Engaging Users to Co-Create – Implications for Service Systems Design by Evaluating an Engagement Platform

Christian Grotherr
University of Hamburg
christian.grotherr@uni-hamburg.de

Martin Semmann
University of Hamburg
martin.semmann@uni-hamburg.de

Tilo Böhmann
University of Hamburg
tilo.boehmann@uni-hamburg.de

Abstract

Far-reaching digitalization affords significantly more opportunities for engaging actors and mobilizing resources in service systems. By leveraging these capabilities, digitally enabled service systems can facilitate user-generated services. Traditional service engineering approaches provide for such service systems. This paper presents and discusses the evaluation of a field-based design science research project for designing an engagement platform that facilitates the co-creation of user-generated services. This study reports contributions to the design knowledge of such an engagement platform and their consequences for engagement activities. Based on the evaluation, we propose design propositions for such an engagement platform from a sociotechnical perspective.

1. Introduction

Service research and practice evolved within the last decade and had reached new levels of complexity. One shift that leads to this evolution was the transition from engineering of single services towards complex service systems [41]. Within those systems, the need to mobilize and integrate operand as well as operant resources is crucial. However, to mobilize and integrate these resources is still unknown or solely subject to high-level description. Even more, design knowledge regarding service systems still is scarce.

Design research acknowledges that engineering of systems requires consideration of social aspects as well as technical aspects. Despite this, approaches for such sociotechnical systems are not widely understood and applied [5]. As already mentioned by Orlikowski and Iacono [31] since 2001, information systems (IS) research analyzes IT artifacts from different perspectives. Accordingly, there is a need to analyze the sociotechnical environment [15] and IS researchers have called for more research on the dynamic between people and technology [1, 15, 28, 31]. This observation does relate strongly to service research, as this research area builds heavily on actors and their relation as well as technology [42]. This is especially mirrored in the discourse on service logic and service dominant logic [12, 23, 44], as well as technology-enabled value co-creation from a sociotechnical standpoint [9, 10].

Accordingly, through the growing interconnection of information technologies in every market-, business- and individual area there is a need to analyze IT artifacts to understand reasons for success and failure of such development projects as well as their impact on the sociotechnical environment. Consequently, research that contributes to the systematic design and development of service systems leads to evidence-based design knowledge that contributes to service research as well as sociotechnical design research [6, 31].

A major challenge in service systems engineering is thus the formation of engagement platforms that link abstract value creation to engagement of actors that ultimately leads to realized value [42]. Since actors have to engage with each other on such a platform to co-create value as part of the resource mobilization, the success depends on the degree of engagement. However, individual actor engagement varies and depending on the motives for engagement, a focus on an individual level has to be taken [42]. These engagement properties are influenced by the design of the platform and are observable activities [42].

Following this service systems engineering perspective, this study reveals insights gained during the evaluation of a contextualized engagement platform within a naturalistic evaluation. The aim of this research is to derive design propositions for the design of successful user engagement platforms. Applying a sociotechnical perspective, functional and social design features and their relating effects on the intention of actors to perform value creation are analyzed. The aim is to understand the design of the

URI: http://hdl.handle.net/10125/50021
ISBN: 978-0-9981331-1-9

engagement platform and its impact on the engagement activities as well as the organizational and individual issues surrounding its use. This leads to the following research question: *How does an engagement platform be adapted based on users' engagement?*

To address this research question, the aim of this research is to deepen the understanding of how sociotechnical artifacts influence user engagement. For this reason, a user engagement platform is observed and analyzed from a sociotechnical perspective. This engagement platform enables users to provide user-generated services as users suggest, rate, discuss, and jointly implement change initiatives, thereby contributing to a successful software introduction [37]. Accordingly, the technical and social design features of the platform are evaluated regarding their impact on the willingness of actors to engage on the platform. By doing so, insights will be gained regarding understanding the desired and undesired consequences of the choice of design variables. Based on these results, implications for the design of service systems will be derived for (a) resource mobilization and (b) possible service interaction points. The insights gained during the demonstration and evaluation of the user engagement platform provide evidence-based knowledge of the nature of sociotechnical systems and reveal several further research opportunities in the field of service systems. By doing so, this research contributes to the emerging field of service systems engineering with evidence-based design knowledge [6].

The remainder of this paper is structured as follows: the second section provides theoretical foundations and related research. The third chapter describes the research design. Subsequently, in the fourth section, we present insights on the benefits of the engagement platform, and the choice of design variables gained during the evaluation. Based on these results, the impact on user behavior and side effects are highlighted in the following and lead to design propositions for the design of value-adding service systems. The paper closes with a conclusion and future research opportunities.

2. Theoretical Foundations

2.1 Service Systems

Service engineering often considers services in isolation, but complex services comprise a combination of different services, so called service systems [41]. "Service systems are complex sociotechnical systems that enable value co-creation" [6] and are defined "as a value co-production configuration of people, technology, other internal and external service systems, and shared information (such as language, processes, metrics, prices, policies, and laws)" [41]. In particular, a service system can represent in its smallest unit a dyadic relationship between a customer and the provider [20] but can also encompass complex service networks [11].

