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**VIRTUAL TEAMS THAT WORK:  
A FRAMEWORK FOR  
VIRTUAL TEAM EFFECTIVENESS**

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**VIRTUAL TEAMS THAT WORK: A FRAMEWORK FOR VIRTUAL TEAM  
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The objective was to get the savings to satisfy Wall Street. Our strategic decision to give clearly assigned common goals to people on both sides of the organization really helped integration in the post-merger environment. We were very successful in a short period of time with the use of virtual teams. We could not have done this in any other way. [Leader, Procurement Management Team].

The cost and risk is much greater. The risk of success is very much hindered by the system...I'm not sure you are going to gain success by having all these people working together on the same program. I'm not sure that they are even aware of the culture differences. Then there are monetary costs. We are losing time on certain design processes that would be so much easier if we were co-located. We lose 50% by teaming virtually. With the tools that we have right now and the people that we have managing those fixes, it is going to be really bad...We are in the crawling stage on the virtual technology stuff. [Engineer, New Product Design Team].

Both of these people are describing their experience with virtual teams. The leader of the procurement management team views the use of virtual teams as critical to his company's post-merger success. In procurement, commodity specialists work together across countries and language to achieve common savings goals. They are developing new procurement strategies from the best practices of their former companies. In their first year of operation, these procurement teams have met their savings goals quicker and more efficiently than expected. Similarly, other post-merger virtual teams in new product development, manufacturing, and sales

and service are determining integrated strategies to position this organization for competitive success.

In contrast, the engineer on the virtual new product design team is skeptical about his company's purported claims for virtual work. He feels that the costs and risks far outweigh the benefits. As a working member of this team that combines engineers from different organizations and countries, he finds the cultural differences to be insurmountable. He resents the time that has been wasted trying to work with unfriendly technology that does not work as advertised and is frequently down. Based on the experience of his team, he believes that virtual teaming is 50% more expensive due to time delays, support needs, and coordination inefficiencies.

So what is the truth? How successful are virtual teams? In this fast-paced global economy, can their achievements propel organizations to competitive success? Or, are virtual teams just another fad, whose claims of effectiveness far outweigh reality?

Virtual teams can be either dramatic successes or dismal failures (or anywhere in between). Virtual teams amplify both the benefits and the costs of teamwork. If designed, managed, and implemented effectively, virtual teams can harness talent from anywhere in the globe to solve business problems, service customers, and create new products. If little attention is paid to how they are designed, managed, or supported, then they will fail. Organizations must create the conditions for effective virtual teamwork. How to do so is the subject of this article.

This article presents a framework for thinking about how to create the conditions for virtual team effectiveness. Before we present our framework, we define the domain of the research: What is a virtual team? What differentiates a virtual team from teams in general? The term has been used in both the academic and popular literature to mean different things, so it is

critical to be clear about the phenomena we are describing. We had a particular framework in mind when we conducted our research on virtual teams. Then we describe the major assumptions underlying our framework.

### **WHAT IS A VIRTUAL TEAM?**

Two problems plague the use of the term "virtual team." First, people casually use the term to apply to a wide variety of social and organizational phenomena. This is misleading, particularly for those who struggle with creating the conditions for effectiveness. Consider the difference between a virtual new product development team and an engineering web-based learning network, both of which may be labeled virtual teams.

In the first case, there is clear interdependence among the geographically dispersed members of the team, and shared responsibility for producing deliverables by a certain time and cost. The members use shared design tools to do work and stay in touch with frequent e-mails. How well they coordinate their activities can make a difference between successfully introducing a new product within the market window or not. In the second case, people are sharing knowledge, but there are no clear deliverables. Membership is voluntary and people join or leave the discussion as they wish. People learn from each other but there is no task interdependence. If a member feels that she has something particular to learn from another member, then she is likely to initiate a one-on-one e-mail correspondence. Designing the new product development team for success is likely to be quite different than designing the learning network for success.

Second, several other terms are used to describe what may be the same phenomena. Are geographically dispersed teams the same as virtual teams? Are global teams, virtual transnational teams or multi-cultural teams different names for the same work unit? When people talk about virtual collaboration, are they talking about working in virtual teams?

We need to be precise about our definition of virtual teams. By clearly specifying our research domain, we can determine the practices that organizations should implement to create the conditions for effectiveness. To be considered virtual to some degree, a team must have the following three attributes:

1. It is a functioning team. That is, a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and are viewed by others as an intact social unit embedded in one or more social systems, and who collectively manage their relationships across organizational boundaries (Hackman, 1987; Alderfer, 1977).
2. The members of the team are geographically dispersed.
3. The team relies on technology-mediated communications, rather than face-to-face interaction, to accomplish their tasks.

