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Frank Siebdrat, Martin Hoegl and Holger Ernst

How to Manage
Virtual Teams

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Large multinational corporations like SAP must frequently assemble teams of people who work at different geographic sites. What's the best way to manage such dispersed groups?

How to Manage Virtual Teams

Dispersed teams can actually outperform groups that are colocated. To succeed, however, virtual collaboration must be managed in specific ways.

BY FRANK SIEBDRAT, MARTIN HOEGL AND HOLGER ERNST

TEAMS ARE THE typical building blocks of an organization: They provide companies with the means to combine the various skills, talents and perspectives of a group of individuals to achieve corporate goals. In the past, managers used to colocate team members because of the high levels of interdependencies that are inherent in group work. Recently, though, more and more companies are beginning to organize projects over distance, with teams increasingly consisting of people who are based in dispersed geographical locations, come from different cultural backgrounds, speak different languages and were raised in different countries with different value systems.

Over the past 10 years, various studies have investigated the differences in performance of colocated and dispersed teams, quietly assuming that members of the latter never meet in person and members of the former work together in the same office throughout a project. But dispersion is not

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THE LEADING QUESTION
What do managers need to know about virtual teams?

FINDINGS

▶ The overall effect of dispersion (people working at different sites) is not necessarily detrimental but rather depends on a team's task-related processes, including those that help coordinate work and ensure that each member is contributing fully.

▶ Even small levels of dispersion can substantially affect team performance.

▶ When assembling a virtual team, managers should carefully consider the social skills and self-sufficiency of the potential members.

only a matter of degree; it is also a matter of kind. Most teams are dispersed on some level. They can be spatially separated (from "across the hall" to "scattered worldwide"), temporally separated (spanning different time zones), configurationally uneven (for example, five members in one location and two in another) and culturally diverse. And as past research has repeatedly shown, even the smallest degrees of dispersion, such as working on different floors in the same building, can greatly affect the quality of collaboration.[1] In our own study, we have investigated the performance of 80 software development teams with varying levels of dispersion, including those with members in different cities, countries or continents. (See "About the Research.") Such geographically distributed teams have commonly been referred to as "virtual" teams,[2] but that label is some-

ABOUT THE RESEARCH

We studied 80 software development teams from 28 labs worldwide (including labs in Brazil, China, Denmark, France, Germany, India and the United States). The labs varied in size (employing between 20 and 5,500 software developers), and each team contained up to nine members. Our research included those software development projects that were completed within 12 months prior to data collection. A total of 392 managers, team leaders and team members participated in the study, and data from multiple respondents were used to ensure the validity of results and to overcome common method bias.

To measure geographic distribution, we used the descriptions provided by team leaders to identify each member's office location. We then calculated a dispersion index taking into account the following factors: (1) miles between team members, (2) time zone difference, (3) number of locations per team, (4) percentage of isolated team members and (5) unevenness of membership across sites. To assess team performance, managers were asked to evaluate the teams with respect to effectiveness (in terms of product quality, reliability, usability, customer satisfaction and so on) and efficiency (in terms of adherence to preset budget and schedule constraints).

thing of a misnomer, because these groups are very real with respect to the work they can accomplish. We found that virtual teams offer tremendous opportunities despite their greater managerial challenges. In fact, with the appropriate processes in place, dispersed teams can significantly outperform their colocated counterparts.

The Bright and Dark Sides of Dispersion

A team's level of dispersion is neither preordained nor fixed; rather, it is an organizational design parameter that companies can set and adjust. When making such decisions, managers should take into

consideration the various pluses and minuses of separation. (See "The Pros and Cons of Dispersion.")

Not surprisingly, several studies have found that collaboration across distance is more difficult than in a colocated environment. Potential issues include difficulties in communication and coordination, reduced trust, and an increased inability to establish a common ground. In contrast, proximity tends to promote more frequent communication and the development of closer and more positive interpersonal relationships. Indeed, the regular physical presence of coworkers improves people's feelings of familiarity and fondness, and frequent informal interactions serve to strengthen social ties. Conversely, physical distance decreases closeness and affinity, which then leads to a greater potential for conflict. Distance also brings with it other issues, such as team members having to negotiate multiple time zones and requiring them to reorganize their workdays to accommodate others' schedules. In such situations, frustration and confusion can ensue, especially if coworkers are regularly unavailable for discussion or clarification of task-related issues.

