

# **Virtual Workgroups: Hidden Challenges to Supporting Distributed Teams**



**WEST POLE**

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## *Summary*

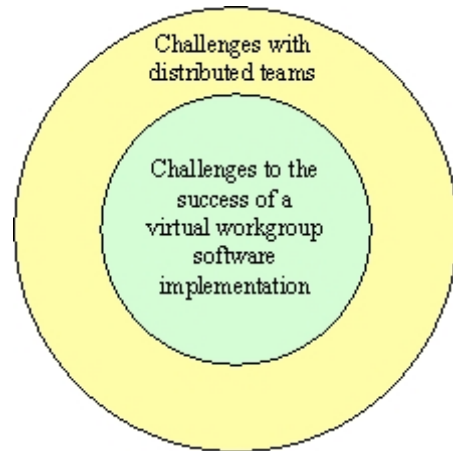
Project teams are often distributed geographically, commonly spanning multiple time zones, working environments, cultures and languages. Effectively leveraging dispersed resources yields significant returns for organizations, yet executing initiatives within a distributed environment presents significant challenges. There is broad agreement that collaborative software is critical to the effectiveness of distributed teams, however most implementations meet with only limited success.

How can an organization improve the effectiveness of distributed teams? It is our experience that organizations tend to neglect certain issues that are critical for the success of any collaboration tool, virtual workgroup solution, or other support for distributed teams.

Virtual workgroups can be difficult to understand because there are layers of challenges associated with them.

First, there are unique challenges facing distributed teams that arise from the loss of rich social and physical interactions. These are the challenges most virtual workgroups have been created to address.

Second, a new layer of challenges arise as virtual workgroup software is introduced within an organization. These are the “hidden challenges” commonly overlooked by organizations. These challenges are not easily solved by the introduction of additional technology, and must be addressed through efforts at the management and organizational level.



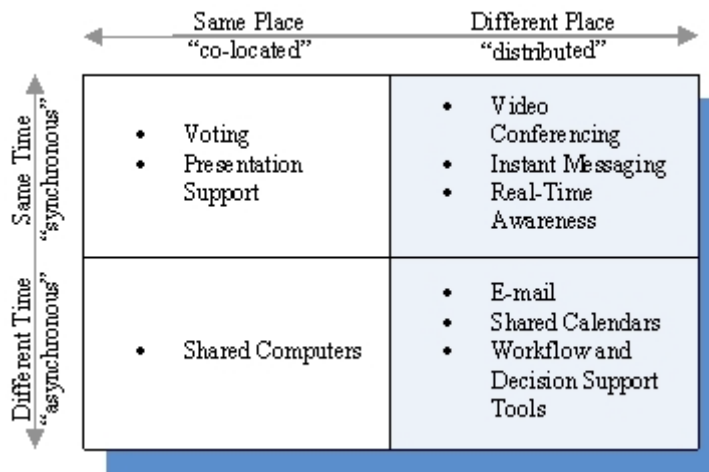
The goal of this paper is to raise organizational awareness of often overlooked challenges that impact the success of virtual workgroups.

As demand for more effective and less space-dependent collaboration increases, understanding the challenges presented by distributed work will allow organizational leaders to make more informed decisions with respect to supporting the needs of their distributed project teams.

## *Introduction*

Information technology devices connected over networks provide the conceptual and physical sub-structure for the family of tools generally known as groupware.

“Groupware is software designed to run over a network in support of the activities of a group or organization. These activities can occupy any of several combinations of same/different place and same/different time. Groupware has been designed for all of these combinations” (see Figure 1)<sup>1</sup>.



**Figure 1. Time and Place Matrix**

For the purposes of this paper, we refer to the sub-set of groupware focused on supporting distributed teams as Virtual Workgroup Software (VWS); where “virtual” refers to the non-physicality of the team workspaces that typically include access to project material and use of collaborative tools.

The language surrounding VWS can be ambiguous. Many organizations make claims about incorporating “collaboration” into their current business practices; however the term “collaboration” can mean different things. A categorization of the meanings might be as follows:

- To work on shared content with remote co-workers, either simultaneously, or by handing-off the content, through email or through some shared repository or workspace,
- To share information with an audience, such as when training or presenting to remote colleagues,
- To work on projects with different departments within a business,
- To work with other companies on projects, either with traditional partners, or with companies that have previously been considered competitors.

