

# Cross-Functional Dynamics in New Product Development

*Creating a culture of interdependence, mindfulness and transparency is essential. Here's what 10 high-tech companies do.*

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**OVERVIEW:** *Managing human interactions and the transfer of technology and ideas among individuals and functional groups can be the most challenging aspect of new product development. Interaction, information sharing and cross-fertilization of ideas among people from R&D, production, marketing, and other functional groups is essential. However, problems arise when people with dissimilar orientations, experiences and interests are called upon to interact, make decisions, and participate in a co-creative endeavor like new product development. A closer examination of the human interaction processes that characterize new product development shows that effective leadership as well as followership, equitable distribution of power and a concern for building collaboration among participants can make human interactions more productive, facilitating the progress of ideas across the organization.*

High-technology firms depend on successful new product introductions for improving customer satisfaction, competitiveness, and profits (1,2). Better communication and cooperation among R&D, production, marketing, and other functional groups, as well as effective coordination in their activities, improve and accelerate the process. Conversely, interpersonal and interfunctional conflicts, poor communication and low commitment to decision making are widely cited as impediments (2).

Nevertheless, *how* multiple functional groups come together, interact and build consensus to achieve complex new product (NP)-related objectives remains poorly understood (3–6). More is known about “the nature of the market, the type of technology, or even the synergy or fit between the project and the firm” (7; p. 84),

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than about the key human interaction issues of new product development.

This article reports findings from an exploratory study of technology transfer and human interaction issues in mid-to-large-sized, technology-intensive industrial organizations. In a pilot study we initially conducted in four firms, we asked six managers (four from R&D and two from marketing) to describe their experiences and NP-related interactions with others. Based on their responses, we developed research questions and an interview protocol that reflected understudied, managerially relevant concerns about technology transfer.

Next, we interviewed 40 managers from 10 firms. To gain multiple perspectives, we interviewed at least one manager each from R&D, production and marketing from each firm. The interviews lasted 90-to-120 minutes.

Our findings address the concerns of managers from the large segment of high-technology organizations that while technically competent are trying to become customer-focused and are challenged by the human and interpersonal problems of new product development; i.e., firms that, in comparison to others, invest more in R&D, employ more scientists, engineers and technically qualified people, and rely more on new products to overcome high product obsolescence rates (see 8).

## Integrating Organizational Skills

We found that R&D, production, marketing, and other functional groups are brought together to focus on NP decisions and participate in its work flows in a variety of ways. In two firms, R&D functions as the hub of nearly all NP activity. It controls NP decisions and solicits inputs from others when necessary, and manages a linear-sequential work-flow. Largely orchestrated by the R&D group, each functional group performs its part of NP activity in relative isolation, and hands its output—over the wall—to other groups.

In one firm, a partnership team between marketing and R&D jointly manages NP responsibilities. The two

groups are co-located, and the R&D manager reports to the marketing manager on the status of NP activities. Another firm uses a concurrent engineering team, consisting of representatives from R&D, design engineering, and production engineering to manage NP activities. Three firms have instituted cross-functional teams (CFTs) within the last three years, and include at least one representative each from R&D, production and marketing groups. Although the interactions among participants is greater than in the other firms, their position on the learning curve of managing interpersonal and process issues of NP activities is relatively low.

Participants report considerable struggle over issues of teamwork. Three firms have employed CFTs for managing NP activities for over three years and have overcome several group and interpersonal problems concerning teamwork. One of these firms is cross-functional in nature, with most complex decision making and work-flows entrusted to CFTs, including NP activities.

### Human Interactions and Cross-functional Linkages

Our study produced three interrelated findings:

**1.** In general, we find production groups' relative participation and contribution significantly lower than others. The R&D group emerges as the clear *owner* of NP activities; i.e., its relative participation and contribution is higher than any other's. The marketing group performs relatively more tasks, and participates relatively less in NP decision making.

**2.** A functional group's participation appears closely related to its contribution—when participation is low, contribution is low, and when participation is high, contribution is high. Describing the link between participation and task performance, a manager notes:

*When we want our [marketing] people and project engineering people to become involved and start moving forward [i.e., perform NP-related tasks], the most effective thing we can do is have a group meeting and allow everyone to participate and analyze the opportunity as a team. So, they all feel a sense of ownership and contribution.*

**3.** Cross-functional cooperation is noticeably weak in all but two firms. More important, the extent of cooperation appears weakly related, if at all, to the extent of a functional group's participation or contribution to NP activities. In other words, efforts to increase a functional group's participation in NP decision making appear to increase the likelihood that they will perform more NP-related tasks—without a proportional or similar impact on the extent of their cooperation with others.

