

## ARTICLES

# Leading Virtual Teams

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## Executive Overview

Virtual teams, whose members are geographically dispersed and cross-functional yet work on highly interdependent tasks, present unique leadership challenges. Based on our observations, interviews, and survey data, we identify six leadership practices of effective leaders of virtual teams. Specifically, we elaborate how leaders of successful virtual teams: 1) establish and maintain trust through the use of communication technology; 2) ensure that distributed diversity is understood and appreciated; 3) manage virtual work-life cycle (meetings); 4) monitor team progress using technology; 5) enhance visibility of virtual members within the team and outside in the organization; and 6) enable individual members of the virtual team to benefit from the team. These practices of virtual team leaders can be used to establish a foundation for training and developing future virtual team leaders.

Virtual teams are teams whose members are geographically distributed, requiring them to work together through electronic means with minimal face-to-face interaction. Often, virtual teams consist of cross-functional members working on highly interdependent tasks and sharing responsibility for team outcomes. More and more, the deployment of virtual teams in organizations requires some level of team-based innovation to leverage and integrate diverse expertise (e.g., functional/organizational/regional expertise) and to generate an innovative product, process, or business strategy (Lipnack & Stamps, 2000; Duarte & Snyder, 1999; & Townsend, DeMarie, & Hendrickson, 1998). Individuals placed on virtual teams are invaluable in terms of their expertise to the organization (locally as well as glo-

bally), and thus are on multiple teams simultaneously (many of which are geographically collocated). Consequently, travel even for short face-to-face team meetings is counterproductive as it takes the member away from the local constituency they need to consult for decisions and information.

Thus, while the term virtual team can apply to any team of geographically distributed people—even if they are working on routine problems and can travel often for face-to-face team meetings—we are interested in that subset of virtual teams whose objective is innovation without collocation. We believe that it is with these teams that the huge challenge of leadership is particularly acute because the leader has the joint challenge of geographic dispersion and innovative problem-solving.

Much has been written about how virtual teams differ from face-to-face teams in terms of

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coordination, communication, and collaboration (Fiol & O'Connor, 2005; Saunders, Van Slyke, & Vogel, 2004; Gibson & Cohen, 2003; Majchrzak, Malhotra, Stamps, & Lipnack, 2004; Furst, Reeves, Rosen, & Blackburn, 2004; Jarvenpaa, Shaw, & Staples, 2004; Maznevski & Chudoba, 2000; Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002). Considerable attention has also focused on the communication technologies needed to facilitate virtual work and enable knowledge sharing (Malhotra & Majchrzak, 2004, 2005; Cascio, 2000; Zigers, 2003; & Davis, 2004). However, the special skills needed to lead teams that have both geographic dispersion and innovative problem-solving challenges have received limited attention in research.

Some researchers have begun to uncover the nature of virtual leadership in experimental laboratory settings (Kayworth & Leidner, 2001/2002). Others have outlined strategies for virtual team leaders (Malhotra & Majchrzak, 2006). However, a large-scale field study of how virtual team leaders manage the joint challenges of dispersion and innovative problem-solving is yet to be reported.

Over the past seven years, we have collected survey and interview data from virtual team leaders, members, and sponsors. We began our research by following a virtual team at Boeing-Rocketdyne through its life-cycle from inception to project completion (Malhotra, Majchrzak, Carmen, & Lott, 2001). In a follow-up large-scale research study, we interviewed team members and team leaders and attended virtual team meetings of 55 successful virtual teams in 33 different companies to make observations of leadership practices in action (see Appendix A for a complete description of our research methodology). In this paper we present results of our research. We highlight six practices used by virtual team leaders that help manage the joint challenge of innovative problem-solving while being dispersed.

### **Leadership Practices of Virtual Team Leaders**

Leaders of *all* teams—dispersed or collocated—that are engaged in innovative problem-solving have a number of responsibilities that they must discharge. These include articulating a vision for the team, communicating the vision with

passion, setting an execution plan so the vision can be accomplished, forming coalitions of believers, aligning others behind the vision, and shaping a team culture by articulating operating values. All leaders carry out these responsibilities by selecting and motivating the right members for the teams, establishing the right norms of behaviors, encouraging social events, building trust, setting goals, preparing the team to anticipate and cope with novel situations, fostering internal communications, and recognizing contributions.

