"I CAN SIMPLY…" - THEORIZING SIMPLICITY AS A DESIGN PRINCIPLE AND USAGE FACTOR

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Abstract

The usage of social software to support collaboration and knowledge management in corporate intranets is a pervasive topic in practice and research. However, there remain many open research questions concerning its socio-technical system design. To address this gap and to contribute to a deeper understanding of the role and success of corporate social software, we first identify and conceptualize simplicity as an influential design principle and usage factor. We propose a theoretical framework that helps us to empirically study the role of simplicity based on six case vignettes of corporate social software implementation and use. From the theoretical basis and the empirical analysis we develop a series of theoretical propositions and discuss implications for IS design and adoption.

Keywords: Platform design, Social Software, Case Study, CSCW.

1 Introduction

In recent years many organizations began to investigate and implement social software in their intranets to facilitate knowledge management and networking processes among employees. While a variety of benefits of these applications have already been identified, companies still face various challenges concerning the design and use of these tools. For example, from a socio-technical design perspective, it is not yet comprehensively understood, what key design principles influence the role and success of corporate social software.

Recent studies revealed that user acceptance can be better explained by taking into consideration additional factors such as playfulness and perceived control. A main influence on these two factors was found to be the simplicity of the system (Lee et al., 2007). Simplicity was further found to be a significant determinant of perceived ease of use. Further research on the role of complexity – as the antipode of simplicity – showed a negative impact of complexity on user satisfaction with website usage (Nadkarni & Gupta, 2007). A similar perspective was introduced to the by Karvonen (2000). He argues that that simplicity should not just be related to effectiveness of design (i.e. a lack of complexity) but that it also has an aesthetic connotation that can even promote trust in an online context. Together, these studies point to an important double impact of simplicity for software implementation success - it bridges a cognitive influence (via ease of use) with an affective influence (via playfulness) on attitude formation.

The interesting combination of affective and cognitive implications and the current lack of theoretical conceptualization motivate a more systematic inquiry into its role as a design principle for IT artifacts related to social software. The only study of simplicity in the IS context (Lee et al., 2007) assumes a formative construct based on Maeda's (2006) anecdotal requirement list. However, we propose that more theoretical grounding of simplicity is required to achieve sufficient understanding of how simplicity impacts design and use of information systems and to avoid a confluence of simplicity and ease of use. This importance of simplicity for evaluating conceptualizations of problems (i.e. constructs) as design science research outputs was initially discussed by March and Smith (1995). However, their conceptualizations have not further been theoretically elaborated or empirically assessed, which is why we contribute by demonstrating the validity of simplicity as an evaluation criteria for IT artifacts.

Consequently, in this article, we develop a theoretical framework of simplicity that is grounded in the philosophy of science. This field delineates two major aspects to characterize simplicity, parsimony of elements (e.g. Feuer, 1957) and elegance of structures (e.g. Walsh, 1979). Parsimony can be theoretically related to ease of use, a cognitive aspect. Elegance connotes aesthetics and beauty as affective aspects, but can also be related back to structural parsimony as certain elegant structural configurations (e.g. elements in a horizontal row) may be perceived as a whole gestalt (Koffka, 2007), which can fuel perceived simplicity in an economic sense. Focusing on these structural-economic aspects, we define simplicity for our research as an economic quality that aims at achieving a maximum of results with given means through parsimony of elements and structural principles. As a related aspect, we argue that simplicity as a design principle also has theoretical implications for users' appropriation. Based on the adaptive structuration theory (DeSanctis & Poole, 1994) and its recent reconceptualization (Markus & Silver, 2008), we argue that simplicity is signaling a low degree of prescriptiveness to the user and conveys room for interpretation.

After conceptualizing the design principle of simplicity in the information systems context (section 2) we assess and refine our proposed framework by studying six short cases of corporate social software implementation. They illustrate and sharpen how simplicity is perceived in the corporate context and how simplicity exerts its influence on the implementation success (section 3). From the theoretical basis and the empirical cases we develop a series of theoretical propositions (section 4) and discuss implications of our findings for practice and future research (section 5).

