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Chapter Twelve

Managing New Product Development Teams

Skullcandy: Developing Extreme Headphones[a]

In 2001, Rick Alden was riding up a ski lift and listening to music on an MP3 player when he heard his phone ringing, muffled in the pocket of his ski jacket. He fumbled around with his gloved hands, trying to get to the phone before it stopped ringing, and at that moment he thought "why not have headphones that connect to both a cell phone and an MP3 player?"[b] In January of 2002 he had his first prototype built by a Chinese manufacturer, and by January of 2003 he launched his company, Skullcandy.[c]

Building an Action Sports Brand

Alden had an extensive background in the snowboarding industry, having previously founded National Snowboard Incorporated (one of the first companies to promote snowboarding) and having developed and marketed his own line of snowboard bindings. His father, Paul Alden, had played many roles in the industry, including serving as the president of the North American Snowboard Association, which helped open up ski resorts to snowboarders. His brother, David Alden, had been a professional snowboarder for Burton, and a sales representative for several snowboard lines. Thus when Alden began creating an image and brand for the headphones, it only made sense to create a brand that would have the kind of dynamic edginess that would attract snowboarders and skateboarders. Alden could also use his deep connections in the snowboarding and skateboarding worlds to line up endorsements by pro riders and distribution by skate and snowboard shops. As Alden notes, "I'd walk into snowboarding and skateboarding shops that I'd sold bindings to or that I'd known for 15 years, and say, `Hey, man, I think you ought to sell headphones.'" Soon he was developing headphones that were integrated into Giro ski and snowboard helmets, and MP3-equipped backpacks and watches. The graphic imagery of the brand—which draws from hip-hop culture and features a prominent skull—helped to turned a once placid and commoditized product category into an exciting and important fashion accessory for action sports enthusiasts.

The company grew quickly. By 2005, the company broke $1 million in sales, and in the following year sold almost $10 million worth of headphones and accessories. By 2007, Skullcandy's products were selling in Best Buy, Target, Circuit City, and most college bookstores in addition to the core market of action sport retailers, for total revenues of $35 million, greatly exceeding even the stretch targets the company was shooting for. By the end of 2011, Skullcandy sales had reached $232.5 million—a 44 percent increase from its 2010 sales. In the same year, the company went public in an initial public offering that raised $188.8 million.

The company was careful in its approach to selling to the mass market, carefully distinguishing between products that were sold to the core channel versus to big box retailers.[d] Alden's philosophy was that "Conservative guys buy core products, but core guys will never buy conservative. In other words, we've got to be edgy and keep our original consumer happy, because without him, we'll lose people like me—old guys who want to buy cool young products too."[e]

In 2009, the company began to target the hip-hop music aficionado market by partnering with key music industry veterans such as Calvin "Snoop Dogg" Broadus and Michael "Mix Master Mike" Schwartz of the Beastie Boys. The collaboration with Snoop Dogg resulted in the "Skullcrusher"—a headphone with extreme bass amplification perfect for listening to rap music. The collaboration with Mix Master Mike was intended to produce the "ultimate DJ headphone."

Developing the Ultimate DJ Headphone

To begin designing a set of headphones that would uniquely target disc jockeys/turntablists, Skullcandy assembled a team that included:

- Mix Master Mike (who would lend insight into the key factors that would make the "ideal" DJ headphone, as well as lending his own personal design inspirations)
- Skullcandy's Director of Industrial Design, Pete Kelly (who would translate the desired features into engineering specifications)
- Skullcandy's Vice President of Marketing and Creative, Dan Levine,
- An external industrial design company (which would be able to more quickly transform the team's ideas into photorealistic renderings)
- Skullcandy Product Manager Josh Poulsen (who would manage the project milestones and communicate directly to the factory in China where the product would be manufactured)
- Skullcandy's "creatives" (people with backgrounds in graphic arts or fine arts who would explore the potential color palettes, materials, and form factors to use)

The small size and informal atmosphere at Skullcandy ensured close contact between the team members, and between the team and other Skullcandy personnel. For example, the director of industrial design and the art director shared an office, and all of the graphic designers worked in a common bullpen.[f] The team would schedule face-to-face meetings with Mix Master Mike and the external industrial design company, and Josh Poulsen would travel to China to have similar face-to-face meetings with the manufacturer.

In the first phase, the team met to analyze what functionality would be key to making a compelling product. For the DJ headphones, the team identified the following key factors that would help to significantly improve headphone design:[g]

- Tough, replaceable and/or washable ear pads made of antimicrobial materials (ear pads were prone to getting soiled or torn)
- Headphones that could be worn by "righty" or "lefty" DJs (DJs typically have a preference for leaning on one side while they work, and this side determines the optimal cable location)
- Sound quality that was not too clear, not too bass, and not too muddy (DJs typically were not looking for the clear quality of studio sound)
- Coiled cord or straight cord options (many DJs preferred coiled cords whereas mass market consumers typically preferred straight cords)

Above all, the team had the mandate given by Alden to create "headphones that don't look like headphones."