<sup>1</sup> Olson, G., and Olson, J. (2002) *Groupware and Computer-Supported Cooperative Work* (pp.683-595). In Jacko, J. A., Sears, A. (Eds.), *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*, Lawrence Erlbaum Associates.

This paper focuses on the first definition and the tools and practices used to support virtual workgroups. Additionally, VWS products address various levels of collaboration “maturity”:

- Lower-level maturity involves collaboration through existing communication tools, such as email, fax, simple un-integrated document management, and teleconference,
- Middle-level maturity includes virtual workspaces with integrated document management,
- Higher-level maturity involves entire product life-cycle process management and integrated knowledge management.

This paper focuses primarily on understanding those middle-level functionalities concerned with shared workspaces and context for project teams. The discussion presented here serves as a stepping-stone to understanding the foundational environment necessary for supporting distributed product life-cycle process management and knowledge management.

## ***Benefits of and Challenges to Distributed Teams***

### **Benefits of Distributed Teams**

There are many good reasons for organizations to enable successful distributed teams. If executed properly, distributed teams can maximize human asset utilization and deliver an excellent return on investment. Benefits include:

- Reduced need for costly travel and relocation, when a project team is comprised of employees from multiple locations
- Increased organizational flexibility by creating and disbanding distributed teams quickly on an as-needed basis
- Efficient collaboration by key personnel on multiple teams, in various locations without their having to be physically present
- Business presence in multiple locations
- Continuous productivity across multiple time zones

These benefits are driving the growing understanding by software vendors of the importance of providing collaboration support.<sup>2</sup> For example, Microsoft’s acquisition of Groove Networks Inc., the creators of a much-heralded peer-to-peer workgroup collaboration platform, is evidence of the “mainstreaming” of these

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<sup>2</sup> Coleman, D., and Antila, D. (2004) *Enterprise Collaboration: Creating Value through Content, Context and Process*, <http://collaborate.com/publication/ecollaboration.pdf>

critical tools. Together, web conferencing, corporate instant messaging, and web sites for team collaboration are expected to generate revenue of \$1.8 billion in 2005.<sup>3</sup>

### Challenges to Working at a Distance

*“Face-to-face conversation provides a richness of interaction seemingly unmatched by any other means of communication”.*<sup>4</sup>

The benefits of distributed project teams are associated with a cost. The interactions between distributed team members are disadvantaged due to the absence of the rich social communication and coordination that is only possible when team members are co-located.

These problems are fairly well known, and have been addressed to varying degrees of success by VWS vendors. Understanding these challenges is essential for evaluating the effectiveness of a VWS solution. The challenges facing distributed teams that arise from the loss of rich social and physical interactions include:

*Problems related to the team’s social functioning:*

1. During distributed meetings or conversations, team members have limited access to the social cues that are apparent in a co-located interaction. For example, team members wanting to observe a colleague’s reaction to a comment can quickly glance in her direction.<sup>5</sup> The loss of this awareness of social cues can be very difficult for distributed teams.
2. Distributed team members are limited in the spontaneous interactions that can occur with other team members. This is exacerbated when there is little real-time overlap between team members’ workdays.

*Problems related to coordination of the team’s work:*

1. Unlike a co-located team, distributed team members cannot easily observe what other team members are working on by simply stopping by their desk, or otherwise receive environmental clues as to what tasks are underway, what documents are in progress, or what the status of an activity is.
2. Relative to face-to-face interaction, coordinating the assembly and review of deliverables can be cumbersome for distributed teams. In distributed

<sup>3</sup> Green, J., (2005) *Combat Over Collaboration*, BusinessWeek Online, April 18, [http://www.businessweek.com/magazine/content/05\\_16/b3929092\\_mz063.htm](http://www.businessweek.com/magazine/content/05_16/b3929092_mz063.htm)

<sup>4</sup> Hollan, J., and Stornetta, S. (1992) *Beyond Being There*, Proceedings of CHI '92.