2 Simplicity

If we want to characterize simplicity as a design principle and an impact factor on the interpretation, adoption and use of IS, we need a thorough theoretical discussion of the concept and its main properties. Given the paucity of comprehensive theorizing in the IS context, we first investigate the contributions from the philosophy of science and then extend on the current reinvigoration of these principles in the design context. The insights can inform an initial kernel theory (Walls et al., 1992) for design. We further assess studies that address the consequences of simplicity for adoption and use.

2.1 Conceptualizing Simplicity

The theoretical concept of simplicity can be traced back to a long-standing discussion in the philosophy of science about its role as a selection criterion for competing theoretical conceptualizations. Simplicity is differentiated into ontological and syntactical (structural) simplicity.

The main philosophical principle related to ontological simplicity is the well-known Occam's razor, which claims the principle of *parsimony*: entities should not be multiplied unnecessary (Feuer, 1957). Philosophers differentiate qualitative parsimony of the number of different types of entities and quantitative parsimony of the number of entity instances. Parsimony can also be interpreted as the economy of an approach; the economy of means is related to a magnitude of result. Inessential elements are omitted until the approach only utilizes a minimum number of essential elements. The rationale for leaving out elements is subject to the specific local context. A second aspect of simplicity is syntactical simplicity, which relates to the structure and its organization, i.e., the number and complexity of relationships between the elements, the used structural principles and perceivable patterns.

This dimension of simplicity links to *elegance* as the appreciation of the structures (Walsh, 1979). As noted above, elegance has two connotations. It relates to aesthetics and beauty as affective aspects, but also is a derivative of structural parsimony. For example, perceiving one line of 5 buttons or a frameset that is split up according to the golden ratio appear as elegant structural configurations but are also likely to be perceived as whole gestalts (Koffka, 2007). Here, gestalt theorists claim that our perception is geared to adopt the simplest possible and hence most economic interpretation of elements and their structure. Elegant patterns such as symmetry, configuration, or closure of forms are improving the degree of perceived structural simplicity (Koffka, 2007) in an economic sense. In other words elegance can be regarded as a derivative of parsimony that relates to principles of structural arrangements of groups of elements. Simplicity hence appears as a key concept of our information processing. When it comes to problem solving, but also in many other contexts, our mind searches for simple explanations and, even further, expects simple encodings of the received sensory data to be the most probable (e.g. Chater, 1997).

2.2 Simplicity: design and adoption

In the application of simplicity as a design principle, Maeda (2006) recently assembled various anecdotes. For example, he traces the success of Apple's consumer products like the iPod and the iPhone to their simplicity. Maeda arrives at a (less simple but also more concrete) set of normative requirements for achieving simplicity in design. They include reduction, prioritizing, organization and integration. At closer inspection, these elements can all be traced back to the above two theoretical principles of parsimony (in the number of elements) and elegance (as economic parsimony of structural arrangement). Other studies that have applied the concept of simplicity to information systems suggest using simplicity as management paradigm for software development (Sha, 2001), or even argue that enterprise information systems have become increasingly complex and therefore may even restrict organization's degrees of freedom (Rettig, 2007). In this context, achieving simplicity is

