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TWO SIDES OF A SINGLE COIN: ASSESSING THE NET EFFECT OF ORGANIZATIONAL MOBILE IS/IT USE

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Abstract

The rise of mobile computing devices in organizations is unabated. For example, over 94% of Fortune 500 companies currently test or deploy iPads, and a similar percentage integrate smartphones into their technological landscape. Mobile information systems (IS) and information technology (IT) use indisputably entails a number of advantages in an organizational context, such as an increase in information availability and information quality. However, researchers have started to assess the drawbacks of mobile IS/IT, including work-life conflict, spillover effects, and an increase in work stress. The goal of our study therefore is to provide a balanced overview of the benefits and drawbacks of mobile IS/IT use in a conceptual research model so as to ultimately assess the net productivity impact of mobile IS/IT use in an organizational context. We use a deductive-inductive research approach to develop our model by combining an extensive literature review and 17 expert interviews in major German and Swiss public corporations. The model therefore integrates insights from theory and practice to arrive at a more holistic understanding of our research topic.

Keywords: Mobile Computing, IS Adoption, IS Value, Conceptual Model Development.

1 Introduction

Usage of smartphones and tablets in an organizational context entails a number of benefits, which are documented in literature and practice (Gebauer, Shaw, & Gribbins, 2004; Scornavacca, Prasad, & Lehmann, 2006). However, mobile computing use is also known to translate into markedly negative impacts, such as increases in work stress (Tarafdar, Qiang Tu, Ragu-Nathan, & Ragu-Nathan, 2011) and a worsening of employees' work-life conflict (Boswell & Olson-Buchanan, 2007). Even though 94% of Fortune 500 companies are currently testing tablets and smartphones (Sloan, 2012), ambiguity remains concerning the net impact of mobile information systems (IS) usage. Scholarly studies assessing the benefits and drawbacks of mobile IS/IT in an organizational context are scarce, and they typically focus on a single issue, rather than adopting a comprehensive perspective on mobile computing use (Fischer & Smolnik, 2013). Our research goal therefore is to develop a comprehensive model of the benefits and drawbacks of mobile IS/IT use in an organizational context in order to assess whether mobile IS/IT usage exhibits a positive net effect. We thereby aim to answer the following research question:

What are the benefits and drawbacks of individual mobile IS/IT use within the organizational realm documented in literature and practice?

In order to answer this research question, we first derive a set of hypotheses from existing literature on the individual impact of mobile computing. Then, we draw on multiple expert interviews to refine the deductively developed hypotheses. In addition, we inductively derive new constructs from the qualitative data. This deductive-inductive approach (Gilgun, 2001) allows us to synthesize insights from theory and practice in order to arrive at new results. Our contribution is threefold: First, we contribute to theory by accumulating and structuring the benefits and drawbacks of mobile IS/IT found in existing literature. Second, we offer a comprehensive model of mobile IS/IT use benefits and drawbacks on the individual level in an organizational context. Third, our findings may support decision makers in arguing for the introduction of mobile computing artefacts and in assessing the net effect of their mobile IS/IT use. In addition, future research can build upon the developed model.

2 Theoretical Background and Related Work

Scholarly interest in mobile computing has picked up in recent years due to the large proliferation of increasingly powerful mobile devices, such as smartphones and tablets (Scornavacca, Barnes, & Huff, 2005). For the purpose of our study, we define mobile computing as the "capability to physically move computing services with us" (Lyytinen & Yoo, 2002, p. 64), which is a subset of Weiser's (1991) understanding of ubiquitous computing. Because of their portability, mobile computing devices are increasingly being taken for granted. They facilitate a broad range of tasks, from inscribing and storing data to handling communication and decision-making (Lyytinen & Yoo, 2002).

The adoption and use of IT is a mature research topic (Davis, 1989; Rogers, 1983). Factors such as their always-on nature, continuous connectivity, long battery life, and consumer-friendly interface make mobile devices truly ubiquitous (Schwarz, Junglas, Krotov, & Chin, 2004). They are being used in a variety of different contexts, including at home, at work, and in society in general for a diverse set of tasks (Scheepers & Scheepers, 2004). Modern mobile devices have thus enabled the "anywhere, anytime" aspiration of computing visionaries (Weiser, 1991).

While scholarly research has been quick to develop and evaluate hardware and software artefacts for the mobile realm, scientific investigations into the business value proposition and effectiveness of mobile IS/IT in an organizational context have so far lagged behind (Fischer & Smolnik, 2013). In addition, it remains unclear whether mobile IS/IT use in organizations entails a wholly positive, or, in fact, negative impact. While initial empirical evidence exists that organizational mobile IS/IT use may

indeed increase individual productivity (e.g. Gebauer et al., 2004; Scornavacca et al., 2006), there is an equal amount of research on the potential downsides of employee mobile IS/IT use, which include drawbacks such as an increase in work stress (Sarker, Xiao Xiao, Sarker, & Ahuja, 2012) and a worsening of employee work-life conflict through the increasing level of availability required of them (Prasopoulou, Pouloudi, & Panteli, 2006). We draw upon Seddon's (1997) discussion regarding net effects/impacts of IS use in order to frame our analysis of benefits and drawbacks.