<sup>5</sup> Olson, G. M., and Olson, J. S. (2000) *Distance Matters*, Human Computer Interaction, 15, 139-179.

environments, communication relies on lower-bandwidth channels (e.g., phone, email) and is constrained by transaction delays.

3. Distributed projects often generate a significant amount of fragmented, but vital content. It is common for critical project information to be stored in the email systems of team members. If the project information is not stored or organized with an eye towards discovery or retrieval, significant inefficiencies result. This is most noticeable when new members join a project team, and are faced with discovering and assimilating the project-critical information.
4. To operate efficiently, distributed team members must manage their project documents electronically. This presents numerous challenges, including version control, user access and digital rights management.

The groupware literature often refers to the interactions between distributed workgroup members as having to go through “impoverished” channels to communicate.

And because those interactions tend to be in direct support of real work getting done, recovering from the loss of those rich interactions has been a central focus of VWS vendors.

### **How Virtual Workgroup Solutions Help**

VWS solutions have attempted to respond in different ways to the problems outlined above. The most notable solutions can be thought of as either aiming to contextualize the group activities into a shared workspace, or to improve transparency so that team member activity can be better perceived.

#### *Contextualize*

Using a shared team workspace to contextualize the resources and information related to a project serves to greatly reduce time spent searching for, understanding, and managing project-related material (e.g., all drafts of documents and other deliverables, discussion items, project management timelines and milestones, scheduling, etc.). Moving files into a common area can also benefit from integration with a document management system that provides document control (checkout, locking, etc.) to allow groups to collectively author shared documents, while trusting that the content within the workspace is the official copy (see “Common Ground” in the next section).

Social interactions are also given support through contextualizing, by providing the team members a shared “location” where they can “go” to keep in contact with other project members. Team members using shared work environments often begin to behave as if they are in a shared physical space; referring to items

in that common space when in conversation with other team members. By capturing project discussions in a persistent project workspace for team members to easily review related conversations on a topic, a team's efficiency and speed of decision-making can be increased. Shared workspaces may also offer group voting mechanisms that provide a degree of simple decision support, making question-response interactions much more efficient than when conducted over email.

### *Improve Transparency*

VWS can provide awareness into the team's work activity and state, allowing quick overviews of project status, like the flag on a mailbox, signaling to the team what state a deliverable is in. These signaling features are also useful for reducing duplication of effort and improving opportunities for coordination between co-workers.

The opportunity for ad hoc interactions increases when transparency reveals the location, presence, or activity of team members. These ad hoc interactions are often unforeseen catalysts in moving projects forward. For example, instant messaging tools that incorporate awareness features improve visibility into what team members are engaging the project. These online team members are made available for the quick, lightweight interactions that allow synergistic, collaborative work to arise. Much like bumping into a co-worker in the hall can trigger a conversation or be a reminder to execute an action item, seeing a co-worker's virtual presence through an awareness feature can stimulate a comparable exchange.

The support provided by VWS for the interactions between distributed teammates is also useful in facilitating interactions between co-workers in the same location. VWS is more than a replacement for lost face-to-face communication, in that it provides additional functionality not directly supported by face-to-face encounters. This functionality includes the ability to manage schedules, discover ephemeral interest groups, have anonymity, conduct semi-synchronous discussions, and transfer files.<sup>6</sup> These beneficial side effects have made VWS standard issue for both distributed and co-located teams in many organizations.

## ***Challenges to the Success of a VWS Implementation***

“Over the last 10 years, Computer-Supported Cooperative Work (CSCW) has identified a base set of findings... they argue that human activity is highly flexible, nuanced, and contextualized and that computational entities such as information transfer, roles, and policies need to be

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<sup>6</sup> Hollan, J., and Stornetta, S. (1992) *Beyond Being There*, Proceedings of CHI '92.

similarly flexible, nuanced, and contextualized...(but) we do not know how to build systems that fully support the social world uncovered by these findings...(this is) the social-technical gap...the divide between what we know we must support socially and what we can support technically”.<sup>7</sup>

Though some challenges that arise from working in distributed teams can be addressed through technology, there are just as many which cannot be. These “hidden challenges” are often bound up with the social and cultural structures of an organization, and thus require management or organizational level attention. They include:

- Conflicting incentives
- Tightly coupled work
- Insufficient adoption
- Lack of trust and common ground
- Inadequate social conventions
- Insufficient management support

### Conflicting Incentives

If the virtual workgroup solution requires participation which in some way runs counter to the incentives currently driving team members’ activities, then the VWS is not likely to succeed. Incentive structures can be difficult to be aware of, largely because we take their presence for granted in our social environments. Many VWS implementations have failed because pre-existing incentive structures were not considered.

