia. The conceptualization in this paper aims to stimulate thinking and address this predicament. At this juncture, considerable conceptual and empirical development is necessary before a *research tradition* and a distinctive ontology and philosophical methodology of technology-transfer research can emerge (see Laudan, 1977).

4.4. Managerial implications

Although no *quick* and *dirty* methods for attaining organizational *pronoia* are apparent, we propose that changes in managerial thinking and perceptions of their environment and people are important initiating steps. We view *pronoic* organizational change as a top–down phenomenon. Our study suggests that leaders of semi-autonomous product teams are likely to play a critical role in: (a) mentoring people within the organization to think and evaluate situations they encounter *cross-functionally*; (b) modelling collaborative and cooperative behaviors to participants; (c) selecting the *right* people to participate in the TT process, i.e., cross-functionally trained managers who value cross-functional collaboration, possess strong people skills, and are willing to experiment with new ideas. We developed this view from several experiences managers

related, including the following observation by a design engineering manager emphasizing the importance of selection who notes that,

You got to make sure that you have the right people in the right positions (on the team). The team leaders that I have picked from the engineering group out here are personable people, they are respected people. You cannot have a dictator in this position (as team leader), and you cannot have someone who would not take a decision. Personalities are as important as technical capabilities. Personalities are probably *more* important than technical capabilities because you can farm-out technical requirements. You can hire a design analyst to do an element analysis for you. But if he cannot interface with people on the floor, what good is it?

Co-location of multiple functional groups in a common facility appears closely associated with high levels of *pronoic* thinking because it shrinks not only spatial, but also perceptual distances between functional groups. We propose that the next generation of new technologies and new products, and surviving the next generation of global competitors will require a significant shift in the way managers think about their environment, people and change, and call for organizations designed *for* collaboration between functional groups and key environmental constituents. We highlight specific recommendations for senior management, as well as managers, directly overseeing TT projects in Table 3.

Table 3

How TT processes become pronoic: implications for senior management and project managers

The senior management

Believes that cross-functional collaboration accelerates TT processes;
 Displays high level of trust and openness in their relationship with employees;
 Shares all possible information about the TT process with all participants;
 Carefully selects technically competent managers that display people skills and pronoic thinking to lead TT processes;
 Emphasizes listening to ideas from all levels of participants;
 Decentralizes TT-related decision making; and
 Co-locates multiple functional groups involved in TT.

The project manager adopts and acts on the view that

Other participants can be trusted to contribute to the TT process without the need for control;
 (S)he is a supplier of resources and information to TT participants;
 (S)he is a coach, mentor, educator of the TT participants;
 External constituents, such as leading suppliers and customers, can be engaged in a creative, collaborative endeavor; and
 Conflicts and disagreements are opportunities to learn about other points of view and expand options.

The project manager emphasizes collaboration and accelerates TT processes by

Removing organizational obstacles, e.g., bureaucracy, distances between participants through collocation;
 Seeking-out skilled individuals and focusing on developing their inherent capabilities;
 Insulating the project team from bureaucratic forces of the organization; and
 Sharing maximum information with TT participants.

5. Summary and conclusion

Based on a study of 10 firms and 40 managers closely involved in the TT process, and a review of literature on organizational trust, we propose that paranoia prevents and *pronoia* promotes organizational creativity and innovation. Rethinking the fundamental managerial assumptions about the environment, people, and change, and attribution of trust to others, we suggest, can result in dramatic improvements in the management of TT and people. The key to accelerated TT appears to lie more in the minds of managers and less in retro-fitted mechanisms foisted on functionally divided, paranoid organizations.

The literature is clear that high-technology firms depend on rapid introduction of new products for survival and growth. Managers are clear in their wish that technology development must integrate with customer needs, and that this requires increasingly higher levels of cross-functional thinking and collaboration. Our conceptualization results from thinking about *why*, despite their wish for an accelerated TT process, are there systematic differences in what managers actually achieve. We propose that the ultimate test of *pronoia* is in its *enactment*, and in managers' ability to take the inordinate risk of trusting others in a climate of distrust, creating an environment where the participants in the process feel safe to trust, and then, adapt their organization based on new ways of thinking and managing the environment. Considerable confirmatory analysis is clearly essential before generalizable findings can be developed.

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