On the other hand, dispersion potentially has substantial advantages. First, in order to accomplish increasingly complex activities such as research and development, companies (particularly larger ones like IBM, General Electric or SAP) tend to cluster their competencies in different centers of excellence, which are often scattered geographically although part of an international corporate network of operations. SAP Aktiengesellschaft, for instance, has its global headquarters in Walldorf, Germany, but has built up large R&D centers in India, China, Israel and the United States in order to reduce costs and leverage their global know-how in software engineering. Within each of these competence centers, the depth of expertise tends to be very strong, while the diversity of functional backgrounds is relatively weak because of specialization. Managers can take advantage of this organizational structure by assembling employees from different locations in such networks to create a team that can optimally integrate the different pools of expertise to perform a particular task.[3]

Second, companies can take advantage of the increased heterogeneity that is inherent in the nature of dispersed teams. Virtual teams tend to

incorporate higher levels of structural and demographic diversity than do colocated teams, and both types of diversity can be highly beneficial.[4] Structural diversity is a direct consequence of having team members from multiple locations associated with different business units and reporting to different managers. Such diversity can be highly valuable for teams, because it exposes members to heterogeneous sources of work experience, feedback and networking opportunities.[5] In addition, virtual team members are often diverse in nationality. Although such diversity may complicate team dynamics, it can also enhance the overall problem-solving capacity of the group by bringing more vantage points to bear on a particular project.[6]
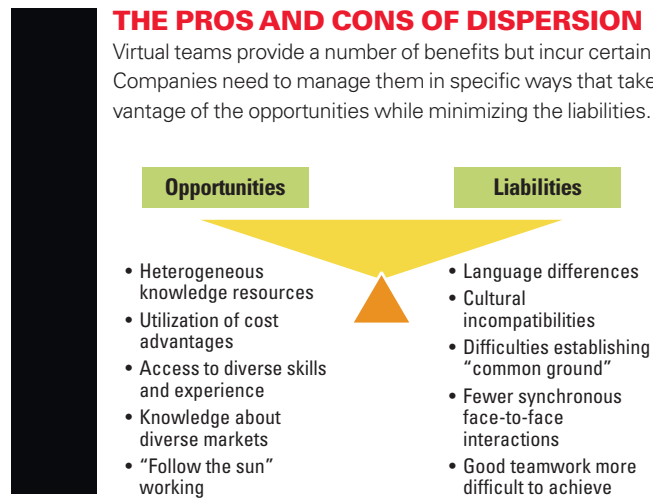
Performance of Dispersed vs. Colocated Teams

Most past studies have found that dispersion hurts performance.[7] Often, dispersed teams fail to perform important processes effectively and are therefore unable to realize their potential. But given the fact that virtual teams have become an increasing reality for many companies, it behooves managers to understand how to maximize the benefits of dispersion while minimizing its disadvantages. Thus, our research investigated two fundamental questions: (1) When do virtual teams outperform colocated ones? and (2) how should companies manage dispersed teams? To answer these questions, we studied software development teams from 28 different labs in countries including Brazil, China, Denmark, France, Germany, India and the United States. From that broad survey, we found that the key drivers of performance are certain crucial team processes that, for example, help coordinate work and facilitate communication among members. In fact, we found that virtual teams with such processes can outperform their colocated counterparts, and that was true even for colocated teams with the same high levels of those processes.

In general, team processes can be classified into two categories: task-related — including those that help ensure each member is contributing fully; and socio-emotional — including those that increase the cohesion of the group. Our study found that

THE PROS AND CONS OF DISPERSION
Virtual teams provide a number of benefits but incur certain costs. Companies need to manage them in specific ways that take advantage of the opportunities while minimizing the liabilities.