*“No technology will facilitate improved collaboration among people who are implicitly or explicitly discouraged from collaborating”.*<sup>8</sup>

A famous study of groupware looks at the failed adoption of Lotus Notes within a consultancy, and one of the reasons for that failure was that time spent learning Notes was perceived to be “non-billable hours” by the consultants, and thus they were reluctant to spend time on it.<sup>9</sup> Here, the organizational culture created

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<sup>7</sup> Ackerman, M. S. (2001) *The Intellectual Challenge of CSCW: The Gap Between Social Requirements and Technical Feasibility*. In John Carroll (Ed.), *HCI in the New Millennium*, Addison-Wesley.

<sup>8</sup> Ozzie, R. and O’Kelly, P (2003) *Back to the Future*, <http://www.groove.net/contact/b2f-download/>

<sup>9</sup> Orlikowski, W (1992) *Learning from Notes: Organizational issues in groupware Implementation*, Proceedings of the Conference on Computer Supported Cooperative Work. 362-369.

incentive structures that inhibited the organization's ability to adopt a desirable collaboration technology.

Issues of credit and authorship, intellectual property and ownership, and other reward/punishment structures within an organization need to be examined to see where they might influence use of the virtual workgroup software. "There (is) no incentive to share one's best ideas if they if they were then going to be seen as common, no longer unique".<sup>10</sup>

Conflict can also arise in goal alignment between different locations and sub-groups within a workgroup itself. As part of the initial formation of the group, team members would do well to meet, discuss and agree on priorities for project goals and insure incentives are in place to achieve those goals.

### **Tightly Coupled Work**

Different types of work are more successful than others when undertaken within virtual workgroups. One useful way of distinguishing between different types of work is to employ the concept of coupling, which refers to the decomposability of the communication that must take place to do the work. "Tightly coupled work is work that strongly depends on the talents of collections of workers, and is non-routine, even ambiguous. Components of the work are highly inter-dependent. The work typically requires frequent, complex communication among the group members, with short feedback loops and multiple streams of information. In contrast, loosely coupled work has fewer dependencies or is more routine".<sup>11</sup>

Tightly coupled work is very difficult to do in distributed teams. VWS and other groupware today does not provide the fidelity of interaction needed to be aware of and resolve ambiguity and otherwise traverse the complex interactions needed for tightly coupled work. Companies can work with these tendencies by structuring "the work organization so that ambiguous, tightly coupled work is collocated. Long-distance dependencies have to be straightforward and unambiguous to succeed. Furthermore, the more formal the procedure to enact the communication (e.g. making it clear who's responsible in an emailed request sent to many people, or that all requests are acknowledged, as in airline pilot communication), the more likely the success".<sup>12</sup>

If tightly coupled work must be done within a distributed team, an organization might improve communication and mitigate project risk by having additional face-to-face meetings for its team members.

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<sup>10</sup> Olson, G. M., and Olson, J. S. (2000) *Distance Matters*, Human Computer Interaction, 15, 139-179.

<sup>11</sup> Ibid

<sup>12</sup> Ibid

### **Insufficient Adoption**

Getting the members of teams to adopt the VWS is obviously essential for the success of the implementation. Many VWS need to achieve a critical mass before the value of the tool will be realized. Critical mass is related to Metcalf's law, which states that the value or power of a network increases in proportion to the square of the number of nodes on the network. For example, a scheduling tool is only useful for the whole group if everyone uses it. Reducing barriers to adoption, so that the critical mass can be reached, is an important focus of those implementing a VWS.