The requirement to be a team constrains our research domain. Learning networks, communities of practice, web-based interest groups, and other loosely formed collectives are not real teams. Communicating with others electronically does not transform a collection of people into a team. Teams must have real tasks to perform, interdependent members, and shared outcomes.

What makes virtual teams virtual is geographic dispersion and the use of technologically-mediated communications. The members of virtual teams are not co-located; their primary worksites are different from one another. They may be located in different buildings, cities, states, nations, and even continents. Team members may belong to the same organization or multiple organizations. Thus these teams may be transnational or global and multi-organizational.

Virtual teams also rely upon electronically mediated communication to stay in touch and get their work done. They use a variety of technologies that range in their sophistication, such as telephone, faxes, teleconferences, e-mail, videoconferences, collaborative design tools, and knowledge-management systems. These teams may meet face-to-face from time to time, but they could not do their work and effectively coordinate their activities without technological support. Of course, teams that are co-located also use telephones, e-mail, and computers. Just the use of technology does not make a team virtual, because all teams use technology. It is the degree of reliance on electronic communication that increases virtuality. Virtual teams often have no choice. They must communicate electronically. Co-located teams typically have more discretion about whether and when to use technology.

It should be obvious from what we have said so far that we do not see virtuality as an "on-off" switch, but rather as a continuum. Virtual teams range in their degree of virtuality, from slightly virtual to extremely virtual. Where a team exists on this continuum is a function of the amount of dependence on electronically mediated communication and the degree of geographic dispersion. A team that does all its work through e-mail, text exchanges, and teleconferences, never meeting face-to-face, is more virtual than a team that meets monthly face-to-face. A team that spans multiple continents and time zones is more virtual than one whose members are located in the same city. Increased virtuality adds complexity that must be managed.

So far we have discussed what is a virtual team. Now we need to talk more about what it is not. A virtual team is not the same thing as a cross-functional team, a multi-organizational team, or a multicultural team. This is because it is possible for a team to be co-located and be comprised of members from different functions, organizations, and cultures. Likewise, given our definition, it is possible for a virtual team to be comprised of members from the same function,

organization, and culture. That being said, many virtual teams have members from multiple functions, organizations, and national cultures. The greater the geographic dispersion on the team, the more likely the team will be comprised of members quite different from one another. Like degree of virtuality, these differences increase the complexity that must be managed. However, they do not define virtual teams. These same differences can and do occur in co-located teams.

By specifying our research domain, we limit the scope of the generalizability of our findings: They apply to real virtual teams. Although bounded, this domain is still relatively large, encompassing virtual management teams, new product development teams, service and support teams, manufacturing teams, and so on. Examples of the virtual teams are:

- A virtual team prototyping a new wireless device enabling children and families to transmit pictures to one another, drawn from representatives of six organizations from four European countries.
- A virtual team comprised of representatives of five aerospace companies – three American, one British, and one Dutch – tests new collaborative technologies and demonstrates that the development of a new fighter airplane can occur without incurring costs beyond those of the traditional development process.
- A virtual team of Israeli information system specialists from a high technology company with subsidiaries in U.S., Europe, and Asia are asked to recommend a new information system that can expedite data transfer across locations.
- An American-based company reconstitutes its French customer team so that it can create and execute a global strategy for building relationships with the French customers not only in France but around the world.



The authors shared five major assumptions about what enables virtual teams to be effective. They also focused their attention on a set of key factors. These factors fit within the preliminary research framework developed by our research team at USC.

### **KEY ASSUMPTIONS**

A key assumption is that teams are more likely to be effective when certain enabling conditions exist. Teams in general, and virtual teams more specifically, are complex social forms, and effectiveness is the result of multiple practices, often redundant with one another. Many factors working together determine effectiveness. In addition, the same outcome can be produced by several different methods: You can reach the same result through different means. For these reasons, trying to identify specific causal relationships between one factor and team effectiveness may not be fruitful (Hackman, 1990).

Instead, a more promising approach is to identify the conditions that promote virtual-team effectiveness. What should leaders and managers do to create these enabling conditions? How can leaders create a context for virtual teams so that they are more likely to perform well? What managers and leaders actually do is create the conditions that support effectiveness. They do not work using just one behavior or pulling one lever at a time. They use multiple techniques, just like teams use multiple performance strategies to achieve their goals. Thus, this approach is consistent with how leaders and teams actually behave in organizations.

