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**BEST PRACTICES FOR
VIRTUAL TEAM EFFECTIVENESS**

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BEST PRACTICES FOR VIRTUAL TEAM EFFECTIVENESS

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We organize this paper into four sections. The first section pulls together key themes around the question, “What makes virtual teams special?” In the second section, we look at the bright side of virtual teaming and highlight the key advantages of this form of organizing. We summarize the benefits that firms might expect to derive from the effective design and implementation of virtual teams. In the third section, we temper the good news with some bad news, summarizing the dark side of virtual teams, including the disadvantages, pitfalls, and challenges. In the final section, we discuss best practices virtual-team leaders, members, and facilitators. Implementing these suggestions helps to address the major challenges from the proceeding section. We conclude with a few final words of wisdom and advice for improving virtual team effectiveness.

WHAT MAKES VIRTUAL TEAMS SPECIAL?

The more teams become virtual, the more they experience certain unique phenomena that set them apart from teams at the co-located end of the degree of virtuality continuum. We were able to categorize these phenomena into four broad categories: technological complexity, extensive diversity, dynamic nature of work, and developmental idiosyncrasies. We summarize each of these in this section.

Technological Complexity

Virtual teams rely substantially on information technology than co-located teams. They use collaborative technology to connect people more so than do co-located teams. This puts a premium on standardized and efficient storage, retrieval and exchange of knowledge, and on

technology training. We anticipated that technology was a critical component of virtual teaming. Yet, virtual teams are not just technological systems, they are socio-technological systems: social systems completely intertwined with technology systems (Maznevski and Chuboda, 2000). Perhaps as a result, we were surprised to find that use of advanced technologies is relatively uncommon in virtual teams, with most team members preferring to use e-mail as the primary mode of communication.

Use of technology is complicated by the composition of most virtual teams. We were particularly intrigued by the different norms for how often members should check in for messages (e.g., e-mail, voicemail, answering service). Further, since different cultures are often involved, silence and lack of responses via technology can have multiple meanings across contexts represented on virtual teams, including indifference, technical failure, discomfort, or confusion. Finally, some members may only have access to electronic communication during certain hours. These features are unique and surprisingly salient in virtual teams that rely heavily on electronic communication.

Extensive Diversity

Beyond technological features, perhaps the second most prominent feature of highly virtual teams that sets them apart from co-located teams is that virtuality brings together members that represent highly diverse groups, including different nations, regions, organizations, or professions. On average, highly virtual teams tend to be more diverse than co-located teams. We anticipated that “differences make a difference,” but the importance of differences in context must be stressed. For example, there are different formal and informal rules that dictate workplace interaction, different policies and government regulations for human resources, and the stability and efficiency of economic and political environments varies greatly among

members on a virtual team. Further, virtual teams are embedded within the larger network of an organization or multiple organizations, and they often have members with multiple domains of expertise. The national, organizational and professional cultures that mingle each have their own shared understanding, sensemaking, beliefs, expectations and behaviors. On some virtual teams, members share many cultural characteristics; on others there is a high degree of cultural differences.

A fascinating and somewhat ironic finding is that when members of virtual teams share many cultural characteristics (e.g., all are Westernized, all share the same function, etc.), subtle cultural differences may go unnoticed, but then cause real surprises as the team interacts. Thus, members cannot take for granted that other members share their contextual knowledge or have a common frame of reference. They are especially likely to hold tacit knowledge unavailable to others, so context must be articulated for sharing to take place. In fact, the more differences represented on a virtual team, the more information there is to be shared. In particular, members need to share more information about context and than they would if working in the same location.

Coinciding with cultural differences on virtual teams are differences in the way in which people use language. We were amazed at how subtle, yet profound, these differences can sometimes be on virtual teams. For example, across cultures, communication varies in the extent to which people use implicit versus explicit language (e.g., the use of qualifiers such as “maybe,” “perhaps,” or “somewhat”), the extent to which messages are context-free or context-specific, the degree to which messages contain emotional content or a serious tone, and the degree to which informal versus formal channels of communication are used.

Finally, more so in highly virtual teams, it is often necessary to create a "hybrid" culture, structure, and set of operating policies that represents a compromise among various alternatives preferred in the team. Therefore, cross-cultural skills and training, a learning orientation, lateral understanding, and cross-functional capabilities are more critical in virtual teams.