VWS can fail to be adopted because it is not advantageous to any particular individual to use it. Associated with incentives is the perceived ratio of value provided by a VWS solution and the effort expended to use it. There is often a disparity in this work/benefit ratio, which may require labor from employees who do not perceive any value from its adoption.<sup>13</sup> Where this disparity exists, some users will take advantage of the work of others and enjoy the benefits of the system, while not contributing. This partial adoption is a common sub-optimal state for many VWS implementations.

A solution to a work-benefit disparity is to design the system so the work is either automated or is balanced between users, such as the way Microsoft Outlook automatically enters new accepted meetings into the user's calendar.

Whenever possible, it is a useful approach to attempt to include groupware functionality within (or tightly integrated with) an already accepted application, instead of creating a new. In this way, the acceptance and familiarity of the existing tool is leveraged to gain the adoption of the new VWS functionality. For example, in many organizations the most used collaboration tool is Outlook, and any VWS introduced into such an organization might struggle, and perhaps be doomed to failure, if the solution does not integrate smoothly with Outlook's functionality.

Insufficient adoption can also arise from the existence of redundant groupware solutions within the organization, each with success in a niche, but without benefits that span the entire organization.

### **Lack of Trust and Common Ground**

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<sup>13</sup> Grudin, J. (1994) *Groupware and social dynamics: Eight challenges for developers*, Communications of the ACM, New York, v37.

***Virtuality requires trust to make it work: Technology on its own is not enough.***<sup>14</sup>

In team situations, group members need to rely on each other to efficiently accomplish team goals. Because of this reliance, each member takes on the risk of their uncertainty regarding every other team member's ability to perform. Team members make this risk acceptable by developing trust between each other. Without this trust, a collection of individuals is not likely to gain the efficiencies of performing as a team.

When distance is introduced to the team relationships, trust-related concerns become evermore important. Without the situational and interpersonal feedback one gets from face-to-face encounters with team members, it is difficult, though not impossible, to establish or maintain the trust needed for a project team to function.<sup>15</sup>

As with any group that has members who are working together for the first time, providing resources to allow face-to-face meetings for the initial kick-off and critical decision points will help establish common ground and support for tightly coupled work. These opportunities for establishing trust can be the difference between a successful team and a team that never quite gets off the ground.<sup>16</sup>

***“Different cities, different cultures, different mindsets, and no water cooler to create a gestalt or de-ruffle feathers”.***<sup>17</sup>

Related to trust is the common ground that comes from confirming that all parties are talking about the same things – it is a trust that a team member will be understood and that shared references or goals exist. Both co-located and distributed teams need to establish these common goals, processes for interacting and communicating, and procedures for undertaking the project work.<sup>18</sup>

VWS enable shared workspaces and the material within them to serve as common ground for team member discussions. However there are numerous other areas that are vulnerable to a lack of common ground, the most notable having to do with discrepancies between assumptions, process and vocabularies used by group members.

From data sharing to domain knowledge, making sure process and vocabulary assumptions are surfaced and resolved within the team is very important. This includes confirming “whom will communicate with whom, how often, and by

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<sup>14</sup> Handy, C. (1995) *Trust and the Virtual Organization*, Harvard Business Review, May-June, 40-50

<sup>15</sup> Olson, G. M., and Olson, J. S. (2000) *Distance Matters*, Human Computer Interaction, 15, 139-179.

<sup>16</sup> Ibid.

<sup>17</sup> Adams, E. (2002) *The Art of Business: Mastering Virtual Project Management*. Creative Pro, May 20, <http://www.creativepro.com/story/feature/16643.html>

<sup>18</sup> Weick, K. E. (1969). *The Social Psychology of Organizing*. Reading, MA: Addison-Wesley.

what mechanism”.<sup>19</sup> Lip service is often paid to creating documents, such as communication covenants or glossaries, to house these agreements, but they are of great importance in distributed teams because the social cues that allow for repair of misconceptions are less available and situations easily arise where incorrect presumptions about meaning and intent plague group communication.

### **Inadequate Social Conventions**

“Groupware may be resisted if it interferes with the subtle and complex social dynamics that are common to groups... Often unconsciously, our actions are guided by social conventions and by our awareness of the personalities and priorities of people around us, knowledge not available to the computer”.<sup>20</sup>

When teams are interacting remotely, social conventions that support effective communication need to be explicitly encouraged and practiced to account for the loss of natural social cues that groups normally rely on when face-to-face, and to counter the sometimes socially disruptive influence of groupware.

