2009

Assimilation of Enterprise Mashup Systems – The Impact on Changes in Work Processes

Immanuel Pahlke
Goethe University Frankfurt, pahlke@wiwi.uni-frankfurt.de

Roman Beck
Goethe University Frankfurt, beck@itu.dk

DIGIT 2009

Assimilation of Enterprise Mashup Systems − The Impact on Changes in Work Processes

Research in Progress

Immanuel Pahlke
Goethe University Frankfurt
pahlke@wiwi.uni-frankfurt.de

Roman Beck
Goethe University Frankfurt
rbeck@wiwi.uni-frankfurt.de

ABSTRACT

A number of Enterprise 2.0 collaboration platforms are beginning to proliferate. By leveraging typical Web 2.0 attributes, these platforms provide enterprises with a collaborative environment to develop capabilities by collectively generating, sharing and refining business knowledge (including information, functionality and business processes). Deductively deriving from the assimilation literature stream, this article conceptually discusses a quantitative research model to constitute a deeper understanding of Enterprise 2.0 technology assimilation on an individual level. Our research contributes to the existing assimilation and adoption theory by integrating the social exchange theory as well as emphasizing the impact of Enterprise Mashup system assimilation towards changes in work processes. Furthermore, we include several object-related constructs like user perceptions about technology-specific aspects and work characteristics as well as moderator effects which are emphasized to have an impact on usage behavior of work-productivity systems and the resulting work processes.

Keywords

Individual Technology Assimilation, Enterprise Mashup Technology, Changes in Work Processes, Collaboration.

INTRODUCTION

In the last 10 years, enterprises have optimized their IT portfolio by introducing modular service-oriented architectures and process-oriented approaches. In the future, applications designed to promptly solve very specific business problems of knowledge workers[1] are becoming increasingly important and lead to the emergence of so-called situational applications (Balasubramaniam et al. 2008). A promising solution is the assimilation and provision of a flexible, collaborative, component-oriented technology platform for user-friendly orchestration and combination of existing software services and dispersed information fragments.

The emergence of the Web 2.0 paradigm as well as the dissemination of semantic web standards has opened up new and innovative ways for mass collaboration, personalization and creation of user-generated knowledge (Hoyer and Stanoevska-Slabeva 2009b). Therefore, the Web has evolved from a unidirectional to a participatory bilateral platform providing services intertwined with their respective data. The emerging technology of Enterprise Mashup systems extends this paradigm by enabling knowledge workers to go beyond static publishing and to foster the creation of highly customized situational applications through the dynamic combination of web-enabled third party resources.

Over the last couple of years, enterprises are increasingly getting serious about Mashup technology. In 2008, 11% of the 2,847 companies that responded to a McKinsey survey were already using Mashup technology (McKinsey 2008). Consistently, Gartner analysts identified Mashups as one of the top 10 strategic technologies for 2009 (Gartner 2008a). According to Gartner Group's predictions for business intelligence (BI) for the time period from 2009 to 2013, one-third of analytical information systems (IS) will be provided by Mashup applications (Gartner 2008b). It is furthermore assumed that by then the overall market volume of Enterprise Mashup technology is worth $ 700 million (Young et al. 2008).

This article discusses the assimilation process of Enterprise Mashup systems on an individual level by highlighting user adoption of the new technology platform and the impact on changes in work processes. We focus on specific aspects of Enterprise 2.0 technologies and work-productivity systems which enable knowledge workers to operate as co-producers not only of information, but also of software services and applications. The remainder of this article is organized as follows: First, we introduce a definition of Enterprise Mashup systems, the benefits of this new technology and business drivers on an individual level. In the next section, we define the overall research question and introduce our derived quantitative research

[1] Following Davenport (2005, p.10) “knowledge workers have high degrees of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge”.

model. Then, we present an outline of each sub-construct to enlarge upon the conceptual consideration. Furthermore, we derive hypotheses and focus on unique EM characteristics that make certain constructs and relationships more important. In the last section, we describe our research contribution and give an outlook to our further research activities.