actually appears as a challenging design task, as creating complexity through more features is much easier than hiding it without reducing capability. In order to study the effects of simplicity for information technology acceptance and usage, Lee et al. (2007) extend the Technology Acceptance Model (TAM) with selected constructs from Maeda's anecdotal requirements and with perceived control as influencing variables on ease of use. They find a positive relationship between simplicity and perceived control. Therefore they argue that not only users are more likely to adopt technology if it shows simplicity, users further feel in control of the situation and therefore can act more independently. Without explication, Maeda (2006) also touches the role of perceived simplicity (i.e. external to the actual design) for implementation success. Next to the above four design principles (reduction, prioritizing, organization and integration) that directly correspond to the philosophical concept of simplicity, Maeda concludes that perceived time savings (compared to a previous state), favorable comparisons to more complex alternatives, and time to learn and build familiarity are further (contextual) factors that moderate the effects of perceived simplicity. This is in line with Tetard et al. (2009) who stress the factor of simplicity when they built their "Lazy User Theory" on top of the assumption that users will choose the product or service which will fulfill their needs with the least effort. These relative economic advantages emphasize the important role of alternatives, history, and experience for user perceptions of simplicity, which relate to theories of innovation adoption (Moore & Benbasat, 1991). For our conceptualization we note that perceived simplicity is subject to the context and previous exposure of users. Implications for introducing information systems include that features may be added over time or that alternative systems need to be assessed.

2.3 Simplicity and malleability

So far, we discussed the principle of simplicity and its role for the level of IS adoption. This adoption, however, is no simple decision of adopting or rejecting a system. Rather it is useful to open the black box of adoption to allow for more qualified insights into *how* simplicity may influence usage. In this context DeSanctis and Poole (1994) point out that design intentions are not directly and completely determining user perceptions and consequent usage. Rather, users interpret and appropriate the system in a way that cannot fully be pre-conceived during the design stage (Pipek & Wulf, 2009). This view implies that systems and their design features are lose bundles which act as affordances presented to the user (Markus & Silver, 2008). As a kind of a second-order quality the system further conveys values such as democracy or efficiency which are perceived by the user. Markus and Silver (2008) characterize these values as symbolic expressions, defined as the communicative possibility of a technical object as sources of signs. The authors argue that these expressions may account for perceived incoherence or unfaithful appropriation. Riemer and Richter apply this lens to collaboration technologies including social software and identify the phenomenon of "Nutzungsoffenheit" (later also referred to as "malleability" in Richter & Riemer, 2013). The authors define it "as a form of openness, whereby the technology and its set of features do not precipitate its forms of usage (…) Nutzungsoffenheit means that the true nature and potential of such technologies does only manifest when people make sense of and incorporate them in their day-to-day work routines." (Richter & Riemer 2009). Such technologies cannot be understood as bundles of features, but have to be perceived as technologies-in-use and need to be appropriated by their users in a particular context (Richter & Riemer, 2013). In this case, structure only emerges when users make sense of their platforms. For example, while these platforms lead to rather hedonistic behavior in the private context ("the big chatter of Twitter") the same type of software has been appropriated in an instrumental and focused way in corporate contexts (Richter & Riemer, 2009). Malleability can serve as a source of free appropriation to explore the boundaries of the open use context but could also lead to insecurity about the actual application scenario of the software. Both cases also imply challenges for the implementation of social software to support a particular corporate objective. In our attempt to theorize simplicity we note that malleability is related in fundamental ways to our focal concept: simplicity can be conceived as a communicated message to the user that affects the range of appropriation acts. The simple appearance of social software could be interpreted as conveying the

values of low degree of prescriptiveness and hence very abstract, user-defined use cases. This in turn implies that simplicity constitutes a fundamental concern in software domains that thrive through malleability, e.g. social software with its focus on affording (personalized) individual and group interpretations of the meaning of the information system.

2.4 Summary

In summary, we identify the primary economic principle of parsimony, which is further divided into parsimony of elements and of structural principles. Next to these structural principles perceived simplicity also has a relational dimension as alternatives and learning processes are influencing a person's evaluation. Finally, simplicity is affording high degrees of freedom in users' appropriation of social software. Following this initial theoretical conceptualization, we will now apply, assess and refine these theoretical claims using empirical cases of corporate social software implementation. The objective of this step in our research is to identify whether the conception of perceived simplicity can be identified as a relevant design principle. We further want to evaluate how the theoretical framework translates to a practical domain and is applicable for a systematic analysis. The domain of corporate social software is a useful application domain as it still bears unsolved challenges that concern design and implementation. Further, social software bears a large degree of freedom in its interpretation and thus may afford a large variety in its appropriation. The corporate context is finally commanding a focus on the economy of simplicity, as employees also aim at achieving an outcome when they decide to use the information system.