Dynamic Nature of Work

A third set of unique features pertain to the fundamental nature of work processes in virtual teams. With virtuality comes an added degree of flexibility in the type of work that can be accomplished. Although face-to-face teams also perform knowledge work, in virtual teams, it is even more likely that knowledge will develop unexpectedly and change over time and that it often involves novel problems, negotiation and interpretation. Virtual work often needs to be construed as conversation making, sense making and community making consisting of trade-offs and deliberations (Markus, Majchrzak and Gasser, 2001). In fact, even the participants may be unknown in advance, e.g., they may not be available due to other meetings, or they may choose not to attend based on other priorities. Therefore, there cannot be a rigid sequence of activities imposed on the work, tools cannot be structured to assume presence of any given participant, work structures must often emerge.

We learned from Mohrman et al., for example, that global new product development occurs via a system composed of a set of complex and overlapping task networks, typically linking multiple product lines and several geographies, and that accomplishing the strategic intent of the global firm depends on developing shared meaning to guide sensemaking processes in the team. This often occurs simultaneously within and across different parts and level of the system, including in different units or projects, and with customers and suppliers.

In addition to placing a premium on dynamic sensemaking, virtual team collaboration requires both synchronous and asynchronous work. We were intrigued by the finding that creating team output through iterative reflection is often easier in a synchronous mode. In fact, reflection will likely take longer if done asynchronously because responses may not be made with people in the same frame of mind, leading to a loss of “mind-share” between responses. Surprisingly, in virtual teams, doing and communicating often occur at the same time (e.g., a discussion may begin verbally and escalate to sketching on a shared whiteboard).

It was also interesting to note that the type of relationships and linkages that are important in a virtual team depends upon which task characteristics are dominant. Some virtual tasks are primarily integration (e.g., combining knowledge to develop a new product), others require differentiation (e.g., customizing for different markets), and still others are learning tasks (e.g., benchmarking). Integration tasks require extensive internal social capital (i.e., internal networks of relationships). Differentiation tasks require extensive links external to the team, and ties can be weaker. Finally, learning tasks probably require a balance of the two types of networks. Configurations of networks are often combined in virtual teams with varied tasks to achieve the best of all worlds.

Developmental Idiosyncrasies

Finally, a fourth category of unique features pertains to the developmental patterns that accompany virtuality. In highly virtual teams, initial structure, start-up and formation activities are potentially more critical than in co-located teams because they provide common ground needed to bridge differences and develop basic operating structure. Further, given that many factors known to contribute to social control and coordination – such as geographical proximity, similarity in backgrounds, and experience with each other – are often absent in virtual teams, the

development of collective trust is critical. This development requires a balance between an optimal level of risk and interdependence. Perhaps somewhat ironically, some minimal level of risk and interdependence are necessary to create opportunities to demonstrate trust. Without any risk or interdependence, trust is not necessary.

Team leaders typically play a key role in the process of balancing risk and interdependence. Interestingly, leaders often emerge in virtual teams, even when they are not formally designated. Emergent leaders tend to be rated higher than other members in terms of trust, particular "role performance trust" that involves demonstrating competency with the tasks and behaviors necessary to accomplish team goals. This is gained through reliability, consistency, quality of work, initiative, and experience. Emergent leaders also tend to be rated higher than other members on transformational leadership (influencing through values and ideals, inspirational motivation, intellectual stimulation, and individual consideration).

Beyond developmental issues related to trust, in virtual teams, the flow of knowledge and information is related to the development of networks of relationships in the team, particularly the subgroups that often form. Interestingly, if subgroups tend to coincide with the different subtasks of the group (i.e., different types of expertise to apply to different client problems), then knowledge will flow more effectively; if the subgroups don't coincide with subtasks, then knowledge flows are often compromised. This process is complicated by the fact that members of virtual teams are often on "their best behavior" because they consider themselves something of "ambassadors" of the groups they represent. Yet, ironically, in virtual teams, crisis and conflict is often the impetus that most clearly signals the need for integration and helps to bridge differences represented on the team.

ADVANTAGES OF VIRTUAL TEAMS

As the proceeding section attests, highly virtual teams are different, special, and in many ways surprising organizational forms. When implemented effectively, they bring many advantages to collaborative efforts. In this section, we summarize three major categories of such advantages: innovation and synergy, effort and performance gains, and constructive influence tactics, politics and conflict.

Innovation and Synergy

When virtual teams bring together representatives from numerous locations, they allow synergetic interaction among parties that might otherwise duplicate effort or even work at cross purposes. Virtuality potentially increases the number of participants, overall contributions to meetings, and allows members to maintain access to their home computing environment and desktop tools, which facilitates knowledge capture and search. In global new product development efforts, for example, virtual teams facilitate work that occurs across diverse and dispersed knowledge centers. By virtue of different locations, members can tap into multiple sources of information and knowledge, and this broad spectrum of knowledge can be leveraged on behalf of the team and the organization. The process of obtaining information is greatly facilitated by building relationships within and outside the team; members hear about what is important from other people they know, they are alerted to knowledge and information that is potentially useful, and they interpret meaning in part based on knowledge of its origins. Good relationships with the right people can help team members acquire knowledge and analysis that competitors cannot obtain.