The product's aesthetic design would be heavily influenced by Mix Master Mike. As noted by Dan Levine, "When you attach yourself to someone iconic, you try to figure out what inspires their form sensibilities. For example, Mike likes transformers, Japanese robots, Lamborghinis, furniture by B&B Italia . . . we use these design elements to build inspiration boards."[h] The team initially met for three straight days in Mix Master Mike's studio. Then, after the team had created 6 to 12 initial sketches, they worked to narrow the list down to three of the best, and then fine-tuned those until they had one best sketch. The external industrial design firm created photorealistic renderings that precisely portrayed what the end product was to look like. At this point marketing people could be brought into the team to begin developing a marketing strategy around the product. The marketing team used "sneak peaks" of renderings and nonfunctioning prototypes to gain initial sales contracts.

The next phase was an iterative process of commercialization and design refinement. According to Levine, "That's when it feels like you're swimming in glue because it never happens fast enough. The design phase is exciting. Once you have that design you get impatient for it to come to market, but you can only work as fast as manufacturing capabilities dictate, and building technical products takes time."[i] First, CAD files would be brought to China where a manufacturer would use a stereolithography apparatus (SLA) to create prototypes of each part of the headphone in a wax resin. As described by Alden, "you can't see the lasers – the part just rises up out of this primordial ooze. Then you can sand it down, paint it, screw it to your other parts. This part will end up costing $300 compared to the 30 cents the part will eventually cost when it's mass-produced using injection molding, but it's worth creating these SLA parts to make sure they're accurate."[j] SLA versions of the products were also often taken to the trade shows to solicit customer feedback and generate orders. Every week or two, the Product Manager would need to talk to the Chinese factory about building or modifying SLA parts, until eventually a 100 percent complete SLA product was achieved. At that point, it was time to begin "tooling" (the process of building molds that would be used to mass produce the product). This phase took four to six weeks to complete and was expensive. Several samples would

be produced while final modifications were made, and then once a perfect sample was obtained, the tools would be hardened and mass production would begin. As Alden described, "after you've got everything in place—after you've made the first one, then it's just like making doughnuts."[k]

All of the steps of the project were scheduled using a Gantt chart (a type of chart commonly used to depict project elements and their deadlines). Project deadlines were determined by working backward from a target market release date and the time required to manufacture the product in China.[l] In general, the firm sought to release new products in September (before the big Christmas sales season), which required having the tooling complete in July.

Team Roles and Management

Josh Poulsen, the Product Manager, was responsible for coordinating all of the team members and making sure all of the deadlines were met. Every major design decision was passed up to Dan Levine for approval, and when the design was ready for "tooling" (being handed off to manufacturing), it had to be approved by Rick Alden, as this phase entailed large irreversible investments. Most of the people at Skullcandy were involved with many projects simultaneously. As Levine emphasized, "This is a lean organization. At Nike you can work on a single or a few projects; when you have a brand that's small and growing fast, you work on a tremendous number of projects, and you also hire outside talent for some tasks."[m] According to Rick Alden, "We used to try to manage everything in-house, but we just don't have enough bodies. We've discovered that the fastest way to expand our development capacity is to use outside developers for portions of the work. We'll develop the initial idea, and then bring it to one of our trusted industrial design firms to do the renderings, for example."[n]

Team members did not receive financial rewards from individual projects. Instead, their performance was rewarded through recognition at monthly "Skullcouncil" meetings, and through quarterly "one touch" reviews. For the quarterly reviews, each employee would prepare a one-page "brag sheet" about what they had accomplished in the previous quarter, what they intended to accomplish in the next quarter, and what their strengths and weaknesses were. These reviews would be used to provide feedback to the employee, and to determine the annual bonus; 75 percent of the annual bonus was based on the individual's performance, and 25 percent was based on overall company performance. According to Rick Alden, "In the early days, we did things very differently than we do now. Everyone received bonuses based on overall performance—there were so few of us that we all had a direct attachment to the bottom line. Now with a bigger staff, we have to rely more on individual metrics, and we have to provide quarterly feedback so that the amount of the annual bonus doesn't come as a surprise."[o] The company also relied on some less conventional incentives. Each year the board of directors would set an overarching stretch target for revenues, and if the company surpassed it, Alden took the whole company on a trip. In 2006, he took everyone heliboarding (an extreme sport where snowboarders are brought to the top of a snow-covered peak by helicopter).