3 Corporate Social Software and Simplicity

The "Web 2.0 phenomenon" has drawn considerable attention from scholars resulting in a significant body of existing research on how social software is used in a corporate environment. The body of research ranges from single and cross case analysis through action research to quantitative surveys to clarify the dissemination of individual applications and examples, to analyze their benefit and to identify barriers and success factors (e.g. Arazy & Nov, 2010; DiMicco et al., 2008; Holtzblatt et al. 2011). These new services are based on a set of new principles like encouraging participation and new forms of relationships and communication among users (e.g. Riemer & Richter 2010). Previous research has explored important drivers that relate to these new principles. One strand of theory confirms the important role of individual motivations and social capital for actively contributing to a community (McLure Wasko & Faraj, 2005). Dholakia et al. (2004) focus social influences and identify social identity as a driver of interaction and contribution. Shen and Khalifa (2009) present empirical evidence that related design features, such as rich profiles, the representation of use and user history, 'user is online' alerts etc., resulted in increased levels of perceived social awareness and identity. These studies propose conceptualizations or reports of empirical results and point out the important role of sociological factors. In doing so, they give insightful answers to the question: *What* drives adoption and implementation success?

In this paper, we argue that a second important aspect is not yet sufficiently understood, namely the question: *How* can implementation success be achieved, once we recognized all the different impact factors? This important question motivates a research perspective that is able to contribute to design theory, which is concerned with the question "how to achieve a goal" (Walls et al., 1992, p.40). As one of the few related theoretical works that focuses on design aspects, Bouman et al (2007) conceptualize the role of sociality in the context of social software systems. The authors address the important issue of how to achieve the desired properties: "The question is not which facilities of imagination, alignment and engagement to create, but how to make them appeal to the users" (p.9). In this context users (1) need to understand "the meaning of the functionality presented" (p.9) and (2) non-factual information should be restrained wherever needed. Assuming a design-oriented research perspective and considering the conclusions of Bowman et al. (2007) we will now assess and illustrate

our theoretical conceptualization with an empirical analysis three brief vignettes of six cases. Our aim is to substantiate practical relevance of simplicity as an important design principle and implementation success factor in the social software context.

4 Empirical Illustration with Cases

Our empirical cases cover an example of a Wiki, a cross case analysis of three Social Networking Services (SNS) and two examples of Enterprise Microblogging (EMB). With the selection of multiple cases we address that our research is inductive and would hence benefit from cross-verification. We adopted two main research methods which reflected the varying degree of participation in the implementation process: In some projects we followed an action research approach as we were active and intervening participants in the software development projects (in rather smaller companies), whereas in other projects (usually with larger companies) we report on participant observations and draw from interviews. Further, we will assume different perspectives on the role of simplicity by including a variety of different stakeholders into our analysis, e.g. users, developers, or managers. As a limitation, our research methods could further have tested more precisely how simplicity in design can be achieved, but our focus was on the implications of simple design, not on its production.

4.1 Case Vignette 1: Wiki

The first case focusses an innovation network, which cooperates on a scientific level with a heterogeneous group of different experts in the area of professional sports (i.e. kinetics and training science, sport technology, medicines, etc.) (cf. Richter & Vogl 2009). As direct participants in the development and implementation process, action research was a suitable main research approach (Baskerville and Wood-Harper, 1996). The special characteristic of action research is that the researcher takes an active role in the development process (Susman and Evered, 1978). A combination of theory and practice is seen as the basis for a better understanding of complex problems in specific situations and contexts. Consequently, surveys of the development team and workshops in focus groups were conducted on a regular basis and the handling of the wiki prototypes was observed. This approach provided deep insights about users' needs and requirements. In total, we conducted five daily workshops with a group of a dozen users or stakeholders of the wiki. The vision of all partners was to create an all-time accessible knowledge base, which should enable easy contribution and retrieval access to increase the number of idea suppliers in the sense of an open innovation process. In particular, insights and experiences about the many, potentially innovation-relevant fields should be made easier to document, comment and access. Based on these deliberately abstract needs and wishes a Wiki was chosen as the technological foundation.