Effort and Performance Gains

Furthermore, if diverse intelligence is leveraged in virtual teams, it allows better outcomes than the best individual team member could achieve. Teammates are able to work around the clock without violating the personal time of any one member (Pape, 1997). Virtual teams have a strong potential advantage over co-located teams with respect to their ability to implement decisions, because of the strong ties distributed members can develop locally with clients, customers, and other external constituents. In addition, some forms of electronic media, such as text-based conferencing and discussion groups, have been found to facilitate a more equal and full representation of team-member inputs (Tyran et al., 1992). It is less likely that a vocal and assertive member can dominate a group that relies primarily on text-based electronic media, and virtuality often decreases power and hierarchy issues in teams. Finally, many managers find that performance is easier to document and review in virtual teams, given that most interactions and commitments are archived electronically.

Constructive Conflict, Influence and Politics

A third important set of advantages accrues regarding processes in virtual teams. For example, relationship conflict, which has demonstrated dysfunctional impacts in teams, is more likely to be filtered out of computer-mediated communication. Further, in virtual teams, communication is often more explicit and therefore may avoid the common problem of misunderstandings found in less-explicit forms of communication.

In terms of influence processes, rationality and sanction are used more frequently in virtual teams, and these tend to be the most functional forms of influence. On the other hand, the less popular and socially acceptable influence tactics such as pressure, sanction, and legitimating, are typically used less frequently because lower familiarity and intimacy serve as gatekeepers to

these tactics. Political behavior takes on a more careful and covert form in virtual teams because communication is more frequently documented. Cultural boundaries and differences restrain people from using extremely aggressive influence and politics (Elron, Shamir and Ben Ari, 1999), and research indicates that there are fewer stable political coalitions based on cultural subgroups in virtual teams.

DISADVANTAGES OF VIRTUAL TEAMS

Despite these advantages, realistically, no organizational form is perfect. Alongside the benefits, virtuality brings several drawbacks. These can constitute major barriers to virtual-team effectiveness if they are not explicitly addressed through various design and process techniques. We summarize five categories of such challenges in this section: technology failures, communication mishaps, dysfunctional conflict, inefficient work processes, and challenges to support systems.

Technology Failures

Across members, the quality and capacity of the infrastructure for communication varies, limiting access and feasibility of high bandwidth technologies such as video conferencing. In addition, members often have different formats and protocols for storing knowledge (e.g., Lotus Notes databases vs. Access or Outlook repositories). These variations in availability of advanced technology and resources to support them can cause major communication breakdowns. To complicate matters, most technologies treat knowledge as object (focus on information only) or knowledge as action (focus on collaborative processes only), and therefore fail to support the full range of virtual team activities and needs. In addition, many of the collaborative structures that are referred to as "teams" are actually communities of practice or work groups, and as such have

different technology needs. Even when everyone agrees that the need for a true team structure exists, members rarely share the same computing platform, even within the same firm.

Communication Mishaps

In addition to technology failures, in highly virtual teams, there is less opportunity to engage in informal and social interaction; communication is more formal, and there is less time allocated for non-task behavior. Further, involvement in the virtual team is often less central than involvement with a member's local environment, so there is less emotional attachment, vested interest, and identification. In turn, this means lower familiarity and intimacy and less self-disclosure. English as a second language may exacerbate this and result in less depth and candidness of exchange, which increases psychological distance and fears of misuse, miscommunication, and misinterpretation of knowledge. As a result, there is often a higher perception of risk, which increases ambiguity and complexity of information exchanged.

Even when English is designated as the official language of the collaborative effort and even when sophisticated technologies or translation procedures are used, language presents a key challenge to collective sensemaking processes in virtual teams. Since non-verbal communication can be an important source of information when assessing the trustworthiness of a new teammate, the use of text-based electronic communication (e.g., e-mail), in particular, may impede the development of trust in virtual teams.

In addition, communication through text-based media is more laborious and so people tend not to type out details they would communicate verbally (Graetz et al., 1998). As a result, computer-mediated groups have lower communication efficiency than co-located groups (DeSanctis and Monge, 1999). The details, qualifications, social rituals, and cues that reveal meaning are often left out of text messages, and this may hinder interpretation, cohesion, and

relationships in virtual teams. Computer-based communication media also eliminate cues about interpersonal affection, warmth, attentiveness, and trust.

