Deploying an ‘Out of Space’ Technology: A Case Study of Non-Human Resistance

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ABSTRACT

This study investigates how environments into which new technologies are introduced interact and interfere with the deployment process, the deployed technologies as well as the research conducted. The material that is used in this study draws from the N4C project development and deployment of Delay Tolerant Network (DTN) technology in the remote Arctic villages of Ritsem and Staloluoka. As the development of DTN technology prior to the deployment was conducted primarily in the laboratories, its usability and functionality still needed to be proven on the field of deployment. Here, Actor Network Theory (ANT) was employed to reveal how climate, flora, fauna and other elements present in the field of deployment interacted and interfered with, but more importantly, drove the technological development and the continued research work.

Keywords: Actor Network Theory (ANT), Delay Tolerant Network (DTN), Deployment, ICT, Resistance

INTRODUCTION

Various research fields have recognized that technology itself cannot guarantee successful ICT deployments. Several studies can be found that focus explicitly on the resistances and tensions that emerge in ICT deployments. For instance, information and management scholars have identified the resistance of users towards new ICT systems as one of the key impediments of unsuccessful ICT deployments (Hong & Kim 2002; Kim, Lee, & Gosain 2005). Within the field of Human Resource Management (HRM), Guowei Jian (2007) has proposed a tension-center model as a tool to explore resistances to ICT that occur within organizations. Deering et al. (2010) present a case study of ICT adaptation in rural Australia, where they show how the deployment process is not only shaped by the technology itself, but also faces many human-related issues. While these accounts provide a fertile breeding ground for theories within ANT, this study focuses less on the humans present in the deployment environment (politicians, users, organizations). Instead, it investigates the emerging resistances to ICT deployment from the environment in which the deployment takes place. This includes climate, flora, and fauna.

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Similar to HRM, the field of ICT for Development (ICT4D) often apply ANT in their studies of ICT deployments in order to investigate the role of governments and politics. See, for example, (Rhodes 2009; Stanforth 2006). But here, the focus is mostly on human aspects.

DTN technology was initially designed for interplanetary communications (Cerf et al., 2002). The technology can also be appropriated for the terrestrial applications where the conventional ICT solutions cannot be used, e.g. remote and developing regions, warzones and in case of a natural disaster (Fall 2003). However, its usability and functionality still needs to be proven on the field environment. The empirical material for this study was gathered through the development and deployment of DTN technology in the N4C project (Udén 2011). The project idea originated in the political realm of “ICT for Development”, “Information Technology for all”, etc., and the interests of the presumed future users (Lindberg & Udén 2010; Doria & Udén 2006). While the development of this particular DTN system has been described in several papers (Grasic et al., 2011; Näslund 2013; McMahon & Farrell 2009) and primarily addressed Computer Science problems, there are aspects of the design and knowledge production, which the scope of the Computer Science could not capture. Obviously, the role of human actors should be recognized. The roles of users, researchers and other participants in our investigated case have been described elsewhere (Udén & Doria 2007; Udén 2011; Näslund 2013; Grasic 2011; Udén 2010). This study however, will focus mainly on elements such as weather, flora, fauna and climate that interfered with ICT deployment. We mean to confirm the importance of recognizing the material environment not just as a static entity but as dynamic and active participant in the process of engineering, in this case ICT deployment, as described by Law (1986).

Law launched the concept heterogeneous engineering as a reaction to that “sociologists prefer to privilege the social in the search for explanatory simplicity” and maintained that this leads to unsatisfactory research results (Law 1986, 113). Law strives to demonstrate “the heterogeneity of the elements involved in technological problem solving” (Law 1986, 112). Thereby he introduces themes, such as, the interplay between technical limits and the forces by which humans have to adhere (climate, weather systems, and so forth). Writes Law: “heterogeneous engineering may be treated as the association of unhelpful elements into self-sustaining elements that are, accordingly, able to resist dissociation” (Law 1986, 114). Law’s notion is analytical – counting with heterogeneity is a means to better capture data and information generated in studies of engineering. Employing Actor Network Theory (ANT), this study reveals fragments and characteristics of the deployment environment relevant to the development and deployment of the DTN technology.

**EMPIRICAL MATERIAL**

The empirical material of this article was gathered throughout three years of field test deployments: 2008, 2009, and 2010. These deployments were conducted once every summer and every winter (Udén 2011). The material was collected using participatory observation on the field. Experiences, thoughts, and ideas were written down in a field diary. The material was also collected by conducting one group interview with local Sami people on the field site (Näslund 2013), as well as informal conversations with the residential Sámi, hikers, and helicopter pilots. Additionally, scientific evidence was collected in the form of photo and video material.

**ACTOR NETWORK THEORY**

The Actor Network Theory is a conceptual framework that derives from Science and Technology Studies (STS). Pioneering ANT work was done during the late 1980s by Bruno Latour, Michel Callon (1986), and John Law (Latour 1987; Callon 1986; Law 1986; Latour 1986). The concept of an actor-network acknowledges that networks consist of actors (human as well
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