THEORETICAL BACKROUND

To ground this article on a consistent terminology we extend the definition of Hoyer and Fischer (2008) by emphasizing the interaction between business process actors. *We define Enterprise Mashups (EMs) as applications that combine existing resources, e.g., content, data or application functionality, from more than one source in enterprise environments by empowering end users to create and adapt individual information centric and situational applications as well as invoking business logic across multiple business process actors (applications, services, and employees)*. Thereby, EMs focus on the user interface (UI) integration (Daniel et al. 2007) by combining the process orientation and approaches of end user development as well as end user participation (Lieberman et al. 2006). Therefore, the EM paradigm can be used to implement the end user innovation concept by leveraging the collective knowledge and productivity of end users. In this context, user innovation refers to innovations provided by consumers and end users, rather than by suppliers (von Hippel 2005). End users are actively involved in the creation of Mashup applications and thus are part of a technologically induced process of organizational decentralization. They are no longer restricted to the sole customization and personalization of existing components. In addition, they re-organize their individual workspace and contribute new ideas.

Consistent with seminal scientific work as well as recent practical approaches, the interest in EM systems in the industry domain has rapidly grown. This interest is induced by perceived high advantages based on increased employee's productivity, higher flexibility, individuality and usability of individual work processes. Furthermore, EMs enable knowledge workers to participate in the information and business functionality creation process by empowering them to integrate internal and external data with business functionality in a cooperative manner. Automating manual and repetitive operating procedures and work processes as well as sharing of business knowledge are further business benefits provided by EM systems (e.g., Balasubramaniam et al. 2008).

Consequently, the assimilation of EM platforms could lead to far-reaching changes in the affected work processes, the distribution of tasks, and existing responsibilities. We define organization-internal "work processes" as operations which are included in work systems (e.g., Bostrom and Heinen, 1977; Alter, 2006) and contribute to the accomplishment of given tasks

and goals. Therefore, we focus on sub-processes on an operational level to investigate organizational changes caused by the deployment of EM platforms.

There is a major literature stream on assimilation of new information technologies on an individual level (e.g., Goodhue and Thompson, 1995; Barki, Titah and Boffo, 2007). However, little empirical research has been conducted on the mapping of individual IT adoption and organizational changes on the operational level reflected through changes in work processes. Much existing research is focused on a single stage (cross-sectional), such as one-shot adoption decisions, and we know little about the stage-spanning assimilation process (longitudinal perspective) on the individual level.

Regarding the assimilation stage model of Zhu, Kraemer and Xu (2006), which describe user reactions and organizational changes during the deployment phases of innovations, our research approach centers upon the two stages "adoption" and "routinization". Because adoption does not always result in widespread and sustainable usage of the new technology, assimilation theorists suggest that most information technologies exhibit an "assimilation gap" i.e., their widespread usage tends to lag behind their adoption (Fichman and Kemerer, 1999). After its initial adoption, the firm and its members usually do not have sufficient knowledge to leverage the system, and often misalignments occur between the new technology and the user environment (Fichman and Kemerer, 1999). Following Zhu, et al. (2006), we therefore include the third assimilation stage "routinization", which is defined as a phase in which EM technology is widely used as an integral part in a firm's value chain activities.

In accordance with the above considerations the following two questions leads our research:

GRQ1 (General Research Question): *Which determinants influence the usage behavior and therefore describe the adoption of EM systems on an individual level?*

GRQ2: *How does the usage of EM systems (measurement of adoption) change the operational work processes of employees (measurement of routinization)?*

Our research contributes to the existing assimilation and adoption theory by integrating these research areas and including topic-specific constructs, e.g., knowledge integration, knowledge sharing, automation and collaboration as well as moderator effects like work characteristics and social structures. Furthermore, for practitioners the research provides an insight in success factors and obstructive challenges of EM system assimilation as well as the business value generation through the improvement of individual work processes.

RESEARCH MODEL

In order to gain a comprehensive overview of the determinants describing EM assimilation and its influence on working processes on an individual level, a model based on the Unified Theory of Acceptance and Use of Technology (UTAUT) framework (Venkatesh, Morris, David and Davis, 2003) - concerning the adoption phase - is created as depicted in Figure 1. All constructs of the utilized research model were derived from a comprehensive literature review of well established IS journals including quantitative research – MIS Quarterly, Information Systems Research, Journal of Management Information Systems and Management Science − and were adapted to the EM context where necessary.