Equally as troubling, when communicating through technology, people often are not successful in directing the receivers' attention. In the absence of rich auditory and visual cues such as voice intonation, understanding of complex messages is inhibited, and there is less feedback that information has not been understood. Receivers often fail to let a sender know their perception of the message that was sent. The complex information that is often exchanged in virtual teams is open to many interpretations, particularly across cultures and disciplines, which presents a key challenge in terms of the coding and categorization that must take place if knowledge will be utilized for collective thought processes. Adjustment to a shared norm of communication may be resented, particularly if that norm is more inclined toward a given culture (e.g., Israelis resent having to be more indirect due to the preferred style of U.S. participants).

Finally, virtual teams may need more time to make sure all voices are adequately heard. Differences in phonics and syntax, unfamiliar accents and inappropriate use of vocabulary can make it really hard or impossible to understand each other. Specifically, participants who are not physically located at or near headquarters or with the core of the team may be at a disadvantage because they do not have as many opportunities to participate in informal exchanges. All of these phenomena may impact creativity and satisfaction, which are linked to team performance.

Dysfunctional Conflict

A third set of disadvantages pertains to conflict. Although teams do experience advantages related to conflict due to the virtual nature of their work, the flip side of these benefits may create challenges. For example, virtual team members often do not have the opportunity to serendipitously engage in sensemaking, and communication is often limited to

short-time episodes; this is efficient in some ways but may potentially increase opportunities for misunderstandings. Consensus is more difficult to reach in virtual teams, particularly in those teams working on complex, non-technical issues (Hollingshead and McGrath, 1995). In addition, conflict is likely to be hidden longer in a virtual team and there may be higher levels of process-based conflict, since members are likely to use different work processes.

Also challenging is that members from different nations are likely to perceive and react to organizational politics differently; thus, what is seen as a negative influence tactic by some may be fine for others. This could result in negative emotions and dysfunctional conflict. Relatedly, distrust and suspicion often arise between individuals from different cultural groups, purely on the basis of group membership. Subgroups often form based on national, organizational, and functional cultures, and perceptions of risk across these subgroups is likely to be super-optimal, prohibiting trust, particularly when members of one subgroup have inadequate information about the other subgroups. Extreme divergence of views is often a reaction to the perceived risk.

Finally, text-based electronic communication makes it more difficult for team members to formulate impressions of their teammates and make inferences about one another's knowledge (Walther, 1993). Thus, virtual team members often err on the side of dispositional attributions (i.e., assuming behavior was caused by personality) because they lack situational information and are overloaded, and this may in turn make them less likely to try to modify problematic situations. In sum, co-located teammates can often establish credibility with each other by a process that is not explicitly designed, but virtual team members must create much more explicit routines that will allow this to happen.

Inefficient Work Processes

A fourth set of disadvantages in virtual teams arises due to the logistics of coordinating work processes across locations. In addition to difficulty in reaching consensus, virtual teams may need more time than a co-located group to accomplish the same basic work task, although the likelihood is that they will have less time. They require advanced lead time to get materials out to remote sites, and this is often viewed as additional preparation. Some members may not have time to prepare and then meetings may be viewed as inefficient by those who did do their homework. Virtual teams also need additional time for updates and getting each other on the same page, which often means redundant discussions and missed dialog. Equally as challenging, virtual teaming typically lengthens the work day for virtual team members, and time zone dispersion narrows the window for synchronous team interaction. Multitasking is a common strategy during meetings that can distract members to such an extent that they miss an opportunity to provide valuable input. Likewise, the focus of virtual team members is often diluted by their local tasks and priorities (e.g., out of site is often out of mind). If local priorities override time team members had planned to devote to team assignments or meetings, process loss may result in team work requiring more time than planned.

In addition, information is likely to be much more distributed across locations in highly virtual teams than in co-located teams, and thus considerable communication is required to make local information commonly known in the team. The distributed nature opens up the possibility of contextual information being delayed, overlooked by remote team members, or lost in transmission because of technical or human errors. Perhaps as a result, members tend to take their own context (local situation) for granted and assume others' are similar, and thus don't know what about their context needs to be communicated to others. Virtual-team members often

complain that too much time is spent on merely sharing information in meetings rather than doing truly collaborative tasks such as decision making or problem solving. In a co-located situation, it is more likely that team members will be around when changes in requirements are made, so information is likely get distributed quicker and with less effort than in virtual teams.

