Chapter 18

Project Contexts and the Possibilities for Mixing Software Development and Systems Approaches

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ABSTRACT

It is widely agreed that no single approach for software or systems development addresses all problems and contexts. This chapter summarizes three software development and systems approaches that are often viewed as somewhat unrelated: soft system methodology (SSM), work system method (WSM), and agile development. Next it presents a framework linking stakeholder interests and problem contexts known as the System of Systems Methodologies (SOSM) from Jackson and Keys (1984) and frameworks from Bustard and Kennan (2005) and Alter and Browne (2005) for visualizing various Information Systems (IS) contexts. It uses SOSM to position and explore alternative sets of IS project contexts described by Bustard and Kennan (2005) and Alter and Browne (2005) using their own frameworks. Comparison of these contexts in relation to SOSM leads to observations about the suitability of SSM, WSM, and agile development in different project contexts. Contributions of this research include identifying and comparing alternative contexts for software and system development and identifying possibilities for including within one project combinations of methodologies that are often viewed as unrelated.

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INTRODUCTION

In a recent interview (see Lane et al., 2008, p.101) Boehm underscored the role of the systems approach in addressing challenges in information systems (IS), software engineering and systems engineering and the importance of a more holistic approach to software development. Systems approaches such as Checkland's Soft Systems Methodology (SSM) (see Mingers & White, 2010; Checkland, 1999) have influenced information systems in the past. The use of SSM in combination with traditional IS development methods has been explored by Stowell (1995), Mingers and White (2010) and others. However, following Mingers and White (2010) and Jackson (2006), we recognize that the complexity of problem situations in software development rarely can be addressed by a single whole systems approach. Possibilities for combining SSM with other systems methods or with software approaches like agile methods raise a number of unanswered theoretical and practical questions.

Meanwhile the Work System Method (WSM) (see Alter 2006, 2010) emerged over the last decade as a new systems approach within the field of Information Systems. WSM is a rigorous but not technically complicated attempt to bring together systems thinking with the needs of software requirements analysis. It is gaining wider acceptance within the IS research community (see Petkov et al. (in press)). However, to the best of our knowledge its application in conjunction with the increasingly popular agile software approaches or Soft Systems Methodology has not been discussed in the literature, even though aspects of WSM have been applied in projects performed by student programmers in several academic settings using somewhat agile methods in relation to needs of real world clients.

This paper's goal is to explore the nature of software project contexts within the System of Systems Methodologies (SOSM), a well known framework in the field of Systems Thinking (for more details see Jackson, 2003) and the positioning of SSM, WSM and agile software development approaches within SOSM. Thus it potentially provides insights about the applicability and limitations of each of those methods, and also ways in which they might be used together within a single project.

The current research is motivated by the possibility that agile development, SSM, and WSM might be used together in the same project under some circumstances. This paper's goal is to provide insights about the applicability and limitations of each of those methods, and also on potential ways in which they might be used together within a single project.

Methodologically this research is based on applying elements from the body of knowledge of systems thinking applied to software development. We analyze SSM, the Work System Method and Agile Development Methods with respect to their positioning within the System of Systems Methodologies (SOSM), an "ideal-type" grid of problem contexts proposed originally in the systems literature in 1984 by Jackson and Keys (see Jackson, 2003). The latter is a tested framework for relating particular systems approaches to certain problem contexts (Jackson, 2003). We map project contexts onto the SOSM after an analysis of the software development contexts discussed by Bustard and Keenan (2005) and the typology of systems analysis and design (SA&D) contexts proposed by Alter and Browne (2005).

This paper contributes to systems theory by positioning SSM, WSM, and Agile Methods in relation to problem contexts mapped in the dimensions of the System of Systems Methodologies. The practical contribution to software development involves exploring the mapping of software development contexts in the SOSM and suggesting possibilities for mixing the above methodologies in particular project contexts. These contributions provide support for possible tailoring of software development processes for particular project contexts, thereby extending the