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DIFFERENT STROKES FOR DIFFERENT FOLKS: MANAGING AND ENABLING VIRTUAL TEAMS

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Ann Majchrzak, Arvind Malhotra, and Lin Chai
University of Southern California
amajchrz@marshall.usc.edu malhotra@bschool.unc.edu
chai@marshall.usc.edu

Abstract

Virtual teams have a number of potential benefits, including cost savings, increased speed of decision making, and effective knowledge management. However, the benefits of virtual teams are often not realized. Costs can escalate, decision-making can slow down, and knowledge can be lost. Reasons for the ineffectiveness of virtual teams are unclear, because research has yielded mixed results on the question. A complex combination of factors appears to be involved, although which combination and the relative extent of individual factors is uncertain. The purpose of the present research is to provide a framework of the key factors that result in virtual team success. In particular, this research is focused on understanding how virtual teams can quickly resolve conflicts, increase their speed of decision making, and minimize travel requirements to increase team diversity, quality, and specialized expertise. Our main proposition is that when technology, task, knowledge-sharing practices, and team composition have been specifically designed to support each other, the VT will succeed. We propose to test this proposition by examining a number of virtual teams in a variety of industries, providing significant contributions to both the theory and practice of virtual teams.

Keywords: Knowledge management, virtual teams, team effectiveness, team conflict, organizational change

Introduction: Success of Virtual Teams

A work team is an organizationally-designated group of people sharing responsibility for producing a product or service (Hackman, 1987). A virtual work team (VT) is one that has geographically separated members and uses communication technologies to conduct its work (Lipnack and Stamps, 1997). The concept of VT suggests that members are typically in separate locations, but this does not rule out occasional face to face meetings (Melymuka, 1997). They could use a variety of technologies to communicate, from e-mail to video conferencing. Numerous groupware tools are available to support particular tasks.

According to International Data Corporation companies spent $175 million in 2000 on virtual meeting services. This number is expected to rise to $400 million in 2002. Events of September 11th have had an accelerating impact on the use of virtual environments for collaboration. With businesses curtailing the travel of their employees, web conferencing has seen a dramatic increase. According to Frost & Sullivan, the Web conferencing market will have revenues of $110 million this year, up 75 percent from 2000's total of $62 million (Bartlett, 2001).

VTs are typically implemented to save travel costs. If six employees located in different corners of the globe can work together virtually, a VT that is well managed will save the costs of repeatedly flying the employees to locations where they can collocate. However, VTs are not always successful at saving these travel costs. For example, one global company started a major business process reengineering effort as a VT but after six months gave up and relocated fifty employees to a central location (for one year) at a cost of several million dollars. Asked why they gave up, the executive answered: "People weren't working together". In another company, VTs were begun in earnest after September 11th when employees expressed concerns over personal security but were recently dropped when employees felt that their "messages were not being understood" virtually and got back on the planes. If the vision of VTs is to be realized, managers would not have to "give up", people would be able to work together and have their messages understood virtually, and the cost savings would materialize.

In addition to cost savings, well-managed VTs have the additional potential benefit of increased speed of decision-making in all areas, from routine decision making to radical innovation (Bui et al., 1987). The reason is that decisions do not have to wait until the time when all parties can physically collocate. Despite this potential benefit, VTs have not often succeeded at increased decision-making speed when the decisions involve conflict and negotiation – a situation most teams find themselves in at various stages in a team's evolution (Chidambaram et al., 1991). Face-to-face meetings are often necessary when conflict arises that requires negotiation. Unfortunately, this has the effect that teams performing anything but the most routine tasks (from planning to design, from troubleshooting to supplier relations) will encounter sufficient conflict that frequent travel is required to resolve each conflict. With such a scenario, decision-making speed is not improved.