These social practices can come in the form of habits of preparation, regular access to specific information sources by the entire group, and attention to the information needs of others<sup>21</sup>; as well as establishing explicit, ritualized ways to factor in small satellite groups.

### **Insufficient Management Support**

Management is faced with evaluating and making decisions regarding VWS within the organization. This evaluation is quite difficult given the complex and interconnected challenges facing VWS implementations.

“Evaluation (of groupware) takes longer. Much of a person’s use of a graphics program can be observed in a single hour, for example, but group interactions unfold over days or weeks.... Field observations are complicated by the number of people involved over time at each site, the variability in group composition, and the range of environmental factors that affect the use of technology”.<sup>22</sup>

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<sup>19</sup> Olson, J., and Olson, G. (2004) *Culture Surprises in Remote Software Development Teams* ACM Queue vol. 1, no. 9 - December/January

<http://www.acmqueue.com/modules.php?name=Content&pa=showpage&pid=105>

<sup>20</sup> Grudin, J. (1994) *Groupware and social dynamics: Eight challenges for developers*, Communications of the ACM, New York, v37.

<sup>21</sup> Olson, G. M., and Olson, J. S. (2000) *Distance Matters*, Human Computer Interaction, 15, 139-179.

<sup>22</sup> Grudin, J. (1994) *Groupware and social dynamics: Eight challenges for developers*, Communications of the ACM, New York, v37.

When management finds evaluating VWS difficult, they may have trouble explaining the total value of the VWS. This risk of uncertainty of value increases the possibility that management might need to withdraw their support for the VWS implementation. As most people are not trained or experienced with

evaluating VWS, management will likely need to learn and/or accept new methods for evaluating VWS.

*Clearly, the main challenge is change management... It's not a big deal to find a solution from a technology standpoint, but you are changing the day-to-day life and working behavior of everybody within the entire organization.*<sup>23</sup>

Having management and organizational support is essential to insure the effort has the financial, technical and management resources it needs to thrive.<sup>24</sup> This support is so essential partially because organizational change needs to be initiated and social practices need to be established or reworked as a result of the introduction

of the VWS. Management is needed to provide leadership and a cohesive vision for collaboration, which employees can draw from as they redesign their work to include their virtual workgroups.

## Conclusion

*The first step toward more efficient and effective leverage of connection technologies is to understand and appreciate the inherent complexity in how people communicate and collaborate.*<sup>25</sup>

The challenges mentioned above will lessen as organizations develop a mature understanding of how VWS augments and impacts their work environment.

A successful VWS implementation is not a simple matter of finding and installing the right technical solution, no matter how good it is, as challenges remain:

- Strong and effective management support is needed to provide vision and support implementation
- Incentives to use the VWS must be aligned with existing organizational, cultural, and professional incentives already guiding individual and group behaviors
- Social practices need to be cultivated to compensate for the loss of natural social cues when interacting through the limited communication channels of the VWS
- Barriers to adoption need to be removed to insure a critical mass of users in the organization embrace the VWS

<sup>23</sup> Thayer, A. M. (2002) *E-Collaboration*, Chemical & Engineering News, v80, num 36, pp.16-19, <http://pubs.acs.org/cen/e-business/8036/8036bus1a.html>

<sup>24</sup> Mark, G., Grudin, J., and Poltrock, S. (2000). *Virtually Collocated Teams in the Workplace*.

<sup>25</sup> Ozzie, R. and O'Kelly, P (2003) *Back to the Future*, <http://www.groove.net/contact/b2f-download/>

- Adequate resources must be dedicated to resolving any lack of trust between group members, or lack of common ground with regards to use of vocabulary or expectations of process or goals
- The work that is distributed needs to be organized and assigned so that the minimal amount of tightly coupled work is being conducted over a distance

As distributed work becomes more common, and organizations continue to globalize operations, it will become ever more essential for organizational leaders to be able to make informed decisions about supporting the needs of their distributed project teams. Understanding the challenges described above will provide the ground upon which organizations can build support for successful distributed teams.