Several contextual features explain why higher levels of participation and integration of activities do not result in high levels of cooperation. First, clear differences in the functional groups' stature, and inequities in decision-making power, contribute to the problem. Where

interfunctional cooperation is noticeably low, R&D is viewed as being the most responsible for NP and production the least. The growing interest in total quality and customer satisfaction, coupled with the view that marketing represents the customer's voice, has increased the marketing group's participation and contribution in some firms.

These developments have done little to change the stature of production groups. A manager overseeing manufacturing, explaining that important NP decisions are made mostly by design engineering (R&D) and marketing, leaving the production function outside the loop, states:

*... if you look at the design development checklist, the sign off... the approvals to continue with phases [of NP] are basically [the responsibility of the] product team [the marketing function], and engineering. Not manufacturing. So manufacturing, while they can go to the meetings and contribute, the real sign-off and approval of taking the project forward does not include them. And that's a standard, that we are a side player.*

Relatedly, because of R&D's *de facto* ownership of NP activities, it appears less enthusiastic about cooperating with others, and less concerned about censure or retribution from senior management. Others are more often asked to cooperate with R&D than vice-versa. Additionally, there is a prevalent view within R&D groups that NP processes are esoteric, futuristic pursuits that do not concern the production groups. A manager from R&D, explaining differences that existed in the priorities of the production group, notes:

*Their [production's] first priority is just getting [the product] out the door. It [the production function] is not looking ahead to the future to what is coming down the road. It's the here and now.*

Hence, R&D's concern for serving future customer needs appears to clash with production's concern for serving current customers, and the two groups frequently compete for resources (i.e., people, equipment and time). Due to R&D's relatively greater stature in all but two organizations in our sample, it tends to keep production groups out of NP-related decision making. There *are* instances of higher participation of production groups in NP decision making. Instead of signalling improvements in their stature, however, these instances are more indicative of R&D's attempts to ensure that: (1) its designs are practical, significant and reproducible in the factory, and more importantly, (2) R&D is not forced to shoulder the entire blame for delays in new product rollouts or production glitches, as it often is.

We find that marketing and production's participation and contribution increases most often after senior management: (1) pressures R&D groups into sharing some of their control over NP activities, and (2) forms CFTs to manage NP decisions and workflows. In five of the eight firms that employ teamwork, cooperation is elusive because key elements that promote collaboration are conspicuous by their absence.

*Effective versus Ineffective Technology Transfer*

	<b>Ineffective transfer of technology and human interactions in NP process.</b>	<b>Effective transfer of technology and human interactions in NP processes.</b>
<b>Driving Force of Technology Transfer</b>	<p>Belief that cross-functional teams are panaceas for increasing integration.</p> <p>Belief that increasing involvement of functional groups will also increase cooperation between them.</p> <p>R&amp;D dominates NP activities, and production and marketing groups function as secondary players.</p> <p>Functional-hierarchical organizational structure, distinctive functional groups with their own unique (explicit and implicit) missions.</p>	<p>Belief that cross-functional thinking and education is critical for effective transfer of technology.</p> <p>Belief that commitment and joint stake in decision making, coupled with high levels of transparency and mindfulness in actions, is critical for effective NP processes.</p> <p>Senior management explicitly empowers R&amp;D, production and marketing groups to make NP decisions as equals.</p> <p>Employees are <i>routinely</i> cross-functionally trained, and cross-functional teams are <i>routinely</i> employed to manage complex organizational initiatives.</p>
<b>Nature of Leadership and Followership</b>	<p>When cross-functional teams are used, team leaders are appointed by R&amp;D and consult others if and when necessary. Other participants have less of a stake in achieving NP goals.</p> <p>Participants are strongly affiliated with their functional groups, and withhold cooperation unless it furthers their functional group agendas. Disinterested, bystander participants, displaying "over the wall" thinking are common.</p>	<p>CFT leaders are carefully selected by senior management to manage the technical and human interaction issues. They make sure that <i>all</i> participants are equal voting citizens, and share equal stake in outcomes</p> <p>Participants are aware of the reciprocal interdependencies that exist, take equal responsibility for the <i>whole</i> process of new product development and its outcomes, and commit to building trust and collaboration.</p>
<b>Nature and Extent of Collaborative Behaviors</b>	<p>Low levels of collaboration, low incidence of synergistic interactions. Hidden agendas, convoluted communication patterns and defensive routines adversely impact technology transfer.</p>	<p>Adoption of processes that promote awareness of the diverse orientations shaping peoples' actions. High levels of synergy result from open exchange of ideas and information.</p>

First, R&D groups resist attempts to share power equitably with marketing and production groups. Although they are increasingly consulted, and their opinions more frequently solicited, participants from marketing and production groups report a weak link, if at all, between their inputs and the NP decisions that R&D attempts to implement.

