

INTEGRATING THE PERSONAL IT ECOSYSTEM IN AN ORGANIZATIONAL ENVIRONMENT A DESIGN SCIENCE PROJECT

Introduction

The work force within companies is subject to constant changes. More dynamic working time models go along with greater social trends, such as the demographic change. While the generation of baby boomers has finally reached retirement age, the number of members of newer generations has been constantly increasing. Members of these new generations have grown up with modern technology and have made it an important part of their private, as well as professional life. Their technological requirements are significantly different from those of the generations before (Burke and Hiltbrand, 2011). Younger generations apply an extensive personal IT ecosystem, comprising a variety of personal systems (e.g., social networks, messaging services and apps) and devices (e.g., tablets, laptops and smart phones), to conduct their private as well as professional activities. Current research refers to this phenomenon as “the individuation of IT” (Baskerville, 2011). Many organizations however struggle to integrate these personal IT ecosystems into their enterprise system landscapes. The effects are manifold, but often negative. A poorly integrated personal IT ecosystem, for example, may lead to a decreased individual performance since the maintenance of several systems and devices is error-prone and leads to time consuming redundancies. In addition, also organizational performance suffers when important information is forgotten on personal devices and therefore never made available to other members of the organization.

One negative example is organizational knowledge management (compare Alavi, 2011): on the one hand, knowledge-management is widely perceived as a possible solution to ease the effects of the demographic change by preventing the leak of expertise companies experience when older employees leave. On the other hand, current solutions seem ill prepared to integrate the personal IT ecosystem of especially younger employees into organizational knowledge-management, hindering a seamless flow of information back and forth (Hansen and von Oetinger, 2001). One obvious cause is the lack of a comprehensive understanding of the individual needs and preferences, e.g., tendency to hide information regarding the integration of the personal IT ecosystem into the enterprise system landscape. Furthermore, these individual needs and preferences must be aligned with organizational requirements, such as legal regulations or existing security policies. Further issues arise from the employed technology itself. The increasing diversity of available end-user devices and software services, but also increasing complex enterprise systems, asks for new approaches to establish an integrated IT landscape.

The proposed research addresses some of the described issues. It investigates the individual side of knowledge management. It focuses on how individuals create personal information and how this personal information is transferred to the organizational context as an input for organizational knowledge management. Main research themes are (1) the kind of professional activities conducted on the individual side involving personal information, (2) the composition of the personal IT ecosystem leveraged for these activities, and (3) how both interact with the organizational context. Based on these findings, it suggests design principles for a knowledge-management system which fosters integration of the personal IT ecosystem and respectively, personal information into organizational knowledge-management.

In particular it addresses the following two research questions:

***RQ1:** Which idiosyncratic needs of individuals can be identified regarding the integration of personal information into the organizational context?*

RQ2: Which design principles for a knowledge-management system can be derived from these findings that increase individual performance?

Methodology

The proposed research uses design science methodology. The design science approach and its application in computer science have been in the focus of several researchers: Takeda et al. (1990) have described the reasoning which occurs in the course of the design cycle of software. Vaishnavi and Kuechler (2007) have extended this analysis to illustrate the knowledge generated in a design effort. They have applied the cycle specifically to information systems design science research leading to the so called *General Design Cycle Framework*. The proposed research approach uses design science methods and follows the general design cycle as described by Vaishnavi and Kuechler (2007). The general design cycle favors the inclusion of multiple methods to design, implement and evaluate an artifact via a design science research approach (Vaishnavi and Kuechler, 2007). The proposed research makes use of a mix of different research methods. Right now, it's in its second iteration. Figure 1 illustrates the choice of methods, their relation and expected outcomes during the current iteration.