Our second key assumption stems from the first. We believe that there are multiple design and implementation factors that help to create the conditions that support virtual-team effectiveness. We use a broad net to identify these factors. We look at the organizational context, team and task characteristics, technology use, team member characteristics, and work

and team processes. Several factors are embedded in each of these categories. For example, selection, training, and reward systems are part of the organizational context. How an organization's reward system is structured, how its policies are designed, and how its practices are implemented, may make it more likely (or less likely) that its virtual teams will succeed. Those who establish, lead, and support virtual teams can influence organizational systems, structures, policies and practices. These are the levers that can be pulled to promote effectiveness.

The third assumption highlights how virtuality amplifies the challenges faced by teams. Given a certain set of inputs, all teams have to overcome barriers in order to create the enabling conditions that lead to effectiveness. As we stated earlier, we believe that teams range in their degree of virtuality, from slightly virtual to extremely virtual. As teams become more virtual, they confront greater uncertainty and complexity, increasing the difficulty of the information processing and sensemaking tasks that they do. Virtual teams face an upward climb, needing to overcome powerful barriers to effectiveness. This puts a premium on using all the design and implementation levers at one's disposal to create highly enabling conditions. If leaders and managers have shied away from using teams because of potential effectiveness problems, they should not consider the use of virtual teams.

The fourth assumption is related to the third. As we said earlier, virtual teams are frequently composed of members who are quite different from one another. They may represent different disciplines, functions, professions, business units, organizations, countries, and cultures. Virtual teams vary in the number and depth of differences they confront. The greater the number and depth of differences that need to be managed, the greater the barriers to effectiveness. If a team is both highly virtual and must cope with multiple and deep differences, then the uphill

climb is even steeper. These teams must be designed, supported, and led in a superb manner to be successful.

Our next assumption is the converse of what we have just said. What we have emphasized are the barriers to virtual-team effectiveness. We have said that the mountain that virtual teams have to climb is really high. However, what happens if they successfully climb that mountain? What happens if they are effective despite all the obstacles?

Our fifth assumption is that virtual teams can amplify the benefits of teamwork. The greater the degree of virtuality and differences, the higher the potential benefit. Virtual teams enable the best talent irrespective of location to be applied to solve business problems, create products and deliver services. Cross-organizational teams can be set up to capitalize on each organization's unique competencies. When organizations compose virtual teams with people from different perspectives and knowledge bases (high degree of differences), innovation is more likely to occur. Problems can be framed in ways that allow for innovative solutions when people can apply knowledge from one domain to another (Pinchot, 1985). Thus, virtual teams have the potential of producing high-quality, innovative business solutions. At the same time, relying on electronically mediated communication reduces the cost of coordination. Face-to-face meetings can be scheduled when needed, but people can do most of the work from their primary, distant work settings. Thus, virtual teams offer efficiency benefits as well. The potential to produce high-quality, innovative solutions at lower costs offers organizations competitive advantage. How can organizations harness the potential of virtual teams? How can virtual teams be designed and supported for success? What can be done to build enabling conditions?

## OUR ORIENTING FRAMEWORK

Our orienting framework consists of four categories of variables: enabling conditions, design factors, outcomes, and mediating conditions.

### **Enabling Conditions**

For virtual teams to perform well, three enabling conditions need to be established: 1) shared understanding about the team's goals, tasks, work processes, and member characteristics; 2) integration or coordination across key organizational systems and structures; and 3) mutual trust in the team. We discuss each below.

*Shared understanding* is the degree of cognitive overlap and commonality in beliefs, expectations, and perceptions about a given target. Virtual teams need to develop this shared understanding about what they are trying to achieve (their goals), how they will achieve them (work and group processes), what they need to do (their tasks) and what each team member brings to the team task (member knowledge, skills, and abilities). When teams involve people from different disciplines, business units, organizations, and cultures, their members will have different ways of perceiving their tasks, key issues, and of making sense of their situation. Dougherty (1992) described new product development team members as inhabiting different "thought worlds" because of these differences. By developing shared understandings, virtual teams learn how to bridge the chasm between "thought worlds."

*Integration* is the process of establishing ways in which the parts of an organization can work together to create value, develop products, or deliver services. The parts of the organization (or organizations) represented by virtual-team members are likely to be highly differentiated in response to global competitive pressures and uncertain business environments. This differentiation across organizational units means that they are likely to have different

policies, organizational structures, and systems. These differences can hinder effective collaboration in virtual teams both directly and indirectly. When organizational units have different information technology infrastructures, for example, connectivity can be a real problem. At the most basic level, virtual-team members may not be able to send e-mails to team members from other business units. In a more subtle way, business-unit policies, structures and systems influence employee behaviors. They provide incentives for certain behaviors and disincentives for others. Incentives for cross-unit collaboration may be lacking. Policies, structures, and systems also shape employee perspectives and worldviews on what is and is not important. The greater the degree of differentiation in an organization, the greater the need for integration. The formation of virtual teams is one mechanism to encourage integration.