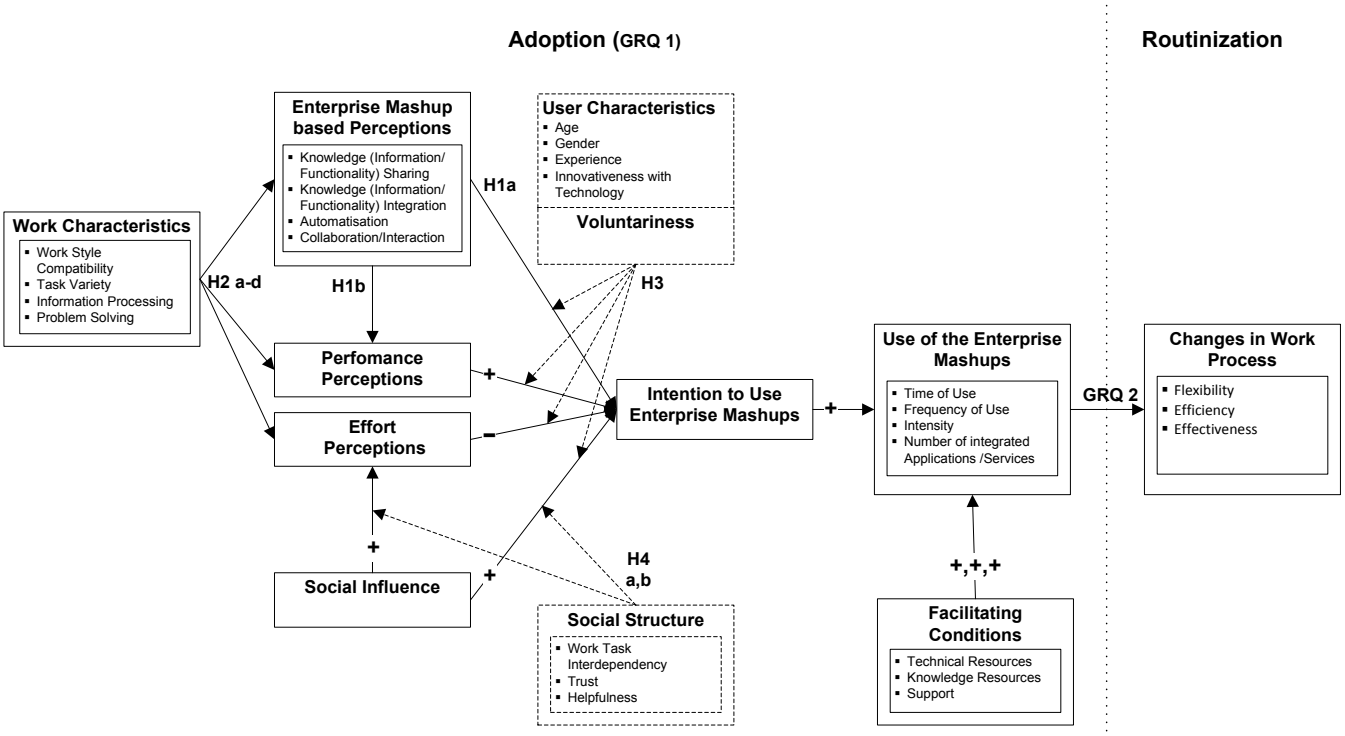

Figure 1: Enterprise Mashup Systems Assimilation Model

Figure 1 presents the proposed theoretical model for the empirical investigation. The usage of EMs is modeled as an endogen variable on the individual employee level, which also has an explanatory part of the endogen variable "changes in work processes". As an Indicator for adoption, technology use is therefore included in the model as a higher-order construct based on the UTAUT framework (Venkatesh et al., 2003) and the integration of object related constructs. "Changes in work processes" are envisioned as a reflective second order construct measured in terms of the effectiveness, efficiency and flexibility of affected working processes. In the following, we present an outline of each sub-construct to enlarge upon the proposed research model.

Adoption of EM Systems

The adoption of new ISs − as a central phase of the assimilation process − is considered as a requisite of organizational changes through routinization (Zhu et al., 2006).

Burton-Jones and Straub (2006) differentiate four major research domains concerning the high-level conceptualizations of system usage: IS success (DeLone and McLean, 1992), IS acceptance on an individual level (Davis, 1989), IS implementation success on the organizational level (Lucas, 1978) and IS for decision making (Barkin and Dickson, 1977). Since each of these streams make important and unique contributions to the literature on user adoption of information technology, we follow the unified view of the UTAUT Model conceptualized by Vankatesh et al. (2003). The goal of Venkatesh et al. (2003) was to understand usage as a dependent variable and to create a unified research model synthesizing the findings of preceding studies.