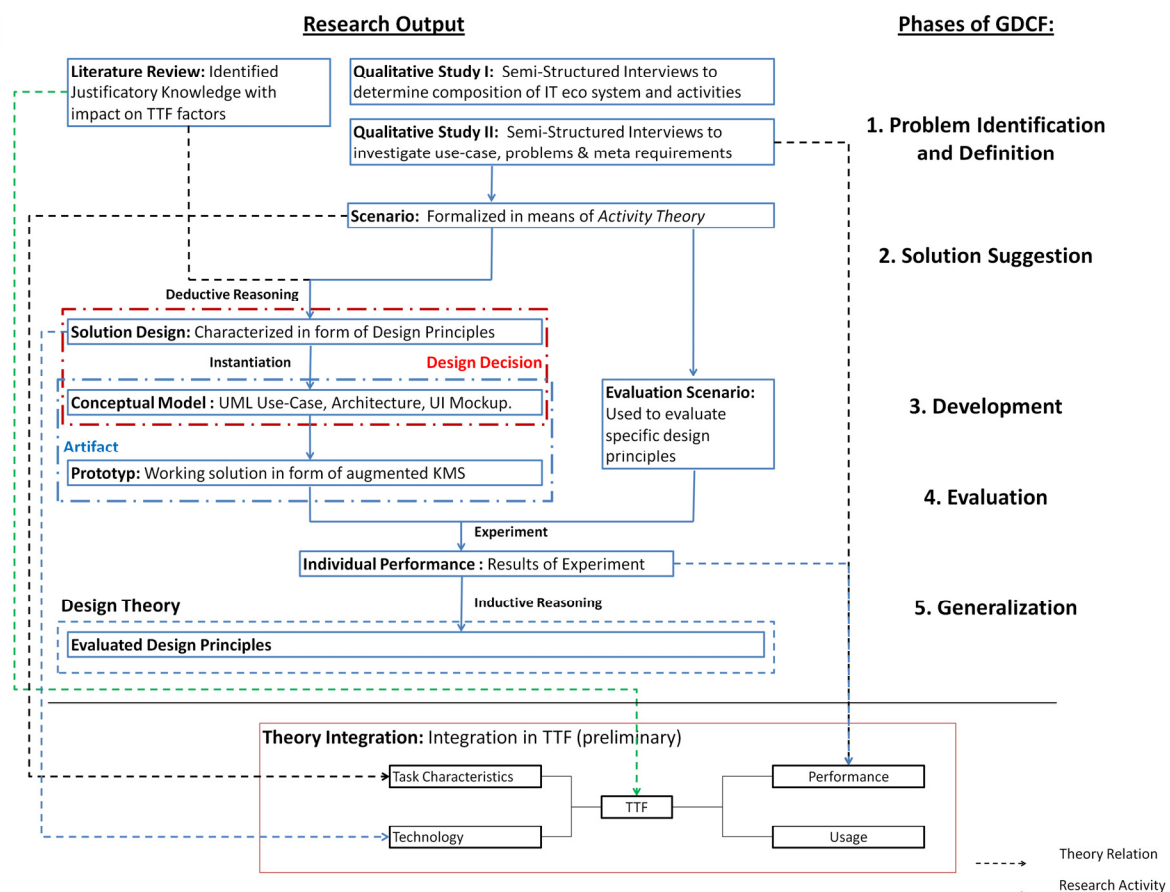


Figure 1: Research Design of 2nd iteration

A first exploratory qualitative study is conducted among eight knowledge workers in the financial industry to identify general activities performed in a knowledge management scenario and also to determine the technological components which are employed to support these activities. The first study lays the foundation of a second more thorough investigation. A second qualitative study assesses a subset of knowledge management activities identified in the first study. It specifically targets the type of personal information leveraged for