When the company achieved nearly triple its 2007 sales goal (earning $35 million instead of the targeted $13 million), Alden took the entire staff and their families to Costa Rica to go surfing.[p]

According to Alden, the biggest challenge associated with new product development has been managing three different development cycles simultaneously. "You have your new stuff that you're coming out with that you haven't shown anyone yet—that's the really exciting stuff that everyone focuses on. Then you have the products you have just shown at the last show but that aren't done yet—maybe the manufacturing process isn't approved or the packaging isn't finished. You're taking orders but you haven't yet finished the development. Finally, you have all of the products you've been selling already but that require little improvements (e.g., altering how something is soldered, improving a cord, changing the packaging). We have so little bandwidth in product development that the big challenge has been managing all of these cycles. We just showed a product in January of this year [2009] that we still haven't delivered and it's now May. We were just too excited to show it. But that's risky. If you don't deliver on time to a retailer, they get really angry and they won't keep your product on the shelf."[q]

Discussion Questions

1. What are some of the ways that Skullcandy's size and growth rate influence its development process?
2. How would you characterize Skullcandy's new product development team structure?
3. What are the advantages and disadvantages of having Skullcandy employees serve on several project teams simultaneously?
4. What are the challenges associated with measuring and rewarding the performance of Skullcandy development team members?
5. If you were advising the top management of Skullcandy about new product development processes, what recommendations would you make?

[a] Based on an NYU teaching case, "Skullcandy," by Melissa A. Schilling.
[b] A. Osmond, "Rick Alden: Founder & CEO Skullcandy," *Launch*, March/April 2007.
[c] Interview with Rick Alden, May 5, 2009.
[d] Anonymous, "Caught on Tape: Rick Alden, CEO of Skullcandy," *Transworld Business,* October 24, 2008.
[e] R. Alden, "How I Did It," *Inc.'s Small Business Success Newsletter*, September 2008.
[f] Interview with Dan Levine, May 2, 2009.
[g] Ibid.
[h] Ibid.
[i] Ibid.
[j] Ibid.
[k] Ibid.
[l] Ibid.
[m] Ibid.
[n] Ibid.
[o] Ibid.
[p] Ibid.
[q] Ibid.

OVERVIEW

New product development often requires activities that are the responsibility of different departments within the organization. To facilitate coordination and cooperation across division boundaries, many organizations create cross-functional new product development teams to lead and manage the development process for the project. There is considerable variation, however, in how teams are formed and managed. In this chapter, we will look at several factors that affect the new product development team's performance, including its size, composition, structure, administration, and leadership.

CONSTRUCTING NEW PRODUCT DEVELOPMENT TEAMS

In constructing new product development teams, the organization must consider how the team's size and composition will affect its mix of skills, its access to resources, and its effectiveness in providing communication and coordination across the divisions.

Team Size

New product development teams may range from a few members to hundreds of members. For example, the development team that created the IBM personal computer had 19 members, but the average team size for development projects at IBM is close to 200.[1] The Yahoo! Internet portal was developed by 13 software developers, split into several small teams of one to three members.[2] By combining the efforts and expertise of multiple individuals, groups can often outperform individuals on many problem-solving tasks, implying that the size of the development team might be related to its potential for success.[3]

social loafing
When an individual in a team does not exert the expected amount of effort and relies instead on the work of other team members.

Bigger, however, is not always better. Large teams can create more administrative costs and communication problems, leading to costly delays. Additionally, the larger the team, the harder it can be to foster a shared sense of identity among team members. Further, as the size of the team increases, the potential for **social loafing** also increases. Social loafing occurs when, as the size of the team increases, individuals perceive that they will not receive full credit (or blame) for their contribution to the group effort and so their effort and commitment decrease.[4] The average team size used by U.S. organizations is 11 members,[5] but there is considerable variance in the size of teams used by organizations, and each team may vary in size over the course of a new product development project.

Team Composition

A lack of communication among the marketing, R&D, and manufacturing functions of a company can be extremely detrimental to new product development. A lack of cross-functional communication can lead to a poor fit between product attributes and customer requirements. R&D cannot design products that fit customer requirements unless it receives *and* attends to input from marketing regarding those requirements. The manufacturing/R&D interface is also of critical importance because of manufacturing's role in determining two key attributes of a product—*quality* and *price.* By working closely with R&D, manufacturing can ensure that R&D designs products that are relatively easy to manufacture. Designing for ease of manufacturing can lower both unit

costs and product defects, which translates into a lower final price and higher quality. Similarly, a lack of cross-functional communication between functions can lead to longer cycle times as a product iterates back and forth between different stages in the process.

cross-functional teams
Teams whose members are drawn from multiple functional areas in the firm such as R&D, marketing, manufacturing, distribution, and so on.

Firms can rectify this problem by building cross-functional product development teams.[6] **Cross-functional teams** include members drawn from more than one functional area, such as engineering, manufacturing, or marketing.[7] For instance, in Chrysler's "vehicle deployment platform teams," team members are drawn from design, engineering, purchasing, manufacturing, product planning, finance, and marketing. Firms around the world rely heavily on cross-functional teams for their new product development efforts. In 2000, 77 percent of U.S. firms, 67 percent of European firms, and 54 percent of Japanese firms reported using cross-functional teams.[8]

Teams that are composed of people from diverse backgrounds have several advantages over teams that are drawn from only one or a few functional areas.[9] A greater variety of specialists provides a broader knowledge base and increases the cross-fertilization of ideas.[10] Having specialists from different areas also allows the project to draw on a wider mix of information sources in the environment through scanning activities (for richer detail on this, see the accompanying Research Brief on boundary-spanning activities).[11] Functional experts often actively read journals and are involved in associations that directly affect their trade. These activities can lead to the creation and improvement of innovative ideas, as well as provide solutions to product development problems.[12] By combining members of different functional areas into one project team, a wide variety of information sources can be ensured.