3 Research Approach

The focus of our research is on the individual, rather than the whole organization: Although an organization decides on the adoption of mobile computing artefacts, it is the individual employees who are the ones directly experiencing the immediate benefits and drawbacks of the technology.

In order to derive initial constructs from extant theory, we conducted an extensive review of the existing literature on the impact of mobile computing in organizations, as recommended by Webster and Watson (2002). Using the keywords "mobile computing", "ubiquitous computing", and "pervasive computing", we searched the leading 30 journals in the IS discipline (as ranked by the Association for Information Systems (AIS)), four major IS conferences (AMCIS, ECIS, HICSS, ICIS), and three specialty journals on mobile and ubiquitous computing (Mobile Information Systems, Mobile Networks & Applications, and Personal & Ubiquitous Computing). This search resulted in 449 publications. An initial filtering to ensure that articles dealt with our focal topic of the impact of mobile, ubiquitous, and pervasive computing and were empirical in nature brought the number of considered papers down to 101 publications. The analysis framework was constructed based on the mobile computing impact framework by Scheepers & Scheepers (2004). From the thus classified literature, we developed a priori constructs and effect relationships to build an initial model.

In order to triangulate the results from the literature review and to refine the model developed from existing theory, we drew on interview data from 17 expert interviews conducted between June and December 2011. The interviews were conducted in 17 global, publicly traded organizations, stemming from a diverse set of industries. Interview partners were sampled using an expert sampling strategy based on the self-reported expertise of the respective interview partner from companies using mobile IS/IT for internal purposes. Data collection consisted of in-depth face-to-face or telephone interviews with employees in charge of enterprise apps (C-level executives, business unit leaders, and project managers), lasting for an average of 100 minutes. Interviews were recorded, transcribed, and coded independently by two researchers using qualitative data analysis software (NVivo9).

4 Conceptual Model Development

Our proposed research model encapsulates both the benefits and drawbacks of mobile IS/IT use in order to present a balanced view on this phenomenon and to assess the net effect of mobile IS/IT use on individual productivity. The research model we propose in this paper (see Figure 1) postulates that the intention to use a mobile IS/IT solution leads to the actual use of the artefact, which is based on the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980) and its successors. The developed model assumes that usage entails a number of individual benefits, which can be classified into task-related and personal benefits. Task-related benefits include an impact on the information quality and on information availability. Personal benefits include work satisfaction and work motivation. In addition, two major drawbacks of mobile IS/IT use are included in the model, which are a work-life conflict impact and a work stress impact. We assume that the enumerated benefits increase individual productivity, while the drawbacks lead to a decrease in productivity. The benefits and drawbacks are summated into a net productivity impact, accordingly. Factors that we control for are prior private mobile IS/IT use, voluntariness, age, gender, industry, and the mobility of the employee's job.

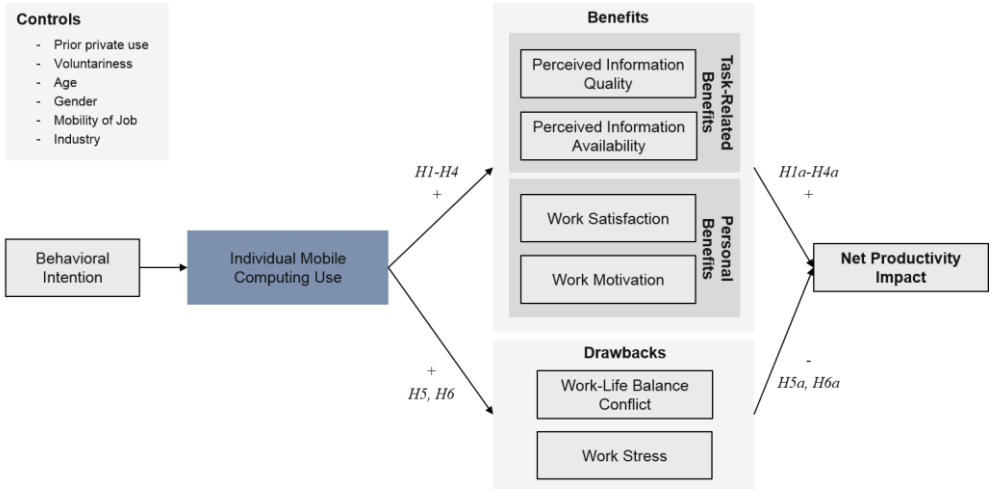

Figure 1. Conceptual Research Model

4.1 Benefits Constructs

Information Quality: Smart mobile devices can be used to retrieve the latest information while users are out in the field. Similarly, new information can be fed back to a central IS as it emerges. Thus, mobile IS/IT use can result in an increased record accuracy and integrity. In addition, information may be tailored to a specific user, leading to increased relevance of information. Existing literature mentions this benefit, as "increased data accuracy" (Barnes, 2004). We thus hypothesize that,

H1: Mobile IS/IT use is positively related to information quality.
H1a: An increase in information quality leads to an increase in perceived individual productivity.