Venkatesh et al. (2003) theorize and empirically investigate that four constructs play a significant role as (indirect) determinants of usage behavior (and therefore describe the adoption on an individual level): performance expectancy, effort expectancy, social influence, and facilitating conditions. While this model has helped us make substantial progress in understanding adoption and use, it focuses primarily on the individual-level psychological processes and contingencies that manifest as general user perceptions and situational factors respectively (Venkatesh et al., 2003; Venkatesh et al., 2007). Therefore, we extend this model by integrating object related constructs to measure for EM specific perceptions. Additionally, we introduce some central constructs like work characteristics as well as moderators like innovativeness with technology and social structures to gain a deeper insight into end user perceptions. Work characteristics are included to be able to classify groups of end users (e.g., knowledge worker) and identify corresponding perceptions. In doing so, groups can be identified which benefit most from a deployment of EM systems. Additionally, we include “changes in work processes” as a measure for the routinization of the new EM technology to investigate the induced organizational potentials.

User Perceptions

User perceptions are the central individual influence factor in prior adoption research (Venkatesh et al., 2003). To analyze this important effect, we use the constructs performance expectations, effort expectations and the object-specific attitudes related to the introduction of an EM platform.

Effort expectancy is defined as the degree of ease associated with the use of the system (Venkatesh et al., 2003). Several existing models capture the concept of effort expectancy through, e.g., the perceived ease of use (Davis, 1989), the complexity (Thompson, Higgins and Howell, 1991), and ease of use (Rogers, 1995).

Performance expectancy is defined as the degree to which an individual believes that using the system will help to attain benefits in work processes (Venkatesh et al., 2003). Model tests by a number of different researchers prove that the performance expectancy construct within the corresponding individual models is the strongest predictor of usage intention (Taylor and Todd, 1995; Venkatesh and Davis, 2000).

Object related perceptions concerning typical enterprise 2.0 aspects are included as system-specific constructs which are expected to have an extensive impact on the adoption and the changes of individual work processes. As noted above EMs enable end-users to participate in the creation and sharing of knowledge as well as automation of processes. Consequently, we include constructs that measure user perceptions about knowledge sharing, knowledge creation, automation, and interaction/collaboration (EM perceptions). These variables not only help us to understand how the specific functionality of EM systems affect its adoption and use, but really allow us to understand how psychology-based beliefs such as performance and effort expectancy can be influenced. Thus, we hypothesize that:

H1a: *Higher perceptions about knowledge creation, automation, and interaction/collaboration capabilities will improve the perception about the overall EM performance.*

H1b: *Higher perceptions about the knowledge creation, automation, and interaction/collaboration capabilities will improve the intention to use EM-systems directly.*

Work Characteristics

Work characteristics have been the most commonly investigated factors in the work design literature (see Morgeson and Humphrey, 2006 for an overview). These work characteristics are primarily concerned with how the work itself is accomplished and the nature of tasks is associated with particular job conditions. Therefore, these constructs allow us to investigate the influence on user perceptions.

The first construct we include in our research model is *work/task compatibility*. Karahanna, Straub and Chervany (1999) introduce two types of work compatibility: normative or cognitive compatibility, referring to compatibility with what people feel or think about an innovation, and practical or operational compatibility, referring to compatibility with what people do. We will focus on the measure of operational compatibility. Consequently, it is unlikely that individuals would view EM

systems as useful (measured by the individual performance perception), if it is not compatible with their work style and do not align the corresponding work processes (Moore and Benbasat, 1991).

The second construct *task variety* can be adopted from the media richness theory (Daft and Lengel, 1986). Task variety refers to the degree to which a job requires employees to perform a wide range of tasks. Corresponding employees could increasingly benefit from automation of tasks and work processes as well as the user friendly combination of functionality and information which is facilitated through EM technology.

The amount of *information processing* needed at work reflects the degree to which a job requires processing data or other information (Wall, Jackson and Mullarkey, 1995). Mashup systems could align these processes by enabling the employees to handle some business intelligence development tasks themselves from within specific user interfaces and client applications. Furthermore, the nontechnical build of personalized, context-rich, role-tailored, ad-hoc views of disparate data and the possibility to explore information in greater depth could accelerate the delivery of actionable intelligence. Therefore, we integrate this aspect in our research model.

