Chapter 7

The Crux of Integration:
Exploring Infrastructure Evolution in the Process Industry

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ABSTRACT

The purpose of this chapter is to identify and explore critical challenges for the process industry in IT infrastructure integration and adaptation. The authors identify four critical challenges in the integration and adaption of IT infrastructure in the process industry: integration as an ongoing process; maintaining stability in the installed base; locking the right stuff in; and balancing user value, continuity of production and compatibility. Given the centrality of IT infrastructure in today's process industries the importance of dealing with these challenges must be emphasized. The four challenges identified in this study are of such a complexity they can only lend themselves to the evolutionary strategy. Such a strategy is in concert with the sensibility towards risk the authors find in the paper industry.

INTRODUCTION

CRUX [' kruks]

1: a puzzling or difficult problem: an unsolved question

2: an essential point requiring resolution or resolving an outcome <the crux of the problem>

3: a main or central feature (as of an argument)

For contemporary organizations the dream of managing their use of information technology (IT) through the establishment of an IT-strategy, and aligning the IT infrastructure with existing business strategies, has never come to be realized. Practical evidence of integration of large-scale IT infrastructure in complex organizations shows that the integration process does not follow a rational and waterfall-like process (Boudreau & Holmström, 2006; Hanseth et al, 1997; Holmström & Robey, 2005). Results from industrial settings, where the "new" IT infrastructure logic becomes intertwined

with "old" and highly institutionalized industrial settings illustrates such complexity in some detail (Jonsson et al, 2008; Rönnbäck et al, 2007; Westergren & Holmström, 2008). While managerial handbook recipes imply that IT infrastructure are highly malleable and enabling, and can be deployed by means of a rational decision making process by the management this perspective to IT-strategy has been criticized for undermining the role of organizational and social issues (Ciborra et al, 2000; Knights et al, 1997; Robey & Holmström, 2001).

This chapter builds on the idea that large-scale IT infrastructures deployed in an organizational setting should be characterized as "infrastructures" rather than "tools", because their deployment is often constrained by an installed base. An installed base can be defined as the interconnected practices and technologies that are institutionalized in the organization (Rolland, 2002).

The purpose of this paper is to identify and explore critical challenges for the process industry in IT infrastructure integration and adaptation. As an example of a process industry, the study presented in this paper is focused on IT integration in an organization in the paper and pulp industry. The paper builds on a growing literature on information infrastructures (e.g. Ciborra et al, 2000; Hanseth et al, 1997; Star, 1996) and in particular the picture painted in this literature of IT infrastructure as stable rather than flexible, as they have been recognized as hard to change due to the inertia of the installed base (Monteiro, 1998).

The remainder of this paper is outlined as follows: First we present a theoretical framework we argue is a useful perspective on IT integration, in the following section the case is presented. In the fourth section we suggest four critical challenges that organizations in the process industry need to address. In the concluding section we discuss the implications of our study, for the process industry and for future research.

THEORY

The question of what comprises the key object of study in IS research is as important as it is continuously discussed (Avgerou, et al, 2004). One possible explanation to the apparently elusive key object is that it changes, or evolves, over time due to technical innovations and innovative ways of using technology. The convergence of information and communication technology (ICT) is one example of a relatively recent technical and social innovation which has challenged the incumbent key object concept in IS research. It reflects not only the convergence of technologies, it captures the growing integration of hitherto different systems (Monteiro & Hanseth 1995; Hanseth 2000) This does not mean that the idea of systems as the key object is rendered irrelevant, but at least it broadens the reach and scope of the research arena. The change in perspective implies we should reconsider several fundamental concepts (coupled tightly with the incumbent notion).

Replacing (information) system with (information) infrastructure as a fundamental concept has been proposed as a way to build a theory more useful for approaching the change in the characteristics of technology and our way of using it (e.g. Hanseth et al, 1997). Infrastructure as a concept captures the integrated nature of the technology and suggests a perspective allowing us to approach questions of for example, design, strategies and methodologies not possible with system as a core concept.

As noted by Walsham, quoted by Angell & Ilharco, theory is "both a way of seeing and a way of not seeing" (Angell & Ilharco, 2004). This paper does not argue that a theory of infrastructure is the right or the only one, but rather that it is a useful perspective which makes it possible to see important aspects of the world we aim to explore in this paper. Aspects that are undetectable or uncapturable when using a systems perspective.

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