Strategies of Effective New Product Team Leaders

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For high-technology firms that depend on new technology-based products, speed has become a source of competitive advantage. In the pursuit of accelerating new product development, many are entrusting product innovation to cross-functional teams, which often include not only representatives from multiple functional groups, but also from leading suppliers, customers, and re-sellers. The popularity of these teams has soared in recent years and they are credited with reducing errors, improving new product decisions, and effectively organizing workflow.[1]

Since the impact of cross-functional teams on new product development (NPD) processes is strongly influenced by their leadership, the literature is rich with insights about what effective leaders do in practice.[2] We know, for instance, that effective new product team leaders:

- clearly communicate the organization's expectations to team members,
- foster high levels of communication within and outside the team, and create a climate that raises morale and energizes team members,
- take responsibility for the team's goals, guide and share the team's burdens, and interface with key external constituents,[3]
- enjoy high levels of autonomy and support from their superiors in the organization,[4]
- involve all functional groups from the initiating stages of the new product project,[5] and
- balance both technical as well as human interaction issues of the project and reduce destructive conflict.[6]

Why do these and other easily derived insights from the proliferating literature on teamwork and innovation not guard all new product cross-functional teams from poor leadership? Why do some team leaders exhibit these positive behaviors, but not all? Our recent study of NPD processes in ten high-technology firms (see the Appendix), eight of which use cross-functional teamwork, shows that simple knowledge of what leaders *ought* to do does not produce an effective team leader. The transformation in team leaders' thinking, learning, and doing—and the similar transformation they affect within their teams—lies at the root of effective leadership, effective teamwork, and accelerated NPD processes.

Our study assessed the *effectiveness* of new product team leaders based on the extent to which they transformed:

- The organization of new product decision-making and actions, and the resulting decrease in cost, increase in creativity and cross-functional collaboration, and acceleration in product innovation.

- The interpersonal dynamics within the new product team, and the resulting increase in satisfaction with team membership, interest in collaborating with, increased willingness to learn and adopt new behaviors.

The Nature of Transformation

Since product innovation holds little meaning if it takes too long or costs too much, we define effective new product team leaders as ones who increase creativity and deliver marketable products faster and cheaper. For instance, most team leaders are familiar with compartmentalized, functionally divided organizations that resemble a salad-bowl of subcultures with disparate thought worlds and NPD processes that follow linear paths. When departments function and make decisions in isolation, NPD processes become inordinately delayed. Often, the problems are linked to the independently made decisions which make micro sense to one department at one time, yet make macro nonsense to other departments and the organization. Also common are delays caused by uncoordinated activities and poorly organized new product workflow. Effective leaders overcome functional differentiation, foster collaborative decision-making, and organize NPD workflow concurrently. They create a social environment in which teams come to resemble less a battleground for turf protection behaviors and more a sanctuary in which people with divergent orientations and talents can share hidden agendas, ask for help, take risks, and develop collaborative relationships with others. They build trust, foster openness, and encourage risk taking so that highly creative products are developed faster and cheaper.

Effective new product team leaders are the key shapers of product innovation[7] and the key managers of interpersonal dynamics among team members.[8] They protect the team's autonomy,[8] break down traditional department-specific loyalties, create a unified focus on product innovation, and increase speed of

product development even as they reduce cost and increase creativity.[9] Because linear new product decision making and sequential organization of its workflow contribute greatly to interdepartmental rivalries and to escalated costs and time delays, effective leaders transform product innovation into organic processes characterized by collaborative decision making and concurrent organization of workflows.

Theories of Action and Strategies of Effective Team Leadership

Table 1 outlines the key findings that emerged from our study. It shows five milestones in the strongly interlinked process by which team leaders initially transform their own thinking and, eventually, the decisions and actions of the team. Column one identifies the key environmental forces that engage effective team leaders and what they define as problematic. Their subjective interpretations are important because they shed light on *how* they view the situation in which they make decisions and *why* they take the kinds of actions that they do.[11]

Column two outlines the key theories of action that emerge from this process of attribution. By theory of action, we refer to the subjective views team leaders develop about "if we do X in Y situations then Z will result." These theories function as the dominant guides and motivators for decisions they make and the actions they take in pursuit of effective teamwork and accelerated product innovation. Column three outlines the objectives and strategies that team leaders set based on their formative theories of action. These objectives and strategies are *formative* because they change over time in response to new environmental cues and new learning. While some objectives and strategies are deliberate (i.e., they involve conscious choice), many are emergent (i.e., they result largely from the implicit, often unarticulated theories of action and learning).[12] Finally, column four outlines a sample of team leaders' actions that transform the NPD process and their teams.

The following discussion focuses on the key objectives and strategies leaders employ to transform their teams and NPD processes.

Ensure Commitment

The relevant environmental forces that trigger new thinking include: a linear, sequential process used for developing new products, which causes inordinate delays; a dominant R&D group that tightly controls information and resources available to the team; and uncommitted, disinterested members from production, marketing, and other functional groups who attach a low priority to new product development.