Additionally, we include *problem solving* as a reflection of the degree to which a job requires unique ideas or solutions and describes the cognitive processing requirements of a job (Wall et al., 1995). Generating innovative ideas or solutions, diagnosing and solving non-routine problems, and preventing or recovering from errors are key aspects of problem solving which could be facilitated by Mashup platforms. Through co-innovation and co-production, the end-users do more than customization and personalization; they self-organize their individual workspace and can submit new ideas. The creative energy of large number of people (”Wisdom of Crowds”; Surowiecki, 2004) could be used to flexibly react on continuous dynamic changes of the business environment and solve acute business problems (Hoyer and Stanoevska-Slabeva, 2008).

Due to these arguments and concerning our research model we hypothesize:

H2a: *A high individual work compatibility of the innovation lead to higher performance expectations.*

H2b: *Employees involved in a number of different work activities have a higher performance expectation.*

H2c: *Employees who are involved in higher level monitoring and active information processing tasks have a higher performance expectation.*

H2d: *Employees with a high ratio of problem solving tasks have a better performance expectation due to improved collaboration and interaction possibilities.*

Social Influence

External influences have been incorporated in prior models as critical determinants particularly in the early stages of use (Karahanna et al., 1999; Venkatesh and Davis, 2000). Especially, social influences have primarily been treated as external pressures exerted by stakeholders, such that they influence the individual perception related to system use.

Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al., 2003). Social influence as a direct determinant of individual's behavioral intention is represented in prior investigations as a central construct (Davis, 1989; Venkatesh and Davis, 2000). Venkatesh and Davis (2000) suggested and empirically validated that social influence appears in a mandatory context that causes social influences to have a direct effect on the intention to use the new technology. In contrast, social influence in voluntary contexts operates by influencing perceptions about the technology. Therefore, we predicate that external effects influence the behavioral intention through an indirect and direct effect (see Figure 1).

Moderators

Venkatesh et al. (2003) found out that there are several demographical moderator variables that influence the strength of causal relationships affecting behavioral intention. We include *user characteristics* (like age, gender and experience) and voluntariness (to control for mandatory settings) as moderators in our research model, which are intensely discussed in the UTAUT paper of Venkatesh, et al (2003). Therefore, we refer to Venkatesh et al. (2003) for the detailed analysis and composition of corresponding prior studies.

Additionally, we hypothesize that experience and innovativeness with technologies could reinforce causal effects of user perceptions and social influence on usage intention. The moderator *innovativeness with technology* is introduced to represent the degree of willingness to experiment with new information technology (Lewis, Agarwal and Sambamurthy, 2003). Based on the studies of Agarwal and Prasad (1998) as well as Rogers (1995), coupled with the predominant findings from previous theoretical and empirical research which suggest that individual characteristics influence IS usage via their effects on beliefs, we hypothesize that:

H3: *Innovativeness with technology has a significant positive moderating effect on the relationship between user perceptions and individual's intention to use the new EM system.*

Furthermore, we include social structure variables like trust and helpfulness which are expected to have a moderator effect on the causal relationship between social influence and usage intention.

A critical factor for the successful adoption of EM platforms is its potential to attract user groups, which can make themselves familiar with the technology and are willing to use it in their daily work. This broad involvement of users can be based on the peer production principle. According to Benkler (2006), peer production refers to "production systems that depend on individual action that is self-selected and decentralized rather than hierarchically assigned". Thereby, the creative energy of a large number of people, often referred to as the "Wisdom of Crowds", could be used to aggregate knowledge and abilities in groups (Surowiecki, 2004). EM platforms could realize such a collaboration work environment by facilitating the sharing of information (integration different data resources), sharing of functionality (integration of different services) as well as invoking business logic across multiple business process actors (applications, services but also employees). Therefore, social and community influences are expected to be very important factors affecting user's intention to utilize the EM platform.

Although social influences have been suggested to be critical determinants in the early stages of use (e.g., Venkatesh and Davis, 2000; Venkatesh et al., 2003), such social influences have primarily been treated as external pressures. In order to extent the understanding of these causal relation we use Blau's (1964) perspective on social exchange as another theoretical basis of our research model (see Figure 1) to conceive the important aspects of social interaction and collaboration. Social exchange theory has been in use and refined now for some decades to explain non-contractual interactions between people (Chadwick-Jones, 1976) and to study a variety of social exchanges, including market relations, work relations (Blau, 1964) and knowledge sharing (Cummings, 2004). To integrate these aspects in our research model we include informal and structural constructs which are hypothesized to reinforce the influence effects of usage intention.