Finally, geographic distance, different contexts, and reliance on technology lead to less similarities across members, less open communication and information sharing and to less use of unshared (unique) information and greater possibility of divisive subgroups. Interdependence is often higher within subgroups (e.g., within a subset of members who are all from the same organization), than across subgroups. Without opportunities to demonstrate reliability and responsiveness across subgroups, collective trust cannot exist, and a negative cycle of divisive conflict will likely ensue. These conditions in turn mean less shared understanding in the team, and this can result in less predictability, less efficient use of resources and effort, more implementation problems and errors, decreased satisfaction and motivation, and increased frustration.

Challenges to Support Systems

The final category of disadvantages captures difficulties associated with the systems that exist in the organizations in which virtual teams are embedded, including human-resource systems and performance-management systems designed to define, develop, and review team performance. For example, in virtual teams, there are often vast differences in job design and staffing patterns across participants and partners. Without common support systems, building competencies and expertise is difficult and this can hamper overall development, knowledge management and sensemaking. Furthermore, it is very difficult to determine what is valued by each member in a virtual team, and this is exacerbated by national and cultural differences.

These differences make application of traditional motivational techniques, such as valence-instrumentality-expectancy theory for example, extremely difficult in virtual teams. Likewise, virtuality may make rewarding individuals (which is a common mode in many organizations) more precarious due to the increased needs for cohesion and mutual accountability, and interdependence.

Finally, when informal networks of relationships within a team don't coincide with a formal structure of an organization, conflict may ensue. Control mechanisms to ensure structural alignment can help, but strict mechanisms (e.g., formal contracts) actually appear to signal the absence of trust and can hamper its emergence. Equally as challenging, it is more difficult to assign monetary values to costs/benefits not easily quantifiable in order to determine return on investment in virtual teams, particularly for the ancillary benefits of virtuality.

BEST PRACTICES FOR VIRTUAL TEAM EFFECTIVENESS

The many disadvantages may seem to paint a grim picture for virtual collaboration. But quite the contrary may be true. By identifying the key potential challenges, we call attention to the areas of opportunity for improving virtual team effectiveness. We discuss these here in the format of best practices for virtual team leaders, members, and facilitators.

Lessons for Leaders

Conduct a limited number of critical face-to-face meetings. A face-to-face introductory meeting in which members develop a charter, norms, roles and deliverables is particularly important. At the very least conduct a one-day video conference to kick off the team, in order to help establish trust that will encourage the recognition of conflict and the use of

positive conflict-management strategies. Immersion training is an important component of the first meeting, and should include a practice task or business simulation to help establish a pilot to learn from and some early successes.

Even after initial formation, maintain a regular schedule of face-to-face meetings, rotating team meeting sites. Encourage and initiate travel by members to other locations. In addition to discussing goals, work processes, and progress, devote time in meetings and during travel to personal network building. In general, the team should meet face-to-face with a regular rhythm, such as every three to four months, for two to three days at a time. Further, person-to-person interactions – key for sensemaking – gradually move from ad hoc meetings and informal hallway discussions to a combination of synchronous and asynchronous electronically mediated communication. Synchronous interaction (both face-to-face and virtual) should be scheduled far in advance.

Create goal alignment across organizational boundaries. Make sure the team's activities and output are aligned with both local and global objectives, and that from the outset there is strong agreement about high-level goals. Ensure that each location has full input into the processes and systems for defining products, projects, architectures, and strategies, as well as ongoing feedback and influence as work evolves. Pay attention to the larger organization and project structure. Does it support virtual teaming? Flatter structures that encourage rationality, reasoning, and assertiveness are recommended. Managers should develop and safeguard team structures that are as flat as possible, dividing responsibilities and authority among team members and allowing the teams to decide on their inner dynamics and procedures. Decentralized approaches coupled with explicit leadership roles that address expectations regarding hierarchy and shared norms around decision making facilitate trust and shared

understanding. Make sure that equity, fairness, and a sense of procedural justice is maintained across parties all involved in the virtual-teaming effort.

Lateral communication mechanisms appear to be particularly critical to ensure links among the different segments of the organization or project, and smooth lateral flow of information creates optimal levels of risk and interdependence that help to establish trust. Each of the different elements of a new product development system, for example, must be aware and connected to the larger system, and the larger system must be responsive to and able to incorporate the knowledge that is generated in the various subunits.

