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TOWARDS A DESIGN THEORY FOR APPLYING WEB 2.0 PATTERNS TO ORGANISATIONS

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Abstract

A significant source of innovation in business software is the public internet and namely web 2.0. Wikis, blogs, social networks, social bookmarking, and microblogging are examples for web 2.0 patterns which have been adopted by organisations. This trend is expected to last on, with technologies like location based services or activity streams already being discussed for business usage. However, business contexts create different requirements which are the reason for e.g. enterprise wiki systems being different from its public counterparts. This technological process of creating business software based on core functionality known from web 2.0 is hardly researched. In this work-in-progress paper I suggest a design theory for systematically passing through this process. The theory is evaluated using well documented cases of existing organisational web 2.0 adoptions. It is expected to set the ground for further research on enterprise 2.0 software as well as to provide valuable guidance for practitioners.

Keywords: web 2.0, enterprise 2.0, enterprise social software, design theory.
1 Introduction

There is a common understanding beyond researchers and practitioners that enterprise 2.0 is mainly a social and organisational challenge then a technical issue. This is because principles like openness, sharing and flat hierarchies do collide with characteristics of the traditional company. Accordingly, there are first research works focussing especially on the deployment process of web 2.0 technologies in enterprises (Raeth et al. 2010). While this paper is fully in line with such works, I argue that an enterprise 2.0 information system nonetheless has a strong technical component which influences its chances for high adoption rates beyond users. Therefore, a deeper understanding of the technical process of applying web 2.0 patterns to business contexts is needed (Richter & Koch 2008).

A prominent example is the wiki, the first web 2.0 technology discussed in organisational contexts. While the general functionality of a wiki is well-known from Wikipedia there are still many projects which do fail because the enterprise wiki software does not fit the organisational requirements as well as skills, experiences and expectations of its users (Hasan & Pfaff 2006). For example, Wikipedia still leverages a source code editor using a mark-up language in its wiki texts. This might be appropriate for the online encyclopaedia where a relatively small group of ambitious and very active administrators is responsible for a significant part of the content (Voß 2005). An organisational wiki, however, which is built to gather knowledge from a broad base of users with different IT skills would need a more user-friendly front-end. Other requirements of enterprise wikis may include rights management, support of structure, and integration with other enterprise systems.

Based on the wiki example the general question is: How should a web 2.0 technology for organisational usage look like? This question already had to be answered for previous web 2.0 patterns like wikis, blogging, social networking, social bookmarking, and microblogging. With the steady creation of new web 2.0 technologies like location based services or activity streams we will face similar problems in future. Thus, there is a clear need for theory supporting this kind of problem. This paper suggests such a theory.

The next chapter sets the methodological grounding of the paper in examining design theories in information systems. Based on these foundations chapter 3 develops a design theory for organisational adoption of web 2.0 patterns. Afterwards, the theory will be evaluated using research on existing cases. A final conclusion ends the paper.

2 Design theories in information systems

The need for theoretically grounded design research is object of a long and ongoing debate in information systems. Especially European IS researchers tend to be pragmatically design-oriented while other parts of the community emphasise the need for a behaviouristic understanding of information systems which naturally includes theory-building. There are several approaches of bridging this gap. In general, they argue that successful design research is based on basic assumptions about reality. This can be seen as implicit theory. A recent, well-known discussion around this question is the design science approach propagated by Hevner et al. (2004). The goal of research on design theories is to provide guidance for the process of describing theoretical assumptions of design work in a way that other researchers can test hypotheses and build on top of existing theory. There is an ongoing discussion on how design theories exactly should look like. Started by Walls et al. (1992) further important aspects in the debate have been introduced by Markus et al. (2002) and Gregor & Jones (2007). Gregor & Jones (2007) name the core components purpose & scope, constructs, principles of form and function, artefact mutability, testable propositions, and justificatory knowledge which should be included in a design theory. Further, they divide design theories into theories for a product and theories for a process. The work presented here applies to the latter.
It has to be noted that there is a current discussion on the question if theories are possible in design research at all. Hevner & Chatterjee (2010) response to the design theory debate with especially focussing on the framework by Gregor & Jones (2007) and stating: “[This] is a useful first step toward building a design theory. However, we claim that this in itself is not a theory. A design theory or a science of design is a noble goal that remains elusive as of yet.” Obviously, the label of design theory still is a matter of discussion. In the sense of this paper the goal is to provide guidance for a certain systems development process for both researchers and practitioners. In line with Gregor & Jones I argue that this can be provided by articulated theoretical assumptions, hence theory. Their well-described and evaluated framework of developing such a design theory provides a strong foundation for this research. I therefore adopt the framework by Gregor & Jones here.

The theory described in this paper has two sources: first, it is based on the experiences of the initial phase of an organisational web 2.0 development project which our research group is currently working on (see chapter 5); second, the developed ideas have been evaluated using existing case documentations (see chapter 4). Gregor and Jones (2007) explicitly emphasise the possibility of this methodology: „Theory recorded after the fact is by no means less of a theory, so long as it still satisfies the requirements of being abstract and general” (p. 331).