Effective leaders attribute ineffective new product processes to low commitment to decisions and disconnected workflow. The theory of action that emerges from this attribution holds that if team members come to *own* the NPD process—i.e., commit equally to the inputs and share equal responsibility for the

TABLE 1. The Process of Team Leader Transformation

Environmental Forces with which team leaders interact:	Interpretations and Theories of Action—Accelerating NPD requires:	Objectives and Strategies leaders formulate to manage the team and the new product task environment	Examples of the Actions team leaders take to transform their team
Linear NPD decision making and work flows (and largely controlled by R&D). Marketing and Production (and others) demonstrate low interest.	Higher levels of ownership, commitment, and involvement from team members and functional groups.	**Ensure Commitment.** Ensure that every participant commits equally to the inputs in the team and takes personal responsibility for team outcomes.	**Involve** all team members from initiating stages of NPD process. **View** all functional groups, key customers, and suppliers as insiders. **Lead** by exhibiting global and integrative thinking.
Information sharing is currently on a *need to know* basis. Functional groups work in isolation and decisions are opaque.	Transparency in decision making. High levels of information sharing.	**Build Information-Intensive Environments.** Ensure that high levels of information exchange occurs in ways that foster integrative thinking.	**Insist** on eradication of hidden agendas and on honesty and openness in communication. **Educate** team members about the techniques of effective communication.
Senior management/R&D micro-manage the NPD process.	The team to ensure that individuals have freedom, and the facility to develop their creative potential to the maximum.	**Play Facilitator.** The leader is a coach and facilitator, not a hero.	**Coach** team members, encourage acquisition of knowledge and skills to accentuate and capitalize on their inherent talents. **Shield** team from the firm's bureaucratic forces. **Forage** for information and resources to facilitate team's initiatives.
Team members are selected solely for their technical competence. Ineffective communication and information sharing within the team.	A renewed focus on *interpersonal* and human interaction skills of participants.	**Focus on Human Interaction.** Team members must become skilled at human interaction issues in addition to technical issues.	**Select** the right mix of team members. **Sponsor** team-building activities. **Build** a team identity to foster belonging. **View** interpersonal conflict as a forum for identifying new alternatives and constructive problem solving.
Strong resistance to change. Poor learning, non-cumulative learning.	Heavy interest in changing, taking risks, and adopting new behaviors.	**Focus on Learning.** A focus on sustained learning is essential for fostering high levels of flexibility and creativity required from team members.	**Support** risky ideas and innovative actions. **Focus** on the link between behaviors and environment, and on the opportunity for learning. **Foster** autonomy and freedom to make mistakes.

outputs—significant improvements are likely. Relatedly, effective leaders focus on increasing participants' personal, emotional commitment to the team. Insisting on the freedom to identify potential team members and form an all-volunteer team represents a common initiating step. During interactions with

team members, effective leaders shape the vocabularies and language to favor the view that all functional groups, as well as key customers and suppliers, are *insiders*. Aware that the perceived dependence on R&D can foster disinterest among team members, leaders interact with team members in ways that makes the interdependence apparent. A leader describing how he helped generate the notion of interdependence among participants noted:

> "On the engineers' side, they didn't understand why they had to go to the manufacturing guy on a daily basis and say, 'Hey look at my design, do you see anything wrong with this?' He's thinking: 'I know how to design this stuff so it works, meets the spec [design specifications].' But he wasn't thinking about: 'How do you build it? How's this going to go together? Is there some way to design it that meets the spec just as well but can go together much more easily on the manufacturing floor?'"

> *Interviewer*: "How did you get that to happen?"

> "Well, every time a guy would complete a design and come to us real proud and puffed up with something he did, the first questions we would ask him is: 'Has the manufacturing guy reviewed that? What does he think of it?' What are the suggestions you got?' Pretty soon they get the idea and they don't want to talk to us until they've crossed that bridge themselves."

Leaders also act in ways to insure that members feel a greater sense of control over the team's destiny by loosening control over information and resources. Team members are encouraged to develop their own protocols, identify their own criteria, assign their own priorities, make their own decisions, and design their own workflow. This often newly acquired autonomy is instrumental for transforming a group of disinterested participants into a team of members who hold a stake in their interdependence, social relationships, and the outcomes of the NPD process.

Much of the commitment within the team results from the team leader's actions outside the team aimed at developing a personal relationship with departmental heads.[13] In particular, these initiatives help team members strike a balance between the pressure to preserve departmental turf *and* the need to gain the trust of other team members. These initiatives also help team members strike a balance between having to answer to the team *and* to their departments when there are few prospects of satisfying either and when decisions and workflow between the two are poorly coordinated. Ensuring commitment has much to do with team leaders' efforts to facilitate the process by which team members blend their loyalties and develop integrated identities of departmental *and* team members. A team leader explained how his personal relationship with departmental heads creates a climate in which team members find it easier to blend their roles and commit to the new product initiatives:

> "You've got to have a blending [between the team's activities and the rest of the organization] because you've got day-to-day organizational activities that need to take place [in addition to new product related teamwork]. I attend the daily staff meetings of the plant manager. I know what's going on everyday, so I tell them

what's going on everyday with the team. We're not isolated from each other. If there's a conflict and they say, 'Hey, we've got to shut the plant down today if we don't get this particular problem fixed.' We will say, 'No problem! We'll back off of the new product process and help you fix your problem.' We work together. We're not like an island out here, isolated from the rest of the world."