Opportunities	Liabilities
• Heterogeneous knowledge resources	• Language differences
• Utilization of cost advantages	• Cultural incompatibilities
• Access to diverse skills and experience	• Difficulties establishing "common ground"
• Knowledge about diverse markets	• Fewer synchronous face-to-face interactions
• "Follow the sun" working	• Good teamwork more difficult to achieve

those processes that are directly task-related are the most critical for the performance of dispersed teams. Specifically, virtual teams that had processes that increased the levels of mutual support, member effort, work coordination, balance of member contributions and task-related communications consistently outperformed other teams with lower levels. (See "The Importance of Task-Related Processes," p. 67.) Moreover, dispersed teams that had high levels of task-related processes were notably able to outperform colocated teams with similar levels of those same processes despite the physical separation of their members. In other words, the overall effect of dispersion is not necessarily detrimental but rather depends on the quality of a team's task-related processes. That said, dispersion carries significant risks: Those teams with poor task-related processes suffered heavily with increased dispersion. The bottom line is that the quality of task-related processes appears to be a significant factor in deciding whether dispersion becomes a liability or an opportunity.

Beyond task-related processes, organizations must also ensure that team members commit to the overall group goals, identify with the team and actively support a team spirit. In other words, social-emotional processes are important too. Especially in teams with physically dispersed members, interpersonal differences are a greater threat to the team's social stability because of the greater difficulty in resolving conflicts across geographic boundaries. Such difficulties can, in turn, demotivate members from contributing fully, thus jeopardizing team

performance. Social processes that increase team cohesion, identification and informal communication can prevent that by helping to establish and maintain interpersonal bonds that enable a group to better cope with conflicts. In our study, we found that social processes were able to boost the performance of virtual as well as colocated teams. We had no indication, however, that virtual teams with favorable socio-emotional processes outperformed colocated teams with similar levels of the same processes. Our belief is that, although socio-emotional processes were not a differentiating factor, they likely facilitated more task-related processes (and hence indirectly enhanced the performance of virtual teams) through, for instance, increased knowledge transfer and better resolution of team conflicts.

The Dos and Don'ts of Managing Dispersion

To boost the performance of its teams, a company needs to implement the appropriate mechanisms for boosting both socio-emotional and task-related processes. Particularly for virtual teams, managers need to pay special attention to task-related processes that will capitalize on the specialized knowledge and expertise of such groups. The following key lessons can help companies maximize the performance of their virtual teams:

SMALL DISTANCES MATTER

In general, team performance tends to drop with increasing member dispersion. But sometimes even a low level of dispersion (namely, members working on different floors in the same building) can have a surprisingly large effect, especially with respect to a team's efficiency.
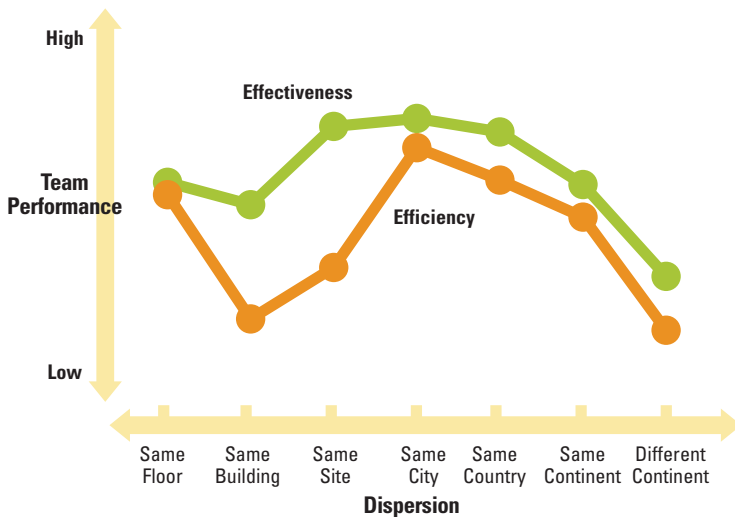
Don't underestimate the significance of small distances. Our research shows that performance is noticeably lower for teams with people located in the same building but on different floors when compared with teams where all members are on the same floor. (See "Small Distances Matter.") This was true regarding both effectiveness (that is, the quality of team output) and efficiency (in terms of time and cost). Interestingly, teams with members in the same building but on different floors also performed worse than teams with greater degrees of dispersion, including those that had members spread across a city, country or even continent. In fact, the only teams that fared worse were the intercontinental teams, with a significantly higher level of intercultural diversity and temporal dispersion (spanning many time zones).