Since, from the beginning, it was known that a majority of users did not have elaborate IT skills, the simplification of the platform (slimming) and means to foster motivation were emphasized. Thus, the extent of the labels was kept to a minimum. On the starting page mainly one simple high-level decision has to be made: Do users want to contribute information or do they search for information? Also the organization of the elements was kept very simple (i.e. low syntactical or structural simplicity). The starting page shows in double size and at the top position the contribution button while the search button is of smaller appearance (priorization). Colors were used to differentiate the functions and to direct the attention immediately to the main buttons. In focus groups the design was discussed. Perceived simplicity and joy of use have been identified as main drivers of system adoption. For example, one user stated that "I like the new start page, since I only want either to search or to contribute content. I don't need all this further stuff." Another user noted in the meetings that it is "actually just login and go". For the users the simplification of the platform also meant that it was clearer how to use the Wiki. To simplify the usage e.g. the WYSIWYG-editor was adopted and many functions were limited. At the first sight there were only two functions: editing text and attaching a file. Further functions, e.g., to compare topic versions, to rename or delete topics etc. were rendered

hardly visible and thus supported users in gaining an overview easily (priorization). This improved transparency for the users who later reported perceived enhanced control over the Wiki. Another example for increased perceived ease of use is the possibility to contribute to the Wiki from an email client. This wish was uttered by a key user (a technophobe). After we had implemented a plug-in, he started to use the wiki – mostly from his familiar email client. To sum up, the case highlights that not a plethora of new and many features did foster the adoption, but simple and easy to use functionality enabled the users' understanding of the technology and their self-confident usage. The responsible for trainer education mentioned: "They [the trainers] use the wiki, because they are sure that they cannot do anything wrong or might be blamed for using it wrong. This was different with other solutions." We also note the role of allowing users to benefit from existing use experiences (e.g. by integrating existing clients) – supporting relative perceived simplicity.

4.2 Case Vignette 2: Social Networking Services

Next, we revisit a cross case analysis of three cases of SNS implementation and use in rather similarly structured, large, knowledge-intensive organizations in the field of IT solutions and services (cf. Richter & Riemer 2009). We started with two interviews with employees responsible for the development and introduction of the SNS and for user monitoring. They provided background information on goals, implementation process, feature range etc. We then continued with six to eight interviews with users of the corporate SNS and conducted 28 semi-structured interviews, which were between 30 minutes and 3 hours in length. All in all, the availability of different data sources, i.e. interviews, internal and external documents, and direct observations, allowed us to triangulate our observations within (and across) the three cases (Klein and Myers 1999). The studied platforms were comparable to existing internet platforms like Facebook or LinkedIn and contained typical functionalities e.g. the possibility to share information on expert knowledge in form of a profile, to search others, or to connect with colleagues. The study revealed differences in the frequency of use and perceived role of SNS across the cases. While in one case the platform enjoyed widespread use across the entire organization and was fully appropriated in the daily processes of the users, the two other platforms were (at the time of the study) used much less frequently and have only been adopted by a quarter to a third of all members of the organizations.