Leaders of successful virtual teams engaged in innovative problem-solving are no different. Leaders of virtual teams spend time mentoring the team members, enforcing norms, and recognizing and rewarding members and the team. However, some of these responsibilities are difficult to exercise without the benefit of physical presence. Leaders of collocated teams can physically observe when the team is getting sluggish, when the team needs a social event to rebuild momentum, when the team needs focus and direction, and when the team needs resources. The leaders of virtual teams don't have the same powers of physical observation, and have to be creative in setting up structures and processes so that variations from expectations can be observed virtually. Leaders of virtual teams cannot assume that members are prepared for virtual meetings. Virtual team leaders have to sense when "electronic" silence means acquiescence rather than inattention. Leaders also have to ensure that the unique knowledge of each distributed person on the virtual team is being fully utilized. Now we look at the six leadership practices—identified in our research—that leaders of successful teams use to overcome the unique challenges of managing virtual teams.

### **Establish and Maintain Trust Through the Use of Communication Technology**

In virtual teams, trust is often based on actions, rather than goodwill (Jarvenpaa & Leidner, 1999). Because goodwill is hard to observe virtually, expectations about actions and the actions themselves need to be made as explicit as possible for all others to see. This is done first by focusing on the norms regarding how information will be

communicated during the course of their virtual work. Several of the teams we studied struggled initially because they lacked a common set of procedures or way of doing things. In the absence of communication norms, team members resorted to using the practices prevalent in their local setting. This often led to each team member communicating in her/his own way, and thus not adequately sharing information with other team members. The result was a lack of cohesion and difficulty in integrating the work of different team members.

Virtual teams need norms that describe how communication technology will be used. These norms describe how often to check the team's knowledge repository, how to ensure that the repository is a "living" team room (to encourage active electronic discussions and ensure that the latest versions of evolving documents are maintained) rather than a place to store old documents. Norms also need to be established regarding what to post (to avoid information overload),

when to post (to support work coordination), how to comment (to ensure documents stay current), who owns documents for revisions (to support version control), how to inform other members of their whereabouts (to help establish virtual co-presence), etiquette for electronic communication (e.g., use of all capitals only to express urgency), and audio-conferencing (e.g., prefacing verbal comments with team member's name to avoid confusion over who is talking).

Trust within a team can be harmed by breaches in confidentiality outside of the team. As breaches cannot be physically observed (given that members are not collocated), an important norm for the team concerns what should be shared outside the team. One team had an external communication norm that restricted team members from conveying negative information to anyone outside the team. Another team had a norm that limited access to the team's virtual workspace to team members, "locking out" managers. Most teams had an "external-facing" website where they would put

**Table 1**  
**Practices of Effective Virtual Team Leaders**

Leadership Practices of Virtual Team Leaders	How do Virtual Team Leaders do it?
① Establish and Maintain Trust Through the Use of Communication Technology	<ul style="list-style-type: none"> <li>● Focusing the norms on how information is communicated</li> <li>● Revisiting and adjusting the communication norms as the team evolves ("virtual get-togethers")</li> <li>● Making progress explicit through use of team virtual workspace</li> <li>● Equal "suffering" in the geographically distributed world</li> </ul>
② Ensure Diversity in the Team is Understood, Appreciated, and Leveraged	<ul style="list-style-type: none"> <li>● Prominent team expertise directory and skills matrix in the virtual workspace</li> <li>● Virtual sub-teaming to pair diverse members and rotate sub-team members</li> <li>● Allowing diverse opinions to be expressed through use of asynchronous electronic means (e.g. electronic discussion threads)</li> </ul>
③ Manage Virtual Work-Cycle and Meetings	<ul style="list-style-type: none"> <li>● All idea divergence between meetings (asynchronous idea generation) and idea convergence and conflict resolution during virtual meetings (synchronous idea convergence)</li> <li>● Use the start of virtual meeting (each time) for social relationship building</li> <li>● During meeting — ensure through "check-ins" that everyone is engaged and heard from</li> <li>● End of meeting — ensure that the minutes and future work plan is posted to team repository</li> </ul>
④ Monitor Team Progress Through the Use of Technology	<ul style="list-style-type: none"> <li>● Closely scrutinize asynchronous (electronic threaded discussion and document postings in the knowledge repository) and synchronous (virtual meeting participation and instant messaging) communications patterns</li> <li>● Make progress explicit through balanced scorecard measurements posted in the team's virtual workspace</li> </ul>
⑤ Enhance External Visibility of the Team and its Members	<ul style="list-style-type: none"> <li>● Frequent report-outs to a virtual steering committee (comprised of local bosses of team members)</li> </ul>
⑥ Ensure Individuals Benefit from Participating in Virtual Teams	<ul style="list-style-type: none"> <li>● Virtual reward ceremonies</li> <li>● Individual recognition at the start of each virtual meeting</li> <li>● Making each team member's "real location" boss aware of the member's contribution</li> </ul>

documents to be shared with outside team members. Discussions were typically needed among all team members to confirm that a document was ready to be shared externally.