The service-for-service exchange perspective is a critical theoretical foundation for the development of service science and the study of service systems [25]. Thereby, value is created through contextualization and re-configuration of service systems [6]. Service science research revisits the importance in engagement of service systems as an integrated view [3, 12]. The development of evidence-based knowledge supporting the systematic development and piloting of service systems is one of the central research areas of service systems engineering [6]. Regarding the design of the elements of service systems, research and practice are faced with a lack of design knowledge, a growing complexity, and novel risks. Designing a service system entails the challenge of finding the right configurations of both IT and non-IT resources (actors) to create value in a context [6, 24, 25]. A central component to mobilize and integrate resources are engagement platforms which are defined as "physical or virtual touch points designed to provide structural support for the exchange and integration of resources, and thereby co-creation of value, between actors in a service system" [8]. However, the engagement of actors depends on the motives to engage [43]. This behavioral view is defined through engagement properties. These relate to relational, informational and temporal properties as well to co-production and value-in-use activities [42]. Relational properties determine the social and institutional roles and position of an actor. Informational properties comprise the information basis for engagement which can be influenced by various actors. Temporal properties relate to the duration, regularity, and frequency of engagement and have implications for the design of channels.

This research contributes by deriving insights from a contextualized user engagement platform. Our aim is to ascertain how the institutional context and the design of the engagement platform influences engagement properties and engagement practices.

2.2 Sociotechnical Artifacts

Through the ongoing dissemination and interlocking of information technology within business and life information systems research highlights the importance of so-called IT artifacts [31]. An IT artifact can be defined as "...a distinctive element of our field, binding together multiple

heterogenous elements of hardware, software, humans and institutions." [31]. This implies that artifacts always interact with their inner and outer environments and confirms that no clear boundaries can be drawn [39]. Thus, IT artifacts comprise not only technical but also, through the design for interactions with different actors, social aspects [17]. Combining these two properties, IT artifacts can be defined as sociotechnical constructs which perceive and interact with outside influences and include technical and social design features [2, 35, 38]. Thus, designing and analyzing such sociotechnical artifact implies two levels: (1) technical handling of the interface provided by the IT artifact as a foundation for (2) the social interaction and communication influenced by "[…] norms and linguistic elements […]" [14]. Hence, users are not able to conduct purely technical or social actions and therefore can't be analyzed separately [14, 40]. Artifacts are always engineered with the aim to interact with their embedded environment by providing functional properties to support the realization of defined goals [39]. For that reason, the analysis and assessment of an artifacts impact can only be performed within its inner and outer environment and during its use [14, 39]. To understand the IT artifact and the potential impact on its environment Orlikowski and Iacono [31] highlight five different views on IT artifacts: (1) nominal view, (2) computational view, (3) tool view, (4) proxy view and (5) ensemble view. Using these perspectives, the user engagement platform proposed in Semmann and Grotherr [37] was analyzed with a sociotechnical perspective to gain insight into how the technical and social design features of the engagement platform influence user behaviors and the engagement process.

3. Research Design

3.1 Overall Research Design

In this paper, we draw insights gained during the demonstration and evaluation phase of an ongoing research project following the design science research methodology (DSRM). Therefore, as described in the following section, an engagement platform was conceptualized in the case of a public organization. The aim of these previous research activities was to develop a prototype of the engagement platform which is deployed within a public organization with 1800 employees. Due to the ongoing and continuous integration with the case company, we conducted a formative evaluation in the demonstration phase and a summative evaluation. We choose a naturalistic evaluation to analyze the impact of the engagement platform within the organizational and social environment. Embedding an engagement platform in a specific context provides the opportunity to understand the organizational and individual issues surrounding its use. The evaluation of the sociological impact is carried out according to the Framework for Evaluation in Design Science Research (FEDS) [45]. The DSR evaluation strategy of human risk & effectiveness was applied and leads to several evaluation cycles. Hence, the engagement platform was first evaluated in the demonstration phase with a close set of voluntary users. By conducting the formative evaluation, data is gathered to identify strengths and weaknesses of the engagement platform and to define improvements. After that, a rollout was conducted for a wider group of users within the organization to use the platform in daily work routines. This summative evaluation aims in understanding how the engagement platform is used within the naturalistic setting as a sociotechnical artifact and what implications can be derived to improve its use.

3.2 Previous Design Results

The introduction of new software within a company often leads to less than satisfying results and goals of the management team are regularly not achieved. This is particularly the case if the introduction leads to changes in users' daily work routines – projects which are called technochange projects [27]. Often, users only discover the full and sometimes unexpected potential of the software while they are already using it [7, 19]. This value is frequently realized after introducing the software [27, 30] when the project team is already working on new projects, and no resources are available to develop emerging requirements.