Second, despite the rhetoric on cooperation, senior management's resource allocation decisions portray R&D as the primary decision maker for NP processes, relegating marketing and production groups to secondary positions. Participants not only fail to commit equally to NP-related decisions, but also believe that they have an unequal stake in NP outcomes.

Third, the R&D-orchestrated increase in cross-functional communication rarely translates into holistic thinking.

**Managing the Human Side**

The Table on this page presents the key features of firms that effectively manage the human side of new product

development, and compares them with the less-effective firms.

*How* the senior management defines the NP process and its role in the firm, and *whom* they view as its major participants, appear to explain *why* NP processes unfold the way they do. When NP activities are viewed as esoteric, higher-order pursuits worthy of scientists in R&D labs, people at operational levels (marketing and production) are alienated and have little incentive to take joint ownership of NP outcomes. This occurs more often in firms led by engineering/inventor coalitions, struggling to adopt customer and market-driven new product initiatives.

We find that relatively powerful R&D groups can resist formation of cross-functional teams, but will appoint one of their own as leader when a CFT *is* formed. Both actions do more to maintain R&D's power and create resistance from other functional groups, and less to improve or accelerate NP activities. In such instances, NP activities become, more than anything else, a test of

R&D's ability to gain compliance from other functional groups to further its own agenda.

Relatedly, the process by which leaders are chosen for new-product CFTs also affects the nature of cross-functional interaction. In three firms, R&D appointed the leaders, who mostly *consult* participants from other functional groups when necessary. They hold strong affiliations to R&D, and view teams as an effective way of organizing NP activities and gaining compliance from production, marketing and other groups. CFTs with *appointed* leaders represent not a circle of participants willing to accomplish more than the sum of their talents, but a senior management-sanctioned totem pole of authority and implied inequality of stature.

In three firms, by contrast, we found that senior management had carefully *selected* cross-functionally trained people who possess both technical and interpersonal skills to lead CFTs. Selected leaders hold relatively weak functional affiliations and focus as much on interpersonal issues of NP activities as they do on its technical elements. They symbolize more equitable distribution of power in NP decision making, and help to convert marketing and production representatives from second-class voices to active and equal participants. They also elevate human interactions to a point where information sharing leads to a shared vision, hidden agendas are replaced by mutual understanding, and synergistic interactions become routine.

The actions of senior management and CFT leaders from firms reporting higher levels of cross-functional cooperation are worthy of note. First, senior management and team leaders have taken steps to distribute power more equitably, and participants have begun to feel a more equitable stake in NP outcomes. Second, CFT leaders are attempting to foster high levels of transparency and mindfulness within their teams (9).

By transparency, we refer to a condition of awareness that participants reach about each others' concerns, motivations and agendas as a result of explicit information sharing. By mindfulness, we refer to a strong trait observed in the behavior of participants that suggests that actions are taken *after* the diverging concerns, interests and orientations of other participants are taken into account. Both have helped reduce defensive routines, guesswork and convoluted communication patterns that plagued their NP activities.

Third, CFT leaders have emphasized that interaction among people with multiple orientations is essential for the emergence of creative decisions and actions. As a result, the NP outcomes reflect more than a simple sum of the talents each individual brings to the process.

Finally, we find the impact of followers to be as critical to effective technology transfer as that of leaders. Participants are effective followers, we find, to the

extent that they: (a) implicitly acknowledge that all NP participants are reciprocally interdependent; (b) feel a sense of belongingness and cohesion that they attribute to their involvement in NP activities; (c) feel a sense of ownership and personal stake in NP activities and its outcomes; and (d) participate in moving the NP activities purposefully forward. We find that effective followers are likely to attribute a higher level of trust to others, admit mistakes when they occur, and openly share and solicit information. They are also willing to participate in dialogues that reduce hidden agendas that impede NP activities. The most enduring feature of effective followership, we find, is the interest in adopting new ways of thinking and behaving congruently with the demands of the new, emerging technologies and customer needs.

### In Conclusion

Although the managers we interviewed agree that customer-driven new product initiatives are critical for organizational survival, how new-product-related technology transfer and human interactions are managed in high-technology firms remains under-studied. We find managers challenged by the prospects of linking together diverse functional groups that otherwise work separately, increasing production's and marketing's stake to equal that of R&D's, and ensuring that the exchange of information adds value and results in creative new products. While new product activities are still viewed as R&D's responsibility in some organizations, many others have successfully experimented with cross-functional teams and *selected* leaders, and equitable distribution of power among *all* participants. Our study shows that creating a culture of interdependence, mindfulness and transparency is critical for sponsoring high levels of synergistic NP-related human and interpersonal interactions. ☉

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