Not only must team norms be established for the use of communication technology, but they must be repeatedly revisited. The virtual team leaders we observed did this through “virtual-get-togethers” in which members would use the time to reexamine norms and renew their sense of purpose and shared identity. These get-togethers were called various names including team tuning sessions, rejuvenation, yearly strategic meetings, team development sessions, and in-process self-evaluations. Sometimes these “virtual-get-togethers” were annual, sometimes on an as-needed basis. All shared the objective of helping the team to evaluate their process and reinvigorate their identity and direction as a team.

The leaders of the most effective virtual teams developed a “virtual” sense about when these interventions were needed to reenergize their teams. They were sensitive to clues such as participation lapses in asynchronous electronic discussions, and terse and potentially divisive electronic communications among some members. Such electronic clues indicated that the virtual team needed an opportunity to “clear the virtual air and get back on the same page.”

Ensuring that everyone “suffered” equally from working in a geographically distributed world also created trust. The team leaders rotated the times at which weekly audio-conferences were held so that everyone (at some point in the team’s life cycle) would experience the pain of a late night or early morning meeting. Making explicit the task progress based on agreed-upon timelines also helped to create virtual team trust. Leaders of successful virtual teams required their members to regularly post their work outputs in the team repository and electronically link it to action item lists and project timelines. These postings also helped to create competency-based trust among team members as other members could “virtually” observe the contributions being made.

In sum, one insightful virtual team leader from an international computer technology company

pointed out that it was critical for the virtual team members to trust the leader and trust each other. “*The quickest ways to build trust in a virtual team,*” he noted, “*was to play fair and deliver on your promises.*”

### **Ensure That Diversity in the Team is Understood, Appreciated, and Leveraged**

**V**irtual teams are composed of individuals representing a rich diversity of stakeholders, experiences, functions, organizations, decision-making styles, and interests. The team’s ability to successfully innovate is in large part based on how well this diversity is understood, appreciated, and leveraged.

A common way leaders of virtual teams ensure that diversity is understood and appreciated is to develop an explicit “expertise directory” at the onset of the team. The directory can include a photo of each member along with information about his or her training, experience, previous assignments, and professional association affiliations. A virtual team leader in the petroleum industry noted that collaboration between virtual team members started once members knew more about the background and expertise of each team member. He said, “*Face-to-face teams would learn what they needed to know for good collaboration over dinner and drinks, but the virtual team members will just have to settle for the electronic directory.*” Other team leaders placed a skills matrix of the team in a visible location on the team’s virtual workspace to remind everyone on the team of the “*deep local domain expertise*” that each member brought to the team. The expertise directory and the skills matrix are both means to understand diversity and sow the seeds for building competency-based trust.

Since members of the virtual teams we studied had rarely worked with one another in the past, most didn’t know what the others knew or their working styles. So team leaders often assigned pairs of individuals to complete a task, picking the pairs based on who could benefit the most by learning from each other. These pairs are often geographically distributed and functionally diverse (e.g., pairing a design engineer in Brazil with a marketing expert in Sweden). Such combina-

tions would not be possible in a collocated team. Once the task is accomplished, the individuals can be redistributed to new tasks to avoid the ingroup-outgroup fault lines often observed in virtual teams. When the virtual pairs (sub-teams) are composed of culturally diverse members, the close working relationship proved an excellent way to break down cultural stereotypes and overcome communications barriers. According to one leader in the international travel and relocation business, *“The virtual bonding that took place within the pairs and sub-groups seemed to endure and carry over to the full team, contributing to greater collaboration and team cohesiveness.”*

Most successful virtual team leaders establish a synchronous as well as an asynchronous collaboration rhythm. In most traditional face-to-face collaborations (and even some unsuccessful virtual teams), team members wait until face-to-face or synchronous (such as all-team audio conferencing) meetings to brainstorm and make progress on the innovation task. On the other hand, successful virtual teams use the time between meetings to asynchronously (through use of electronic discussion threads and annotation of documents in the repository) generate and evaluate ideas. By working asynchronously virtual team members can pick and choose when they can make their contributions. This allows team members with diverse backgrounds to have a different rhythm and pace of generating their own ideas and digesting others' ideas. Leaders also use asynchronous discussion threads to identify areas of disagreements because the discussion threads give members with different language capabilities time to share their thoughts in their non-native languages in ways that they find difficult in synchronous (fast-paced audio-conference) sessions.