To counteract this phenomenon, untapped employee resources within an enterprise should be used, following the sharing economy paradigm [37]. The fundamental assumption is that employees or users of a software have free resources which they can use to improve their work environment. Furthermore, knowledge is spread throughout the entire company and can be used to improve software by adapting it to the needs of the users. Hence, users should be enabled to suggest, discuss, evaluate and realize so-called 'change initiatives' [37]. By doing so, users act as an internal crowd that is capable of coordinating and managing itself [47]. They are empowered to make decisions on their own, without the need for approval processes. Concepts like internal crowdsourcing [22, 47], benefits management [36] and the development of service systems [4, 44] are transferred into the context of software introductions.

The user engagement platform is developed as a platform which combines the concepts mentioned above [37]. This platform enables the realization of user-driven, internal change initiatives and should be used within a company to improve software introductions. Therefore, mechanisms are provided for rapid and constructive feedback during the software introduction phase and thus directly contribute to agile and iterative improvements.

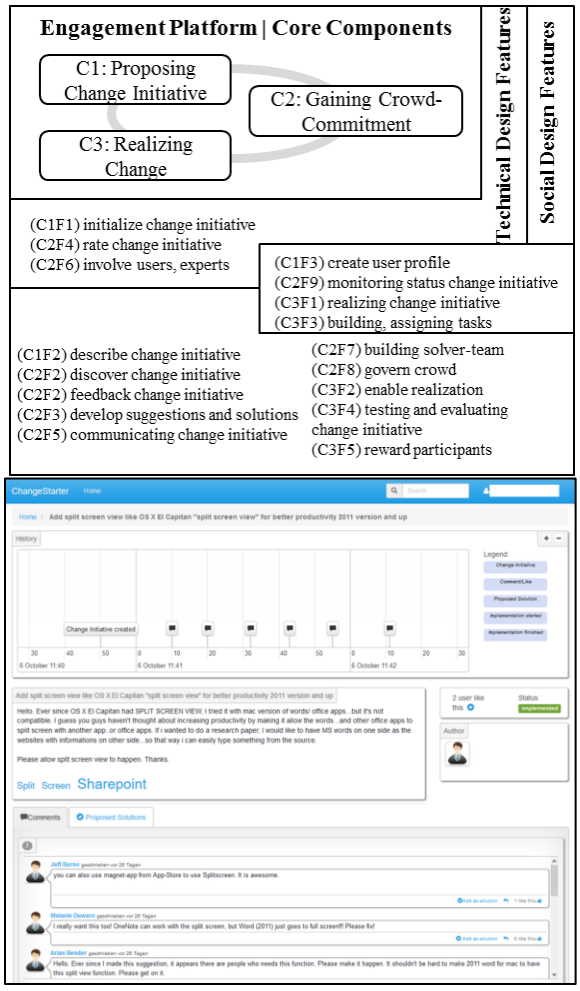

Figure 1. Core components, functions, and prototype of engagement platform (adapted from [37])

3.3 Data Collection and Analysis

During the evaluation activities, we collected data of (1) the software (logfiles, frontend, traffic) and user data through (2) thinking aloud and (3) observation. Through these sets of software data, conclusions can be drawn on activities on the platform. The analysis of the frontend especially allows for the interpretation of the content provided. To collect user data we used thinking aloud as a method for "evaluations that are typically conducted at an early stage in the design process, where the results of the evaluation can be used to improve the system" [29]. In sum, 33 thinking aloud tests were conducted over a period of three months and with a duration of 30-45 minutes. Potential users were selected representing all hierarchical levels as well as business departments. During the thinking aloud tests, tasks were given to the users to become familiar with the engagement platform. To support users during this exploration, we decided to use the moderated thinking aloud [18]. Also, we observed the user during the execution of the provided tasks. Subsequently, a short interview was conducted to address aspects of the thinking aloud test and to get feedback from the user.

The engagement platform is placed within a dynamic and naturalistic environment, in which actors engage continuously through the proposed platform. By doing so, the boundaries between the engagement platform and its surrounding environment play a key role and become impossible to define and distinguish clearly. Taking the perspective of the engagement platform as part of a work context, the interaction with its features do have implications on social actions [14, 31]. To gain a deep understanding of the impact of the design of the engagement platform and its influence on engagement properties it is necessary to replace the perspective of the engagement platform as a mere IT artifact with that of a sociotechnical artifact [14, 31].

To adapt the sociotechnical perspective, the design variables are classified as a preparatory step between social and technical design features as shown in Figure 1. This is necessary since the components described in Semmann and Grotherr [37] refer to the tool view representing a developer position. To analyze the impact of design variables and features of the engagement platform on the work environment and engagement properties we take a deep focus on the 'ensemble view' [31]. More precisely, we choose the subview 'embedded system' to analyze users' behavior which focuses on better understanding of how technology is used in a particular way embedded in a complex and dynamic social context [31]. Through this assignment, impacts can be determined by actors and the environment. The data gathered during the evaluation is mapped to this analysis framework and the results are presented in the following sections.

4. Evaluation Results

The evaluation is naturalistic in a real-world organization and aiming for voluntarily and ongoing participation of users on the engagement platform. Consequently, the first goal is to acquire users to join

the engagement platform. Therefore, we invited users to participate in moderated thinking aloud tests. Doing so ensured a structured opening of the platform for all users and additionally ensured the first population of change initiatives as well as communication between the users. Thus, 40 user profiles were created for the invited users to perform the thinking aloud tests on the platform. At the end, we conducted 33 thinking aloud tests. The results are described in the following section.