Trust is one of the informal underlying precepts of an effective social exchange (Blau, 1964), and as such, may also affect the relation between social influence and usage behavior.

Work interdependence, or the degree to which team members rely on one another to accomplish their work (Thomas and Bostrom, 2008) is also proposed to moderate the causal effect between social influence and usage intention. In contrast to trust this expected moderator has its roots in the organizational structure (especially determinate by the operational structure and the existing workflows). In this context, we hypothesize:

H4a: *Employees trust will positively moderate the causal relation of social influence and technology usage.*

H4b: *Under high work interdependence, individuals have a higher intention to use or not use a new EM technology depending on the social influences.*

Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure as well as the required user support exist to enable the efficient and effective usage of the EM platform. This definition captures concepts embodied by three different constructs: perceived behavioral control (Ajzen, 1991; Taylor and Todd, 1995), facilitating conditions (Thompson et al., 1991) and compatibility (Rogers, 1995). Venkatesh, et al. (2003) validate empirically that facilitating conditions do have a direct influence on usage beyond that explained by behavioral intentions alone. Therefore, consistent with Ajzen (1991) and Taylor and Todd (1995), facilitating conditions are also modeled as a direct antecedent of technology usage.

Intention to use the Technology

The role of intention as a predictor of behavior is critical and has been well-established in IS and the reference disciplines. Consistent with the underlying theory for different prior research models (see Venkatesh et al, 2003 for an overview), we expect that behavioral intention will have a significant positive influence on technology usage. Behavioral intention to use the system we will measure using a three-item seven point Likert scale adapted from Davis (1989) and extensively used in many of the previous individual adoption studies.

Routinization and Infusion of EM Systems

Following the assimilation phase-model of Zhu et al. (2006) we also include aspects of the IS success research domain to incorporate routinization in our investigation. Therefore, technology usage is considered as an independent variable or mediating variable leading to downstream impacts in order to determine how EM platforms could benefits individuals (e.g., Goodhue and Thompson, 1995) and the organization (e.g., Teo and Wong, 1998) due to effective and efficient work processes and task performance.

Changes in Work Processes

“Change in work processes” is the central endogen latent variable and our prime interest. It measures to which extent an innovation has become a stable and regular part of organizational procedures and behavior (Fichman, 2000). This second order construct is designed as an aggregation of several aspects that represents fundamental changes in the work processes, facilitated through the adoption of EM systems.

In order to identify the expected changes in work processes being influenced by EM systems, several expert interviews with IS executives and corresponding end-users are scheduled in our further research activities. Additionally, a careful review of the existing literature about EM application and corresponding product documentations will be utilized to further ground the set of identified working processes. On the basis of an extensive literature review we expect that the following categories of work processes are primary affected by the assimilation of EM systems: Knowledge creation (end user development), automation, information procurement, and knowledge sharing (information and functionality).

How the corresponding work processes have changed will be measured by the operational efficiency, operational effectiveness, and operational flexibility (Karimi, Somers and Bhattacherjee, 2007). While operational efficiency reflects the extent to which the use of EM applications decreases the input/output conversion ratio, operational effectiveness defines the extent to which EM applications provides an improved functionality and enhances the quality of the users' work. The extent to which EM applications provides users with more flexibility in response to changing business environments and working conditions defines the operational flexibility of the work processes construct.

However, the changes in work process will also be combined with objective measurements like process time and degree of automation to get a comprehensive declaration.

RESEARCH CONTRIBUTION AND OUTLOOK

In this article, we focused on developing a model emphasizing the impact of EM system assimilation towards changes in work processes on an individual level. This model can also be used to describe the adoption of other work-productivity systems (especially arising within enterprise 2.0 developments) enabling knowledge workers to participate in the information and business functionality creation process by empowering them in a cooperative manner.

Since little empirical research has been accomplished in this field so far, we plan to conduct expert interviews in a large international bank that is introducing an EM platform in the investment department to identify the most affected work processes leading to significant changes in the operating principles. Further work is needed to operationalize the underlying theoretical constructs in order to quantify the specific drivers of technology adoption and impact factors concerning the changes of the affected work processes. As far as the research model is concerned, other mediating or moderating factors may be identified, leading to a refinement of the current research model.