Build Information-Intensive Environments

An information-deficient environment, the reliance on soft data, and paralysis in decision making trigger new theories of action. The symptoms of a dysfunctional, information-poor environment include: senior management's actions suggesting that the new product team should operate on a *need-to-know* basis; a dominant functional group (most often R&D) reluctant to share information; *safe* decisions that are devoid of insights or vision, and the overt reliance on innuendo and soft data (i.e., information that people with differing views cannot reconcile); and the propensity to use information as a weapon that prevents others from succeeding and helps avoid blame for failures.

Effective leaders link information deficiency with low creativity, overlap of efforts, poorly coordinated activities, and the escalated cost of re-work and re-tooling. They attribute the differences that exist in the thought worlds of participants —along with the relative absence of a shared vision about new product processes—to poor information sharing. The meanings derived from their experiences and attributions favor the creation of an information-intensive, information-redundant team environment. Similarly, the theory of action favors activities that lead to information sharing, airing of divergent views, emphasis on openness, and holistic thinking.

Effective team leaders take steps to eradicate the opaqueness with which new product decisions are made. They increase the frequency of formal meetings and encourage informal meetings for airing divergent orientations, emphasize openness and honesty in communication, and eschew hidden agendas. Their strategies focus on accelerating the process by which multiple bits of information from multiple sources are generated and eventually amalgamated into a shared vision. One team leader described how he ensures that each team member becomes aware of other participants' subjectively constructed realities:

> "Nobody knows everything. And you can't do it all by yourself. There's a great tendency among people to not really respect the other person that they're dealing with. A lot of people are quick to judge or to snap 'oh, he's not as smart as he needs to be,' or 'this guy's a fool,' or 'he's hard to work with,' or whatever. And just because you don't understand doesn't mean what that guy is doing isn't right. In a lot of cases he is doing things because of a lot of factors that affect him and you might not understand those factors in your decision process. The more that you can meet people and work with people outside of the normal connections, the better off you are as far as being able to understand what you do and how you can impact the big picture."

Effective leaders also co-locate team members. In one instance, the leader co-located the administrative functions of multiple departments as well. The co-location and close physical proximity create unprecedented opportunities for interaction across departments. Similarly, effective leaders invite key internal and external constituencies (e.g., leading users, suppliers, re-sellers) to partici-pate in new product decision making from the initiating stages of the process. They encourage people not only to give, but also to ask for hard data when making decisions (i.e., information that people with opposing views find easy to reconcile). A great deal of emphasis is placed on shrinking the time lag between the availability of information and its dissemination. A leader, describing how portable two-way radios provided to team members promoted *real time* infor-mation exchange, noted:

> "When it came time to implement the product out on the floor, to actually put it into place, I got radios for everybody. All the major functions had radios, 2-way radios. And that was something that was never done here before….[mimicking the nay sayers:] 'It will not work, it can't work, we've never done that.' Well, I went ahead and did it. Now, they won't give up the radios. And we could have never implemented the program because we were asked to pull off the program by one month. We were asked to do it one month early by our customer. We did. And one of the reasons we were able to do it was all the major functions had radios. They could talk to each other. We all had beepers, but you can't rely on that and the telephone . . . it's too late. I need an answer now, you need the per-son who has a problem on the line . . . I need him there now. Now, I think radios are going to become permanent."

Facilitators, not Heroes

The clear link between a senior management's and/or R&D's propensity to micro-manage and shape team's activities, the associated disinterest of team members, and the chaotic organization of new product workflow trigger new learning. Leaders note that R&D's or senior management's exercise of power over the new product process engenders feelings of powerlessness among team members and creates an environment ripe for apathy, finger pointing, and shift-ing blame. As a result, team members' interest in taking initiative and risks, they note, declines sharply. Responding to the feelings of powerlessness, team mem-bers often feel absolved of their collective responsibility toward new product outcomes. More importantly, the team leaders note that R&D's and senior man-agement's attempts to shape and mould people's behaviors are clearly linked to teams that display low creativity and avoid taking risks.

These observations fundamentally transform the view of leadership. For instance, the view of a leader as a center-stage, limelight-hogging hero figure is replaced by the view of a leader as a facilitator. The view that leaders ought to control and orchestrate new product activity is replaced by the view that leaders ought to act in ways that make them redundant. Defining his role, a leader notes:

"My role is really to be the coach and the facilitator. I am the tiebreaker. I encourage or point people in the right direction. 'Gee, we're having a problem here, what do you think we should do?' 'Well, have you talked to so-and-so, I suggest you talk to that person. Work with that person. If you can't work it out, come back and see me.' And 99 times out of a 100 I never see him again. I try to encourage right from the beginning that they're empowered to do it. They don't need me. They're empowered to make the decision. I trust you. You're on the team, you need to make a decision, you think it's best for the team, make it. Don't come to me for approval. Make it yourself."

Leaders as facilitators take overt steps to shield the team from the bureaucratic tendencies of the larger organization. Although many of these actions are barely perceptible to team members and occur outside their purview, the leaders' network of personal relationships with key constituencies outside the team help generate useful information and, more importantly, aid in the implementation of the team's decisions. Their behind-the-scene activities and the resulting improvements in new product related workflow emerges as one of their enduring contributions. A leader describes his role as such an insulator:

"You've got to keep people [team members] away from the day to day political stuff. In this organization there are sharks all over the place and then there are corporate sea gulls. I don't know if you've heard of the sea gull mentality. The corporate seagulls are the people that fly in, make a lot of noise, eat your food, go to the bathroom all over you, and then fly away. And we've got corporate seagulls all over the place in this company. Part of my job is to keep the corporate seagulls away from the real workers."