A number of arguments also support other types of diversity. Individuals who enter the organization at different times (organizational tenure diversity) are likely to have different contacts outside of the team, enabling the team to draw from a wider mix of resources. Teams that incorporate cultural diversity should show better problem solving by incorporating multiple viewpoints, and teams composed of members who are diverse in terms of gender or age will also ensure a variety of viewpoints are considered and external resources are tapped.[13] Studies have demonstrated that demographic diversity in teams can increase innovative outcomes and overall performance.[14]

homophily
The tendency for individuals to like other people whom they perceive as being similar to themselves.

Diversity of team members, however, can also raise coordination and communication costs. Individuals tend to interact more frequently and more intensely with other individuals whom they perceive as being similar to them on one or more dimensions.[15] This phenomenon is known as **homophily.** Research on homophily suggests that individuals prefer to communicate with others they perceive as similar to them because it is easier and more comfortable to communicate with those who have similar dialects, mental models, and belief systems.[16] The perception of similarity can also be self-reinforcing—as individuals interact with frequency and intensity, they can develop a common dialect, greater trust, and greater familiarity with the knowledge each possesses. The common dialect, trust, and familiarity, in turn, make the individuals both more willing and more able to exchange information effectively in future interactions. When individuals perceive others as being very different from them, they may be less willing to interact frequently or intensely, and it may be more difficult for them to develop a shared understanding. Heterogeneous teams often have greater difficulty integrating objectives and views, leading to conflict and lower group cohesion.[17] Research has also indicated, however, that the communication and coordination differences between heterogeneous or homogeneous teams diminish if the groups

Research Brief Boundary-Spanning Activities in New Product Development Teams

To be successful, new product development teams must be able to manage relationships with groups that are beyond the team's boundaries. Teams need to be able to collect information and resources both within and outside of their organizations, and they also need to represent the team to other groups in the organization to ensure that the team continues to receive support and that team members are not overloaded with non-team-related activities.[a] The most successful new product development teams have gatekeepers who provide important links to the environment.[b]

Deborah Ancona and David Caldwell conducted a study to explore the full range of boundary-spanning activities in which teams engage and to identify which of these activities enhanced team performance. They interviewed 38 experienced product development team managers and collected data from 45 product development teams in five high-technology companies in the computer, analytic instruments, and photographic equipment industries. Ancona and Caldwell found that teams engaged in three primary types of boundary-spanning activity:

Ambassador activities—These activities were directed at representing the team to others and protecting the team from interference. For example, an ambassador might convince other individuals in the organization that the team's activities are important.

Task coordination activities—These activities emphasized coordinating and negotiating the team's activities with other groups. For instance, task coordination activities might include negotiating delivery deadlines with other divisions of the firm or obtaining feedback about the team's performance.

Scouting activities—These activities were directed at scanning for ideas and information that might be useful to the team, enhancing its knowledge base. For example, scouting activities could include collecting data about what competitors were doing on similar projects or finding technical information that might be useful in the development project.

Ancona and Caldwell found that boundary-spanning activities affected the performance of the new product development team, and their impact depended on the timing of the activities. In particular, they found that scouting and ambassador activities were more beneficial if conducted early in the development project cycle, while task coordination activities were beneficial throughout the life of the team.[c]

[a] D. B. Ancona and D. F. Caldwell, "Making Teamwork Work: Boundary Management in Product Development Teams," in Managing Strategic Innovation and Change, eds. M. L. Tushman and P. Anderson (New York: Oxford University Press, 1997), pp. 433–42.

[b] M. L. Tushman, "Special Boundary Roles in the Innovation Process," *Administrative Science Quarterly* 22 (1977), pp. 587–605; and E. B. Roberts and A. R. Fusfeld, "Staffing the Innovative Technology-Base Organization," *Sloan Management Review* 22, no. 3 (1981), pp. 19–34.

[c] D. B. Ancona and D. F. Caldwell, "Bridging the Boundary: External Activity and Performance in Organizational Teams," *Administrative Science Quarterly* 37, (1992), pp. 634–65.

maintain long-term contact. Presumably, through extensive interaction, heterogeneous teams learn to manage their group processes better.[18]

In sum, heterogeneous teams should possess more information, on average, than homogeneous groups. The heterogeneity of a team can also increase the creativity and variance in decision making, leading to more innovative outcomes and higher overall performance.[19] However, to realize this potential performance advantage, heterogeneous teams may require long-term contact and incentives to foster communication and cooperation.