As shown in Table 1, 27 ideas to improve the software were proposed on the platform within the component C1, thus confirming the assumption that users have ideas which leads to change initiatives. Relating to the change initiatives, users were aware of tagging their proposals and thereby contributed to enhancing the accessibility of the platform.

Table 1. User data gathered on the engagement platform

40	User profiles	C1
27	Change initiatives	C1
53	Tags	C1 / C2
144 (34)	Likes (community management)	C2
82 (19)	Comments (community management)	C2
20	Solution proposals	C2 / C3
5	Realized change initiatives	C3

Its users perceive the engagement platform as a central communication medium which enables collaborative value creation. For example, a user recognizes the presence of "many helpful and technically experienced colleagues" on the platform. Almost all users used the comment and like mechanisms to express their opinions and to help other users with the same problem. Solely two users did not participate by commenting on proposals. Each user liked at least one initiative. Thus, interaction does take place on the platform and helps to provide valuable information of software use. This is fostered even more through the broad use of tags as organization-specific taxonomies within the naming scheme of the organization. Thus, access to information is easy, expert knowledge is made accessible to the entire organization, increasing the creation of synergies across business units. For example, some participants found a change initiative which was solved some days before or they were able to help in finding a suitable solution (C2F1). Accordingly, the collaboration and value co-creation of the users leads to first realized change initiatives (C3). However, depending on the change initiatives the scope of the solution varies. It can be classified into two *types of user-driven change initiatives*: (1) behavior change initiatives and (2) technical change initiatives. Ten users proposed ideas for changes to the software (C1) but did not recognize that the solution already exists. In this case, other users are able to explain how to use the software providing short how-tos and guidelines that complement behavioral change. From an IT departments perspective, these types of ideas indicate shortcomings of software training and thus indicate levers for improvement of these training services. In this case, there is no technical adaptation needed, but benefits can be realized through changing operational practices of the user. Further benefits from an IT departments perspective can arise from the provision of technical change initiatives. The IT department can be disburdened since a mature change initiative already contains detailed solution proposals developed by users collectively and thus can be implemented more quickly (C3). Especially, as the head of IT operations states, "solutions based on open source projects help us to ensure timely implementation without the need for finding internal partners that could fund the initiative.". Lastly, change initiatives that neither match the current portfolio of projects nor have high priority are integrated into the overall backlog. These change initiatives can be realized if relating projects occur or by members of the IT department alongside their daily routines.

5 Discussion

5.1 Design propositions for facilitating engagement

Based on the prior development of the platform that was done strictly by involving the organization [37], the engagement platform is evaluated within the organization and open to all interested employees. The results reflect insights of three months naturalistic evaluation. Given this setting, the usage within the first weeks was scarce, as few users applied the platform in their work routine. Accordingly, first change initiatives were contributed and comments were made on the platform as shown in Table 1.

Hence, various challenges and *engagement barriers* occur that influence the engagement properties of individual actors and therefore engagement activities. These barriers include all obstacles that arise when the platform is used or prepared for engagement but is prevented or interrupted from being used for *social* or *technical problems*. Social problems encompass e. g. uncertainty or lack of appreciation of the underlying value of the platform. Further, on actor's behavior, not

only positive types of interaction occur during the engagement process. For example, one change initiative was proposed on the platform to criticize previous events and completed projects. Technical problems, for example, can be related to the performance of the platform, usability aspects, or downtimes related to regular server maintenance. Hence, a disturbed or disabled communication flow has a negative impact on the sociotechnical communication of the actors and their embedded environment. These challenges limit the engagement of users and outline barriers for successful resource mobilization.

To draw conclusions on the design variables for the engagement platform as a sociotechnical artifact, user behavior is analyzed. Based on the analysis of the engagement properties, design propositions for the user engagement platforms and service systems are gained, supporting the engagement process and resource mobilization. By doing so, we enhance knowledge for contextualization and re-configuration of service components and resources as supposed by Böhmann, et al. [6]. Also, through the design and evaluation of the user engagement platform, evidence-based knowledge for systematically designing and developing service systems is derived. By doing so, this research contributes to the lack of design knowledge for service systems [6].

Visibility of engagement activities as a resource mobilization mechanism through individual actors' recognition

The visibility of actors' engagement and their perception by other actors are crucial aspects when designing mechanisms for a user engagement platform. Visibility affects various engagement properties. First, informational properties are affected by users acting in their name and not anonymous. Thus, users are able to influence each other and are incentivized to mobilize their resources such as time and knowledge. Analogously, the power of actors based on their internal network or role can be leveraged as a relational property. Last, temporal properties are affected as visibility fosters continuous engagement of actors, as they are perceived as responsible for actions taken within the platform.