Interviewer: "You sound like a protector . . ."

"Well, I kind of was. Tried to keep as much stuff away from people [on the team]. I tried to insulate them from a lot of stuff that goes on. Stuff that they don't need, that will distract them. I guess that's the best, insulate them from the distractions that take place. I tried to do that. I wouldn't say protector, more of an insulator. But that was one of my roles."

Also, team leaders as facilitators take inordinate steps to scout for the right mix of talents and coach each team member. Instead of predefining a conceptually appealing notion of an *ideal* team member to which all participants are expected to conform, they encourage team members to improve their inherent, and necessarily distinctive, talents. The result is a team with a wide variety of highly refined talents, capable of making intelligent choices and taking effective action in a wide variety of NPD situations. Based on the evidence in our study, the coaching role of team leaders and its impact on new product development can hardly be overemphasized. The breadth of talent and the team's acquired ability to seamlessly manage high levels of uncertainty—and to respond to the large variety of unforeseen, unpredictable contingencies that arise during new product development—strongly differentiates effective teams from others. In a related vein, the high levels of creativity that effective teams display is strongly linked to the interaction that occurs among diversely qualified and skilled

people. A team of clones, which can result from senior management's efforts to micro-manage, unduly handicaps attempts to identify creative alternatives.

Focus on Human Interaction

Despite the presence of technical skills on the team, the major hindrances to effective new product development are the relative absence of intra- and interpersonal skills as well as the relative unfamiliarity with methods of effective communication. Effective leaders focus on problems associated with people, personalities, and information exchange. They recount frustrations with poor perceptions, low fidelity of communication, and escalating error. The emerging theories of action favor purposeful efforts to improve the human interaction skills of team members. A leader recounted his approach to ensuring that his team came to terms with interpersonal and human interaction issues:

> "There were some struggles, there were times when people just said, 'This person won't work with me or that person won't work with me.' I would bring them in and get them to talk to each other. One time I had them all in here and I shut the door and I said, 'Okay, I'm leaving now and you guys get it all figured out and tell me when you get it all figured out I'll come back.' Well, then they had words, and they got it out, and it was because everybody brought their own little stuff in with them— all these attitudes and feelings and hurts and dislikes and everything with them. And that's normal with any family, I think every family goes through the same thing. Personal things that you need to deal with."

Several steps they take to achieve these ends are worth noting. Effective leaders tend to select the right mix of team members who not only possess complementary technical talents, but also the requisite variety of human interaction skills. Moreover, effective leaders are unyielding in their insistence that the team is the only legitimate forum for making decisions that bind the team. For instance, effective leaders eschew back room deals, special favors for members, or unilateral decisions that impact the team. In one team, the leader insists that the designs developed by R&D and design engineers be approved not by him, but the team that includes representatives from marketing, production, and production engineering. This forces members to learn about human interaction skills in addition to relying on the power of ideas.

Effective leaders also emphasize education and training of participants in human interaction, communication, and team-building skills. The leaders often held off-site training sessions led by external consultants, which help create a team identity and contribute substantially to the sense of belonging. As one team leader described it:

> "Initially, we do hold some team-building sessions to get people to work together as a team. In fact this team will be going off-site next month for a one-day session of team-building exercises."
>
> *Interviewer:* "Do you go on a retreat?"
>
> "Yeah, it's like a retreat. It works very well to get away from the day-to-day activities and just get to know each other a little bit more. Just like any family, we're

developing a relationship. You can't do that trying to work on day-to-day problems. You need to get off site and spend some time away from the plant and just get to know a little bit more about each other personally. We do some team-building exercises and then we do some additional team-building things throughout the life of the program."

Finally, effective leaders define interpersonal conflict among team members less as problems to be avoided, and more as an opportunity for exploring unfamiliar options, airing diverse agendas, examining alternative theories of actions, and expanding the repertoire of choices. Effective team leaders manage conflict in ways that enhance the creativity of the team and gain their commitment to bold, risky initiatives.

Focus on Learning

The perceived importance of two environmental forces triggers the emergence of new theories of action and strategies. First, leaders recount their frustrations with the failure of teams to prevent mistakes from recurring. Second, leaders recount inordinate frustrations with the variety of ways in which some team members, and some functional groups, resist change and refuse to modify behaviors necessary for accelerating NPD processes. The failure to commit to change, they note, is often cleverly disguised as genuine concern for additional information (e.g., the call for a market feasibility study that cannot be justified by the time and resources available). Similarly, they describe frustrations with the inability of the team to identify and prioritize the criteria for decision making. This often involves the participants' insistence that *all*, even contradicting criteria, be considered simultaneously (e.g., they might insist on avoiding risky decisions *and* refuse to approve product designs perceived as too safe).