The ability of team members to communicate and cooperate effectively is also a function of the personalities of the individuals on the team. A study by Susan Kichuk and Willi Wiesner explored whether five personality factors (conscientiousness, extroversion, neuroticism, agreeableness, and openness to experience) influenced the likelihood of success in new product development teams. Kichuk and Wiesner found that the personality characteristics that enhanced the success of a new product development team were high extroversion, high agreeableness, and low neuroticism.[20]

THE STRUCTURE OF NEW PRODUCT DEVELOPMENT TEAMS

Teams can be structured in a number of ways. One well-known typology classifies teams into four types: functional, lightweight, heavyweight, and autonomous.[21] Figure 12.1 depicts each of these types graphically.

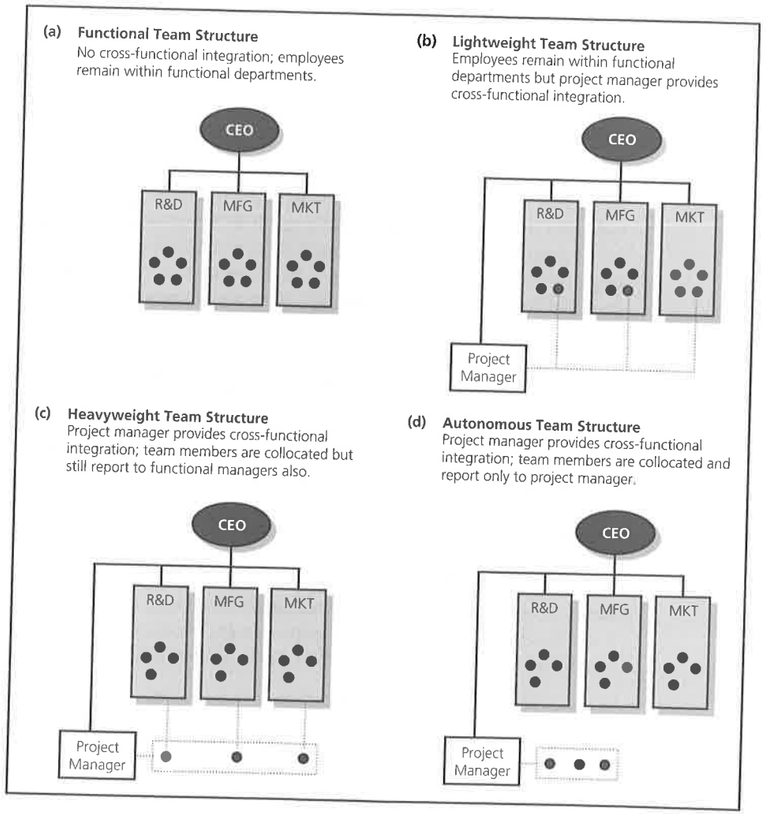


FIGURE 12.1 Types of Development Teams

Functional Teams

In functional teams, members remain in their functional departments (e.g., R&D, marketing, manufacturing, etc.), and report to their regular functional manager (see Figure 12.1, panel a); however, they may meet periodically to discuss the project. Such teams are usually temporary, and individuals may spend less than 10 percent of their time working on team-related activities. Functional teams also typically do not have a project manager or dedicated liaison personnel. While this team structure is straightforward to implement because it requires little (if any) deviation from the firm's normal operations, this structure provides little opportunity for cross-functional coordination.[22] Further, since individuals are still evaluated and rewarded almost exclusively based on their functional performance, the team members may have little commitment to the development project. Functional teams are more likely to be appropriate for derivative projects that primarily affect only a single function of the firm.

Lightweight Teams

In lightweight teams, members still reside in their functional departments, and functional supervisors retain authority over evaluation and rewards (see Figure 12.1, panel b). Like functional teams, lightweight teams are typically temporary, and members spend the majority of their time on their normal functional responsibilities (up to 25 percent of their time might be spent on team-related activities). However, lightweight teams have a project manager and dedicated liaison personnel who facilitate communication and coordination among functions. Managers of lightweight teams are normally junior or middle management employees, who are not able to exert significant influence or authority over team members. As a result of these factors, lightweight teams offer a small improvement in team coordination and likelihood of success over functional teams. Such a team structure might be appropriate for derivative projects where high levels of coordination and communication are not required.

Heavyweight Teams

In heavyweight teams, members are removed from their functional departments so that they may be *collocated* with the project manager (see Figure 12.1, panel c). Project managers of heavyweight teams are typically senior managers who outrank functional managers, and have significant authority to command resources, and evaluate and reward team members.[23] The core group of team members in the heavyweight team is often dedicated full-time to the project. This combination of factors helps ensure that the team has strong cross-functional coordination and communication, and that team members are significantly committed to the development project. However, heavyweight teams are still often temporary; thus, the long-term career development of individual members continues to rest with their functional managers rather than the project manager. This type of team structure offers a significant improvement in communication and coordination over functional teams, and it is typically considered appropriate for platform projects.

