

IMPROVING THE PERFORMANCE OF NEW PRODUCT TEAMS

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An increasingly competitive global economy, coupled with rapid technological change, has made improvements in new product development a necessity. Strategies of being "first-to-market" or a "quick second" are increasingly seen as the most effective approaches for competing with both foreign and domestic rivals (Porter, 1987). Streamlining the innovation and product development processes can allow a company to "grab a share of the new product market before it becomes congested and cut-throat" (Sasser & Wasserman, 1984; p.4).

The drive to shorten the time necessary to develop new products spans a variety of industries ranging from computers to packaged goods and from automobiles to pharmaceuticals. The proposed techniques for shortening the development process are equally diverse ranging all the way from increased use of new technologies such as CAD/CAM, to changing the structure of the organization, to reorganizing the teams that are responsible for actual development and testing of the new product (Clark, 1988; Kanter, 1983; Sasser and Wasserman, 1984).

What many of these techniques for speeding up the product development process have in common is their attempt to improve the coordination among the different functions in the organization. A good deal of research (see Dougherty, 1987) suggests that much of the delay in the product development process comes from the difficulty in coordinating the efforts of the various groups that must contribute to the development of a new product. Examples abound of the difficulties of ensuring that product designs can be easily manufactured or of failing to include important information from marketing or sales and service early in the design process.

Perhaps the most common approach for speeding up the product development process is the use of a team of individuals to design the new product rather

than assigning the design and development work to a single individual. As products, particularly technical products, become more complex, it is no longer possible for a single engineer or scientist to complete a project alone. In addition, the use of a cross-functional team has the potential to improve inter-unit coordination, to allow for project work to be done in parallel, not just sequentially, and to reduce delays due to the failure to include the necessary information from throughout the organization (Kazanjian and Drazin, 1987).

If new product teams are able to fulfill their promise of shortening the product development cycle, they must develop the ability to obtain information and resources from diverse sources both inside and outside the organization. Without detailed technical, market, political, and financial information from other parts of the organization it is unlikely that the new product will both meet customer needs and the expectations of others inside of the organization. In addition to simply collecting information from diverse sources, to be successful, teams must also interact with others in the organization to negotiate delivery deadlines, coordinate or synchronize work flow, obtain support from upper levels of management, and smoothly transfer the "ownership" of the new product to other groups in the organization such as manufacturing or marketing. What this suggests is that developing an understanding of how teams deal with other groups can have important implications for helping improve the performance of these teams.

Boundary management is the process by which teams manage their interactions with other parts of the organization. This may refer to lateral communications with other functional groups such as marketing, manufacturing, and other parts of engineering or research and development. It may also refer to communications with others further up the division or corporate hierarchy.

Boundary management not only refers to communications or interactions that the team initiates but also how it responds to input from others. It describes the entire set of interactions a team must undertake in dealing with others upon whom it is dependent for information or resources or with whom it must coordinate to complete its assignment. The pattern a team uses to manage its boundaries can affect the performance of the team.

This article reports some general findings from a study of the boundary management activities of forty-five new product teams in five high-technology companies. After describing the study, we will lay out the patterns of activities teams use to coordinate with other parts of the organization and indicate how these patterns can influence both the internal functioning of the team and its overall performance. We will end with some recommendations for managers who wish to improve the product development process.

#### The Study

The study from which our descriptions of boundary management in new product teams are drawn from was conducted in two phases. The first phase consisted of thirty-eight interviews with new product team managers at seven companies in the computer, integrated circuit and analytical instrumentation industries. In addition to the interviews, all members of two teams kept logs of all of their external activities over a two-week period. In this initial phase, our goals were to understand the complete task the team faces and catalogue the complete set of activities that group members carry out with other parts of the organization.

In the second phase of the study, questionnaires were distributed to members of forty-five new product development teams in five companies. Four hundred and nine people responded. We also asked senior division managers to evaluate the performance of each team. The goal of the second phase of the

research was two-fold. First, we wanted to identify clusters of boundary activity, and second, we wanted to see how activity differed over the development cycle, and for high and low performing teams.

#### Managing Across the Team's Boundary

Before we describe how team members interact with others, it is useful to know how the members of the forty-five teams we surveyed spend their time. On average, team members spend about 48 percent of their time working alone, 38 percent of their time working with other team members, and only 14 percent of their time working with outsiders. Although the average amount of time individuals spend working with outsiders is low, this is somewhat misleading. Viewing the distributions we find that certain team members spend a great deal of their time (in some cases, as much as 90 percent) working issues across the team boundary, while others are totally isolated from outsiders.