Leaders state that resistance to change is clearly linked to dramatic failures of new products and the ultimate loss of customers and market share. Moreover, they observe that: inflexibility, rigidity, and maintaining the status quo leads to poorly managed learning processes; the day-to-day hustle of the new task environment and the inordinate involvement in fighting fires can deflect attention from the underlying causes of recurring problems; and unless processes for continually testing and evaluating premises and theories of action are installed, sustained improvements in product innovation are unlikely. Without the emphasis on learning and intellectual growth, the team is likely to become entropic and a forum for acting out old rivalries.

Effective team leaders seek to transform the nature of learning that occurs within their teams. There are several steps they take to improve the team's learning and its ability to adapt and improvise. First, effective leaders invest heavily in training and educating team members about the process of learning. Even though different leaders design training sessions differently, they commonly call on team members to identify and evaluate the key premises that guide their thinking and actions and ask team members to develop meaningful

ways of thinking about *why* their teams are imprisoned within the confines of dated thinking.

Second, effective leaders create opportunities for new learning to emerge from intense interaction among team members and between the team and its external environment. A team leader describes how he encourages team members to approach their departments, gain fresh perspectives, and solve problems collaboratively:

> "The product engineering department has to deal with the current design, current activities. The team members representing the product engineering department go back and they work with their counterparts in product engineering and say, 'You know I am working on this part, I know you've worked on it before, what do you think.' That kind of thing. The product team and technology transfer concept has got people thinking more and more universally rather than sticking right to their own little narrow focus. You even get people who have not been on a team beginning to think in terms of: 'Gee, I wonder if this is going to affect quality. I'm going to go talk to them. I wonder if this will affect manufacturing. I'll go talk to them.'"

Third, effective leaders are highly interested in linking double-loop learning with effective decision making and actions.[14] For instance, effective team leaders explain the premises guiding their decision making and actions and they make such premises discussible among team members. This creates a double loop of thinking and learning because: the link between their actions and outcomes is examined for insights; and the implicit theories of action are examined and evaluated in order to understand *how* and *why* those decisions were made and those actions were taken in the first place. The open discussion of premises and theories of action emerges as the key difference between teams that learn and adopt new behaviors and those that resist learning, resist change, and repeatedly make the same mistakes.

Finally, effective leaders emphasize experimentation and taking risks and have little trouble answering the question: *Have you tried anything innovative or unusual that helped accelerate NPD?* For instance, one leader notes:

> "And that's new and different, we've never done that before. We put together an assembly team of hourly people and they designed and developed the assembly line. They built the assembly line. They decided where the material handling was going to be, how the material was going to be handled, what kind of machines were needed to put it together. They did it themselves, instead of a group of engineers sitting up in the office laying out this beautiful assembly line and then turning it over to the workers and saying here you make it go and look at this wonderful assembly line. The workers would then not have any ownership because they didn't have input. Three and a half years ago when we started programming we put this group together and said you meet as often as you want to meet, but it's going to be your line. You lay it out the way you want it. They did that and that line down there today is a result of those workers doing it. That was different and had never been done before. We had to break some paradigms there in order to get that done."

In a related vein, effective leaders are distinctive in terms of their attitude toward failure. They insist that the team's learning occur at the initiative of the team members. They encourage members to act on their decisions, even in the instances when these decisions are contrary to their best judgements. They demonstrate a visible openness to team members' decisions about directing their energies, talents, and the team's resources to alternatives that differ substantially from their own experience-based views. They show their willingness to let the team learn from the link between its autonomous decisions and immediately felt negative consequences. A team leader explained how during debriefing sessions the link between actions and failures results in new learning:
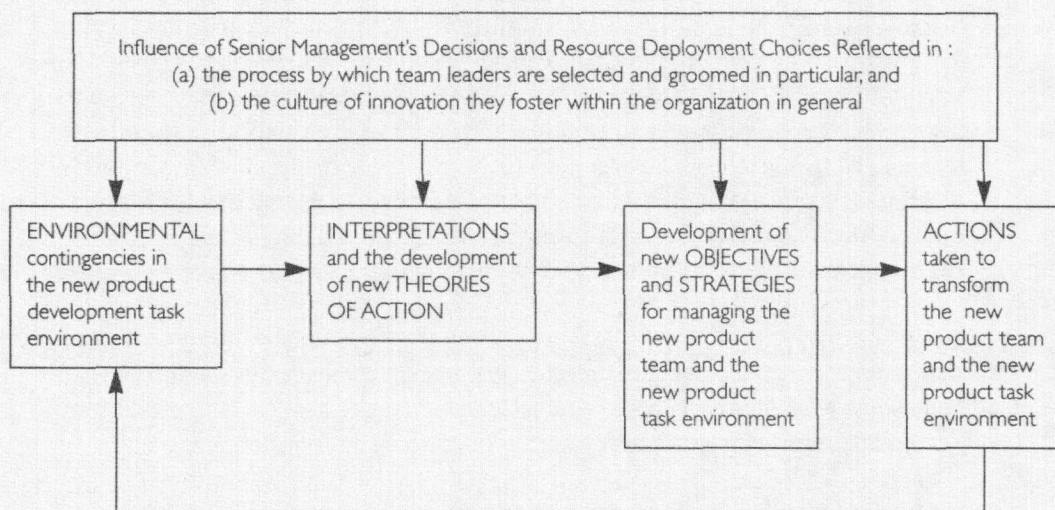
> "When we finished the previous NPD project, we had a brainstorming session with the team and we put together a list of things that we would do different for the next team. When I started up this team, it was very easy. I could take this list and say here's the things we could do different, we're going to do them now. We're building upon our experiences."