Autonomous Teams

In autonomous teams, members are removed from their functional departments and dedicated full-time (and often permanently) to the development team (see Figure 12.1, panel d). Team members are collocated with the project manager, who is a very senior person in the organization. The project manager of an autonomous team is given full control over

resources contributed from different functional departments, and the project manager has exclusive authority over the evaluation and reward of team members. Autonomous teams often do not conform to the operating procedures of the rest of the organization; instead they are permitted to create their own policies, procedures, and reward systems.[24] Autonomous teams are also held fully accountable for the success of the project; in many ways, autonomous teams act like independent divisions of the firm. Autonomous teams typically excel at rapid and efficient new product development, particularly when such development requires breaking away from the organization's existing technologies and routines. Thus, autonomous teams are typically considered to be appropriate for breakthrough projects and some major platform projects. They can be the birthplace of new business units.[25] However, the independence of the autonomous teams can cause them to underutilize the resources of the parent organization. Furthermore, autonomous teams are often hard to fold back into the organization if the project is completed or terminated. Many autonomous teams thus go on to become separate divisions of the firm, or may even be spun off of the firm as a subsidiary.

Figure 12.2 summarizes key dimensions across which the four teams vary, including a number of points that have not yet been dealt with in the text. The potential

FIGURE 12.2
Summary of Characteristics of Team Types

Characteristics	Functional Team	Lightweight Team	Heavyweight Team	Autonomous Team
Project manager	None	Junior or middle manager	Senior manager	Senior manager
Power of project manager	NA	Low	High	Very high
Time spent on team activities	Up to 10%	Up to 25%	100%	100%
Location of team members	Functions	Functions	Collocated with project manager	Collocated with project manager
Length of commitment to team	Temporary	Temporary	Long-term but ultimately temporary	Permanent
Evaluation of team members	Functional heads	Functional heads	Project manager and functional heads	Project manager
Potential for conflict between team and functions	Low	Low	Moderate	High
Degree of cross-functional integration	Low	Moderate	High	High
Degree of fit with existing organizational practices	High	High	Moderate	Moderate-low
Appropriate for:	Some derivative projects	Derivative projects	Platform projects/ breakthrough projects	Platform projects/ breakthrough projects

for conflict between the functions and the team, particularly the project manager, rises with the move from functional teams to autonomous teams. The independence of heavyweight and autonomous teams may prompt them to pursue goals that run counter to the interests of the functions. Senior managers should keep such conflict in check.

THE MANAGEMENT OF NEW PRODUCT DEVELOPMENT TEAMS

For a new product development team to be effective, its leadership and administrative policies should be matched to the team's structure and needs.

Team Leadership

The team leader is responsible for directing the team's activities, maintaining the team's alignment with project goals, and serving as a communicator between the team and senior management. In heavyweight and autonomous teams, the team leader may also be the person who is primarily responsible for the evaluation, compensation, and promotion of individual team members. Effective team leaders are often much more directly related to the team's success than senior management or project champions. This may be because team leaders interact much more frequently with the team and more directly influence the team's behavior.[26]

As described in the team type and structure section above, different types of teams have different leadership needs. For instance, while lightweight teams might have a junior or middle-management leader who provides basic coordination between the functional groups, heavyweight and autonomous teams require senior managers with significant experience and organizational influence. In heavyweight and autonomous teams, the project manager must be someone who can lead and evaluate the team members, champion the development project both within the team and to the wider organization, and act as a translator between the various functions.[27] In particular, project managers in heavyweight and autonomous teams must have high status within the organization, act as a concept champion for the team within the organization, be good at conflict resolution, have multilingual skills (i.e., they must be able to talk the language of marketing, engineering, and manufacturing), and be able to exert influence upon the engineering, manufacturing, and marketing functions.[28] Other things being equal, teams whose project managers are deficient on one or more of these dimensions will have a lower probability of success.[29]

Team Administration

To ensure that members have a clear focus and commitment to the development project, many organizations now have heavyweight and autonomous teams develop a project charter and contract book. The *project charter* encapsulates the project's mission and articulates exact and measurable goals for the project. It might include a vision statement for the project (e.g., "Dell laptops will be the market standard for performance and value") and a background statement for why this project is important for the organization. The charter may describe who is on the team, the length of time members will spend on the team, and the percentage of their time that will be spent

on team activities.[30] It may also stipulate the team's budget, its reporting timeline, and the key success criteria of the project (e.g., meeting a particular time-to-market goal, exceeding customer satisfaction criteria established for the project, capturing a target amount of market share within a defined period of time, etc.). Establishing an explicit set of goals for the project helps ensure that the team members have a common understanding of the project's overall purpose and priorities. Goals also help to structure the new product development process and can facilitate cooperation by keeping team members oriented toward a common outcome.[31]