Through the evaluation activities, a contribution to the discussion of the *visibility of engagement activities* (anonymity of the engagement activities compared to providing transparency (C1F3)) and the perception of actors' activities by other actors can be made. Due to the type of engagement visibility on the platform, the effect on the engagement results in changes, creating different types of engagement or even values. There is evidence that suggests a positive relation between the visibility of engagement activities and the perception of other actors. Certain users seek to support other actors in solving a problem or realizing change initiatives (C2/C3) by sharing their knowledge and investing parts of their limited time budget. Through the variety of engagement activities, 82 comments are proposed on the platform. This leads to nearly every change initiative containing one solution proposal. By doing so, users try to represent themselves and their expertise within the company through the engagement platform. This result indicates a strong direction in defining recognition as a non-monetary motivational incentive (C3F5) that results in user enthusiasm and hence enables user engagement, ultimately leading to co-creation of value. Through the visibility of engagement activities, meaningful contributions can be made transparent to the community. Individual actors' enthusiasm accrues and leads to increased dynamics on the platform.

Another aspect that supports the engagement process through visibility of activities is the possibility to explore other peers based on their record of engagement. As noted during the observation of the thinking aloud tests, each actor would like to know who is engaging on the platform and contributing to ongoing discussions. This creates group dynamics, which promote the development of the performance and target-oriented groups. This dynamic is reinforced by a strong interest in communication with the selected actors via the platform (C2F5).

Facilitating continuous engagement of leading actors and users on the platform to increase group dynamic

A supporting mechanism to increase continuous engagement and group dynamic is to facilitate the steady presence of leading actors and users on the platform. For example, leading and recognized users with domain knowledge should not only be regarded as so-called 'key users', but also have to show a continuous presence on the platform. Therefore, they have to be integrated continuously on the platform as described to trigger platform dynamics (C2F6).

For this purpose, the design variable *communicating change initiative* (C2F5) has a positive impact on the engagement properties, i.e. temporal, informational and relational properties. Additional engagement opportunities are requested by fourteen users, which include the connections and interfaces as they represent accessibility to the platform. Several statements are identified which indicate that users want to be automatically and continuously informed via multiple channels. Thus, new activity on the platform is pushed to all actors to increase platform dynamic. Even the argument of increased information

flow yielded during the interviews was accepted by about 90% of the participants, since it was stated out that the interaction and presence on this platform are most important to the actors. Thus, actors are given the opportunity to influence the informational properties, as they can timely give a direction with feedback to other actors. Several participants used the like mechanism and assigned 144 likes and 82 comments for proposed change initiatives to express their opinion, affecting the decision-making. In addition, by multichannel communication, the ability to mobilize support or access to resources is fostered (C2) [42].

Facilitating engagement with managed engagement visibility

However, the visibility and transparency of the engagement activities can also potentially lead to barriers to engage. Some users stated that especially regarding data privacy "the time and content of the engagement activities are transparent to everyone and can lead to a transparent status." For example, two users were concerned about how to formulate change initiatives due to concerns over their proposal being unimportant or evoking critical comments. Thus, through proposing a change initiative, this contribution may be associated with the individual actors as an indirect representation of their personality. This uncertainty leads to a high entry barrier and reduces engagement. Hence, there are engagement scenarios in which a partial anonymity can positively influence the platform dynamics. For example, by applying the possibility to contribute anonymously, a reduction of the inhibition level for organizational- and hierarchical-critical questions and the possibility of voicing complaints can be achieved. A similar effect can be achieved with a temporary anonymity of the user (C1F3). As soon as the communication or contribution gains more interest or approval, the anonymity is rescinded and results in a clear assignment to the participant.

In sum, the choice of making engagement activities visible indicates a positive impact on actors' recognition and group dynamic and therefore supports resource mobilization. In addition, the visibility of engagement activities preserves the quality of engagement, although every user should be given the opportunity to be able to discuss simple questions without harming themselves. Nevertheless, when choosing the variant of anonymity challenges have to be taken into account, since a high proportion of anonymous contributions leads to reduced personality and, in the worst case, to a so-called "firestorm" [34, 32, 33]. Further, bullying could arise due to the lack of anonymity but has not been an issue within the evaluation. Consequently, not only the design variable for engagement visibility has to be considered in the design process, but also a quality of users' engagement has to be guaranteed through introducing adequate measures (C2F8).

Establishing community management to govern actor engagement

A possible mechanism to (1) govern the crowd and (2) activate users for engaging is to *establish community management* (C2F8). Seven users highlight the importance of such a role for quality management and moderation on the platform. The role of a mediator is necessary because different attitudes of actors as well as existing policies lead to conflicting interests and uncertainties. For this reason, a quality assurance should be guaranteed by a moderator. Also, the moderator could present the development and top themes in the weekly report or directly inform users via newsletter about updates on the platform. Giving these stimuli for resource mobilization, an increased platform dynamic will be the result.