At first glance, those results might seem odd, but consider. Teams with members in the same building, albeit on different floors, do not usually consider themselves as being dispersed and, hence, may easily underestimate the barriers to collaboration deriving from, for instance, having to climb a flight of stairs to meet a teammate face to face. In contrast, groups that are dispersed across a country or continent are more aware of their situation and may make extra efforts to improve such vital processes as task-related communication and coordination. One manager of a leading worldwide software company in our study stated that team leaders regularly underestimate the significance of small distances. They tend to treat team members located on different floors or in an adjacent building as being in direct proximity, failing to acknowledge the negative effects of even such comparatively small distances. A team leader from the same company commented that sometimes "colocated" teams spread across his laboratory use electronic communication technologies such as e-mail, telephone and voicemail just as much as globally dispersed teams do — a sign that people might be allowing short physical distances to become larger obstacles than they should. To prevent that from happening, companies such as Cisco Systems, BMW and Corning have designed their office layouts to maximize interpersonal interactions. At Cisco Systems Inc.'s sites in Germany, for example, only three people have their own individual offices. All of the other 850 employees work in an open-space

environment that provides ample opportunities for "hall talks" and other informal interactions.

Emphasize teamwork skills. Clearly, one of the key reasons for organizing a dispersed team is to draw on the superior knowledge that resides in remote locations. But many companies make the mistake of staffing such teams primarily (if not solely) on the basis of people's expertise and availability. Instead, managers must also consider social skills — a major prerequisite for good teamwork — as a much more pivotal part of the catalog of requirements. In other words, it's unrealistic to bring together individuals from different locations with the expectation that they will automatically know how to collaborate in a virtual environment. Groups with increasing levels of dispersion are also progressively more dependent on their level of teamwork, specifically, their ability to perform key processes such as mutual support, communication and coordination. In order for virtual teams to achieve their greater potential (and take advantage of their functional and structural diversity), members must first and foremost be able to establish a basis for the effective exchange of their varying capabilities — all of which requires teamwork-related skills as a critical ingredient. Otherwise, the virtual team could very likely perform worse than a colocated group. Thus, managers need to consider teamwork skills as a necessary attribute when selecting the members of a virtual team.

Promote self-leadership across the team. Beyond social skills, managers need to ensure that dispersed teams have broad-based leadership capabilities. When a group is closely colocated, an individual leader can more easily detect any deficiencies in teamwork and address them with a hands-on managerial style. An interpersonal conflict, for example, might be resolved by talking in person with the different parties in an informal setting. Such an approach is largely nonexistent in virtual teams. Geographic dispersion and cultural diversity make it difficult for any individual leader to ensure that the team is functioning effectively. Even though the advanced use of the latest information and communications technologies can help, they are no magical panacea for managing people across countries and time zones. "We are often not

THE IMPORTANCE OF TASK-RELATED PROCESSES

Teams with a high level of task-related processes (such as those that help ensure each member is contributing fully) outperform teams with a low level. The difference becomes particularly acute the more dispersed the team is. Moreover, virtual teams with high levels of task processes are able to outperform colocated teams with similar levels of those same processes despite the physical separation of their members. That is, the overall effect of dispersion can be beneficial, depending on the quality of a team's task-related processes.
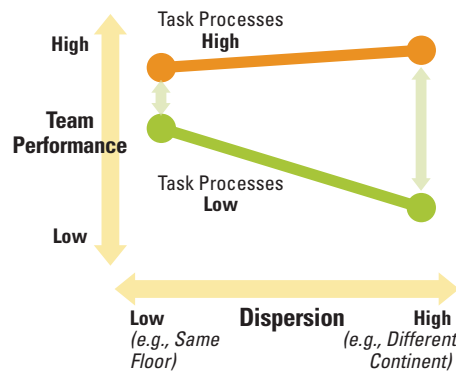
able to overcome the cultural problems," admits one team leader in the study. "And only very experienced team leaders can handle these challenges and lead these teams to success." For a virtual team to succeed, members generally need to be aware of the difficulties of dispersed collaboration and find effective ways to overcome those obstacles on their own. This highlights the need for people to be more self-sufficient in how they manage their own work because the team leader is less in a position to help. Consequently, companies that are serious about virtual collaboration must target their HR efforts not only at designated team leaders but also at team members so that those individuals can develop the skills necessary to work in a virtual setting.