Another potential benefit of VTs is that the quality of decision-making should increase by allowing additional people to become involved in a decision (Dubrovsky et al., 1991). For many organizations, some people are in such demand that they can rarely devote the uninterrupted time of days and weeks that may be required to formulate a decision with a collocated group. These same people, however, may have many periods of short amounts of time available throughout a day. When such people bring critical expertise to a problem, virtual teaming offers the only way to include such people and thus the only way to ensure that decisions of the highest quality are made. Yet, because VTs are not yet adopted as a natural way of including such people, companies are settling for what we call "Best Available" people for the teams (e.g., those who can travel) rather than the "Best Able". As a result, a new venture team, for example, may not include individuals from other companies or sectors because too much of their time is required to travel. Or a redesign team may not include a production worker because production work would suffer if she left the production area for several days to travel to a meeting. Or a mobile workforce may not be adequately "plugged into" an ongoing discussion because they may only be able to participate sporadically. Consequently, the anticipated benefits of increased quality of decision-making does not often materialize (George et al., 1990).

A final potential benefit of VTs is that the electronic medium provides the opportunity to capture knowledge for later reuse, by capturing, cataloguing, structuring, searching, and disseminating the knowledge exchanged among the VT members (Boland et al., 1994). Effective knowledge management of VTs would allow, for example, membership to be fluid over the life of a project since members could easily review the team's progress to date when they join a project or return to the project after a significant absence. Similarly, effective knowledge management would allow other teams to benefit from the knowledge generated by a team. Despite this potential, effective reuse of VT knowledge is problematic (King and Majchrzak, 2002). For example, discussions are often not captured and categorized in a way amenable to future use.

Extant Research on Virtual Teams

Research on the relative effectiveness of VTs, as compared to in-person teams, has produced mixed results. Some studies show that VTs are more effective (Straus, 1996), while others show in-person teams to produce better results (Smith and Vanecek, 1990). To account for the mixed results of studies on the effectiveness of VTs, researchers have investigated a number of factors thought to influence VT success, including task type (DeSanctis and Jackson, 1994), shared norms (Zack, 1993), trust (Jarvenpaa and Leidner, 1998), diversity (Watson et al., 1993), and culture (Kirchmeyer and Cohen, 1992).

Despite the various studies, no consensus has emerged on the those variables that are most important for VT effectiveness, although preliminary qualitative research suggests that a complex combination of factors is involved, including process and structure, technology and social systems, and the interaction of these elements over time (Maznevski and Chudoba, 2000). The purpose of the present research is to provide a framework of the key factors that result in VT success. In particular, this framework is focused on improving the realization of expected benefits of virtual teams by understanding how virtual teams can:

(a) quickly resolve conflicts virtually without collocation to increase their speed of decision making
(b) minimize travel requirements to increase the diversity, quality, and specialized expertise incorporated into decision making, and
(c) effectively manage the team's knowledge to allow members to more easily join and re-join team conversations, as well as allow other teams to benefit from the team's knowledge

Conceptual Framework

To examine the three issues of a) virtually resolving conflicts, b) inclusion of a broad range of participants, and c) managing knowledge for fluid participation and dissemination outside the team, we propose the conceptual framework shown in Figure 1.

In this conceptual framework, we argue that successful management of these three issues will be possible when there is a match among four dimensions of a virtual team: task characteristics, member composition, knowledge shared within the team, and technology characteristics.