### **Manage Virtual Work-Cycle and Meetings**

There have been some that say virtual brainstorming is not possible, that when you can't see the “whites of one's eyes” it is hard to judge the confidence that others have in what they are suggesting or what you are proposing. Yet, the team leaders have to be able to facilitate virtual brainstorming. How do they do it?

A large majority of team leaders in our studies

reported that regular all-team audio-conferences were the “life-blood” of the team, even when tasks were distributed among all the team members. The meetings were structured, though, not just for reporting and coordination, but also for discussions. In order to “keep everyone in the loop” it was often mandated that all team members attend these audio-conference sessions (some were as frequent as once every week).

Virtual team leaders use meetings as the way to keep members engaged, excited about the work, and aligned with each other. Virtual team meetings (especially the ones that involved all team members) are “premium” activities. Team leaders need to ensure that a clear agenda is set out for these meetings and communicated in advance. Such meetings have a tendency to get off-track (or as a leader put it, “hijacked”). Team leaders have to ensure that the agenda is adhered to and that the “attention-span” at virtual meetings is optimized. Because members can be easily distracted in a virtual meeting, meetings should be treated not simply as a semi-structured activity in which members share, but rather as an opportunity to instill creativity, focus, and enthusiasm. For a meeting to capitalize on this opportunity, it must be managed carefully as a highly choreographed event. Several practices were used to turn meetings into choreographed events. These practices can be categorized as stages in an event lifecycle:

#### **Pre-meeting Practices**

As one leader commented to us: *“We found that planning out a meeting poorly for a collocated team is OK; but in a virtual environment, team pre-planning is critical. Otherwise nothing gets done and bridge meetings are required to fill in the gaps.”* In order to ensure that the work is accomplished, between virtual meetings, a large majority of team leaders we observed follow these practices:

- Begin electronic discussion threads about the team's current work activities prior to all-team audio-conference meetings. (Posting draft documents in the virtual workspace and asking team members to comment on them often started these discussion threads. The comments posted on the discussion threads were examined

and summarized a few days before the virtual meeting took place. To ensure that the virtual meetings were productive, only those areas of *disagreement* that were identified from the discussion thread were raised at the meeting.)

- Ensure that all team meetings have clear written agendas with time allocations circulated in advance so that members know when they should attend during a meeting.
- Request that members post their progress (using draft documents, memos, drawings, spreadsheets, analysis results, PowerPoint slides, etc.) on the repository linking them to project timelines, action item lists, and responsibility charts prior to the meeting.

#### Start of Meeting Practice

Virtual team leaders often report feeling the need to have members “reconnect” at the start of a meeting. As is often the case, virtual team members have only been in touch with each other asynchronously and most of their electronic communications are almost exclusively task related. Virtual team leaders feel that it is helpful to have team members reconnect with the “human” side of each individual, which helps to remind each member of their similarities, as well as provide them “boundary objects” or common metaphors to work from during the meeting. To reconnect, team leaders start their meetings in various ways:

- Have each member share a personal story about an event that happened to them over the last week.
- Ask each member to share a hobby they were working on.
- Focus on major events in one or two of the members’ lives. For example, one team member lived in a Washington, D.C. suburb near the 2002 sniper attacks, which became the focus of the beginning of one meeting.

#### During Meeting Practices

Most team leaders we interviewed find it critical to keep members engaged throughout a meeting. They maintain this engagement by having members “check-in” throughout the meeting process,

sometimes using voting tools as check-in devices. For example, one team leader used the voting tool on the net conferencing technology to have members vote on whether or not an issue being discussed was resolved to their satisfaction and should continue to be discussed. Increasingly, team leaders are using Instant Messaging to stay checked-in during meetings and engage those not participating actively.