The first major finding of our study is that new product team members engage in four distinct sets of activities with other groups. The four patterns of activity are: ambassador, task coordinator, scout, and guard activity. Examples of each of these patterns are shown in Table 1.

Ambassador activities are those aimed at representing the team to others and protecting the team from interference. The team leader typically takes on these responsibilities, although they are often shared by several experienced team members. Ambassador activities are most often directed toward influencing individuals at upper levels in the organization and are directed toward one of four aims. The first aim is buffering or protecting the team. In our sample, people reported that they spend time absorbing pressure from high levels and protecting the team from "political" pressures. As one interviewee pointed out, he tried to follow the lead of Tom West described in the book Soul of a New Machine and "not pass on the garbage and the politics" to his team.

The second aim of the ambassador is building support for the team. This frequently means "talking up the team" in order to build the enthusiasm of outsiders and attempting to obtain resources the team feels it needs. Related to this is the third aim of ambassador activity which is reporting the team's progress to those higher in the organization. The final aim is developing an understanding of the company strategy and of the potential threats or opposition the team might face. The ambassador attempts to find answers to questions such as: What is the current product strategy? How can the product we are developing fit that strategy? How can we win over those who oppose this project?

Task coordinator is the name given to the second set of activities we identified. In contrast to those taking on the ambassador activities, people taking on this set communicate laterally rather than up the organization. In our sample, the primary communication links were with manufacturing and other parts of R & D, and to a lesser extent, marketing. The activities of the task coordinator are aimed at coordinating the team's efforts with others. Examples of the kinds of things related to this goal included discussing design problems with others, obtaining feedback about the team's progress, and getting information about the progress other functional groups are making in accomplishing goals. Coordination planning is often accompanied by negotiating. This might involve attempting to get another group to speed up the development of a component or to share data with the team.

This use of this set of activities may change over the life of a project. In some teams, members describe a process of building relationships with other groups early in the product development process, well before coordination or negotiation are necessary. By doing this, team members are able to establish personal links with other groups before conflicting demands and deadlines put

pressure on relationships. People who have high levels of ambassador or task coordinator activities spend more time working with outsiders and less time working alone than do other individuals. These individuals take on a higher percentage of the team's interactions with outsiders than others.

The third set of activities is labeled scout. People carrying out these activities act like a scout on an expedition; that is, they go out from the team to bring back information about what is going on elsewhere in the organization. Scout activities differ from task coordinator activities in that they are much less focused. Rather than having a specific schedule to work out or seeking out specific feedback on a particular piece of work, this set of activities involves more general scanning. Scouting provides general information about markets, technology, and competition. Individuals taking on these activities communicate more frequently with the marketing and sales functions than do individuals carrying out other activities. Scout duties are taken on more frequently by those who have experience in marketing and sales functions, and are seldom taken on by people who have spent their careers in manufacturing. Scout activities appear to be most important in the early phases of product development when the specifications of the new product are still being defined.

The final set of activities are guard activities. This set of activities differ from the others we have described in that they are designed to keep information and resources inside the group and prevent others from drawing things out of the group. Not surprisingly, people taking on the guard role do not have significant amounts of communication with other functions or levels and many of the communications they do have are designed to block or head off the requests of others. A key guard activity is keeping information secret. High levels of guard activity are most often found in teams working on



high-priority projects or in organizations where product teams are highly competitive. An extreme form of guard activity is for a team to isolate itself and attempt to form its own "skunkworks."

In each team we studied, we observed different amounts of each of these classes of boundary activities and different patterns of how these activities were distributed among team members. Some teams have broad communication networks with other parts of the organization while others are virtually isolated. Within teams, there are different ways in which activities are split among team members. In some teams, the activities are widely distributed across individuals. In other teams, the activities are confined to a few individuals. Of particular interest is that people were seldom formally assigned to take on these activities.

#### Changing Boundary Activities Over the Product Development Cycle

The second major finding of our study is that boundary management activities must differ across the product development cycle if the new product team is to be successful. Based on our early interviews with team leaders, we divided the development process into three phases: creation, development and diffusion. Each of the phases poses a different set of demands which the team must meet and as the demands of the task change, so must the pattern of interactions the team has with other groups.

