

**From “Bytes” to “Atoms”:
Conceptualizing, Describing and Comparing Infrastructures for Adaptation**

Paul R. Carlile
Boston University
Carlile@bu.edu

Karim R. Lakhani
Sloan/MIT
Lakhani@mit.edu

November 16, 2005

Very Early Draft—Please Do Not Cite

**From “Bytes” to “Atoms”:
Conceptualizing, Describing and Comparing Infrastructures for Adaptation**

Abstract

In this paper we move beyond the debate between technology and social structure through conceptualizing what we call “infrastructures for adaptation.” An infrastructure consists of three elements: actors, artifacts and information—with the focus being on the performative production of information that leads to adaptation. To describe an infrastructure for adaptation we develop two reference points from “bytes to atoms:” an ethnographic study of an Open Source Software community (OSS) and a case study of Toyota’s “production system” (TPS) and “design process” (TDP). Comparing the infrastructures across these very different distributed innovation systems reveals a common capability to form a pragmatic mixture from what they know and what is new or novel. The make up of these infrastructures in terms of the capacity of the artifacts and the skill levels of the actors involved to use them limits the amount of novelty that builds up and so maximizes opportunities for learning and timely adaptation.