Challenges and Opportunities Related to Remote Diagnostics: An IT-Based Resource Perspective

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ABSTRACT

Remote diagnostics is expanding the business scope of vehicle manufacturers, ranging from products to services. In this paper, the authors focus on investigating the business challenges and opportunities related to the remote diagnostics of vehicles from an IT-based resource perspective. Remote diagnostics involves technology, human skills and intangibles. IT-based resources consist of physical IT infrastructure, human IT skills and IT-enabled intangibles. In this study, the authors find that remote diagnostics not only faces challenges in these three categories of IT-based resource, but also creates opportunities. One contribution of this paper is to provide an overview of the challenges and opportunities for business related to the technology. The paper also makes a contribution to information systems by shedding light on the discussion of digital infrastructure. It also highlights the application of IT-based resource perspective to find out the business challenges and opportunities of an emerging technology like remote diagnostics.

Keywords: Human IT Resource, IT-Based Resource, IT-Enabled Intangibles, IT Infrastructure, Remote Diagnostics

INTRODUCTION

One fine day a city bus was en route to its destination with passengers on board. Everything was running smoothly and on schedule. All of a sudden the bus stopped in the middle of the journey. The driver tried to identify the problem to no avail. He called the manager of the transport operating company, informed him of the situation and requested to send another bus. The manager replied that all other buses were in operation and that the only spare bus was currently covering another breakdown. He sent a service technician to fix the problem, who once on the scene, reported that it would take time to identify and fix. The bus underwent maintenance just a week ago and still this unfortunate event took place. The passengers started wondering about the situation and some started...

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The above scenario is an example of city bus breakdowns that occur every year around the world. There are research initiatives in Europe to implement innovative approaches in vehicle maintenance to reduce such occurrences. The research aims to predict faults with the parts of a bus by embedding digital devices so that faults can be diagnosed in advance and breakdowns can be reduced. The European council for automotive R&D (EUCAR) is investing in vehicle research, which includes innovative vehicle maintenance (EUCAR, 2012). The Swedish government agency VINNOVA is also devoting money to research on remote diagnostics of vehicles (VINNOVA, 2012). These initiatives are expected to bring benefits to the society as the vehicles will be safer, more efficient and effective.

To achieve these benefits, rapid developments in information and communication technologies (ICT) bring challenges and opportunities to the existing maintenance in different industries (Angeles, 2005). In the vehicle industry, such technologies give rise to the development of remote diagnostics systems. These systems belong to the class of e-maintenance, which is a broad concept and covers various maintenance related services (Campos, 2009a; Jonsson, Holmström, & Levén, 2010). The remote diagnostics systems monitor vehicle performance from a distant location, predict and diagnose problems and request attention from service technicians once the problems are diagnosed (Biehl, Prater, & McIntyre, 2004).

The challenges and opportunities related to remote diagnostics shown in recent studies are mostly focused on technological aspects (Kuschel, 2009). Although some studies are conducted on the business related issues in remote diagnostics, the focus of the previous studies have been to investigate the outcome of deploying remote diagnostics in the vehicles (Jonsson et al., 2010; Kuschel, 2009). However, the pre-implementation business challenges and opportunities of remote diagnostics have not been widely investigated. In our study, we seek business challenges and opportunities associated with remote diagnostics as a prospective IT-based resource for a vehicle manufacturing company.

Recent research has shown an increased interest in this area. Tilson, Lyytinen, and Sørensen (2010) state that research on digital infrastructure (such as remote diagnostics) is scarce and requires more attention. Our research is a response to that call. Further, Lyytinen and Yoo (2002) emphasize that IS researchers should be actively involved in studies during the development of technologies and not after they enter the market. Finally, the competitive environment in manufacturing companies compels the companies to think in advance about the challenges and opportunities of their future products and services (Lyytinen & Yoo, 2002). Remote diagnostics is a special class of e-maintenance. There is limited understanding about the benefits of e-maintenance when business models change from product to service (Jantunen, Emmanouilidis, Arnaiz, & Gilabart, 2010). Therefore, we pose our research question as, “what are the business challenges and opportunities related to remote diagnostics?”

To answer the question, this paper reports from an ongoing research on remote diagnostics of vehicles. The research is organized between a vehicle manufacturing company and academic researchers in Northern Europe. We use IT-based resource perspective to describe remote diagnostics systems for the vehicle manufacturing company. IT-based resource perspective (Bharadwaj, 2000; Melville, Craemer, & Gurubaxani, 2004) not only discusses the technical infrastructure of IT, but also describes the human IT resources and IT-enabled intangibles. As a prospective IT-based resource, we argue that remote diagnostics will face challenges and create opportunities in all three aspects of IT-based resource, i.e. IT infrastructure, human IT resource and IT-enabled intangibles.

This paper is organized as follows. In the next section, we describe the phenomenon of remote diagnostics. Later, we present the
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