In our future research, we will elaborate on other aspects of the assimilation concerning EM systems (representing a typical Enterprise 2.0 technology) in the financial services industry leading to a more holistic theoretical model. Finally, we will

conduct an intra-organizational field study focusing on the individual level in a large international acting bank in order to validate our research model. Following Orlikowski and Baroudi (1991), positivistic studies are a valid research approach to primarily test conceptualizations in an attempt to increase predictive understanding of phenomena. By assuming that there is an objective, measurable reality that can be deductively decomposed to quantifiable constructs, formal propositions and relations of measurable variables could be tested against defined hypotheses and complex causal models.

To capture the effect of progress concerning the different stages of the assimilation process (adoption and routinization) we will conduct a longitudinal study. The first survey (t_1) should be carried out before the introduction of the EM platform to capture the user perceptions. In a second survey (t_2) after the introduction of the innovation, we will request for usage behavior and changes in work processes. During the time between the first and the second survey (t_2 - t_1) the changes in use of the EM platform will be continuously measured by capturing log-information like time of use, frequency of use and the number of built EM applications. The results of the planned surveys are intended to be of interest to both, researchers who explore the role of enterprise 2.0 technologies in the financial services industry as well as financial services providers that are interested in the operational impact of EM platform assimilation.

REFERENCES

1. Agarwal, R. and Prasad, J. (1998) A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology, *Information Systems Research*, 9, 2, 204-215.
2. Ajzen, I. (1991) The Theory of Planned Behavior Some Unresolved Issues, *Organizational Behavior and Human Decision Processes*, 50, 179-211.
3. Alter, S. (2006) The Work System Method: Connecting People, Processes, and IT for Business Results, Work System Press, Larkspur
4. Balasubramaniam, S., Lewis, G., Simanta, S. and Smith, D. (2008) Situated Software: Concepts, Motivation, Technology, and the Future, *IEEE Software*, 25, 6, 50-55.
5. Barki, H., Titah, R. and Boffo, C. (2007) Information System Use–Related Activity: An Expanded Behavioral Conceptualization of Individual-Level Information System Use, *Information Systems Research*, 18, 2, 173-192.
6. Barkin, S. R. and Dickson, G. W. (1977) An Investigation of Information System Utilization, *Information and Management*, 1, 1, 35-45.
7. Blau, P. (1964) Exchange and Power in Social Life, John Wiley & Sons, Inc., New York, Sydney, London.
8. Bostrom, R. P. and Heinen, J. S. (1977) MIS Problems and Failures: A Socio-Technical Perspective. Part I: The Causes, *MIS Quarterly*, 3, 1, 17-32.
9. Burton-Jones, A. and Straub, D. W. (2006) Reconceptualizing System Usage: An Approach and Empirical Test, Information Systems Research, 17, 3, 228-246.
10. Chadwick-Jones, J. K. (1976) Social Exchange Theory: Its Structure and Influence in Social Psychology, Academic Press, London.
11. Cummings, J. N. (2004) Work Groups, Structural Diversity, and Knowledge Sharing in a Global Organization, *Management Science*, 50, 352-364.
12. Daft, R. L. and Lengel, R. H. (1986) Organizational Information Requirements, Media Richness and Structural Design, *Management Science*, 32, 5, 554-571.
13. Davis, F. D. (1989) Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology, *MIS Quarterly*, 13, 3, 319-340.