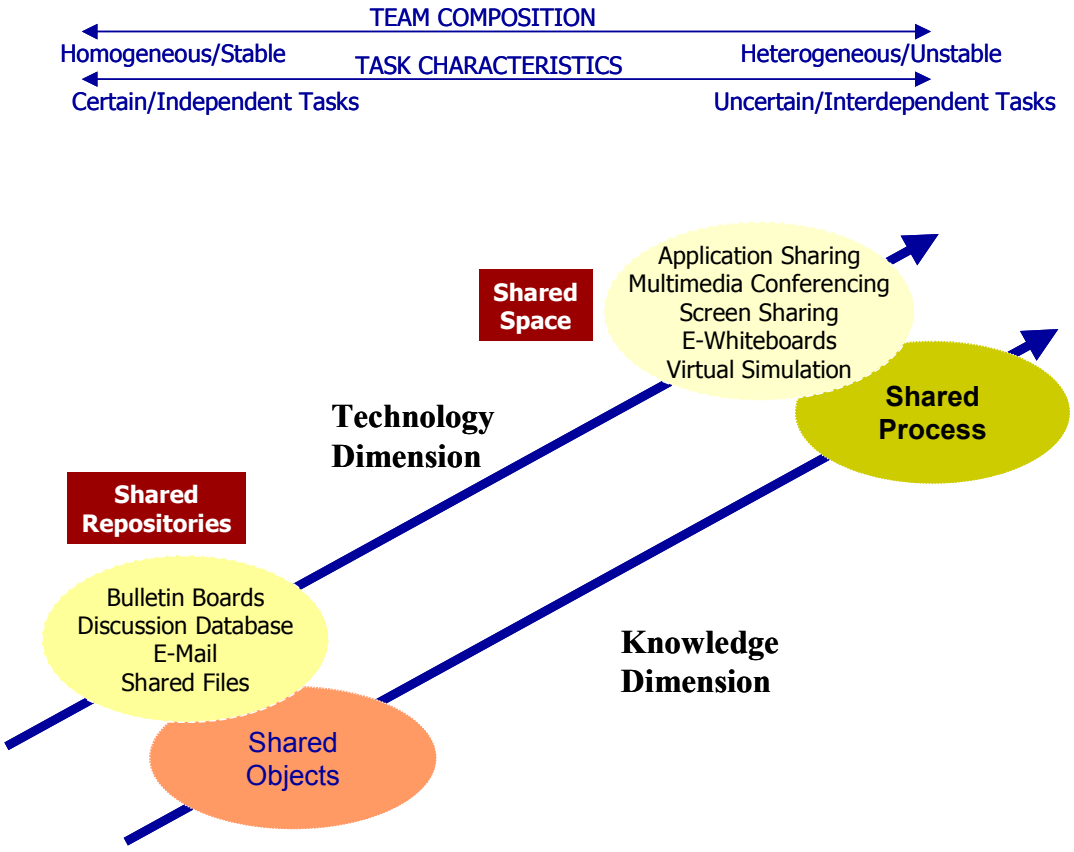

Figure 1. Management Practices and Technologies for Virtual Teams

Task Characteristics refer to the degree of task uncertainty and interdependence in the primary task performed by the virtual team. VTs differ in the degree of uncertainty and interdependence required for the task to be completed (Levitt, 1999; Lewis, 1998). With highly uncertain tasks, task-based conflict (conflict over interpretation of knowledge) is likely to occur (Earley and Mosakowski, 2000). Task conflict (as opposed to social-based conflict) requires new information and analysis for resolution and thus mechanisms (such as technologies) that foster information acquisition and analysis from sources outside the minds of the immediate team members may be helpful. This suggests, then, that face-to-face meetings in which members share what they currently know may NOT be the most effective management practice when task-based conflict arises (since new information may be needed), although face-to-face meetings might be helpful with social-based conflict (DeChurch and Marks, 2001). The measurement of task characteristics is adapted from Szulanski's (1996) causal ambiguity and Van Der Vegt et al. (2001) task interdependence.

Team Composition refers to the heterogeneity (in terms of different disciplines, functions, experiences, firms, and industries) and instability (in terms of length of time expecting to work together and perceived identity with the team) of the members in the virtual team. Extreme heterogeneity of a team's membership means team members will not initially have the trust in each other's competency, while less heterogeneous teams such as VTs drawn from the same organization know each other's competence (Maznevski, 1994). We suggest that there are two types of trust, relational- and competency-based (Sztompka, 1999). We also suggest that competency-based trust is more important with extreme heterogeneity. Moreover, how one builds competency-based trust is not clear, especially in virtual environments. Are there technology features that facilitate this process? We suggest that features that clarify ownership over an entry in the knowledge-sharing virtual space, for example, may facilitate competency-based trust (Boland et al., 1994). Team composition will be measured by the Flynn et al. (2001) scale for demographic diversity.