As in the previous case, our direct observation suggested the (perceived) reduced complexity of usage of the SNS as an important factor in interviews with users of all three social networking services. In this situation, where all systems had comparable degrees of complexity, relative aspects of perceived simplicity surfaced again: The more successful platform (in terms of adoption) emerged from a previous system and had been developed in a step-wise iteration over the past years in which users had sufficient time to get acquainted with the system. Hence, when the functionalities for social networking were added, these appeared simpler because users have become familiar with the platform and the other functionalities. Instead of creating the feeling of "yet another platform" that is complicated to learn the users felt more at ease and are even more eager to learn new functions as one admin mentioned: "The platform evolves and is getting more and more interesting. Some people come and ask me: 'I heard there is something… can you show it to me, I am interested.'". Users had time to accommodate the software's affordances. Simultaneously to the users' appropriation of the platform, it was also iteratively adapted to users' needs and their changing working processes. One admin summarized that in the light of the simple functionality "the key is [...] to make the functionality fit the need for the workplace." In one of the other cases the high degree of freedom provided by sticking to simplicity was also perceived as a barrier for deriving organizational benefits: "Then there is the problem of scope. Nowhere the main intention and purpose of [the system] are actually documented. Is it a tool for preparing events, or for asking questions? Is it a tool for managing my skills, etc.?" This admin then continues: "We have experimented with many little things, but there was nothing conclusive about which we could state that this is the tools main purpose. [...] Currently, people enter the tool and have to find out for themselves what it is useful for. This discourages people which do not like to explore. They just enter [the system] when they have learned how exactly it can benefit them."

This concern indicates that simplicity and the resulting intuitive easy use is fueling the scope of interpretation and appropriation but also at the same time increases uncertainty about the intended use case supported by the tool. The users need to explore it for themselves over time, or, for others who do not want to invest in such exploration, more contextual cues are required which direct them to beneficial or organization-compliant use cases. Time and learning aspects further appeared as a major factor for experimenting with different uses and alignment with the organizational demand while maintaining simple user interfaces.

4.3 Case Vignette 3: Microblogging

The importance of context for perceived simplicity surfaced again in another case dealing with enterprise microblogging in a medium-sized consulting and software company (Riemer & Richter 2010). We conducted seven face-to-face interviews with employees, for gaining a general understanding of the company, e.g. its structure, projects and work practices. These interviews lasted between 22 and 61 minutes. We interviewed one executive director, two team managers, one consultant, two software architects and the human resource manager. The interviews helped us to gain an understanding of multiple facets of the case, i.e. to explore different aspects of simplicity. In this case simplicity played a role as enabler of creative system usage as well as factor on technology choice. We observed that the software use itself had been perceived complex and ambiguous at the beginning and had evolved over time to very simple usage, i.e. public posting of short messages. By embracing the single mechanism of posting updates various use cases (e.g. questions and answers, or project communication) were supported without leveraging special features of the software.

The same dichotomy has been observed in our second case. The latter uses a microblogging platform to support project communication. People publish for example their current activities, important documents and ideas. In order to make the microblogging tool central for daily work routines, ease of use and pragmatism including mobile access were important success factors for the solution, as many users were travelling or did not want to use yet another communication channel. One interviewee illustrates this aspect: “I can simply enter something ad-hoc into my project microblog. In other channels, I need to conceptualize and think more before I post. This takes much more effort.” Therefore the functionalities for microblogging were integrated into other tools like the wiki and enabled employees to reuse the published information in different contexts. However, the interviews with the implementation team showed that especially in the enterprise context there is a conflict between front-end simplicity and back-end complexity. For example business demands like access restrictions or information management (tagging, categorizing) were difficult to hide in the user interface in order to maintain the simple appearance and use.

5 Theoretical framework and Implications

As all our cases illustrate, simplicity was not only a driver for the success of every analyzed solution, it also appeared in different variations and can be achieved in different ways. Our case vignettes suggest that simplicity should not be conceptualized as simple dichotomous variable but as a complex and flexible design paradigm of information systems, which is defined dependent on different factors such as user interface design, usage concepts, integration to other IS, usage alternatives or work space organization. We now attempt to synthesize our initial theoretical framework with our empirical insights to structure and interpret the various ways to achieve simplicity in the context of the usage of corporate social software platforms.