Information Availability: One of the purported core benefits of the portability facet of mobile IS/IT is that it enables users to access the right information at the right time. An increase in information availability was among the most frequently mentioned benefits in the explorative interviews. Nah, Siau, and Sheng (2005) mention this benefit as part of a qualitative case study of mobile workers. We thus hypothesize that,

H2: An increase in mobile IS/IT use leads to an increase in the user's perceived information availability.
H2a: Perceived information availability is positively related to perceived individual productivity.

Work Satisfaction: We define work satisfaction as "the degree of compatibility between the individual and the organization" (Cheney & Dickson, 1982, p. 173), which includes pride, prestige, and authority. We argue that using a device that is enjoyable to use is likely to increase a user's work satisfaction. The ability of mobile IS/IT use to increase work satisfaction was mentioned several times during the expert interviews. This leads us to hypothesize,

H3: Mobile IS/IT use is positively related to a user's work satisfaction.
H3a: An increase in work satisfaction leads to an increase in perceived individual productivity.

Work Motivation: Literature typically distinguishes between intrinsic and extrinsic motivation. For the purpose of our study, we consider intrinsic motivation as the "performance of an activity for no apparent reinforcement other than the process of performing the activity per se" (Davis, Bagozzi, & Warshaw, 1992, p. 1112). Intrinsic motivation is commonly linked to perceived enjoyment (Davis et al., 1992), which is presumed to be high for mobile IS/IT due to a high level of usability. We thus hypothesize that,

H4: An increase in the use of mobile IS/IT leads to an increase in the individual's work motivation.
H4a: Work motivation is positively related to perceived individual productivity.

4.2 Drawbacks Constructs

Not all effects of mobile IT/IS use are positive in nature. Several studies have found that mobile IS/IT use can entail markedly negative effects, such as a work spillover effect, where boundaries between work and private life become blurred and an increase in work stress (Sarker et al., 2012). These drawbacks can decrease the productivity of employees.

Work-Life Balance Conflict: Boswell and Olson-Buchanan (2007) define work-life conflict as the blurring of physical, temporal, and behavioural boundaries. With regard to mobile IS/IT use, Prasopoulou, Pouloudi, and Panteli (2006) state that "professionals fear that not answering their mobile phone after normal office hours [. . .] would be interpreted as evading or not delivering on work responsibilities." (p. 283). A sustained lack of work-life balance has been shown to lead to a decrease in productivity (Sarker et al., 2012, p. 143). We therefore hypothesize that,

H5: Mobile IS/IT use is positively related to an individual's work-life balance conflict.
H5a: An increase in an individual's work-life balance conflict leads to a decrease in perceived individual productivity.

Work Stress: Work stress caused by technology use is often referred to as *technostress* (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). It is commonly attributed to information overload or the inability to deal with the complexities of IS (Tarafdar et al., 2011). Such stress is created by the "always-on" mentality, which is often required from mobile IS/IT users by their superiors (Sarker et al., 2012, p. 143). Work stress has been shown to significantly affect a user's productivity (Tarafdar et al., 2011). We hypothesize, accordingly, that,

H6: An increase in mobile IS/IT use leads to an increase in work stress.
H6a: Work stress is negatively related to perceived individual productivity.

4.3 Net Productivity Impact

We argue that an individual's use of mobile IS/IT leads, in total, to a net productivity impact. Time savings, reduced paperwork, and increased employee self-service increase a user's productivity, whereas stress and work-life conflict lead to a decrease in individual productivity. Previous studies on mobile IS/IT use have found preliminary empirical evidence that it leads to an increase in individual productivity (e.g. Gebauer et al., 2004; Scornavacca et al., 2006).

5 Next Steps and Conclusion

In a subsequent survey-based study, we aim to validate the proposed conceptual model on a larger empirical scale. To do so, we will first derive a measurement instrument. We will follow Straub's (1989) recommendations regarding an iterative development process for the instrument creation. The resulting instrument will then be administered to a sample of mobile IS/IT users from a number of case companies – using a criterion sampling strategy based on internal mobile IS/IT use – to ensure a comparable setting and similar technological artefacts used. The resulting quantitative dataset will then be used to test our hypotheses and overall model fit.

Our review of the extant literature on mobile IS/IT has revealed that there is currently no comprehensive model of the individual benefits and drawbacks of mobile IS/IT use within organizations. We therefore developed such a model based on existing research and an interview study in 17 companies.

Our contribution is threefold: (1) We contribute to theory by synthesizing and structuring the benefits and drawbacks of mobile IS/IT use discovered in existing research. (2) The developed model may help practitioners in designing mobile IS/IT adoption strategies and (3) can serve as a reference framework for scholars assessing mobile IS/IT implementations.

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