

# Chapter XII

## Managing Knowledge-Based Complexities Through Combined Uses of Internet Technologies

**Cécile Godé-Sanchez**

*Research Center of the French Air Force, France*

**Pierre Barbaroux**

*Research Center of the French Air Force, France*

### ABSTRACT

*This chapter introduces a theoretical framework to study how Internet technologies provide organizations with additional capabilities to handle various forms of communication and decision-making complexities. In particular, we investigate how specific use-based combinations of Internet technologies emerge within operational contexts. Principal illustrations are drawn from the U.S. military uses of Tactical Internet during recent operations in Afghanistan and Iraq. Military contexts offer relevant illustrations of organizations using Internet within complex decision environments for which short-term responsiveness and tactical adaptability are critical. Within this framework, we discuss the conditions for which combined uses generate additional value for organizations, and we underline the active role played by final users in exploiting the benefits of tactical Internet. Finally, we examine their additional value in the formulation of an effective technological strategy.*

### INTRODUCTION

Information and Communication Technologies (ICTs) provide organizations with major technological solutions to manage decision-making

and communication processes (Gittell & Weiss, 2004; Pickering & King, 1995). Exploiting the benefits of ICTs often requires deep organizational transformations. Organizations have to select an appropriate technological strategy (and implement

associated technological tools) with regard to the decisions and problems they face. Therefore, understanding the impact of ICTs on an organization involves a close examination of its uses. This issue goes far beyond technical aspects to be related to a socio-organizational “use-based” approach of technology (Barley, 1986; De Sanctis & Poole, 1994; Orlikowski, 1992). There is a need to discuss the uses of ICTs in terms of contextualized work practices, and to understand how uses emerge through the actions of final users within organizational contexts (Brown & Duguid, 1991; Orlikowski, 2000).

In this chapter, we focus on the use of Internet technologies within organizations, and analyze their impact on decision making and knowledge sharing. We develop a theoretical framework to study how Web-based tools provide organizations with additional capabilities to handle various information and knowledge problems. According to our framework, people assimilate technologies with regard to their technical features while satisfying their own needs. Uses are driven by the logic of adaptation of final users to uncertain and complex conditions. Hence, technologies might trigger the emergence of unexpected uses, and generate mitigated results. We suggest that combinations of technology uses enable organizations to control and foster decision making and communication processes. Therefore, we investigate how specific use-based combinations of technological functions, knowledge types, and knowledge processes emerge within operational contexts, and we discuss the conditions for which use-based combinations generate additional value for organizations.

Principal illustrations are drawn from the recent U.S. military operations in Afghanistan and Iraq. These operations have been the opportunity for U.S. military organizations to experiment with a new model of warfare that consists in exploiting network-centric technologies to develop information superiority on the battlefield (Alberts, Gartska, & Stein, 1999). At the tactical level

of warfare, this new doctrine consists in using digital Web-based tools (Tactical Internet, TI) to communicate and to make decisions. Tactical Internet comprises various functions related to distinct knowledge processes: decision making and communication. In using decision-support and communication tools, war fighters learn to combine knowledge-based functions and processes, which, in turn, enable them to solve operational problems.

We now develop a theoretical framework that describes the ways ICTs enable organizations to manage various forms of complexity. Then, we provide empirical illustrations, and analyze how Tactical Internet affects knowledge sharing and decision making within military organizations. Finally, we suggest that combined uses of Web-based tools are one of the main sources of value for the organization, and enable decision makers to manage complexities. The last section is conclusive.

## **THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES TO MANAGE UNCERTAINTY AND COMPLEXITY**

Organizations are confronted to increasing paces of technological and socio-organizational changes that are major sources of uncertainty and complexity. In seeking to adapt their products and services to changing circumstances, organizations develop technological solutions to deal with multiple forms of complexity. Before discussing the various types of knowledge and processes involved in the development of such technological solutions, the next section focuses on the concepts of uncertainty and complexity.

### **Complexity and Uncertainty**

Complexity is a cross-disciplinary research topic that is firmly rooted in systems theory and infor-

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