Chapter 5.28
A Multi-Methodological Approach to Study Systems Development in a Software Organization

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ABSTRACT

Large-scale systems development is a complex activity involving number of dependencies that people working together face. Only a few studies concentrate on the coordination of development activities in their organizational context. This research study tries to fill at least part of this gap by studying how systems development process is coordinated in practice. The study uses a multimethodological approach to interpret coordination of systems development process in a contemporary software organization in Finland. The methodology is based on the empirical case-study approach in which the actions, conceptions, and artefacts of practitioners are analyzed using within-case and cross-case principles. In all the three phases of the study, namely multi-\site coordination, requirement understanding, and working with systems development methods, both the qualitative and quantitative methods were used to an understanding of coordination in systems development. The main contribution of this study is to demonstrate that contemporary systems development is much more complex and more driven by opportunity than is currently acknowledged by researchers. The most challenging part of the research process was the combination of qualitative and quantitative methods, because of the lack of multimethodological work done in IS discipline.

INTRODUCTION

Large-scale systems development is a complex activity involving number of dependencies that people working together face. Furthermore, in distributed and multiparty information systems projects, there is even a larger number of stakeholders involved, and a great number of dependencies. These dependencies create a need for coordination that requires continuous effort by developers. Broadly defined, coordination is management of interdependencies between activities (Malone & Crowston, 1994). This definition assumes that if there are no interdependencies, there is nothing to coordinate. The activities can be activities or objects; everything that has dependencies requires coordination (Malone & Crowston, 1994). Coordination is an inherent aspect of work in any organization and takes place in the form of meetings, scheduling, milestones, planning, and processes.

To systematize coordination, many methods and process models have been proposed over the years. These models mainly focus on the sequence of steps used by developers to develop information systems. The status of methods as a whole has been described as a "method jungle," as "an unorganized collection of methods more or less similar to each other" (Jayaratna, 1994). Though these methods and process models have helped companies to gain certification and attain global standards, they do not take into account interpersonal interactions and various other social aspects of development organizations. The development of new methods has tended to be more technology driven, often being influenced by the introduction of improved techniques and software tools (Nandhakumar & Avison, 1999).

Only a few studies concentrate on the process of systems development and coordination of development activities in their organizational context. Kraut and Streeter (1995) found that coordination becomes much more difficult as project size and complexity increases. Apparently, complexity increases when the project is located in multiples sites. Communication is a salient part of coordination, and it has been observed (e.g., Allen, 1977) that distance affects the frequency of communication. Communication delays and breakdowns taking place in software development projects are discussed in several studies (Curtis, Krasner, & Iscoe, 1988; Kraut & Streeter, 1995; Herbsleb et al., 2000).

Systematic surveys of the existing literature in both Information Systems (Wynekoop & Russo, 1997) and Software Engineering (Glass, Vessey, & Ramesh, 2002) fields revealed that most of the research papers in these fields consist of normative research in which concept development is not based on empirical grounding or theoretical analysis, but merely upon the author's opinions. Because of that, many researchers (e.g., Curtis et al., 1988; Orlikowski, 1993) call for more empirical studies in order to understand how information systems are developed in today's organizations and how development work is coordinated in various types of organizations before development of new methods.

This research study tries to fill at least part of this gap by further clarifying how systems development process is coordinated in practice. This objective is reached by conducting a series of empirical studies of two systems development projects in a contemporary organization that competes in the information technology business. We study the early systems development, which we consider to be most important phases in development process: requirement elicitation and architecture design. In this study, the actions, conceptions, and artefacts of practitioners are interpreted and analyzed using multimethodological approach. By multimethodological approach is meant research approach that uses different research methods structured as a set of guidelines or activities to assist in generating valid and reliable research results (Mingers, 2001). The objective for this research is twofold: (1) to understand how practitioners coordinate the systems development process and (2) to make a contribution to the theory and practice of systems development.

The rest of this chapter is structured as follows. First we describe the other research using multiple research methods and then the research