5.2 Organizational framing and boundaries: Implications of service systems in context

Even though service systems often comprise additional resources to provide a value proposition, the proposed user engagement platform does not comprise dedicated resources for value creation, since users engage on this platform on a voluntary basis. This is in line with the statement given by Maglio, et al. [26]: "In this context, economic exchange depends on voluntary, reciprocal value creation between service systems (each system must willingly interact, and both systems must be improved)." Actors such as a community manager supports value creation and the engagement process, but value is only created if external actors and resources of adjacent service systems engage into the value co-creation process. Thus, resource mobilization mechanisms have to be developed to support actors' engagement. Nevertheless, engaging actors on a voluntary basis remains challenging. For example, actors seek and consume external resources such as knowledge, but are often not willing to share their own resources. Reasons for this phenomenon are diverse. One user stated out that especially in "within a hierarchical organizational structure, the resource knowledge reflects authority and strength which nobody wants to lose." This behavior attributes to the absence of a culture of knowledge sharing and corresponding incentives. An intermediate-term goal of the organization involved is to achieve a culture of knowledge sharing. To address this goal, the first step

is to break down silo mentality and establish a culture of collaboration and cooperation. Therefore, not only users should engage on the platform, but moreover leading actors (C2F6). These actors may engage in defined processes and responsibilities on the platform to provide for example qualified assessments for change initiatives (C2F7). Building on these processes and responsibilities, the evaluation shows that an engagement platform needs strong integration within the organization. Thus, these additional possible service interaction points were identified. As highlighted during the evaluation, the IT department and the corresponding responsibility for portfolio and requirements management derived valuable insights and implications for improvements from a wide range of users. As the example of the head of IT operations shows, he could extract some useful implications to evaluate current training services as well as admit solution proposals into the portfolio. This supports the identification of unrealized benefits for newly introduced software, which is one central purpose of an established competence center within the case company. Accordingly, new potentials and synergies can be created for different actors through further integration, which is realized through adaptation and contextualization of the existing user engagement platform, thereby increasing the value proposition. To integrate the engagement platform into existing service systems, a decision has to be made on the roles and processes to be related to the interaction design. However, this integration also brings unforeseen challenges due to a growing complexity and conflicts of interests as well as value of each engaged actor. Conflicting goals between actors - especially considering varying granularity of actors, i.e. business units or individual actors - should be taken into account when developing cooperative engagement platforms to increase synergies. This has to be mirrored by developing a mutual value proposition for the platform and accordingly, extending it by contextualized value propositions based on actors' roles. For example, the engagement platform seeks to establish transparency on change initiatives in general but also contributes to knowledge management, as developments are described within the platform and can easily be integrated with corresponding tools.

Further research is needed to understand what binds actors in a service system together. Although it was recognized that this could not be achieved by standards or technologies, but "a trinity of resources: competences, relationships, and information" [23]. To address these research opportunities, further investigation has to be undertaken to embed the engagement platform in wider service systems contexts through reconfiguration and contextualization. There is a need to examine how diverse actors offer value through integration on the engagement platform and how this platform would be shaped by mutual influence of different actors.

7. Conclusion

Engagement platforms represent a promising opportunity for organizations to bundle creativity and diverse potentials of actors and resources through reconfiguration and enhance their ability to develop new services, processes, and improvements. Despite this potential, designing and developing engagement platforms to leverage service systems is considered a challenging aspect that remains poorly understood [6]. Due to the ongoing digitalization, the boundaries between technical and social subsystems to sociotechnical systems disappear [46], and information systems cannot be viewed as an isolated entity that has an impact on their environment but IS and environment have to be viewed as a single entity.

To obtain such a view, the user engagement platform proposed by Semmann and Grotherr [37] has been analyzed from a sociotechnical perspective. Therefore, we used the 'ensemble view' [31] to focus on the interaction and social implication for actors as the dominant perspective of analysis. The aim was to evaluate users' behavior on the platform to draw conclusions on the sociotechnical integration in the organizational environment. For this purpose, the technical and social design features of the engagement platform were compared to the sociotechnical actions and the effects on users' behavior.

As a result, the impact of the engagement platform on its social environment and users' behavior is highlighted. These findings relate to insights on type of engagement (e.g. contribution), the engagement activities (e.g. communication and interactions) and engagement barriers (e.g. user's uncertainties). For instance, we draw conclusions on the visibility of engagement activities that have a strong impact on users' behavior. Based on these insights prescriptive knowledge [16] on how to design user engagement platforms with their corresponding design variables is derived. This relates to social design features such as the visibility of engagement activities (C1F3), governance mechanisms (C2F8) such as establishing community management, but also to technical features such as supporting the active communication of change initiatives and involving actors (C2F5). Moreover, the resulting implications influence not only users' behavior and engagement activities within daily work practices, but also on an organizational level. Thus, it is shown that the user engagement platform provides further opportunities to be

integrated into existing processes to increase the value within the organization. Further, the need for organizational framing and interfaces to other service systems is highlighted with the aim to exploit the value-creating potential of the engagement platform fully. By doing so, this paper contributes on the one hand to the design of service systems by demonstrating the results of a contextualized user engagement platform and deriving design propositions for the design of such service systems [6, 42]. On the other hand, this research contributes to the ongoing discussion of sociotechnical artifacts and their relating effects on their environment [13, 21].