5.1 Simplicity: Design and Adoption

The first case example of the Wiki illustrates how the principle of simplicity is instantiated in the design of social software user interfaces. The team responsible for implementing the platform

presented only very few essential elements and structural relationships between these elements to the users. Similar to the SNS case, users could become familiar with the functionalities step by step. Our observations indicate that users clearly recognized how this emphasized parsimony and elegance. Our data suggests that the intended simplicity of the artifact was highly appreciated by the users. This strong link is consistent with the study of Nadkarni and Gupta (2007). Both our theoretical discussion and the case vignettes motivate the following proposition (henceforth denoted with P):

P1: Simplicity in design is achieved by reducing to the essential functional elements and principles (ontological simplicity, i.e. parsimony) as well as by emphasizing simple organization of structures and layouts of the functional elements (syntactical simplicity, i.e. elegance).

Through simplicity in the user interface, it was generally clearer for most (not IT-skilled) users how to derive personal benefits through using the Wiki. This resulted in a high degree of perceived transparency and led to improved perceived control over the social software. In enabling users to not only operate a software tool but to also grasp the platform's simple basic mechanisms, they are enabled to act more creatively and to achieve higher outcome from tool usage. Since their understanding of using the wiki increased (due to the improved perceived control) they were also of the opinion that the usage patterns were more logically. We note:

P2: Perceived simplicity is linked with perceived control.

For many users in the case, simplicity and joy of use were very closely connected, since they perceived the reduced complexity as improvement of the software usage experience. Eventually they felt more at ease with using the platform. In the second microblogging case this was achieved by integrating the functionalities into other tools. These findings unfold a qualitative explanation for the statistical evidence of Lee et al. (2007). We conclude:

P3: Increased simplicity is linked with perceived ease of use.

The qualitative aspects also indicate the role of the user as an agent in the relationship between simplicity and ease of use: As the example of the first microblogging case highlighted, complex project structures were mapped to very simple software-mechanisms by the users instead of thinking in pre-defined categories known from traditional project communication tools. The user agency also supports our notion of relative perceived simplicity (outlined in the theory section). Time for adoption and the related familiarity emerged as a main factor that is positively related to perceived simplicity. The importance of agency and time indicates the important role that the users' appropriation acts may have for benefitting from simplicity.

P4: Perceived simplicity is relative: It is positively influenced by routinization effects like (a) the incremental addition of elements over time and (b) the relative familiarity of the artifact.

Finally, based on the theoretical framework and its resonance with the case vignettes we can posit:

P5: Simplicity of the design is positively related to software adoption success.

5.2 Simplicity and Malleability

Our cases are illustrating our theoretical claims also with regards to malleability: in contrast to most classical software that is use-case driven and built to support a particular process, corporate social software supports very basic and abstract functional patterns (e.g. publishing short information snippets in microblogging, editing and adding text in wikis). They can be easily understood by users or be applied to an individual usage in a wide variety of situations. As a result, we find that the systems' simplicity is related to a high degree of malleability and low prescriptiveness. Based on the theoretical discussion and our case vignettes we can hence formulate:

P6: Simplicity is related to a high degree of malleability.

Based on our cases we further find that the appropriation of simplicity-oriented systems depends on the users' organizational context: the software's affordances are simple to grasp, but also lead to increased levels of uncertainty and incoherent appropriation by different users. If implemented step by step the work routines can provide the required context (that is lacking in the technological functionality) for a coherent interpretation among the workforce that is compliant with the organizational demands. The work context (e.g. suggested use cases) can serve as boundaries for the appropriation processes and keeps them in line with the intended work practice. In the implementation and appropriation phase, the necessary additional contextual cues are given to complement the simple systems design. This ex-post compensation of information cues during work practice and appropriation acts is also highlighting the important role of iterative implementation over time to maintain the perceived simplicity which is required to produce the low entry barrier necessary for facilitating systems adoption in a voluntary use context. Based on our case vignettes we propose:

P7: Malleability requires special implementation strategies in order achieve a coherent and faithful appropriation of the system and to derive organizational benefits.