Once the team charter is established, core team members and senior managers must negotiate a *contract book*. The contract book defines in detail the basic plan to achieve the goal laid out in the project charter. Typically, the contract book will estimate the resources required, the development time schedule, and the results that will be achieved. The contract book provides a tool for monitoring and evaluating the team's performance in meeting objectives by providing a set of performance benchmarks and deadlines to which the team's performance can be compared. More important, however, the contract book is an important mechanism for establishing team commitment to the project and a sense of ownership over the project. After negotiation and acceptance of this contract, all parties often sign the contract book as an indication of their intention to honor the plan and achieve the results. Team members who sign the contract book typically feel a greater sense of duty to work toward the project's goals. Furthermore, signing the contract book can give team members a sense of ownership over the project and empowerment to make decisions about the project. This ownership and empowerment can help team members identify with a project's outcome and can encourage them to exert extra effort to ensure its success.[32]

Managing Virtual Teams

virtual teams Teams in which members may be a great distance from each other, but are still able to collaborate intensively via advanced information technologies such as videoconferencing, groupware, and e-mail or Internet chat programs.

Recent advances in information technology have enabled companies to make greater use of virtual teams. **Virtual teams** are teams in which members may be a great distance from each other, but are still able to collaborate intensively via advanced information technologies such as videoconferencing, groupware, and e-mail or Internet chat programs. Virtual teaming can enable individuals with unique skills to work on a project, regardless of their location. By meeting virtually, individuals who live at great distances can collaborate without incurring travel costs or disruption to their lives.[33] This is especially valuable for a company whose operations are highly global. For example, when IBM began deploying more of its products globally, it increased its use of virtual teams. About one-third of IBM's employees will participate in virtual teams at some point in their career. When IBM needs to staff a project, it gives a list of the needed skills to the human resource division, which identifies an appropriate pool of people. If the skills and talent of the people are more important than their ability to meet face-to-face, a virtual team is formed.[34]

Virtual teams pose a distinct set of management challenges, however. As described earlier in the chapter, much of the work on the structure of new product development teams has emphasized the importance of collocation. Collocation facilitates communication and collaboration by giving team members opportunities for rich face-to-face communication and informal interaction. Proximity and frequent interaction help teams to

Research Brief Virtual International R&D Teams

Gassman and von Zedtwitz build on the transnational corporation model discussed in Chapter 10 by examining how such firms coordinate their international innovation efforts via virtual teams. As in some of the arguments made in Chapter 10 about loosely coupled R&D activities, virtual international R&D teams may jointly work on a single development project, utilizing information technologies (rather than geographical proximity) to achieve coordination. However, while information technology decreases the need to collocate R&D activities, it does not readily solve problems related to building trust and transferring tacit knowledge. The type of innovation project being undertaken and the type of knowledge that must be shared should influence the degree to which firms rely on decentralized, virtual coordination processes.

Gassman and von Zedtwitz studied 37 technology-intensive multinationals and identified four patterns of teams: (1) decentralized self-coordination, (2) system integrator as coordinator, (3) core team as system architect, and (4) centralized venture team. In the *decentralized self-coordinating* teams, there was no single source of power or authority over the teams. Teams communicated primarily through telephone, the Internet, shared databases, and groupware. Coordination was relatively weak and relied largely on a strong corporate culture. Decentralized self-coordination was more likely to arise if there were well-developed standard interfaces between components being developed in different locales; thus, it tended to be suited to modular innovation as opposed to architectural innovation (see Chapter Three).

In teams with a *system integrator as R&D coordinator,* a single individual or office takes responsibility for helping different divisions coordinate. The system integrator helps to build a common understanding of the project among each of the divisions, translates knowledge from one division to another, and tracks progress and contributions. While the overall project is decentralized, the system integrator enables some centralized coordination.

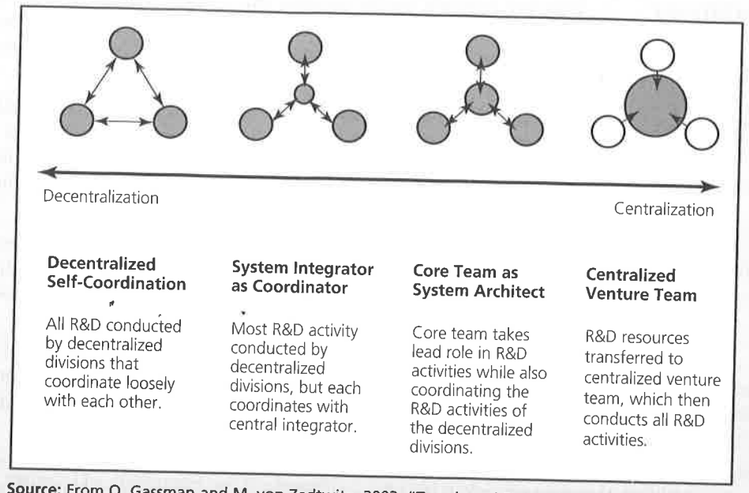
In the *core team as system architect* model, a core team of key decision makers from all of the decentralized R&D groups meets regularly to coordinate the otherwise decentralized groups. The core team often includes a strong project manager, leaders from each of the decentralized groups, and occasionally external customers or consultants. The core team constructs the overall architecture of the development project and maintains its coherence throughout its development. Because the core team has more direct authority over the individual divisions than the system integrator described above, the core team is better able to resolve conflict and enforce standards across the divisions. Because core teams can provide a significant level of integration across the divisions, core teams are often able to conduct architectural innovation. In the *centralized venture team,* R&D personnel and resources are relocated to one central location to enable maximum integration and coordination. The team is likely to have a very powerful senior project manager with significant authority to allocate resources and define the responsibilities of individual team members. Gassman and von Zedtwitz describe two examples of centralized venture teams—Asea Brown's "High Impact Projects" and Sharp's "Golden Badge" projects. Because of their high expense, such teams are likely to be used only for strategic innovations of the utmost importance.