Finally, the overall business strategy is a key means of aligning the subunits – it relates the loose configuration of teams and projects to the larger system, provides direction and meaning to work, and also determines what knowledge needs to be acquired, generated and leveraged (Zack, 1999). A strategic activity core to building innovative capacities, for example, is determining the role of each of the units and/or members and what they contribute to the overarching strategy. Knowledge-sharing priorities, encoding (preparing and labeling), and priorities for reuse of knowledge between the team and the firm must also be established. Finally, to build internal team alignment, consider creating a metaphor to talk about the team's task, as well as a team logo, slogan, and/or letterhead.

Develop infrastructure and technologies that connect dispersed members. The information technology infrastructure is a key part of linking together geographically dispersed activities. At the same time, the best infrastructure is the one that goes unnoticed! In general, knowledge repositories and databases that help develop transactive memory systems (knowledge about who knows what) are extremely helpful and can help establish the knowledge competency and expertise needed to build trust. Develop an infrastructure to capture a team's history in order

to share conflict management norms and patterns. Also ensure that the team has adequate resources for appropriate technology and for meetings. Ensure that task, social and contextual information is included in the sharing and storage of information.

Not all technologies are appropriate for all teams; technology use should be matched to the nature of the team's task, the stage of development of the team, and the broader organizational context. Teams should conduct a technology and infrastructure assessment when deciding on which technologies to use. The transmission capacity (bandwidth), propagation delay (lag between when the information is sent and when it is received), and the degree of shared access required are all important considerations. For example, work-sharing software is important if a team needs to build strong internal networks of relationships for integrating knowledge tasks (such as developing a new product). If a team needs to tap into organizational knowledge in a targeted way, access to knowledge-management technology such as human resource systems, ERPs and data warehousing are important tools. If the team focuses on differentiation tasks (such as establishing a new market), then issues of firewalls and compatibility with external systems becomes important. If the team needs broad and diffuse networks for learning, then access to news services and search technologies is critical externally.

Knowledge complexity should also guide choice of information technologies. For example, tasks that require the team to generate ideas can be accomplished with a structured “chat tool” or an “electronic meeting room.” On the other hand, tasks requiring virtual teams to resolve conflicting views or interests may need transmission of rich information through sophisticated software such as Computer Supported Collaborative Work (CSCW) technologies. Further, team size must be considered. Larger teams (e.g., 10 or more people) are likely to take longer to reach consensus, and may constrain the use of certain applications. For example, at the

time of this writing, Microsoft Netmeeting could not support application sharing among more than about 7 users. Thus, larger teams may need more sophisticated technology to ease the decision process.

Because knowledge relevance changes so quickly, capturing and coding it may not be cost effective. Balance costs of capture and categorization to determine the relevance/cost ratio. Organizational attitudes and practices toward the security of a firm's information resources must be adapted to allow outside access to knowledge archives. Incremental resource commitments can help to manage some sources of risk and potential mistrust. Stability of processes and routines can also help to build infrastructure and trust. In addition to building relationships inside the team, also help the team establish and encourage networks outside the team and with customers to keep on top of changes in context and to serve as back-up to share differences of opinion inside the team. If the team needs strong external ties, face-to-face meetings with external constituencies are advised.

Over the life of the virtual team, technology and infrastructure needs will change. Early on, it is best not to use experimental tools that may frustrate people. Likewise, it is better not to introduce new technologies when deadlines are imminent or at the final stages of a team's lifecycle. Consider introducing the technology for a small pilot project before disseminating it across a range of applications. Another strategy is to introduce collaborative technologies to all employees regardless of virtuality, since many technologies can facilitate co-located collaboration as well as virtual collaboration. It may be useful to perform a technology audit at set points during the team's process to ensure the technology is matched to the various contingencies, and to make certain that new technologies will fit with existing tools. All parties must be convinced that issues of version control, security and data integrity have been resolved.

Establish selection, development, and training programs for virtuality. Help your virtual teams reach their full potential by carefully selecting partner organizations and units, team leaders, and team members. Firms with a reputation of professional integrity and participants with honesty and fairness are a good place to start. In building virtual teams, recognize the special knowledge, skills, and abilities needed to lead and work virtually. Important KSAs include tolerance and understanding of diverse viewpoints (i.e., laterality across functions and culture), interpersonal and team skills requiring new forms of communication and information sharing, self-regulatory skills, and high levels of comfort with technology hardware and software for managing virtual tasks. For members in leadership roles, reliability, consistency, responsiveness, and ethical integrity are particularly important.