The first phase, creation, is the early period of the product development cycle when the product idea is being formulated and the team organized. It is a time when the dominant activity is that of exploration. The team must consider many technical possibilities, integrate marketing data into technical considerations, and develop support for the product within the organization. During this time, we observed high levels of ambassador, task coordinator, and scout activities. During this phase, teams must collect large amounts of

information: technical information about what is feasible; market information about what products are selling well; and political information about who in the organization supports the project and what resources will be available. In addition, many successful teams had members begin building relations with individuals in other functional areas to facilitate interactions later in the process.

The second phase of the team's task is that of development. For the team to enter this phase, the project must have received some organization support and commitment. Product specifications have been agreed upon and the major task of the team is to develop a prototype of the new product. The dominant activity during this time the exploitation of the information and resources the team has previously acquired. During this time period the team struggles to find the most efficient way to coordinate members and get the prototype finished. During this phase, the high levels of ambassador and scout activities seen during the creation phase are reduced. Successful teams reduce the incorporation of new ideas from outsiders so that the team can set schedules and get technical problem solving underway. Task coordination remains a dominant activity for these teams.

The few teams in our sample that failed and were disbanded before completing the project upon which they were working, failed because they were unable to change the work patterns that developed in phase 1. These teams were unable to commit to a single plan of action but rather kept changing the product idea, schedules, and team composition in response to continuing input from outsiders.

A change of boundary activities takes place again during the third phase, diffusion. This phase can be referred to as a technology transfer point in that the prototype, technical expertise, and enthusiasm and excitement for the

product must be transferred from the team to other groups in the organization, particularly sales, marketing, and manufacturing. During this phase, the important task of the team becomes that of exportation of the work that has already been completed. In our sample of teams, the diffusion phase was characterized by the highest levels of external interaction. Here teams need to convince manufacturing that their product should take priority and get marketing to have the documentation ready on time. Unfortunately, many team members are "burnt out" or have moved on to other projects and are not prepared for the surge of activity needed at this time.

#### Boundary Activities and Team Performance

The third major finding of our study is that high performing product development teams generally carry out more external activity than low performing teams even when controlling for the phase of the project. More specifically, high levels of scout activity are important only early in the process while ambassador and task coordinator activity remain linked to performance throughout the product development cycle. High performers interacted more frequently with manufacturing, marketing, R & D, and top division management than low performers during all phases of activity. Members of high-performing teams did not simply react to communications from others; they were more likely to be the initiators of communication with outsiders than those individuals on low-performing teams.

In contrast, internal team dynamics were not related to performance in our study. High-performing teams were not distinguished by clearer goals, smoother work-flow among members, or a greater ability to satisfy the individual goals of the team members. In short, there was very little difference in the internal operations of high and low performing teams. In fact, in teams with high levels of interaction with outsiders, conflict between team members was

higher than in teams with less boundary activity. This is not to suggest that teams do not have to consider their internal operations. In fact, to successfully integrate information from outside sources and deal with the complexities in organizing and managing interactions with other groups, attention to the group's internal processes becomes critical. However, it is the external activities that are linked to high performance.

Perhaps as interesting as the findings were the reactions of team members, and leaders, to those findings. When we interviewed members of these top performing teams, they frequently reported that communication with top management was necessary in order to obtain resources, to present their proposals in line with current corporate thinking, and to build a reputation for excellent work that could be spread throughout the firm. Yet, when the pivotal role of ambassadorial activity was reported, members were often surprised and disappointed in the role that "politics" played in successful products. Leaders were not at all surprised by this finding and saw their ambassadorial activity as a critical mechanism to move the product across functional lines and through the organization.

Team members also viewed it as somewhat paradoxical that large amounts of time spent working outside the group can facilitate the group's effort. A number of engineers complained about the management responsibilities they had to assume, bemoaned the fact that they were being called upon to move beyond their technical assignments, and worried that spending time away from the team would negatively affect the product. Our results did not indicate this to be true.

#### Recommendations

Although teams are currently touted as a mechanism to speed up the product development process, this study suggests that putting a team structure in place

is only the first step in a longer process. Team members also need to be educated to consider boundary management as an important part of their task. As authority and responsibility get delegated down through the organization to facilitate flexibility and speed, team members have the task of convincing the rest of the organization that they have the right product, and moving that product through creation, development and diffusion. Finding the best design is no longer enough. Team members first need to be convinced that ambassador, task coordinator, and scout activities are needed to both improve their product and get it to market in time to make a difference.