Gassman and von Zedtwitz's model is summarized in Figure 12.3. Overall, Gassman and von Zedtwitz argue that innovations that are radical, are architectural, or require the intensive transfer of complex or tacit knowledge will require greater centralization. Innovations that are incremental, are modular, and do not require the frequent transfer of complex or tacit knowledge can be more decentralized.

continued

concluded

FIGURE 12.3
Gassman and von Zedtwitz's Typology of International Virtual Teams



Source: From O. Gassman and M. von Zedtwitz, 2003, "Trends and Determinants of Managing Virtual R&D Teams," *R&D Management,* vol. 33, no. 3, pp. 243–62. Reprinted with permission of Blackwell Publishing.

develop shared norms and a dialect for communicating about the project. Virtual teams, by contrast, must often rely on communication channels that are much less rich than face-to-face contact and face significant hurdles in establishing norms and dialects.

In the forming of virtual teams, it is important to select personnel who are both comfortable with the technologies being used to facilitate collaboration and who have strong interpersonal skills.[35] Team members must be able to work independently and have a strong work ethic. Since distance makes it easy for team members to deflect opportunities for interaction, it is important to choose individuals who tend to seek interaction rather than avoid it. It is important that members of the team establish standards for how quickly they will respond to messages, and how often they will be available for synchronous communications (communications where the involved parties must participate at the same time, such as telephone calls, videoconferencing, and instant messaging).[36] Furthermore, because many of the opportunities for informal interaction may be lost in a virtual environment, more types of interaction may have to be incorporated into the ground rules of the team.[37] For example, the team leader might schedule daily or weekly unstructured "chat" times where team members are required to participate in a group conference call or online conference to share ideas that may not be uncovered in the team's more formal interactions.

Virtual teams also face challenges in developing trust, resolving conflict, and exchanging tacit knowledge, as discussed in the accompanying Research Brief about virtual international R&D teams.

Summary of Chapter

1. Bringing multiple people together into a team enables multiple bases of expertise to be collectively directed toward problem solving; thus, teams are powerful mechanisms for problem solving. However, if teams become too big, administrative costs and communication problems can become significant.
2. Diversity of team members ensures that the team can draw on different perspectives and bases of expertise. In particular, functional diversity is often sought in new product development teams. Cross-functional teams enable design, manufacturing, and marketing objectives to be integrated in the new product development process.
3. Diversity of team members ensures that the individuals in the team not only possess different knowledge or viewpoints, but also have different sources of extra-team resources upon which to draw through boundary-spanning activities.
4. Diversity can also make it more difficult for teams to develop a common understanding of the new product development project and can result in lower group cohesion. Teams may need long-term contact and incentives for cooperation to overcome these challenges.
5. The way in which a team is structured (collocation, permanence, supervisory relationships, etc.) significantly influences how team members interact and the likely outcomes of a development project. Different types of teams are appropriate for different types of development projects.
6. Attributes of the team leader (seniority, authority, multilingual skills) must match the team type for teams to be most effective.
7. Many firms have teams develop and sign a project charter and contract book to ensure that all team members have a common understanding of the project's goals and possess a sense of ownership and commitment to the project's success.
8. When a company wishes to form a team with individuals who have unique skills but live great distances from each other, it might opt to form a virtual team. Virtual teams use information technologies to achieve communication and coordination. Virtual teams face a distinct set of challenges in promoting participation, cooperation, and trust. As a result, they require special consideration of the selection of team members and the team administration processes.

Discussion Questions

1. What are the trade-offs in choosing a team's size and level of diversity?
2. How can managers ensure that a team reaps the advantages of diversity while not being thwarted by some of the challenges team diversity raises?
3. Identify an example of a development project, and what type of team you believe they used. Do you think this was the appropriate type of team given the nature of the project?
4. What are some advantages and disadvantages of collocation? For what types of projects are virtual teams inappropriate?

Suggested Further Reading

Classics

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Endnotes

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4. S. J. Karau and K. D. Williams, "Social Loafing: A Meta-Analytic Review and Theoretical Integration," *Journal of Personality and Social Psychology* 65 (1993), pp. 681–706.
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