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Understanding Information Infrastructure II

Abstract

The term *information Infrastructure* was coined by policy makers seeking to promote the international development of computer technology networks, drawing analogies with the emergence of physical infrastructures like railway transport and electricity. The metaphor was applied by STS writers to characterise distinctive features of emerging large-scale organisational uses of technology. Star and Ruhleder (1996)[1] examined how heterogenous expert communities used computer networks to achieve effective collaboration across physical and disciplinary spaces[2]. Monteiro, Hanseth and Hatling (1994)[3], addressing challenges in integrating computer systems within and between organisations, highlighted the emergence and evolution of IIs as complex 'systems of systems', patterned by their 'installed base', of software, standards, data and users. To capture the continually evolving and unfinished character of IIs – which grow over time through the additions of new users and uses – new concepts (e.g. the term infrastructuring [Pipek and Wulf 2009]) and methodological frames emerged[4]. The Biography of Artefacts and Practices perspective was articulated in critique of prevalent STS methodologies (e.g. localised laboratory studies) which were not well-equipped to capture these developments which took place over multiple locales and extended timeframes. Insights into sociomaterial arrangements for technology development and use from sustained work has drawn attention to the diverse arrays of human and material elements and the different ways of combing them into an II.
Different architectures afford different scope for technological dynamism and for local control (Hanseth & Rodon 2021)[5].

Star and Ruhleder's (1996) compelling characterisation of IIs (Large-scale; Complex, Enduring, Integrated, Interconnected and in particular « Invisible until breakdown ») captured features of many developments in our globalized and interconnected society. One consequence is that the infrastructure concept has been applied to an enormous range of developments – albeit with inconsistencies in definition and usage. This infrastructural turn brings a risk of conflating diverse processes and outcomes.

[1] Susan Leigh Star, Karen Ruhleder (1996) Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces, *Information Systems Research* 7(1):111-134 DOI: 10.1287/isre.7.1.111.

[2] This journey originated with an interest in how members of different social worlds could achieve meaningful collaboration – and a desire to depart from perspectives which took a central actor as their starting point. (Star and Griesemer 1989).
Star, S. L., & Griesemer, J. R. (1989). Institutional Ecology, « Translations » and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387–420. http://www.jstor.org/stable/285080.

[3] Eric Monteiro, Ole Hanseth and Morten Hatling 1994 'Developing Information Infrastructure: Standardisation vs Flexibility' Science Technology and Society Working Paper No.18 , University of Trondheim.

[4] Pipek, Volkmar and Wulf, Volker (2009) « Infrastructuring: Toward an Integrated Perspective on the Design and Use of Information Technology, » *Journal of the Association for Information Systems*, 10(5).

[5] Ole Hanseth, Joan Rodon (2021) The Dynamics of Architecture-Governance Configurations: An Assemblage Theory Approach *Journal of the Association for Information Systems* 22(1):130-155.