Implications for Senior Managers

There is growing interest in the literature about *why* managers act in ways that differ substantially from their professed knowledge.[15] For instance, as Pfeffer and Sutton note in their recent article:

> "all too often, even with all that knowledge floating around, nothing happens. . . . What causes the knowing-doing gap? It can often be traced to a basic human propensity: the willingness to let talk substitute for action." [16]

The less-effective leaders in our study are rarely lacking in insights about what presumably ought to be done to improve teamwork and the organization's NPD process. The key difference among more and less-effective leaders relates to the knowing-doing gap and to the process by which the former learn and transform their own and their team members' thinking and actions. Effective leaders are, however, products of their environments and are strongly influenced by the decisions and resource deployment choices of senior management (see Figure 1). For instance, effective leaders in our study overcome what the literature uniformly regards as the principal challenge of product innovation—namely, the challenge of fostering inter-functional collaboration and the common vision among diverse participants—largely because they are set up to succeed by the senior management. The effective leaders are more likely to emerge in cultures that look favorably upon change and view product innovation as a high priority organizational activity. They are also more likely to succeed when a senior management more receptive to their ideas shapes their social interactions. By contrast, the lower effectiveness of some team leaders in our study is attributable as much to their personal learning and ability to transform others as to the policy and resource deployment decisions of senior management.

FIGURE 1. Senior Management's Influence on Team Leader Effectiveness

Influence of Senior Management's Decisions and Resource Deployment Choices Reflected in :
(a) the process by which team leaders are selected and groomed in particular, and
(b) the culture of innovation they foster within the organization in general

ENVIRONMENTAL contingencies in the new product development task environment

INTERPRETATIONS and the development of new THEORIES OF ACTION

Development of new OBJECTIVES and STRATEGIES for managing the new product team and the new product task environment

ACTIONS taken to transform the new product team and the new product task environment

Our findings urge careful attention to the complex, essentially subjective process by which people interpret and draw meanings from senior management's resource deployment choices and who use these meanings to define their own behaviors. For instance, there is little scope for cross-functional thinking, much less for actual collaborative behaviors to emerge among team members, when senior management's theories of action hold that new products are about technology and that R&D understands new technology better than others. When they endow the bulk of NPD-related resources and decision-making power to R&D, and then permit their appointees to lead new product teams, they implicitly promote the view that new products are *not* organizational but an R&D responsibility. Worse yet, they empower R&D to singularly own the NPD process and absolve others from attributing a personal stake in new product processes and their outcomes. The thinking and theories of actions spawned among the participants in the process, almost without regard to senior management's proclamations about cross-functional cooperation, promote rivalries and turf protection behaviors within new product teams. Similarly, the actions of marketing and production representatives on the team can fail to reflect even their own best judgements about trust, commitment, and cooperation when their personal experiences in the team are shaped by R&D appointed leaders, and when they perceive a weak link between their personal contributions to teamwork and the decisions their leaders eventually attempt to implement.

Similarly, the process by which senior management selects, grooms, and empowers team leaders emerges as a clear determinant of ensuring commitment

and a strong influence on team members' learning and theories of action. Effective leaders are carefully selected by senior management for their *intra*personal skills (i.e., their interest in learning, their sense of security that promotes self-disclosure, and the opening up of their hidden agendas and theories of action for scrutiny by others) and their *inter*personal skills (i.e., their ability to relate with others and build collaboration). The allegiance that potential candidates owe to the team, versus the allegiance they owe to their department, factors strongly in the selection criteria. Moreover, once selected, effective team leaders undergo considerable training on issues of managing change, conflict, and/or teamwork. By contrast, *all* of the less-effective team leaders in our study are R&D appointees who tend to view team leadership as a part-time job. Despite their professed knowledge about teamwork, their strong affiliations with R&D get in the way of effective leadership. When their team skills are tested, team members report, it is not unusual for R&D appointed leaders to act in ways that belie their *real* theories of action which hold new product teams as little more than instruments for implementing R&D's product innovation agenda.

Our findings offer clear arguments in favor of continual training and development of team members—particularly for building their human relations skills. We find effective leaders unyielding in their convictions that:

- if existing ways of making decisions and managing new product workflow continue, old and not new objectives will be achieved;

- sustainable improvements in team member decision making and actions are rooted in cognitive and behavioral learning that involve the investment of time, energy, and other resources; and

- their role as leader is about fostering a team environment in which members can view and interpret their environment differently, draw new meanings, develop new theories of actions, and practice new behaviors in a tolerant, supportive environment.

