The Practice and Promise of Virtual Project Management

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INTRODUCTION

Virtual projects are essential components of modern organizations that seek to be flexible and take advantage of distributed resources. A virtual project is a project in which team members are dispersed geographically and potentially on other dimensions, and are working together to accomplish a specific task under time and resource constraints. Because of their dispersion, team members have to rely on computer-mediated communication tools to do their work. Virtual projects are prevalent in software development and increasingly common in research and development, marketing, and customer relationship management, hence they are an important phenomenon for study. The challenge is to discover which practices and perspectives help to enhance the effectiveness of virtual projects, so that team members can leverage the advantages of virtuality while avoiding its pitfalls.

The relevant literature on this topic comes from many areas, including studies of virtual teams as well as the body of knowledge in project management. In this article, we bring together disparate fields and provide an integrated view of virtual project management. We begin by defining key terms and concepts in the context of an overall framework and briefly describe relevant knowledge from current research. We then discuss key issues and future trends for research, and conclude with overall observations and implications.

BACKGROUND AND FRAMEWORK

Figure 1 shows the overall framework for the discussion of key concepts that are relevant to the study of virtual projects. The classic input-process-output approach identifies factors that are relevant to effective project management in a virtual environment. The following sections define and briefly discuss each of the factors (see Khazanchi & Zigurs, 2005 for a more detailed discussion). The purpose is not to be comprehensive in all the factors that might affect project management, but instead to focus specifically on management issues that are particularly salient or problematic in virtual contexts.

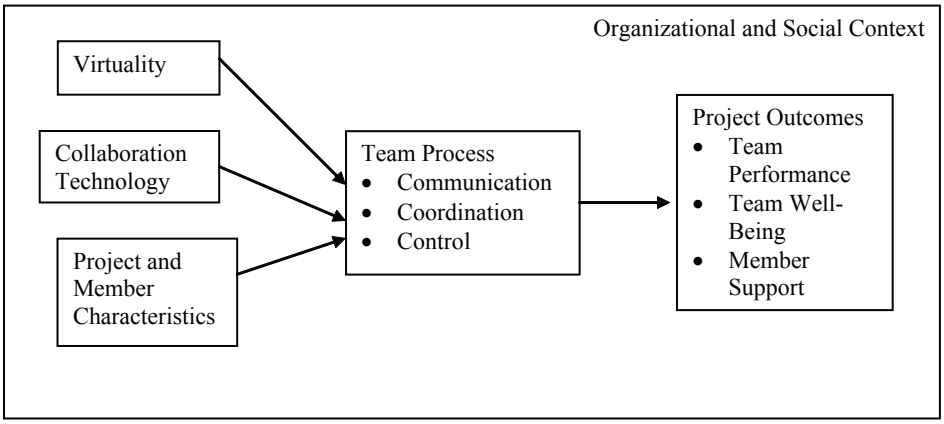
Organizational and Social Context

The management of virtual projects does not occur in a vacuum. The characteristics of the organization itself are important to how such projects are managed, as is the larger social context, which can include governmental and environmental issues. Organizational norms affect how technology is adopted and used (Orlikowski, 1993; Orlikowski & Robey, 1991) and therefore are relevant to the setting for virtual projects. A detailed discussion of these contextual factors is outside the scope of this article.

Input Factors

Virtuality is a term that is defined in a variety of ways, but typically with respect to dispersion. Virtual teams can be dispersed on many dimensions, most often geographically, and also in time, organizational affiliation, culture, and technology. The greater the dispersion, the greater is the virtuality of the team (Katzy, Evaristo, & Zigurs, 2000; Watson-Manheim, Chudoba, & Crowston, 2002). Other views of virtuality include dynamic switching among defined requirements and

Figure 1. Framework for the study of virtual projects



services (Mowshowitz, 1997) and extent of reliance on communication and information technologies (Dubé & Paré, 2004). Dispersion is an intuitively appealing characteristic by which to define virtuality, and technology is also an essential component of the ability to be virtual. Thus, we define *virtuality* as the extent to which project members are dispersed geographically and on other dimensions *and* rely on information and communication technologies for carrying out team processes and achieving project goals.

The second major concept is collaboration technology, which has also been characterized in different ways. The major challenge in defining collaboration technology is to avoid a monolithic view and be able to capture variability in technology features. Key perspectives on collaboration technology have defined it in terms of characteristics of media (Carlson & Zmud, 1999; Dubé & Paré, 2004), levels of support for information exchange or communication or information sharing (DeSanctis & Gallupe, 1987; McGrath & Hollingshead, 1994), and time-space configuration (Johansen, 1988). Consistent themes across different views of technology are that it must provide support for communication, for information exchange, and for structuring a team's process. Thus, we define *collaboration technology* as an integrated and flexible set of tools for structuring process, supporting task requirements, and communicating among project members. These characteristics are not fixed, but instead can be adapted by team members as they develop knowledge of the task, each other, and the technology itself (Carlson & Zmud, 1999).

The third major concept in the framework is *project and member characteristics*. Existing typologies of projects are based on such factors as the domain of the project (e.g., software engineering or construction), the extent of globalization, and project complexity, risk or scope (Palmer & Speier, 1997; Project Management Institute, 2004). The latter three factors are the most consistent ones, i.e., complexity, risk, and scope, and it is reasonable to classify most project characteristics under one of these three factors. Project complexity can be affected by the extent to which teams have variety in their size, culture, language, member characteristics, resources, and knowledge. Project scope can be affected by the extent of duration, innovation, and breadth. Project risk is defined typically in terms of different categories of risk in different phases of the project. Thus, project characteristics vary widely but can be examined across these common factors.

Several findings related to these input factors and their relationships with team process factors are worth highlighting. It is well established that the on-going process of team member communication can re-define input factors by a process of adaptation of both tools and team characteristics (DeSanctis & Poole, 1994). Virtuality clearly impacts the complexity of a project, in that the greater the temporal and geographic dispersion of team members, the greater the degree of communication, coordination, and control required. Research has shown that the impact of virtuality on project managers can be diminished by reducing temporal distance through collaboration with organizations in closer time zones and by reducing the intensity of collaboration