

Chapter 2

Information Infrastructure: An Actor–Network Perspective

Antonio Cordella
London School of Economics, UK

ABSTRACT

Recent work on information systems has discussed the nature and the complexity of the Information Infrastructures (II) concept. This research has mainly focused on two aspects: studying the process that both shapes and stabilizes information infrastructures, and studying the role played by information infrastructure in leveraging business performance. Using the ideas proposed by the Actor Network Theory (ANT), this article suggests a new way to conceptualise the nature of II, that is, its ontology. Using ANT as an ontological foundation to analyse the relations among actors, the article proposes the concept of information infrastructures in action to highlight their dynamic nature. This leads us to consider information infrastructures not as stable entities, but rather as entities performed in, by, and through relations. The aim of this work is to overcome the limitations associated with studying information infrastructures that rely on stability and manageability assumptions. Conceiving information infrastructures in terms of performative forces that evolve dynamically, this work provides a framework to examine information infrastructure in terms of dynamic relationships by looking at the process that shapes these relationships. The article suggests that information infrastructures should not be studied retrospectively to understand how they are established, but rather should be studied focussing on the process of making. Here we study the action of making rather than the processes that made.

INTRODUCTION

Since the introduction of computers in the middle of the twentieth century, the potential of Information Technology (IT) to transform organizations has been a constant subject of analysis for both

organization studies and information systems research. Each new generation of technology and every major technological innovation has been followed by strong claims that organizations, businesses, and society in general, would have to be radically and fundamentally transformed to take into account the new opportunities offered by the innovations in technological capabilities.

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The changes brought about by technologies in organizations have been discussed examining how technology can help to reorganize work activities or improve their management. A very similar debate characterises the dispute on the role of information infrastructures in supporting economic activities in contemporary society. As a result of the increased diffusion of information technologies in organizations and in society, the level of interdependence among single information systems is escalating such that today, it is very difficult to think about independent information systems as opposed to Information Infrastructures (IIs) (Hanseth, 2004b). In fact, information infrastructures are characterised by the intricate interplay of the set of interconnected hardware, software, and procedural configurations. These artefacts are commonly deployed to support and enact pre-determined paths of behaviour in organizations and among users.

This article aims to contribute to this area of research by questioning the nature of information infrastructures which try to partially fill the gap identified by Orlikowski and Iacono (2001) in the theoretical conception of IT and hence information infrastructures. In making this contribution, this article discusses how the traditional distinction between technology and organization, and the analyses based on these distinctions, are not sufficient to explain the problem associated with information infrastructure design, deployment, and management. This article focuses on information infrastructures looking at the interplay between technologies and the organizations using them, responding to Lee's (2001) claim that "research in the information systems field examines more than just the technological system, or just the social system, or even the two systems side by side; in addition, it investigates the phenomena that emerge when the two interact". This interplay is regarded as the main force that shapes information infrastructures, and hence it is the most important fact to be considered in order to understand the complexity of these systems.

Actor network theory (ANT) provides the interpretative framework of analysis underpinning this study. ANT recognises that technology and people are not distinct pre-existing actors which influence each other through their relationships. Instead, they are considered as the constitutive elements of these relationships and, at the same time, the output of these same relationships. Following this ontology, information infrastructures are considered to be phenomena in action: IIs are the outcome of the relational status that continuously shapes and reshapes their characteristics. This relational status of shaping and reshaping reveals information infrastructures are the output of the recursive dynamic interaction between technology and people, and are not, following the more traditional assumption of II, the stable set of underlying functionalities that standardize organizational actions as the foundation of organizational activities (Broadbent & Weill, 1999; Hammer & Champy, 1993; Weill & Broadbent, 1998). Deploying this general framework, this article contributes to the debate by discussing, in depth, the nature of information infrastructures building upon concepts and ideas borrowed from the Social Studies of Science and Technology (SSST), in particular ANT. The building upon these concepts and ideas has led to the study of information infrastructures as emergent phenomena that are dynamically and continuously defined and re-defined within their use – rather than simply looking at the planned consequences of adopting a specific technology, or the result of planned actions by users and organizations.

The relational dimension of information infrastructure is studied as the outcome of the existing intricacy and interdependence among various technologies and applications (Hanseth, 2004b), and as a result of the adoption and use of these technologies and applications by organizational agents.

Thus, the basic argument underpinning the overall work in this article is that technology and its users co-define their trajectories in a dynamic

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