Knowledge Shared refers to whether the team is best served when "process-based" vs. "object-based" knowledge is shared. In the literature, this distinction has been made to describe the difference between discussion forums, for example, which share the process by which decisions are made, and repositories such as Docushare for example, which share files, drawings, and presentations (Blackler, 1993; Hansen et al., 1999; King and Majchrzak, 2002). For team members to be able to share "objects", there must be a common understanding of their work. With uncertain tasks, however, and extreme instability of membership, such a common understanding may be difficult to develop. Therefore, we suggest that knowledge-sharing with highly unstable membership and uncertain tasks needs to focus on sharing of decision processes. Thus, technologies that help to store and share knowledge about process may be most important with unstable memberships and highly uncertain tasks; while the other extreme requires traditional repositories that store knowledge objects. Knowledge shared will be measured by the Gold et al. (2001) scale for shared know-how and know-why.

Technology Characteristics refer to the degree to which the technology only supports what we call a "Shared Repository" or is supportive of a more comprehensive "Shared Virtual Workspace". Shared repositories are databases and email that can be accessed by multiple people. These often include discussion forums, electronic bulletin boards, and listservers, as well as shared files. Shared Virtual Workspaces are technologies that include shared repositories but in addition offer electronic white boards, application linking, file-sharing, process support (e.g., such as organizing and cataloguing files), and, in some cases, shared simulation capabilities (such as simulated wind tunnels, circuit board tests, and crash tests). We argue that shared virtual workspaces will be a more appropriate technology than shared repositories when the tasks performed by the VT are uncertain and interdependent, when the membership is highly heterogeneous and unstable, and when the knowledge that needs to be shared is more process-focused than object-focused. Technology characteristics will be measured by Faraj and Sproull (2000) scale for technology mediated task coordination and Clark and Brennan (1991) scale for technology mediated interactivity.

In sum, then, our main proposition is:

> ***When technology, task, knowledge-sharing practices, and team composition have been specifically designed to support each other, the VT will succeed.***

Testing this proposition will require obtaining virtual teams that differ in the four dimensions of task characteristics, technologies used, knowledge-sharing practices, and member composition. Since most teams perform a variety of tasks using a variety of technologies, members, and practices, we will limit our sample selection to looking for cases that fulfill the following criteria:

- have recently completed a "core" (i.e., important, primary, mission-critical) task
- managers and team members are able to assess how well the task has been completed
- the task was completed with a minimum of 50% of the activity performed using non-collocated mechanisms for coordination (e.g., electronic or audio instead of face-to-face).

In addition, our sample will include teams varying along each of the four dimensions. For example, some teams will be performing highly uncertain tasks (such as new product development) while others need to be performing fairly routine tasks (such as purchasing); some teams will be using 'shared common workspace' technologies while other teams need to be using 'shared knowledge repositories'; some teams will have a stable homogeneous membership while other teams will have highly unstable and heterogeneous membership; some teams will be focused on sharing knowledge objects while others share process issues. With a diverse sample of cases, we will then be able to test the proposition that successful teams are those who fit their practices along all four dimensions.

Assuming our proposition is supported by the cases, we will organize the cases into archetypes representing the different dimensions and appropriate management practices to support these cases. We will be conducting this study with the Society for Information Management's Advanced Practices Council. Five teams for this study have been chosen to initiate our empirical investigation of our virtual team conceptual framework.

Contribution

This research has both theoretical and practical significance. Despite considerable research on the effectiveness of virtual teams, no consensus has emerged on the combination of main determinants for that effectiveness. Theoretical advances have suggested individual determinants, however, and this research builds on those advances to propose an integrated model of virtual team effectiveness.

This research will also test the proposed model with a broad range of virtual teams from industry, adding to our theoretical understanding. Recent management research has emphasized the role of knowledge in creating and sustaining competitive advantage (Kogut and Zander, 1992). Virtual teams can play a significant role in creating sustainable knowledge for organizations, and the present research would aid in our understanding of the dynamics of the knowledge creation process that is embedded in virtual teams.

Companies would also benefit from the findings of this research. Use of virtual teams is expanding across industries, and teams that are effective can both cut costs and boost profits for individual organizations. Managers who understand the determinants of team effectiveness could intercede with some of the variables and thus have an impact on their company's bottom line.

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