#### End of Meeting Practices

Virtual meetings are the primary mechanism for creating commitment toward forward movement. Therefore, ending each meeting with a list of action items that are then posted in the team repository is a key practice in virtual teams. Action items include assignments of individuals to tasks and assignment of due dates for task completion.

In addition to action items, several team leaders we interviewed use a “minutes-on-the-go” practice, where minutes are logged during the meeting and appear immediately on the virtual workspace screen. The minutes are then posted to the repository immediately after the meeting. The minute-taking responsibility is often rotated among members, supported by development of norms for minute-taking. In one team, norms require that minutes be taken during the meeting on a Word document opened and displayed in the shared workspace for all to see. The norm also dictates that only results of discussion (i.e., decision and rationale) be captured to reduce the burden on the note-taker. Team members summarize what should be said in the minutes, and the minutes are posted immediately after the meeting.

#### Between Meeting Practices

Leaders understand that virtual team members may easily forget that they are members of a team when the team isn’t actually in a virtual meeting session. Therefore, the team leaders work hard to keep the members engaged as a team between meetings. They use a variety of techniques including electronic discussion threads, instant messaging (e.g., to see who’s available to discuss a problem immediately), making spontaneous announcements on the team’s website (e.g., to share

some recent good news with the team), and automatic notifications of recent postings to the website to keep members abreast of progress of team members.

In sum, by orchestrating virtual team meetings carefully, virtual team leaders are able to reinforce the team's mission, increase team commitment and participation, leverage the team's collective expertise, and reinforce the value of virtual team membership. As one virtual team leader pointed out, *"The challenge was to command member attention and focus in an era of multi-tasking."*

### Monitor Team Progress Through the Use of Technology

While all leaders monitor team progress, virtual team leaders have the opportunity to monitor progress online; the most successful leaders we observed leveraged this opportunity. Virtual team leaders can scrutinize asynchronous (electronic threaded discussion and document postings in the knowledge repository) and synchronous (virtual meeting participation and Instant Messaging sessions) communications patterns to determine who is participating in team activities and who needs support and prompting for further participation. Virtual team leaders can also monitor how the communication technology is used and offer coaching and training for those team members who underutilize their electronic communication and collaboration resources. This monitoring is done in a variety of ways. Leaders track the usage of the team's knowledge repository on a regular basis, emailing members who do not contribute to or use the repository regularly. Other leaders examine repository log data to determine who is using the team repository and how often. Team leaders also assign a "facilitator" to keep track of tool usage and report problems to the team leader. The leaders check for the possibility of "social loafing" or "coasting" when some members fail to meet deadlines or follow work protocols. In these cases, virtual leaders waste no time investigating problems and confronting underperformers.

Virtual team leaders also diligently monitor progress in the use of information technology to

support team processes as well. Virtual teams rarely began with their teams having all the technologies in place from the onset. Instead, team leaders instill an attitude of: *"Let's try and work together virtually and find the tools we need to do our job."* This attitude of experimentation means that the teams are not unduly frustrated by failure (i.e., when the technology doesn't work), accept some responsibility to make it work (i.e., by asking questions if they don't understand the technology and finding the right resources to help them), and are interested in making something work regardless of how elegant or complete the technology solution. Team leaders allow for flexibility in the usage of information technology tools as the needs of the team evolve, and as the technology itself evolves. In sum, leaders closely monitor tools that work and allow for technology evolution over time. In the words of one team leader: *"Our technology use evolved over time. Our database [of services and clients] matured. We initially had a discussion database. Then we added IM. Then we added Change Request capability. Then we added a Call Tracking database. Then we added an Issue Log. Then we created a view called "Management View" with schedule, costs spent to date and project status. Then we added a Working Section view just for the team. We tried videoconferencing but stopped using it when the team did not find it useful."*

### Enhance External Visibility of the Team and its Members

Leading a virtual team requires parallel processing skills. While team building requires an internal focus, virtual team leaders must especially also remain sensitive to the needs of various external stakeholders including project sponsors, local executives, and both internal and external customers of the virtual team's output. When it comes to external (specifically local bosses of the virtual team members) the phrase "out of sight, out of mind" is all the more a challenge. Therefore, leaders often develop "balanced scorecards" for the team indicating what each manager expects from the team as a whole and from the member who is reporting to that manager. To develop this balanced scorecard, the virtual team

leaders work with each member's primary local manager to ensure that expectations for each member are clear. Once established, the balanced scorecard provides a relatively objective and standardized basis for the allocation of team-level rewards.