More importantly, they are distinctive in their ability to deploy resources to build team members' interpersonal, communication, teamwork, and other human relation skills. This point is noteworthy because the senior management in over half the firms in our study has failed to provide team leaders with access to resources for training and educating their team members. Not only are these non-technological skill-building initiatives seen by some as superfluous, but such investment is perceived as providing long-term versus immediately observable returns.[17]

Events that jar a senior management from its comfort zone can build commitment to change in ways that can ultimately help bridge the knowing-doing gap. For instance, team leaders and members in two firms recalled near-death experiences precipitated by the inability to translate new technologies into new products. Senior management should, as a matter of routine, confront the limits of its comfort zones before a crisis occurs. Another firm reduces its risk of encountering critical events by meticulous benchmarking with best practices

TABLE 2. The Influence of Senior Management's Decisions

Carefully selected team leaders endowed with high levels of autonomy	R&D appointed team leaders with low levels of autonomy
are likely to **Ensure Commitment** by: • defining the contribution of every stakeholder as equally important • inviting all relevant stakeholders to participate in NPD activities from the initiating stages as equal partners. • emphasizing consensus building.	are likely to **Weaken Commitment** by: • adopting the perspective of one stakeholder (most often R&D). • viewing the team as a mechanism for expediting the implementation of their (or their functional group's) agenda. • micro-managing team members.
are likely to build **Transparency** by: • demonstrating genuine interest in knowing about others' divergent orientations. • insisting on (and insisting that others) make explicit their hidden agendas. • hunting, gathering, and foraging for information within and outside the firm to facilitate informed decision making.	are likely to build **Opaqueness** by: • hoarding and controlling information. • viewing differences in the official status and unofficial stature of functional groups and participants as a legitimate reason for controlling information. • involving team members from marketing and production groups only when their input is deemed necessary.
are likely to function as **Facilitators** by: • creating opportunities for team members to further refine their inherent talents. • empowering others (i.e., the emphasis that teams develop their own objectives and strategies).	are likely to function as **Controllers** by: • viewing the team as an impulsive mandate of senior management designed to weaken R&D's control over product development. • viewing NPD processes as essentially R&D activities, and others as incapable of knowing the technical ramifications of the process.
are likely to **Strengthen Human Relations** by: • focusing on relationships within the team. • choosing members based on their technical and interpersonal skills. • providing team members with training on team building and human interaction skills. • defining the team as the only legitimate forum for making decisions.	are likely to **Weaken Human Relations** by: • focusing more on the relationship between the team and the senior management. • defining team members in terms of their technical skills. • failing to prevent back room deals aimed at placating select participants. • making unilateral decisions that bind the team.
are likely to **Foster Learning** by: • encouraging team members to act like entrepreneurs and risk takers. • acting on their feelings of security, and opening up their implicit agendas and theories of action for scrutiny by all team members.	are likely to **Strengthen Resistance** to change by: • responding to resistance to change by further exercise of power (increasing their control over resources and information) • demonstrating an inordinate interest in finding short-cut solutions to complex problems.

and an unrelenting pursuit of market leadership. A culture of assessment, self-reflection, and continual scrutiny of resource deployment choices significantly improves the odds for new product team leaders.

Table 2 summarizes the distinctions between the actions of effective and ineffective leaders that are attributable to senior management's explicit and implicit policy and resource deployment choices.

Conclusion

Team leaders must transform their behavior with regard to the ways they interact with the environment, develop new theories of action, form new objectives, and define new strategies. However, unless the behavioral transformation is rooted in cognitive transformation, weakly held convictions can result in a resistance to change and a failure to create a lasting impact on NPD-related cross-functional teamwork. Meanwhile, senior management plays an important role in ensuring commitment among multiple departments, in positioning NPD activities as an organizational priority, and in selecting, grooming, and empowering new product team leaders. Furthermore, senior management must support the often lengthy, unpredictable, and error-prone process of learning that team leaders and their teams undergo. Since new product teams are called on to accomplish objectives that can stretch their notions of what is possible—and because they are called on to learn new ways of thinking and doing in order to accomplish these new objectives—the importance of investing the time and resources for this learning to occur cannot be overemphasized.

APPENDIX
How We Conducted the Research

We conducted the study in two stages. We initially conducted a pilot test in four firms and interviewed six managers directly involved in developing new products from new technologies. Based on their insights, we developed research questions for further study.

In the second stage, we interviewed forty managers directly involved in new product development processes from ten high-technology industrial organizations with 650 or more employees. They were classified as "*high-technology firms*" because in comparison to others, they faced high product obsolescence rates; employed proportionately more engineers, scientists, and technically qualified people; and invested more in R&D and new product development.[18] They represented manufacturers of radar systems, emissions control equipment, electric and electronic components, medical diagnostic instruments, automobile transmissions systems and components, electrical construction materials, jet engine cables and harnesses, single package cooling units, locomotive brake systems, and high-technology specialty metals.

We conducted forty on-site in-depth interviews with representatives from R&D, manufacturing ,and marketing involved in the same new product project in each of the ten firms. We also interviewed individuals that the initial interviewees identified as important contributors to their new product projects (including team leaders and departmental heads). We tape-recorded, transcribed, and content analyzed each interview lasting between 90 and 120 minutes. The content analysis was essentially iterative; we identified themes that ran across interviews and firms, and we continually re-visited the transcripts to anchor our data

based notions in actual managerial quotes. We stopped interviewing managers when we reached data saturation; i.e., we found that new managers were reinforcing the themes we had already identified without contributing much to the breadth of findings.