Our vignettes finally also motivate further research on the importance of embedding open technologies with existing ICT-enabled work practices in the organization. The true nature and potential of such open technologies only manifested when people incorporated them in their day-to-day work routines. In this context simplicity demands that even if the usage of a platform is not prescribed, it should be (made) transparent how it is supposed to be used. The actual benefit of corporate social software for a particular organization only unfolds (a) through experimentation and appropriation by their users and (b) when the platforms become part of group or organizational practices. In order to understand the possible implications of open and simplistic technologies on different levels, it is important to conduct further studies which uncover how people use social software and in which ways it is embedded in the everyday work practices in distributed work contexts.

5.3 Implications for practice

Based on our case study data we can derive practical implications of the design principle simplicity for the socio-technical system design of corporate social software and for the adoption of the systems. To achieve simplicity all unessential front-end complexity of a platform should be reduced by deleting, hiding or prioritizing elements, or minimizing the organization structure of the elements (e.g. principles like color, order, rankings). In this way the users gain an overview over the platform more easily and perceive this as improved control. Simplicity appears further to be related to other factors, e.g. joy of use, and hence contributes to system adoption and implementation success. Since simplicity is related to a high degree of malleability, users should adopt the software to their specific needs in diverse usage scenarios by making sense of the software. To concert this sense making and to align it with an intended business context, it is important to embed these open platforms with existing ICT-enabled work practices in the organization and to emphasize familiarity. This should happen iteratively over an extended period of time in order to maintain the perception of simplicity.

6 Conclusion

By studying the domain of corporate social software, we analyzed and theorized how simplicity can be employed as a design principle with important implications for information systems implementation and use. We propose two philosophical conceptualizations: ontological and syntactical (or structural) simplicity. The former is linked to the principle of parsimony; the latter is emphasizing the role of structural elegance and perceptual Gestalt patterns. These aspects can serve as the foundation of a design theory (Walls et al., 1992) for simplicity-oriented design. The case vignettes provide further illustrations for the impact of simplicity in the design on perceived simplicity by the user. This relationship is consistent with the study of Nadkarni and Gupta (2007) who found a relationship between objective and perceived complexity (as the antipode of simplicity). Our observations also

corroborate the link to perceived ease of use, satisfaction, and enjoyment (Nadkarni & Gupta, 2007; Lee et al., 2007). Simplicity thus emerges as a leveraging factor for facilitating the implementation success of social software in a voluntary use context.

Further, we found a link between simplicity and a low degree of perceived prescriptiveness in the symbolic expression of the software. This property of malleability has positive and negative implications for social software adoption. It enables high degrees of freedom for appropriation by users, which may be the explanation for the positive links found in quantitative studies. Users can employ the system for very abstract and intuitive use cases and they perceive low entrance barriers. However, it also can give rise to increased uncertainty about how to actually appropriate the software. In this context, our cases indicated the importance of *relative* perceived simplicity: Over time people routinize an interface and accommodate more elements while maintaining the perception of simplicity. This suggests a step-wise iteration of a system with a high degree of malleability, where enough time is planned to have experimental appropriation of users which is then bounded again by management via providing cues about the working context and corporate requirements that aid the users' interpretation of the system. The situation gets more complex if we assume users with heterogeneous levels of familiarization.

We can finally conclude that while it is easy to let complexity abound, the concept of simplicity entails the profound challenge to reduce that complexity. The ambiguity of the implications of these decisions for the system adoption is further rendering simplicity as the art of complexity. Appropriation processes appear to be linked to this objective in fundamental ways. In the light of its broad applicability to information systems in general, improving our understanding of simplicity in an IS design and appropriation context emerges as an ongoing and important challenge of IS research. Future research might further include a more detailed analysis of the implications of individual design decisions.

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