Provide for face-to-face meetings. Periodic face-to-face meetings of dispersed team members can be particularly effective for initiating and maintaining key social processes that will encourage informal communication, team identification and cohesion. A project kick-off meeting, for example, can be used to bring everyone together in one location for several days so that people can develop a shared understanding of the task at hand and begin to identify with the team. These processes, in turn,

will support task collaboration during the project. The time and expense necessary to provide such opportunities for face-to-face interactions then become an investment that can lead to large returns if the virtual team is able to take full advantage of its diverse expertise and heterogeneity. Companies should also remember that informal interactions can be just as important as formal ones — if not more so. One experienced team leader in the study, for instance, asserted that projects should include one essential initial step: "to go out for a beer with all team members in order to establish a common ground before starting the collaboration."

Foster a "global culture." Our research suggests that a global mind-set, in which people see themselves as part of an international network, helps provide an environment that is conducive to dispersed teams. Accordingly, managers and team members need to recognize and frame their company as such, communicating the international nature of the organization's operations and markets. Various human resource strategies can help foster that mind-set, including temporary staff assignments at foreign locations and inter-cultural training. Nestlé, General Electric, IBM and SAP — all known for the global reach of their business activities — provide good examples of how to actively foster a global employee mind-set. Managers at Nestlé S.A., for instance, are expected to move to another country every three or four years so that they can learn about the specifics of each of those markets and develop a global mind-set from their experiences. Such practices advance the development of diversity-friendly attitudes and the ability to work in different contexts, which in turn help employees cope with the challenges of distance when working on virtual teams. At General Electric Co., a steering committee oversees the company's global R&D efforts, and employees are assigned to different locations worldwide in order to facilitate the development of an informal network across all four main R&D sites in the United States, China, Germany and India.

CONVENTIONAL WISDOM SUGGESTS that the performance of teams suffers with increasing levels of dispersion. Because of that, managers have typically viewed dispersion as a liability rather than an opportunity. But dispersion can provide substantial benefits if companies can take advantage of the diversity and varied expertise of team members at different locations. In fact, our research shows that virtual teams can outperform their colocated counterparts when they are set up and managed in the right way. In other words, a company can't just assemble a dispersed team of top-notch talent and hope for the best; it also needs to ensure that the group has the necessary socio-emotional and task-related processes in place. Only then can virtual teams effectively integrate dispersed knowledge to take advantage of their cultural and structural diversity, thereby avoiding some of the drawbacks of dispersion while reaping its benefits.

*Frank Siebdrat is a consultant at the Boston Consulting Group in Munich, Germany. **Martin Hoegl** is a professor and holds the Chair of Leadership and Human Resource Management at the WHU-Otto Beisheim School of Management in Vallendar, Germany. **Holger Ernst** is a professor and holds the Chair of Technology and Innovation Management at the WHU-Otto Beisheim School of Management. Comment on this article or contact the authors at smrfeedback@mit.edu.*

REFERENCES

1. See, for example, T.J. Allen, "Managing the Flow of Technology" (Cambridge, Massachusetts: MIT Press, 1977).

2. J. Santos, Y. Doz and P. Williamson, "Is Your Innovation Process Global?" MIT Sloan Management Review, 45 (summer 2004): 31-37.

3. S.D. Eppinger and A.R. Chitkara, "The New Practice of Global Product Development," MIT Sloan Management Review 47 (summer 2006): 22-30.

4. J.N. Cummings, "Work Groups, Structural Diversity and Knowledge Sharing in a Global Organization," Management Science 50, issue 3 (2004): 352-364; and D. van Knippenberg and M.C. Schippers, "Work Group Diversity," Annual Review of Psychology 58 (2007): 515-541.

5. J.N. Cummings, "Work Groups," Management Science 50, no. 3 (2004): 352-364.

6. D.C. Hambrick, S.C. Davison, S.A. Snell and C.C. Snow, "When Groups Consist of Multiple Nationalities: Towards a New Understanding of the Implications," Organization Studies 19, no. 2 (1998): 181-205.

7. M. Hoegl and L. Proserpio, "Team Member Proximity and Teamwork in Innovative Projects," Research Policy 33, no. 8 (2004): 1153-1165.

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