Chapter 4

Making IT Visible:
The Paradox of Ubiquitous Services in Practice

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ABSTRACT

As computer devices go embedded into the environment people will be surrounded by ubiquitous computers in their everyday life. These devices can serve as a base in services where data are collected and analyzed to serve the customers. Ubiquitous services are to a great extent invisible as people can neither see the computers nor have to be involved in the data collection or the data analysis. The service provider can be located at a distance and is thus also invisible to the customers. A challenge for the parties involved in the service production is to deal with the invisibility and the distance that emerge in ubiquitous services. The aim of this paper is to address the issues of invisibility and distance in ubiquitous services by exploring the implications of using ubiquitous computing to produce services. To address this question, the paper adopts a practice perspective to analyze data from an empirical case study of a remote diagnostics service provider and one of its customers in the mining industry. The study shows that both human enactment and the technology have implications for the service. They do however, reveal a paradox: the technology is designed to enable invisible services while people's enactment of the service strives towards making them more visible. For ubiquitous service providers it is important to cope with this paradox, otherwise it might cause unfulfilled expectations and an unsuccessful service delivery.

INTRODUCTION

Ubiquitous computing changes the way we use and interact with technology. As Weiser (1991, p 66) stated "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it". Information technology (IT) that disappears into the environment will not only influence our relation with the technology, it will also have a great impact on the way we access and use services, enabling new services that only make sense

by virtue of being embedded in the environment (Fano & Gershman, 2002). Research on the impact of ubiquitous computing on services emphasizes the new conditions for service production that are enabled by the technology. For instance, as a lot of the interaction can take place automatically ubiquitous services can be provided that do not imply any particular interaction or attention from the user (Langheinrich, 2005). Weiser's (1991) vision of the invisible computer will thus enable invisible or calm services (Ohbyung, 2004) embedded in the environment ready to serve their customers.

In the consumer market Fano and Gershman (2002) expect ubiquitous computing to transform aspects of services such as the role of their location, the scope of the service, and its duration and frequency. Service providers will be able to make the location of the customers the location of their business, which will foster new remote service providers offering services to their remote customers. Technical devices will then become the eyes and ears of the remote service providers (Gershman & Fano, 2006). While these studies of ubiquitous services have yielded important insights, most have tended to focus on the technical possibilities and their potential impact on service production for the consumer market (Fleisch & Tellkamp, 2006). Previous studies have not addressed how, in practice, ubiquitous computing is used for business-to-business services in organizational settings.

A specific type of services based on ubiquitous computing can be found in the processing industry, where remote diagnostics systems are being increasingly used to monitor the machines used in the process line (Hibbert, 2000). Previously the maintenance teams relied on their staff's personal skills and use of senses to monitor the machine's condition (Westergren, 2007). Nowadays, they are more likely to be monitored through IT-applications such as remote diagnostics systems that can automatically monitor performance, diagnose problems and request attention from service technicians for detected problems (Biehl, et al., 2004).

The monitoring is increasingly being outsourced to remote service providers where experts use the IT-infrastructure to access data from the customers and perform analysis (Jonsson, et al., 2008). With remote diagnostics systems no direct user involvement is required in the data collection as sensors are embedded into the machines to log their condition and the subsequent data analysis often takes place at the remote service centers by distant experts. The services based on remote diagnostics systems are thus to a great extent invisible to the customers as they can neither see the systems nor have to be involved in the data collection or the data analysis. A key issue for the parties in the service production is thus how to deal with the invisibility and the distance that emerge in remote diagnostics services. The aim of this paper is to address the issues of invisibility and distance in ubiquitous computing services by exploring the following research question: What are the implications of using ubiquitous computing to produce services in practice? To address this question, the paper adopts a practice perspective (Orlikowski, 2000), to analyze data from an empirical case study of a remote diagnostics service provider and one of their customers in the mining industry. The paper is organized as follows: section two gives an overview of related research on ubiquitous services and the relation between IT and organizational behavior. Section three describes the research methodology. The case study is presented in section four and analyzed in section five. The paper ends with conclusions in section six.

CONCEPTS FOR ANALYZING UBIQUITOUS SERVICES

The development of IT has enabled computing devices to be embedded into objects in our environment, which supports the collection and mobile use of data. With computers operating in the background the objects can be transformed

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