professional activities. Focus of the investigation is interoperability issues which occur when personal information is exchanged with the organizational context. In detail, it strives to identify conflicts that arise between components used to manage this information on the personal side, i.e. devices and systems of the personal IT ecosystem, and the corresponding component on the organizational side, i.e., enterprise systems. The study uses semi-structured interviews conducted among 15 financial agents to collect data. Independent financial agents represent one type of knowledge worker which is not bound to organizational regulations regarding the setup of their personal IT ecosystem. Even though they are subject to legal regulations regarding the acquiring, processing and storing of customer related knowledge, and also need to maintain an interface to affiliated financial corporations, they are free to design their personal IT ecosystem according to their individual needs. This allows us to focus on interoperability issues which result from idiosyncratic decisions and do not go back to ill choices that were enforced by the organizational context. In contrast to previous studies, the proposed approach does not just focus on functional characteristics of the employed systems, but also analyzes the social context these systems are embedded in. This is achieved by applying activity theory as a systematic approach to elicit and analyze interaction between individuals, their personal IT infrastructure and the organizational context (Zowghi et al, 2005). Activity Theory as an approach represents a method that has gained increasing attention in recent years (e.g., Kaptelinin et al., 2006). It serves as a lens to analyze any computer-supported activity of an individual or group and to study the design of artifacts for individuals and groups. Activity Theory suggests that human activity is directed toward an object, mediated by artifacts or instruments and socially charged by the surrounding environment (Bertelsen et al., 2003; Vygotsky, 1978).

The next step is to exploit the gained knowledge to derive determinants of interoperability between the components of the personal organizational IT ecosystem and the corresponding organizational systems. These determinants will be formulated as characteristics of a knowledge-management system enabling a seamless integration of information resulting from personal IT ecosystem into the enterprise systems landscape. The highest abstraction level, on which these characteristics are described, is along a set of design principles. These design principles are the result of deductive reasoning combining both qualitative results and justificatory knowledge from literature: the solution concept comprises a direct answer to an insufficiently supported activity (or action). Justificatory knowledge derived from literature is used to predict the impact of particular principles.

After the development of an artifact, it is necessary to evaluate the artifact using empirical methods to determine how well it works (Hevner et al., 2004). In this research, we use experiments to evaluate the design principles.

The evaluation phase is based on a test scenario comprising typical activities (and actions) of knowledge workers. The scenario is designed based on the findings of the second qualitative study and also follows the dimensions of activity theory. The measured dependent variable is individual performance as introduced by Task-Technology-Fit (TTF). TTF suggests that information technology is more likely to have a positive impact on individual performance and experiences higher system utilization if the characteristics of the information technology match the tasks that the user must perform (Goodhue and Thompson, 1995).

The evaluation is conducted using a series of experiments. So far, it is planned to use students as test subjects in a controlled test environment. At this point, a basic experimental setup seems feasible to test the impact of particular design principles on performance against a control group, i.e., the absence of the design principle. However, more complex experiments to investigate correlations between design principles may be necessary but are not further framed yet due to the early stage of the project.

Expected contribution

The proposed research investigates the idiosyncratic needs and preferences of knowledge workers regarding the integration of their personal information into the organizational context. The results are used to derive design principles for a knowledge management system which foster the interoperability with a personal IT ecosystem. The impact of particular design principles will be measured in terms of individual performance and interpreted in the context of TTF. The theoretical contribution comprises the evaluated design principles as a possible input for a holistic design theory for knowledge-management systems. From a practical perspective, the proposed research will align with the tradition of Design Science and provide resolution of a practical problem. Resolution will come either in the form of general design principles that help to improve future professional solutions or a working prototype exemplifying these principles and providing instant relief to practitioners.

Current status

The introduced design science project comprises several cycles. The initial cycle resulted in a set of preliminary design principles, of which a sub-set was evaluated in a basic experimental setup. The results were published in Gass and Maedche (2011).

Currently, the design science project is in its 2nd, more comprehensive, iteration. By now (March 2012) the first two qualitative studies have been concluded. Coding is currently in progress. Implementation of the next version of the prototype is planned for April. The evaluation of the experiment is scheduled for fall.

Issues of Interest

- Integration of kernel theories, especially in connection to empirical findings.
- Generalization of findings, especially formulization of design theories

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