3 A design theory for applying web 2.0 patterns to organisations

Walls et al. (1992) name the Systems Development Life Cycle (SDLC) as example for a design theory. Therefore, it provides a good starting point for discussing specialities of web 2.0 systems development. The different steps of the SDLC can be clustered into three groups: definition stage, development stage as well as installation and operation (Weitzel & Kerschberg 1989). The general idea of the definition stage is to assess user requirements based on process analysis or use cases and to develop according information systems based on these requirements. On the contrary, Kazman & Chen (2009) argue that web 2.0 technologies need extremely different development paradigms as the use cases and therefore the requirements are unstable and often unknown. The described examples in chapter 4 support the statement that such characteristics of “letting go” are very important for organisational adoption of web 2.0 patterns and that use cases evolve during usage (Chui et al. 2009). Further, the motivation of web 2.0 projects inside organisations often is the success of the original web 2.0 pattern in the public internet instead of solving a special organisational problem with a special information system. Obviously, the characteristics of the web 2.0 pattern have to be taken into account in designing the organisation counterpart.

The challenge for organisational adoption of web 2.0 technologies therefore is creating a balance of the web 2.0 pattern’s characteristics and the requirements of software used inside organisations which cannot be ignored as organisational culture or employees’ attitudes cannot be changed in an ad-hoc manner (organisational context). Further, a software project is expensive and needs budgets. Therefore it needs a sponsor inside the organisation. This is the reason why many web 2.0 applications inside enterprises have to start with at least one initial use case which provides value to the organisation.

Hence, there is a need for an alignment process. This process is the central idea of the proposed design theory (see figure 1). It suggests three perspectives which have to be included in the alignment phase: the original web 2.0 pattern, the organisational context and initial use cases.

The outcome of this alignment process can and will be very different depending on the web 2.0 pattern and the organisation. It provides a concept of how the applied web 2.0 pattern should look like in the special case. The following development process itself is not part of the design theory’s scope. There are existing theories which perfectly use the idea of alignment between different parties during the development project. An example for such a practitioner’s theory is the project management methodology Scrum (Rising & Janoff 2000).
The design theory provides a structured process for applying web 2.0 patterns to organisations. The focus is on technical specification, i.e. functionality and features. The theory includes a structured process presented in figure 1. The central idea is to analyse the web 2.0 pattern as well as initial use cases and organisational contexts. Afterwards an alignment phase balances the potentially oppositional results. The goal is to keep as much from the original web 2.0 pattern as possible while its core characteristics have to be preserved.

The alignment process is an iterative process where mutability and flexible application to special needs is part of the process itself. This also applies for the suggested implementation methodology Scrum.

If applied, the design theory ensures a fit between the applied pattern and the organisation’s requirements. Theoretical foundations for the developed design theory are knowledge on Web 2.0 in organisations and existing software development theories.

The developed design theory has been evaluated using well documented cases of existing web 2.0 adoptions in research papers. Cases on an enterprise wiki (Hasan & Pfaff 2006), enterprise blogging (IP & Wagner 2008), and enterprise bookmarking (Millen et al. 2006) are discussed in tables 2, 3, and 4. Although the cases showed very different characteristics all of them can be described using the alignment perspective of the proposed design theory. Further cases on enterprise social networking...
(DiMicco et al. 2008) and enterprise microblogging (Böhringer & Gluchowski 2010) have been successfully applied to the theory but have been left out here due to space limitations.

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Enterprise wikis are motivated by the success of wikis in the public internet.</th>
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| Analysing web 2.0 pattern | (1) The authors discuss public wiki services.  
(2) The authors review famous examples for corporate wiki usage. |
| Use case statement | The case organisation showed a bottleneck in knowledge acquisition. A wiki was suggested to solve these problems:  
(1) Narrow bandwidth of knowledge conversion from sources.  
(2) Lag in time between knowledge creation and sharing.  
(3) Knowledge inaccuracy (incorrect information).  
(4) “Maintenance trap” (no sufficient technology to manage the company’s knowledge efficiently). |
| Organisational context statement | (1) The organisation shows a traditional structure based on a strong hierarchy.  
(2) The organisation’s management demands structured knowledge with intensive quality control.  
(3) The authors describe a list of additional concerns against wiki usage (e.g. vandalism, no rewards for work and the problem of intellectual property). |
| Alignment | In the original case, no alignment has been done which led to project fail. Based on these experiences the authors suggest the following alignments:  
(1) The authors suggest a shift in organisational culture as prerequisite for the adoption of web 2.0 technologies in the case organisation.  
(2) Additional features could resolve some of the concerns (e.g. revision control and real name identification).  
(3) Corporate incentives for rewarding participation, productivity, quality articles and good ideas are suggested.  
(4) The authors suggest using an open source licence for the wiki’s content to meet the intellectual property problem. |
| Result | The missing alignment of organisational context and wiki characteristics in the described case led to the rejection of the wiki by the management. |