Virtual team leaders often have multiple people to report to—each of the team members local managers, as well as senior executives of the organization. The virtual team leaders we studied used a variety of approaches for external reporting; all, however, had the underlying goal of continuously and clearly representing the “virtual work” of their team and its members. One team leader, for example, organized a steering committee of managers from the various departments and client organizations represented, and conducted formal status briefings with this steering committee. A virtual team in the electronics testing industry was required to report the team's outcomes and accomplishments to a steering committee. The steering committee was designed in a way that it had a representative (senior level executive) from every location where there was a team member present. This senior level executive provided the aegis under which his/her local team member worked on the virtual team. They were also responsible for periodically ensuring that their local team member remained at a high motivation level.

In an alternative approach, the team leader expected each member to “report out” to the sponsoring manager closest to the functional, geographical, or business unit that the individual member represented. The choice of the approach depends on the preferences of management, the type of tasks the team is performing, and the abilities of the team members. Regardless of the approach selected, leaders often instill a norm whereby all reports intended for managers be approved first by all team members so that they feel a part of the report-out process.

In addition to report-outs to management, virtual team leaders often find themselves in the position of explaining to managers the value of a member to the team. In one case, the team leader worked with each member's manager to create and sign a “certificate of contribution” which clarified

how the individual's contribution to the team would help the manager's own division.

Many leaders of face-to-face teams attest to the difficulty of providing individuals and teams with the recognition that they deserve. Recognizing and rewarding virtual team work is even more complex and even more important. By keeping virtual team members in the corporate spotlight, the rewards and recognition follow.

### **Ensure Individuals Benefit from Participating in Virtual Teams**

**F**or team members to contribute, they must believe that they personally benefit from the team. We asked team leaders how they ensured that individuals personally benefited from the team. Team leaders reported conducting the following activities:

- Virtual reward ceremonies, such as having gifts delivered to each individual and then having a virtual party.
- Starting each virtual meeting with recognition of specific successes. A leader of a virtual team in the high-tech industry used the practice of giving members a “gold star” for work well done. This award afforded the members recognition in the organization and could be parlayed for future promotions.
- Praising a manager for having a great employee. Team leaders often had the entire team or sub-team brief executives (often virtually). When an executive was pleased with the briefings, the team leaders would suggest that the executive inform each member's manager about the great work that the members were doing.

Importantly, leaders of successful virtual teams realize that team members are often in high demand by others (their local responsibilities). Regardless of how much up-front negotiation occurs over time commitments, team members generally gravitate to those commitments that give them the greatest benefits: in terms of intellectual growth, visibility, and fun. Virtual team leaders understand this and often structure team meetings to capitalize on these benefits by including mini-lectures on a topic related to the team's work



which might be provided by an expert, short on-line appearances by executives giving members an opportunity to enter into a virtual dialogue about an issue related to the team's work, and fun activities such as sharing hobbies, sharing catered lunches, Internet-based scavenger hunts, and virtual celebrations.

In short, the most effective virtual team leaders enhance the team experiences for each of their members by ensuring that each has an opportunity to learn, grow, contribute, and feel an integral part of the team.

### Final Words On Leadership of Virtual Teams

**W**e noted at the onset that leading a virtual team requires all the leadership and project management skills needed for leading a collocated team and *more*. As one of the team leaders we spoke with said: *"Synchronizing the efforts of a geographically, culturally, and technically diverse virtual team does not happen magically. . . . My first priority is to build the kinds of working relationships where team members will freely share knowledge, leverage members' collective expertise, anticipate each others' actions, and feel confident that all team members are making a full-fledged contribution to the team's success."*

Virtual team leaders must overcome coordination barriers associated with working across distance and time, cross cultural and language barriers, trust and team cohesion barriers created when team members have very limited opportunities to identify common values, and numerous other challenges associated with virtual work. Our virtual team leaders emphasized the additional challenges of fighting for each team member's commitment to the virtual project, given the local demands for their special expertise.