Also provide your virtual teams with appropriate training at every stage of team development. Ongoing face-to-face training and learning helps to achieve understanding of tacit elements of knowledge and context. Of particular importance is helping your virtual teams build social capital, use technology effectively, overcome cultural differences, and build communities of practice. Communicating effectively using technology means more than understanding how to transfer knowledge and information. Team members also need training as to how to inspire, motivate, mediate conflict, and develop trust through a variety of communication mediums. For teams that rely primarily on text-based electronic media, training in written communications is especially critical.

Creating “learning cohorts” can help to build formal and informal networks that can be used to promote future knowledge transfer and sensemaking. Establish subject matter experts to help increase information gathering and direct information flow. Transfers and exchanges of personnel may help accomplish some of the internal transfer of expertise needed to build the

overall competencies of the team. Actively rotate people in and out of headquarter locations to develop a working network of contacts and an understanding of the bigger picture. Also implement team training sessions that coincide with customer visits. These practices all serve to help increase mutual perspective taking, that is, an understanding of how one's own behavior impacts those at distant sites with different perspectives. In the initial stages, it is particularly important to have facilitators and trained support staff present during all training to facilitate and solve both interpersonal and technical problems. As work progresses, establish some stability of membership in order to create a high level of commitment among a core in the team and to maintain and transfer knowledge, norms, and expertise. Finally, monitor the use of technologies and the effectiveness of training over the lifecycle of the team. Consider a measure of productivity costs before and after technology and training implementation in order to justify the investment in collaborative technologies and special programs.

Build performance management systems that enable strategic alignment. Create one (or more) team performance template(s) to focus virtual teams and their members on important team outcomes and team processes. Careful development of team performance templates help managers align virtual teams with strategic organizational objectives. Direction, goals, and rewards also help to avoid process conflict and dysfunctional conflict management. Consider complementing the performance templates with a 360-degree evaluation model to provide the developmental feedback for virtual teams and their members essential for continuous improvement.

A key decision is whether to pay for skills and/or performance, and the answer should depend on the level of integration needed, the extent of self-management required, the type of team, and the goals of the performance management system (e.g., attract/retain, motivate,

promote skills/knowledge development, shape corporate culture, define/reinforce structure).

Paying the individual instead of the job and pay for performance approaches that focus on collective performance more than individual performance are potentially the best fit for virtual teams of all types and for multiple performance-management goals. It is critical to use valid team-performance measures as the bases for team recognition and reward. In the final analysis, calibrate prospective return on investment in virtual teams against prior projects, and emphasize whether a virtual team's charter is consistent with your company's bottom line objectives.

Design dynamic systems responsive to changes across contexts. Last but not least, be sure to redefine the task, structure, and policies when conditions change to maintain alignment with organizational strategies, particularly in dynamic environments where contexts change frequently. At a micro level this may mean, for example, negotiating a flexible agenda format for meetings. At a more macro level, this may mean balancing a globally integrated approach with applications in diverse local and industry markets, and across existing and emerging technologies. Technical “road maps,” system architectures, and standard processes for change management can help to initiate alignment, but these frameworks should be dynamic and should respond to what is learned as team activity evolves. An ongoing process for weaving emergent understandings into the formal framework of the system or project should be developed.

Must Haves for Members

Discuss cultural differences and similarities openly. It is particularly important to understand cultural differences in relation to one's own culture. Identify, discuss and elaborate upon your understanding of your own and others' context, and specifically organizational cultures, given that the political culture of the organization and the influence norms it holds have a strong impact on the intensity of political activity in the team. Such discussions should include

both values and work practices. Learn to make inquiries about others' contexts on a regular basis. Discuss cultural differences in influence behaviors openly, and reach a consensus on a comfortable range of such behaviors that are legitimate within the team. In addition to differences, establish similarities across members (e.g., education, goals, fate, etc.). Through consistent and sustained information sharing, identify and develop important commonalities that you share with other members.

Become familiar with each others' competence and unique personal attributes and establish trust. Create opportunities to collect evidence about other members' credibility and trustworthiness. Frequent communication facilitates this. It is important to share each other's view of the team's distributed activities, but to also invest time in showing good will and intimacy. Become familiar with personal needs, concerns interests, priorities and fears of team members to fill in communication gaps. Use storytelling to allow for implicit, complex and contextual information to be shared or "round robin sensemaking" where each member tells what they know about a particular topic. Credibility can also be established through "imitation," that is, trial and error that is critiqued by a mentor. Virtual teams with higher "role performance trust" (e.g., established based on knowledge of competence, reliability, and consistency) perform better.