Table 2. Example for enterprise wiki research (Hasan & Pfaff 2006)

<table>
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<th>Motivation</th>
<th>Enterprise blogging is motivated by the success of blogging in the public internet.</th>
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| Analysing web 2.0 pattern | (1) The authors review three popular blogging services and derive “commonly used features”.  
(2) The authors review existing research on blogging.  
(3) The authors conduct interviews with users of public blogging services. |
| Use case statement | (1) The authors present a modified Task-technology fit model which they call Needs-technology fit model for blogging. It implies that blogging meets individual needs (social).  
(2) IP & Wagner suggest knowledge sharing communities as organisational use case of blogging. |
| Organisational context statement | (1) “In many companies, social computing is anathema to management.”  
(2) Software is often provided by well established software providers.  
(3) Organisational policies (disclosure of confidential or proprietary information). |
| Alignment | (1) IP & Wagner suggest that organisations have to open up. According to them, employees are already able to use blogging technologies due to their personal usage.  
(2) However, the adoption process should be gently and in line with organisational policies.  
(3) There will be a shift in organisational policies “encouraging employees to share openly, but responsibly”. |
| Result | The paper ends with motivating practitioners to leverage blogging as internal tool for e.g. building knowledge sharing communities. |

Table 3. Example for enterprise blogging research (IP & Wagner 2008)
Motivation
Enterprise social bookmarking is motivated by the success of social bookmarking in the public internet.

Analysing web 2.0 pattern
(1) The authors discuss public social bookmarking services.
(2) The authors identify core functionalities of social bookmarking tools.

Use case statement
(1) There is a tangible use case of saving and sharing intranet bookmarks which could be leaked if stored in public bookmarking services.
(2) The authors further leverage a very open approach in asking “whether large enterprises or organizations would also benefit from a social bookmarking system.” The expected benefits include expertise location and communities of practice building.

Organisational context statement
(1) The organisation, IBM, is a big multi-national IT company with manifold teams, roles and topics.
(2) There are organisational policies, e.g. to use formal names within the corporate applications.
(3) IBM includes lots of web-minded IT experts but also non-IT people.

Alignment
(1) Dogear uses real name identities (for supporting communities of practice) and private/public bookmarks (for supporting individual users). The authors state that they are aware this could have negative impact on creating critical mass. On the other hand the large size of IBM would allow losing some user participation.
(2) Dogear is built with an easy-to-use front-end for the ordinary user. At the same time it supports expert users with a REST API which allows for building custom extensions.

Result
Dogear has been launched successfully and next steps are planned based on user feedback.

Table 4. Example for enterprise social bookmarking (Millen et al. 2006)

5 Conclusions

As with every theory a design theory must be testable. Walls et al. (1992) argue that an information system design theory needs an information system constructed upon its concepts for full evaluation. While the former chapter showed a general fit of the proposed theory and existing web 2.0 adoptions by organisations, this step is still missing for supporting the theory’s properness. The developed design theory is part of a larger research project of the author’s research group. Its aim is evaluating the current web 2.0 trend known as activity streams (e.g. Facebook’s “news feed”) and developing a concept for its organisational usage (for detailed information on the research project see Böhringer 2010). In contrast to most existing web 2.0 patterns, activity streams provide an integration approach to combine user activities from different information systems. This means that an enterprise activity stream system would have to be connected with legacy systems. Therefore we expect efforts both for fitting organisational needs and for adopting the technology in implementation projects to be higher than of existing web 2.0 patterns. This implies a strong need for a sound theoretical foundation of the underlying process. The design theory developed in this paper provides such a foundation for the process of applying activity streams to organisational contexts. This process has not been finished yet. However, first results are very promising and support the applicability of the design theory.

The theory’s contributions for research are twofold: First, it provides a first step towards understanding the process of applying web 2.0 patterns to organisations. Already today this is an important source of innovation for business information systems and this trend is expected to last on. Therefore, a theoretical understanding of this adoption process is necessary. Second, design-oriented researchers who develop next generation information systems based on web 2.0 patterns may use the theory as a framework for their work.

The latter is also the main implication for practitioners. The theory provides guidance for organisational implementations of web 2.0 patterns and suggests a structured way of providing a sound technological foundation for enterprise 2.0 projects. However, the theory will not be able to ensure that organisational adoption of the resulting tool will be successful in every case. In contrary, its aim is to make sure that all factors have been taken into account to reach the best result possible.
Therefore, one possible result of the alignment process may be to cancel the project because of incompatibility of the web 2.0 pattern’s characteristics and either the organisational context or the initial use case. If the structured alignment process prevents an organisation from a costly and pointless implementation project this would also be a perfectly positive benefit of the theory.

References