In our sample of managers, ninety percent had spent ten years or more in the industry, seventy percent had spent ten years or more in their firms. Their average experience in the industry was twenty years. Eight of the ten sampled firms used teams to manage new product projects. The findings in this article are drawn largely from these eight firms and the interviews with team leaders and team members involved in NPD. However, our understanding of major issues in the NPD process was developed from all the 40 interviews we conducted across the ten sampled firms.

Notes

1. See M.A. Frohman, "Do teams . . . but do them right," *Industry Week*, April 3, 1995, pp. 21-24; S. L. Brown and K. M. Eisenhardt, "Product Development: Past Research, Present Findings, and Future Directions," *The Academy of Management Journal*, 20/2 (1995): 343-378; K. B. Clark and T. Fujimoto, *Product Development Performance* (Boston, MA: Harvard Business School Press, 1991); J. W. Henke, A. R. Krachenberg, and T. F. Lyons, "Cross-Functional Teams: Good Concept, Poor Implementation!" *Journal of Product Innovation Management*, 10 (1993): 216-229; H. J. Thamhain, "Managing Technologically Innovative Team Efforts toward New Product Success," *Journal of Product Innovation Management*, 7 (1990): 5-18.

2. See G. Barczak and D. Wilemon, "Communication Patterns of New Product Development Team Leaders," *IEEE Transactions on Engineering Management*, 38/2 (1991): 101-109; G. Barczak and D. Wilemon, "Leadership Differences in New Product Development Teams," *Journal of Product Innovation Management*, 6 (1989): 259-267; Henke et al., op. cit.; E.F. McDonough, "Faster new Product Development: Investigating the Effects of Technology and Characteristics of the Project Leader and the Team," *Journal of Product Innovation Management*, 10 (1993): 241-250; E.F. McDonough and G. Barczak, "Speeding up New Product Development: The Effects of Leadership Style and Source of Technology," *Journal of Product Innovation Management*, 8 (1991): 203-211;

3. See Deborah G. Ancona and David F. Caldwell, "Bridging the Boundary: External Activity and Performance in Organizational Teams," *Administrative Science Quarterly*, 37 (1992): 634-665; Deborah G. Ancona and David F. Caldwell, "Improving the Performance of New Product Teams," *Research-Technology Management*, 33 (1990): 25-29; Deborah G. Ancona, "Outward Bound: Strategies for Team Survival in an Organization," *Academy of Management Journal*, 33 (1990): 334-366; R.J. Hershock and D.L. Braun, "Cross-Functional Teams Drive Change," *Executive Excellence*, 10/7 (1993): 16-17.

4. See R.G. Cooper and E.J. Kleinschmidt, "Determinants of Timeliness in Product Development," *Journal of Product Innovation Management*, 11 (1994): 381-396.

5. Ancona and Caldwell (1992), op. cit.

6. See G. Barczak and D. Wilemon, "Successful New Product Team Leaders," *Industrial Marketing Management*, 21 (1992): 61-68; Henke and Krachenberg, op. cit.; Ancona and Caldwell (1992), op. cit.

7. Brown and Eisenhardt, op. cit.

8. D. Dougherty, "Understanding New Markets for New Products," *Strategic Management Journal*, 11 (1990): 59-78. Also, see Deborah G. Ancona and David F. Caldwell, "Demography and Design: Predictors of New Product Team Performance," *Organization Science*, 3 (1992): 321-341.

9. Ancona and Caldwell (1992), "Bridging the Boundary," op. cit.

10. See Clark and Fujimoto, op. cit.

11. For the link between subjective interpretations and behaviors, see H. Blumer, *Symbolic Interactionism: Perspective and Method* (Englewood Cliffs, NJ: Prentice Hall, 1969).

12. For further differentiation between deliberate and emergent strategies, see H. Mintzberg and J.A. Waters, "Of Strategies, Deliberate and Emergent," *Strategic Management Journal*, 6 (1985): 257-272.

13. For additional evidence on team leaders' boundary spanning behaviors, see Ancona and Caldwell (1992), "Bridging the Boundary," op. cit.; Ancona (1990) op. cit.

14. See Chris Argyris, *Overcoming Organizational Defenses* (Boston, MA: Allyn & Bacon, 1990). For additional discussion of double loop learning, see Gareth Morgan, *Images of Organization* (Newbury Park, CA: Sage, 1986).

15. For additional thinking about the knowing-doing gap, see Hemant C. Sashittal and Avan Jassawalla, "Why Managers Do What They Do," *Management Decisions*, 36 (1998): 533-542; Hemant C. Sashittal and David Wilemon, "A Typology of Marketing Strategy Behaviors: Understanding Why Marketing Strategies Turn Out the Way They Do," *Journal of Marketing Management*, 6 (1996): 17-33. For additional evidence on the "smart talk followed by ineffectual behaviors", see Jeffrey Pfeffer and Robert I. Sutton. "The Smart-Talk Trap," *Harvard Business Review*, 77 (1999): 134-142.

16. Pfeffer and Sutton, op. cit.

17. For recent thinking about the failure to build human capital and the link between short-term thinking and the failure to invest in training, see Jeffrey Pfeffer and John F. Veiga, "Putting People First for Organizational Success," *The Academy of Management Executive*, 13 (1999): 37-48.

18. See M.A. Von Glinow and S.A. Mohrman, *Managing Complexity in High Technology Organizations* (New York, NY: Oxford University Press, 1990).