Yet even if convinced of their value, team members may not have the skills necessary to carry out such activities. Nor should those with critical and unique technical knowledge be encouraged to develop them. For others, however, training is suggested. This might take the form of classroom training where team members would struggle with cases of critical cross-functional problems and role play solutions as well as apprenticeship programs whereby those with appropriate skills could model their boundary activity to an observant trainee. As an interim measure, liaison managers could be assigned to act as links between multiple product teams and various functional areas until the necessary skills are diffused throughout the organization. Furthermore, recruitment decisions in the future would have to reflect the need for individuals who could carry out ambassador, task coordinator, and scout activities.

The recommendations proposed thus far involve the individual members of the new product team. Yet cross-functional teams often face an organization that has rewards, norms, structures, and management, that work to push members into old patterns of activity. The iron curtain that may exist among functions works to encourage the marketer not to trust the engineer. The fact that a

team member is evaluated by a functional manager decreases commitment to the team.

This suggests that change at the individual and group level is not enough. New product teams may need to be moved out of the traditional structure and into new quarters where rewards are based on output and coordination, and the old modes of working are discouraged. In order to diffuse these innovations into the rest of the organization, broad changes in structure and culture are required. We would look to new information technologies which network individuals across traditional boundaries, and new management tools such as quality function deployment, which orchestrates interaction and understanding across functions, to act as catalysts of change. The new organization would have the language, vision, and rewards to support a set of interconnected teams whose task is both quality design and efficient pooling of technical, market, manufacturing and sales expertise.

#### Conclusions

The change process described above is going to be a long and difficult one. Frustrations are already apparent in companies around the world. However, if teams are to be the kernel of the structures of the future, such actions may be necessary. As our study suggests, the importance of boundary management in these teams should not be underestimated. Improving the ability of new product team members to carry out ambassador, scout, and task coordinator activity and to manage their relationships with others has the potential to shorten the product development cycle and help companies improve their competitive positions.

Table 1: Examples of Ambassador, Task Coordinator, Scout, and Guard Activities

Ambassador:

"Near the end I talked to the top management group a lot. I tried to protect the group from that kind of pressure though. It's like Tom West said, 'we won't pass on the garbage and the politics'."

"The first thing I did was to talk to lots of people to find out what they thought the product was and how to get there....I started out with the guy who brought me here, he sent me to someone else, and so it went that I came to talk to a lot of high and middle level people....So I gained knowledge about details of what the product ought to be, who the players were, what they did and what they wanted."

Task coordinator:

"After a few weeks we had a design review with all of R&D. We just wanted to make sure that we weren't going off in crazy directions."

"At this point we have to use the test line, which is a shared resource so there's a lot of competition to use it. I have one guy who checks the schedule every morning so we know of any holes that we can fill."

"We had to explain (to manufacturing) how certain things worked. I had lots and lots of meetings about the status of the project. We wanted some last minute changes on the machine, but manufacturing was not able or not willing to put it in all the machines. There were great arguments....By April we had worked out a compromise agreement."

Scout:

"We have a kind of detector....She spends time with all the groups in manufacturing to detect problems so they can be dealt with quickly."

"I have been to several meetings with the marketing representative--although it's not clear that he knows exactly what the marketplace is ready for. We're thinking about making some customer visits."

Guard:

"So we set up living quarters and moved the team away. That kind of intensity needed to be isolated. People kept coming over and saying, 'How's it going? What are you up to now?' That was at best distracting and at worst like being in a pressure cooker."

## REFERENCES

- Clark, K.B. (1988). Managing technology in technology competition: the case of product development in response to foreign entry. In A.M. Spence and H.A. Hazard (eds.) International Competitiveness: 27-74, Cambridge, MA: Ballinger.
- Dougherty, D. (1987). New products in old organizations: the myth of the better mousetrap in search of the beaten path. Ph.D. Dissertation, Sloan School of Management, MIT.
- Kanter, R.M. (1983). The change masters: innovation for productivity in the American corporation. New York: Simon and Schuster.
- Kasanjian, R.K. & R. Drazin (1986). Implementing Manufacturing Innovations: Critical Choices of Structure and Staffing Roles. Human Resource Management, 25 (3): 385-403.
- Porter, M.E. (1987). From competitive advantage to corporate strategy. Harvard Business Review, 65 (3): 43-59.
- Sasser, W.E. and N.H. Wasserman (1984). From design to market: the new competitive pressure. Harvard Business School working paper.