The launch of the engagement platform and the start of the evaluation took place at the same time. Thus, first contributions and comments were made on the platform, but it takes time to establish an engagement platform and empower users to co-create qualitative solutions. Due to the initiation and adoption phase of the user engagement platform, the transfer to sociotechnical effects is therefore not given due to several aberrations. Thus, establishing a new user engagement platform remains challenging. Several activities are necessary to engage users on the platform, which entail a high time and cost for carrying out the evaluation. For instance, the value of the engagement platform and its related function may be not understood by its actors. It takes time to communicate the value from an actors' perspective and to educate users in handling the platform. Further, during the evaluation, the reactivation to engage users on the platform remain challenging.

In addition, due to the explorative nature of these research project, the challenge is to handle and interpret design mistakes. As a consequence of this limitation, the sociotechnical artifact fell back on a purely technical artifact, which thus has reduced or no communication and information capabilities. From a methodological viewpoint, further research is needed to understand the systematic engineering of service system under conditions of instability and change during the design and development process. Furthermore, the challenge to re-engage actors on the user engagement platform after a period of inactivity occurred, leading to novel research opportunities. As complex design science projects are confronted with a time lag between initial design and results of an evaluation, further resources to timely adapt the artifact are needed. This is especially crucial in naturalistic settings. Also, mechanisms have to be identified on how the initial design could cope with limitations identified while evaluating. Ultimately, the collected results represent a snapshot which gives first important insights but must be verified in distinct organizational settings. Further research is needed to verify the proposed implications for designing a user engagement platform. Therefore, additional evaluation activities should be conducted continuously and in different organizations to gain insights on the sociotechnical impact in different environments.

8. Acknowledgements

This research was partly sponsored by the German Federal Ministry for Education and Research in the project ExTEND under the reference 02K14A170. Further information can be found under: http://www.projekt-extend.de/.

9. References

[1] S. Akhlaghpour, J. Wu, L. Lapointe and A. Pinsonneault, "The ongoing quest for the IT artifact: Looking back, moving forward", Journal of Information Technology, 28 (2013), pp. 150-166.

[2] S. Alter, "The concept of 'IT artifact'has outlived its usefulness and should be retired now", Information Systems Journal, 25 (2015), pp. 47-60.

[3] S. Alter, "Metamodel for service analysis and design based on an operational view of service and service systems", Service Science, 4 (2012), pp. 218-235.

[4] S. Alter, "Service system fundamentals: Work system, value chain, and life cycle", IBM Systems Journal, 47 (2008), pp. 71-85.

[5] G. Baxter and I. Sommerville, "Socio-technical systems: From design methods to systems engineering", Interacting with computers, 23 (2011), pp. 4-17.

[6] T. Böhmann, J. Leimeister and K. Möslein, "Service Systems Engineering", Business & Information Systems Engineering, 6 (2014), pp. 73-79.

[7] M.-C. Boudreau and D. Robey, "Enacting Integrated Information Technology: A Human Agency Perspective", Organization Science, 16 (2005), pp. 3-18.

[8] C. Breidbach, R. Brodie and L. Hollebeek, "Beyond virtuality: from engagement platforms to engagement ecosystems", Managing Service Quality, 24 (2014), pp. 592-611.

[9] C. F. Breidbach and P. P. Maglio, *A service science perspective on the role of ICT in service innovation*, 2015.

[10] C. F. Breidbach and P. P. Maglio, "Technology-enabled value co-creation: An empirical analysis of actors, resources, and practices", Industrial Marketing Management, 56 (2016), pp. 73-85.

[11] J. Cardoso, H. Fromm, S. Nickel, G. Satzger, R. Studer and C. Weinhardt, *Fundamentals of Service Systems*, Springer, 2015.

[12] J. D. Chandler and R. F. Lusch, "Service Systems: A Broadened Framework and Research Agenda on Value Propositions, Engagement, and Service Experience", Journal of Service Research, 18 (2015), pp. 6-22.

[13] A. Drechsler, *A Postmodern Perspective on Socio-technical Design Science Research in Information Systems*,