14. DeLone, W. H. and McLean, E. R. (1992) Information Systems Success: The Quest for the Dependent Variable, *Information Systems Research*, 3, 1, 60-95.
15. Fichman, R. G. (2000) The Diffusion and Assimilation of Information Technology Innovations, in Zmud, R. W. (Eds.) Framing the Domains of IT Management Research, Pinnaflex Educational Resources, Cincinnati, OH, 105-128.
16. Fichman, R. G. and Kemerer, C. F. (1999) The Illusory Diffusion of Innovation: An Examination of Assimilation Gaps, *Information Systems Research*, 10, 255-275.
17. Gartner (2008) Top 10 Strategic Technologies for 2009, http://www.gartner.com/it/page.jsp?id=777212, Accessed 2009-07-20.
18. Goodhue, D. L. and Thompson, R. L. (1995) Task- Technology Fit and Individual Performance, *MIS Quarterly*, 19, 2, 213-236.
19. Hoyer, V. and Fischer, M. (2008) Market Overview of Enterprise Mashup Tools, in *Proceedings of the 6th International Conference on Service-Oriented Computing*, December 01-05, 2008, Sydney, Australia.
20. Hoyer, V. and Stanoevska-Slabeva, K. (2008) The Changing Role of IT Departments in Enterprise Mashups Environments, Lecture Notes in Computer Science (LNSC), 5472, 148-154.
21. Hoyer, V., Stanoevska-Slabeva, K. (2009a) Generic Business Model Types for Enterprise Mashup Intermediaries. In: *Proceeding of the 15th Americas Conference on Information Systems*, San Francisco.
22. Hoyer, V. and Stanoevska-Slabeva, K. (2009) Towards a Reference Model for Grassroots Enterprise Mashup Environments, in *Proceedings of the 17th European Conference on Information Systems*, Verona, Italy.
23. Karahanna, E., Straub, D. and Chervany, N. (1999) Information Technology Adoption across Time: A Cross-sectional Comparison of Pre-adoption and Post-adoption Beliefs, *MIS Quarterly*, 23, 183-213.
24. Karimi, J., Somers, T. M. and Bhattacherjee, A. (2007) The Role of Information Systems Resources in ERP Capability Building and Business Process Outcomes, *Journal of Management Information Systems* 24, 2, 221-260.
25. Lewis, W., Agarwal, R. and Sambamurthy, V. (2003) Sources of Influence on Beliefs about Information Technology Use: An Empirical Study of Knowledge Workers, *MIS Quarterly*, 27, 4, 657-678.
26. Lieberman, H., Paterno, F. and Wulf, V. (2006): End-User Development. Springer, Dordrecht
27. Lucas, H. C. (1978) Empirical Evidence for a Descriptive Model of Implementation, *MIS Quarterly*, 2, 2, 27-41.
28. McAfee, A. P. (2006) Enterprise 2.0: The Dawn of Emergent Collaboration, Sloan Management Review, 47, 3, 21-28.
29. Moore, G. C. and Benbasat, I. (1991) Development of an Instrument to Measure the Perception of Adopting an Information Technology Innovation, *Information Systems Research*, 2, 3, 192-222.
30. Morgeson, F. P. and Humphrey, S. E. (2006) The Work Design Questionnaire (WDQ): Developing and Validating a Comprehensive Measure for Assessing Job Design and the Nature of Work, *Journal of Applied Psychology*, 91, 6, 1321-1339.
31. Rogers, E. M. (1995) Diffusion of Innovations, Free Press, New York.
32. Surowiecki, J. (2004) The Wisdom Of Crowds: Why the Many are Smarter than the Few and how Collective Wisdom Shapes Business, Economies, Societies And Nations, Doubleday, New York.
33. Taylor, S. and Todd, P. T. (1995) Understanding Information Technology Usage: A Test of Competing Models, *Information Systems Research*, 6, 2, 144-177.
34. Teo, T. S. H. and Wong, P. K. (1998) An Empirical Study of the Performance Impact of Computerization in the Retail Industry, *Omega-The International Journal of Management Science*, 26, 5, 611-621.
35. Thomas, D. and Bostrom, R. (2008) Building Trust and Cooperation through Technology Adaptation in Virtual Teams: Empirical Field Evidence, *Information Systems Management*, 25, 1, 45-56.
36. Thompson, R. L., Higgins, C. A. and Howell, J. M. (1991) Personal Computing: Towards a Conceptual Model of Utilization, *MIS Quarterly*, 15, 1, 125-143.
37. Venkatesh, V. and Davis, F. D. (2000) A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Sciences*, 46, 2, 186-204.
38. Venkatesh, V., Morris, M. G., David, G. B. and Davis, F. D. (2003) User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, 27, 425-478.
39. von Hippel E (2005) Democratizing Innovation. The MIT Press, Cambridge
40. Wall, T. D., Jackson, P. R. and Mullarkey, S. (1995) Further Evidence on some new Measures of Job Control, Cognitive Demand and Production Responsibility, *Journal of Organizational Behavior*, 16, 5, 431-455.
41. Yu, J., Benatallah, B., Casati, F. and Daniel, F. (2008) Understanding Mashup Development, *IEEE Internet Computing*, 12, 5, 44-52.
42. Zhu, K., Kraemer, K. L. and Xu, S. (2006) The Process of Innovation Assimilation by Firms in Different Countries: A Technology Diffusion Perspective on E-Business, *Management Science*, 52, 10, 1557-1576.