

## Chapter 2.8

# A Case Study of Web-Based Collaborative Decision Support at NASA

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### ABSTRACT

Today, organizations rely on decision makers to produce “mission critical” decisions that are based on inputs from multiple domains. The ideal decision maker has a profound understanding of specific domains, coupled with the experience that allows them to act quickly and decisively on the information. Daily they face problems and failures that are too difficult for any individual person to solve; therefore, teams are now required to share their knowledge in spontaneous collaborations. Since requisite expertise may not all reside in the same organization, nor be geographically colocated, virtual networked teams are needed. This chapter presents a case study describing the development and use of Postdoc, NASA’s Web-based collaborative and knowledge management platform.

### INTRODUCTION

*Knowledge intensive* organizations rely on decision makers to produce *mission-critical* decisions based on inputs from multiple domains (Nonaka & Takeuchi, 1995). The ideal decision maker has a profound understanding of specific domains that influence the decision-making process, coupled with the experience that allows quick and decisive action based on such information (Becerra-Fernandez, Gonzalez, & Sabherwal, 2004; Davenport & Prusak, 1998). The ideal decision maker is usually someone who has lengthy experience and implicit knowledge gained from years of observation (Leonard & Swap, 2004, 2005; Senge, 1990).

While the profile of today’s ideal decision maker does not mark a significant departure from past practices, the following four underlying trends

are raising the stakes in the decision-making scenario (Becerra-Fernandez et al., 2004):

1. *Increasing complexity*: The complexity of the underlying domains (internal, external, competitive, process, technology, etc.) is increasing.
2. *Accelerating volatility*: The pace of change (volatility) within each domain is increasing.
3. *Speed of responsiveness*: The time required to take action based upon subtle changes within and across domains is decreasing.
4. *Less experience*: Individuals with decision-making authority potentially have less tenure with the organization than ever before, due to such factors as high employee turnover rates.

Today's technological environment is complex and changes at an ever-increasing pace. Many problems and failures are too difficult for any individual person or organization to solve. Teams are now required to share their knowledge in spontaneous collaborations. Since requisite expertise may not reside in the same organization, nor be geographically colocated, virtual networked teams are needed. Collaborative decision support technologies enable knowledge sharing and provide access to explicit organizational knowledge, so it is easy to learn from previous experiences. The use of adequate collaboration technology platforms results in the minimization of costly mistakes, while reducing time-to-market in research and development projects (Majchrzak, Cooper, & Neece, 2004). Collaboration tools also help the organization make better decisions by capturing the knowledge from groups of experts and providing the means to mine this knowledge and experience (Malhotra & Majchrzak, 2005; Malone, Crowston, & Pentland, 1999).

In this chapter, we describe the characteristics of decision making in knowledge intensive

organizations (Becerra-Fernandez et al., 2004). Given the fact that increasingly complex decisions require the collaboration of individuals who many times are dispersed geographically and across organizations, Web-based collaboration technology platforms can effectively support decision making at such organizations. The balance of the chapter is organized as follows. The second section provides a description of one of the best-known knowledge-intensive organizations, the National Aeronautics and Space Administration (NASA). Given the characteristics of decision making at NASA, it provides for an excellent environment to study how this organization has been able to successfully coordinate complex projects through the use of Postdoc, a Web-based collaboration system. The third section describes the design, development, and implementation of Postdoc. The fourth section describes the use of Postdoc to manage complex projects such as Remote Agent, and the fifth section demonstrates the value of this application as a platform for collaboration in complex decision-making environments. Finally, the last section presents conclusions and lessons that could prove valuable to organizations considering the implementation of such systems, as well as a vision for the future of Postdoc and Web-based collaboration systems in general.

## **HISTORY OF DECISION MAKING AT NASA**

A recent NASA workforce study (NASA, 2003) reveals that the average number of years of service for all occupation groups at NASA has been increasing since 1995. The NASA workforce has, in fact, been aging, since most recent science and engineering graduates are taking jobs outside of government, partly due to the lure of dot-coms and private industry in general, coupled with years of government downsizing and hiring freezes. Most of NASA's employees today are between the

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