International Conference on Design Science Research in Information Systems, Springer, 2015, pp. 152-167.
[14] G. Goldkuhl, "The IT artefact: An ensemble of the social and the technical?–A rejoinder: An ensemble of the social and the technical?–A rejoinder", Systems, Signs & Actions, 7 (2013), pp. 90-99.
[15] G. Goldkuhl and E. Perjons, "Focus, Goal and Roles in E-Service Design: Five Ideal Types of the Design Process", e-Service Journal, 9 (2014), pp. 24-45.
[16] S. Gregor and A. R. Hevner, "Positioning and presenting design science research for maximum impact", MIS quarterly, 37 (2013), pp. 337-355.
[17] S. Gregor and D. Jones, "The anatomy of a design theory", Journal of the Association for Information Systems, 8 (2007), pp. 312.
[18] M. Hertzum and K. D. Holmegaard, "Thinking aloud influences perceived time", Human Factors, 57 (2015), pp. 101-109.
[19] S. Jackson and G. Philip, "A techno-cultural emergence perspective on the management of techno-change", International Journal of Information Management, 30 (2010), pp. 445-456.
[20] C. A. Kieliszewski, P. P. Maglio and M. Cefkin, "On modeling value constellations to understand complex service system interactions", European Management Journal, 30 (2012), pp. 438-450.
[21] P. Kroes, "Experiments on socio-technical systems: The problem of control", Science and engineering ethics, 22 (2016), pp. 633-645.
[22] J. M. Leimeister, S. Zogaj and D. Durward, "New Forms of Employment and IT--Crowdsourcing", 4th Conference of the Regulating for Decent Work Network (2015).
[23] R. F. Lusch and S. Nambisan, "Service Innovation: A Service-Dominant Logic Perspective", MIS Quarterly, 39 (2015), pp. 155-175.
[24] R. F. Lusch, S. L. Vargo and G. Wessels, "Toward a conceptual foundation for service science: Contributions from service-dominant logic", IBM systems journal, 47 (2008), pp. 5-14.
[25] P. P. Maglio and J. Spohrer, "Fundamentals of service science", Journal of the Academy of Marketing Science, 36 (2008), pp. 18-20.
[26] P. P. Maglio, S. L. Vargo, N. Caswell and J. Spohrer, "The service system is the basic abstraction of service science", Information Systems and e-Business Management, 7 (2009), pp. 395-406.
[27] M. L. Markus, "Technochange management: using IT to drive organizational change", Journal of Information Technology, 19 (2004), pp. 4-20.
[28] S. Matook and S. A. Brown, "Characteristics of IT artifacts: a systems thinking-based framework for delineating and theorizing IT artifacts", Information Systems Journal, 27 (2016), pp. 309-346.
[29] S. McDonald, H. M. Edwards and T. Zhao, "Exploring think-alouds in usability testing: An international survey", IEEE Transactions on Professional Communication, 55 (2012), pp. 2-19.
[30] W. J. Orlikowski, "Improvising organizational transformation over time: A situated change perspective", Information Systems Research, 7 (1996), pp. 63-92.
[31] W. J. Orlikowski and C. S. Iacono, "Research commentary: Desperately seeking "IT" in IT research - A call to theorizing the IT artifact", Information Systems Research, 12 (2001), pp. 121-134.
[32] J. Pfeffer, T. Zorbach and K. M. Carley, "Understanding online firestorms: Negative word-of-mouth dynamics in social media networks", Journal of Marketing Communications, 20 (2014), pp. 117-128.
[33] L. Rösner, S. Winter and N. C. Krämer, "Dangerous minds? Effects of uncivil online comments on aggressive cognitions, emotions, and behavior", Computers in Human Behavior, 58 (2016), pp. 461-470.
[34] K. Rost, L. Stahel and B. S. Frey, "Digital social norm enforcement: Online firestorms in social media", PLoS one, 11 (2016), pp. e0155923.
[35] M. Sein, O. Henfridsson, S. Purao, M. Rossi and R. Lindgren, "Action design research", (2011).
[36] M. Semmann and T. Böhmann, "Post-Project Benefits Management in Large Organizations - Insights of a Qualitative Study", International Conference on Information Systems, 36 (2015).
[37] M. Semmann and C. Grotherr, *How to Empower Users for Co-Creation – Conceptualizing an Engagement Platform for Benefits Realization*, *13th International Conference on Wirtschaftsinformatik*, St. Gallen, Switzerland, 2017.
[38] M. S. Silver and M. L. Markus, "Conceptualizing the SocioTechnical (ST) artifact", Systems, Signs & Actions, 7 (2013), pp. 82-89.
[39] H. A. Simon, *The sciences of the artificial*, MIT press, 1996.
[40] J. Sjöström and G. Goldkuhl, *The semiotics of user interfaces*, *Virtual, Distributed and Flexible Organisations*, Springer, 2004, pp. 217-236.
[41] J. Spohrer, P. P. Maglio, J. Bailey and D. Gruhl, "Steps toward a science of service systems", Computer, 40 (2007).
[42] K. Storbacka, R. J. Brodie, T. Böhmann, P. P. Maglio and S. Nenonen, "Actor engagement as a microfoundation for value co-creation", Journal of Business Research, 69 (2016), pp. 3008-3017.
[43] J. Van Doorn, K. N. Lemon, V. Mittal, S. Nass, D. Pick, P. Pirner and P. C. Verhoef, "Customer engagement behavior: Theoretical foundations and research directions", Journal of Service Research, 13 (2010), pp. 253-266.
[44] S. L. Vargo, P. P. Maglio and M. A. Akaka, "On value and value co-creation: A service systems and service logic perspective", European Management Journal, 26 (2008), pp. 145-152.
[45] J. Venable, J. Pries-Heje and R. Baskerville, "FEDS: a Framework for Evaluation in Design Science Research", European Journal of Information Systems, 25 (2016), pp. 77-89.
[46] Y. Yoo, O. Henfridsson and K. Lyytinen, "Research commentary—the new organizing logic of digital innovation: an agenda for information systems research", Information systems research, 21 (2010), pp. 724-735.
[47] O. Zuchowski, O. Posegga, D. Schlagwein and K. Fischbach, "Internal Crowdsourcing: Conceptual Framework, Structured Review and Research Agenda", Journal of Information Technology (2016).