In essence, integration refers to organizational structures and systems while shared understanding refers to people's thoughts. Integration is a structural variable while shared understanding is cognitive. However, the two co-vary together. The greater the differentiation among business units, the more likely that team members will inhabit different "thought worlds," making it more difficult to develop shared understanding. At the same time, the lower the level of integration, the greater the difficulty of developing shared understanding.

The third enabling condition is *mutual trust* in the team. Mutual or collective trust is a shared psychological state that is characterized by an acceptance of vulnerability based on expectations of intentions or behaviors of others within the team (Rousseau, Sitkin, Burt and Camerer, 1998; Cummings and Bromiley, 1996). Teams that have established mutual trust are safe environments for their members. Members are willing to take risks with one another and to let their vulnerabilities show. Trust is difficult to establish in virtual teams. Members are geographically dispersed, and are likely to be from different backgrounds, experiences, and

cultures. People tend to trust those whom they perceive as similar to themselves. Electronically mediated communication lacks the interpersonal cues that are so important for building trust. Special steps need to be taken to build trust in virtual teams.

In general, managers and teams cannot simply command a high rating on the enabling conditions. Giving the right instructions does not create shared understanding, integration, and trust. It is how the team is designed and managed that creates the enabling conditions. This is a cyclical process that is ongoing over time.

### **Design Factors**

The systems and structures that make up the *organizational context* are important for virtual-team success, such as selection, education and training, and performance evaluation, and reward systems.

The virtual *team structure* should promote task accomplishment. Are there clear goals? Is the task designed so that the group is held accountable for a meaningful piece of work? Do group members receive feedback on their progress (Hackman and Oldham, 1980)? How is information shared and processed in virtual teams? What is the structure of social relationships in virtual teams? Can social capital be built over communications technologies, rather than through face-to-face interaction. We expect that these elements of team structure that are critical in face to face settings, will also be important in virtual settings. In addition, leadership is key. How do leaders emerge in virtual teams? What should virtual team leaders do to ensure effectiveness?

*Information technology* provides the infrastructure for virtual collaboration. It should enable virtual-team members from any location to effectively communicate and coordinate their work. Technology should also support virtual-team development and work on tasks. Many

commercialized products exist to support collaboration in virtual teams. The challenge for practitioners is to figure out which technologies are most appropriate for their teams.

The *people* who work in virtual teams need to possess certain capabilities in order for them to work effectively with their teammates. First, they need sufficient task-related knowledge and skills. They also need to have the skills to work collaboratively in virtual space. We believe that they need lateral skills to work with people quite different from themselves. Team members need to have a tolerance for ambiguity to deal with the unstructured communication that characterizes much of virtual teamwork. The personality dimensions and skills that team members possess will influence the establishment of enabling conditions.

Finally, the *team and work processes* that are followed can help or hinder the creation of enabling conditions. Conflict can have both positive and negative effects on virtual-team performance. Communication and developmental processes are key.

## **Outcomes**

We consider both business outcomes and human outcomes as virtual team effectiveness measures. Possible business outcomes are goal achievement, productivity, timeliness, customer satisfaction, organization learning, innovation, and cycle time. Possible human outcomes are team member attitudes such as commitment and satisfaction, and longevity, the capacity to work together in the future. Essentially, selecting the appropriate performance measure depends upon the team and its task. Often judgements of performance are subjective, and are best done by the team's manager or other stakeholders in its social system.

## Summary

Figure 1.1 presents our research framework. It shows that effectiveness outcomes are a function of the enabling conditions. It categorizes and lists the design factors that contribute to the establishment of enabling conditions. It shows that degree of virtuality and degree of differences moderate the relationship between design factors and enabling conditions. Stated another way, degree of virtuality and degree of differences amplify the effects of the design factors on the enabling conditions. The greater the degree of virtuality and degree of differences, the more difficult it will be to establish supportive enabling conditions. This framework does not make specific causal predictions.

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Insert Figure 1.1 Here

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Let the (virtual) fun begin!



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**FIGURE 1.1: RESEARCH FRAMEWORK**

Note: Variables listed under each category are meant as examples; they do not constitute an exhaustive listing.