Communicate frequently using e-mail and other media. Proactive information exchange, regular and predictable communication and verbalization of commitment, excitement, and optimism can help build trust. Therefore, communicate frequently with everyone on the team, including one-on-one interactions. In order to notice conflict early and manage it effectively, document commitments through e-mail. E-mail is more effective in increasing the range, amount and velocity of information and communication of equivocal information

(McKinney et al. 1992), and asynchronous interaction can help make meetings more valued added. At the same time, face-to-face communication is more effective than electronically mediated communication in ambiguous or uncertain circumstances, in socially sensitive conditions, in intellectually difficult situations (Nohria and Eccles, 1992), and for resolving misunderstandings.

Plan advanced technology use carefully. Make sure all members have sufficient access to repositories and adequate bandwidth (computer functionality) to run the collaborative tools selected by the team. E-mail and multi-point audio conferencing are currently the most widely available, reliable, and cost-effective tools being used by most virtual teams, and they can be used throughout the entire life cycle of a virtual team. Balance concerns with security and information sharing, and recognize that there are different norms around these issues. Where possible, utilize multimedia methods of capturing the content of meetings and exchanges, including documents, audio, visual, and databases. Utilize shared workspaces and websites (electronic places all members can access) to communicate, share, and store documents in order to increase shared understanding, and also to help reinforce team identity. Include aspirations, norms and procedures. Create and integrate search and retrieval processes such as an index of standard key words.

Develop communication norms that facilitate technology use and bridge differences. To minimize process-related conflict, agree on times when it is reasonable to call, appropriate communication media and contact information, documentation procedures, and meeting schedules. Develop protocols for expectations around team meeting attendance and punctuality, timeliness of input and feedback to each other and advanced preparation. Encourage members to highlight important parts of long messages as well as questions in the body of an e-mail or in a

phone message. Active listening, that is, frequent requests for elaboration and clarification, can help overcome intercultural challenges to building trust. Listening for key ideas and common themes across members is important, as is the ability to “frame” messages. Framing involves taking the other’s point of view.

Responses are equally as important as the original message sent in creating a supportive communication climate that encourages the safety to share ideas early in their development and take risks that lead to innovation. A response is an endorsement that you are willing to take the risk of interpreting the sender’s message, supply the missing elements, and make it understandable in your own terms. Further, responses are trusting behaviors that indicate involvement, which in turn conveys intimacy, affection and commitment. “Following-up” by accurately repeating a communicator’s message in a timely manner can also go a long way to establishing a supportive communication climate in virtual teams.

Philosophies for Facilitators

Provide a human link. Consider yourself the human link that administers, coordinates, and facilitates meetings and networks. Keep tabs on the effectiveness of communication and intervene when puzzles, misunderstandings, or problems arise. Utilize “shuttle diplomacy” for particularly sensitive issues, in which you conduct a series of one-on-ones with each member, integrate, and feed back information to the team.

Intervene to maintain on-going communication. Do not allow communication to lapse or become sporadic. Watch for member withdrawal or infrequent/sporadic participation. Ensure that interaction encompasses task, social and contextual information, including member whereabouts, availability, progress, local events, personal developments, and deviations from

plan. Disseminate information about team members (i.e., biographies, resumes, photos, internet pages) to facilitate development of social knowledge and trust.

Minimize politics and identify conflict early and proactively resolve it. Less socially acceptable influence tactics and high prevalence of organizational politics are related to negative attitudes and behaviors and to deficient performance at the individual, team, and organizational levels. Good logic presented in a rational manner is almost always sufficient to run the team. At the same time, recognize that political activities do occur in virtual teams even if in a milder or less intense manner. Help virtual-team members focus on noticing conflict and identifying it in its early stages. Use face-to-face meetings to resolve relationship conflict. Frequently stop discussions to check that all understand what is being said the same way. Pair up conflicting team members to create partnering. Avoid secretive or selective operations and personal blaming when things go wrong. Encourage team members to give each other the benefit of the doubt.

Develop roles, sponsors and champions that value virtual teaming. Finally, it is critical to assign experts to particular domains of information, since teams recognize more unshared information when group members are assigned such roles (Stewart and Stasser, 1995). Help to recognize and work with "gatekeepers" in the set of virtual collaborators that serve as key links between subgroups, bridging differences and "filling structural holes." Senior sponsorships help raise the importance of the team's work in the eyes of team members and re-focus team members on the work of the virtual team.

FINAL WORDS OF WISDOM

Armed with knowledge of what makes virtual teams special, key advantages and disadvantages, and the most critical tools for improving virtual-team effectiveness, we believe the vast majority of people involved in collaboration have much to gain from virtuality. We have witnessed the benefits of virtual teaming firsthand in our own collaborations and those of our research participants. We wish you the same in your virtual endeavors.

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