

# Analyzing the Quality of Virtual Teams

**Robert M. Verburg**

*Delft University of Technology, The Netherlands*

**J.H. Erik Andriessen**

*Delft University of Technology, The Netherlands*

**Joris P.G. de Rooij**

*Delft University of Technology, The Netherlands*

## INTRODUCTION

Global market developments and the large-scale use of diverse applications in the area of information and communication technology (ICT) have been key factors in the emergence of distributed teams. Such teams are often referred to as virtual teams. Virtual teams enable collaboration between people across traditional boundaries and offer tremendous opportunities for various achievements. Businesses are no longer tied to a single time zone and are, for example, able to develop software around the 24-hour clock. The Internet—as the almost universal medium for interaction across boundaries—has created an infrastructure that enables many organizations to launch virtual teams. Hardly any technical obstacle for communication and collaboration across geographic boundaries remains, as these processes are supported by high-tech collaboration solutions such as groupware and other collaborative applications (e.g., videoconferencing, electronic blackboards). Virtual teams have a number of opportunities that are not found with co-located teams, such as involving rare expertise.

For example, a group of eight scientists from different organizations rapidly developed a revolutionary rocket engine design by working under geographically dispersed conditions and without prior work relationships (Majchrzak, Rice, Malhotra, King & Ba, 2000). The complex and innovative design could not have been developed without the expertise of the eight highly specialized scientists. However, the design was not only a result of a careful combination of expertise, but required a number of interdependent iterative ‘virtual’ brainstorming sessions among the team of rocket scientists. All these activities were performed through a collaboration tool called “the Internet notebook,” whereby the specialists spend no more than 15% of their time on the project.

As the above example illustrates, virtual teams have the advantage of bringing people together without the obvious constraints with regard to travel time, work-

space, and socialization. Virtual teams perform a variety of tasks and are also defined in various ways. The term generally implies groups of geographically and culturally dispersed co-workers using a combination of communication and information technologies to accomplish an organizational task (Townsend, DeMarie & Hendrickson, 1998; Jarvenpaa, Knoll & Leidner, 1998). Hutchinson (1999) distinguishes three types of virtual teams: intra-organizational teams, inter-organizational teams, and inter-organizational distributed teams. In this overview we will have all three types in mind when discussing our approach.

## BACKGROUND

Being ‘virtual’ is a matter of degree and refers, according to various authors, to dimensions such as spatial distance, time, cultural diversity, temporality, organizational contract, and mode of interaction (Mowshowitz, 1997; Jarvenpaa & Leidner, 1998; DeSanctis, Staudenmayer & Wong, 1999; Vartiainen, 2003). Mode of interaction is an important dimension. Some teams meet regularly face to face, but may also have some e-mail-based interaction, while other teams interact intensively and almost exclusively via various media and sophisticated groupware tools. Geographical distance and different timeframes may obviously be important reasons for groups to communicate electronically.

‘Virtuality’ refers to the extent to which a group is geographically distributed, is organizationally and culturally diverse, has different timeframes for work, communicates electronically (‘mode of interaction’), and whose members are freelance or have fixed contracts with an organization. The degree of reliance on ICT, its availability, and the proficiency of the users are very important for virtual teams (Dubé & Paré, 2004). The more of the above, the more a team is considered to be a virtual group. ‘Virtuality’ is the highest in globally dispersed teams of culturally diverse members of different organizations (or

freelancers) that interact temporarily and communicate exclusively via electronic means.

A useful definition of a team (or work group) is a collection of individuals who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems (e.g., community, organization), and who perform tasks that affect others (Guzzo & Dickson, 1996). Although often not defined, a number of implicit characteristics of conventional teams seems to include that members are often permanent employees of one organization, are often co-located, and the main form of interaction consists of face-to-face contact.

Virtual teams may not seem to be crucially different from co-located teams. There are comparable levels of responsibility for adequately performing basic processes of groups, such as information sharing, cooperation, coordination, and team building. Virtual teams also have to mobilize the necessary resources, and need to develop a cohesive team with clear goals. However virtual teams have to care for these processes under conditions of less-than-optimal communicative channels, of higher distance in time, space, and culture than face-to-face teams. Inadequate ICT tools or infrastructures and the incompatibility of technology will result in barriers for cooperation. But with sufficient attention to team building and adequate ICT tools, these problems may be overcome. The process of team building can be difficult in the virtual context, specifically when the 'life cycle' of a team is short, the stability of membership is limited, and face-to-face meetings are scarce.

*Global* virtual teams have to deal with the additional issues of communicating across different time zones, languages, and cultures (e.g., Dubé & Paré, 2001; Montoya-Weiss, 2001).

Other problems may include missing non-verbal cues in communication and a lack of unplanned social encounters, resulting in problems with 'awareness' of availability and state of others, of progress of the work, or of the setting in which others work (see, e.g., Steinfield, 2002). These barriers may result in a lack of trust and cohesion, which often may lead to lower performance levels. Jarvenpaa and Leidner (1998) confirmed that global virtual teams might start with a form of 'swift' trust (Meyerson, Weick & Kramer, 1996), but that such trust appears to be fragile and temporal. Cramton (1997) illustrates, for instance, the multiple interpretations members of virtual teams may give to the meaning of silence of their distant team members. Additionally, virtual team membership can be highly fluid, demanding continuous adaptation processes between the existing team and new members, who bring their own beliefs and frame of reference. It is this system of shared views and beliefs people hold that is

often considered very important for team functioning. The specific situation of a virtual team hinders the development of such a system.

## **TEAM PERFORMANCE**

A crucial difference between co-located and virtual teams is the fact that virtual teams have the opportunity to combine and integrate both co-located and distributed interaction. Virtual teams may combine the better of two worlds and may therefore have an advantage over conventional teams. Virtual teams require certain tools in the area of information and communication technology to support interaction. Some modern tools have sophisticated functionalities that provide such teams with opportunities that conventional teams do not have. One of the major effects of the introduction of collaboration technology has been that certain types of meetings can now be held with a large number of participants. Moreover, some tools allow for easy storage and retrieval of information and for collaborative editing of documents.

So far, the development of virtual teams has mostly been technology driven, almost neglecting other aspects of work, such as knowledge sharing, combining expertise, and dividing tasks. As a consequence, the performance of many virtual teams is far below their potential, thus producing poor business results (e.g., Jarvenpaa & Leidner, 1998).

In order to reach this optimal level of functioning, these new types of collaboration require new ways of organizing and managing. Major challenges for both managers and employees are the consequences of dealing with virtual teams. Systematic insight in the design and performance of effective (global) virtual teams is therefore an important prerequisite. It is clear that virtual teams may face substantial barriers for effective cooperation and that the probability of failure is ever present. The next section presents a model for analyzing the reasons for failure and can support the design of virtual groups.

## **ANALYZING VIRTUAL TEAMS: A MODEL**

The model is based on a general model of group functioning, called the Dynamic Group Interaction model (DGI-model), which is applied in several case studies (Andriessen, 2002; Andriessen & Verburg, 2004). The purpose of this model is not to limit the analysis of collaborative activities to specific aspects, but to structure the analysis by providing ideas and insights that have proven their value in other contexts.

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