In addition, virtual team leaders have to overcome member feelings of isolation, build team cohesion, establish norms of collaboration and knowledge sharing, and motivate team members to make a major commitment to the team's mission. To do so required the development of new leadership skills. As one virtual team leader noted, *"I must be a diplomat to help teams overcome cultural differences, an ambassador to keep sponsors around the world updated on the team's progress, a psychol-*

*ogist to provide a variety of rewards to a diverse and often isolated group of team members, an executive, a coach, and a role model all at the same time."* Another noted, *"Leadership in my book comes down to communication. But communicating in person and communicating electronically are not the same. It is darn hard to motivate and inspire from long distance. Even telephone conversations fall short of actual meetings. So, for me to lead virtually, I have to learn to be clear and concise, but also to communicate a passion for the assignment and a caring for my people. Communicating virtually is a work in progress for me."*

Given the challenges associated with leading a virtual project team, the payoffs need to be substantial for an organization to embrace this relatively new way of working. Because virtual teams have access to specialized expertise across geographical boundaries, they are poised to develop better-informed and more creative solutions to complex, often global organizational problems. For instance, one of the teams in our sample was developing collaborative technologies that would be used in different regions of Europe. By including team members from 15 European countries, the team was able to create a solution that was customized for the different regions, yet had 70% commonality. This "think global, act local" solution reflects the creative capacity of virtual teams.

When firms become virtual, the need to change work and leadership practices is imperative. In the years ahead, we would expect greater organizational efforts to prepare future leaders of virtual teams. Recent research indicates that only a small number of organizations have created specialized training programs to prepare virtual team leaders and virtual team members (Rosen, Furst, & Blackburn, 2006). Among those organizations that have training programs in place, an even smaller number rate them as effective. And, some organizations report that while virtual team training is available, it is often ignored.

Similarly, we would expect business schools to focus more on developing the critical competencies needed to lead project teams from a distance. For example, in the context of a project management course, students could be assigned to work virtually with other students taking similar courses at universities in various parts of the world. The

experience of working cross-culturally and virtually introduces students to both the potential and the challenges of working in virtual teams. Instructors can use these assignments to coach teams at the “teachable moments” when they encounter project management issues.

The adage that “forewarned is forearmed” rings particularly true when it comes to virtual leadership and management. Organizations that appreciate the value in developing virtual team leaders are likely to see substantial benefits from their investments.

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## Appendix A: Research and Data Collection Methodology

In order to understand the leadership practices in successful virtual teams we collected data in two phases. In the first phase, we followed one virtual team at Boeing-Rocketdyne through its life cycle (from inception to project completion) (see Jarvenpaa, Shaw, & Staples, 2004). We interviewed the team members and leaders at different points in the life-cycle and attended the virtual meetings of the virtual teams to observe leadership practices “in-action.”

In the second phase, we solicited participation from several hundred virtual teams and screened them based on stringent criteria to determine whether they fit our notion of virtual teams. Over the course of six months we identified 54 “successful” virtual teams from the several hundred teams that responded to our call. These were categorized as successful based on the independent assessment of an executive familiar with the team. Executives who were knowledgeable about the team but were not members of the team were asked to complete a short ten-item assessment of the team’s outputs to-date, including assessments of the team’s efficiency, quality of innovations, adherence to schedule and budget, and work excellence.

The 54 virtual teams that were identified represented 33 different companies from 14 different industries. The teams in the study represented a range of outputs for which they were responsible: new product development, pure research and development, best practice identification, knowledge management, information systems support, mergers, strategy development, new technology development, development of employee training, and benchmarking analysis.

The teams ranged in size from a low of 2 (not including the team leader) to a high of 50, with the teams having 12 members on average. Among the teams, 43% were tasked with innovation-oriented tasks while 33% were involved in

operational services tasks. Teams were at diverse phases of their life-cycles, with 25% already completing their tasks and 20% just starting. Half of the teams included more than one company and more than 50% included more than one function. Finally, 75% of the teams included members from more than one national culture, with 60% including members at 3 or more time zones apart or with different native languages.

To collect data on the teams, we first interviewed each team leader. The interviews, which lasted about 40 to 60 minutes, addressed such questions as: the purpose of the team; why it was structured as a distributed team; what

practices the leader established in the team for cohesiveness, trust-building, and shared understanding; any adjustments made to the team during its lifecycle; and the use of technology by the team. Team members were contacted (either by us directly or by the team leader) and asked to complete a web-based survey that we prepared. We guaranteed confidentiality of all responses. In all, 269 individuals from 54 teams completed our survey. Members were asked about the intellectual capital they had acquired on the team and their views of such team management issues as trust, leadership, cohesiveness, and personal benefits from the team.

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