Not Only for Ideation, But Also for Signaling: Incorporating User-Profile-Webpages into Virtual Ideas Communities

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ABSTRACT

This research-in-progress-paper describes the case of SAPiens, which is a Virtual Ideas Community (VIC). Typically, SAPiens - and VICs in general - focuses solely on supporting the ideation interactions among members. There is evidence from a survey that SAPiens members are also interested in actively signaling competences, experiences and skills to third parties. However, SAPiens does not offer IT functionalities that would allow for such a signaling. Against this backdrop, we propose to enrich SAPiens through User Profile Webpages allowing SAPiens members to construct a public profile within the community and thereby to signal individual capabilities, skills and experiences. The aim of this action design research is to design such an IT artifact by building on the signaling theory. After this initial design, our research constitutes a circular process of constant refinement as well as piloting and evaluation of the IT artifact in the real world setting of the SAPiens VIC.

Keywords
User Profiling, Virtual Ideas Community, Action Design Research, Technology Acceptance Model

1. INTRODUCTION

This research-in-progress-paper describes the case of SAPiens, which is a Virtual Ideas Community (VIC) hosted by SAP, a German software provider. Such communities, where distributed groups of individual customers and product users focus on voluntarily sharing and elaborating on new ideas, are used by firms as a promising practice for transcending their boundaries in search of innovation, according to Chesbrough's Open Innovation

paradigm or according to the more general Crowdsourcing principle (Afuah and Tucci 2012; Chesbrough 2003). Many well-known companies, including DELL, Starbucks, Google, Intel, BMW and SAP, have established Virtual Ideas Communities (VICs) (Bretschneider et al. 2013; Di Gangi and Wasko 2009).

SAPiens' (this is also true for VICs in general) technical platform is kept very simple and provides only a few functionalities for the management of ideas, such as functionalities for idea uploading, storage, commenting, elaboration, and visualization. Thus, in the SAPiens community customers can post their ideas, vote for presented ideas and comment on other customers' ideas as well as help improve ideas in a collaborative manner. To sum it up, SAPiens' platform focuses solely on managing ideas and supporting the ideation processes among customers.

However, there is evidence from a survey by Bretschneider et al. (2013) that in the SAPiens VIC customers are not interested exclusively in ideation interactions, but also in signaling competences, experiences etc. to third parties (signaling motive) (Bretschneider et al. 2013). The fact that customers' ideas are prominently visualized together with the idea submitter's name on the SAPiens platform is perceived by customers as a chance to demonstrate personal capabilities and skills mirrored in their ideas. This is a way of signaling in terms of the signaling theory through which one party transmits underlying information about itself to another party. For example, in the job-market-signaling-model, potential employees send a signal about their experiences and skills to the employer through former job references or certificates of schooling (Spence 1973a). Applied to SAPiens, by submitting ideas customers are able to send signals of competences, knowledge and skills to SAP thereby supporting a search for job opportunities at SAP. Audiences of such signals could also be hundreds of other customers in other firms. In general, submitting ideas, or generally speaking participating in VICs, therefore, is also perceived as a good channel for self-marketing.

However, this signaling is only possible in an indirect way, as signals can be sent only enclosed in submitted ideas. SAPiens do not offer certain IT functionalities that would allow users to directly display their level of professional experiences,

competencies and skills etc. Against this backdrop, we propose in this research to enrich SAPiens' platform with User Profile Webpages (UPWs) allowing SAPiens members to construct a public profile within the community and thereby to signal directly individual capabilities, skills and experiences. The first step of our action design research was to design such an UPW by building on the signaling theory, which was the basis for the initial, theory-driven design. After this initial design, our research constitutes a circular process of constant refinement as well as piloting and evaluation of the IT artifact in the real world setting of the SAPiens VIC.

2. RESEARCH METHODOLOGY

Our research follows an action research approach because we: (1) address a practical concern of people in an immediate problematic situation, (2) design a problem solution for the before mentioned problem and (3) pilote this solution as a measure of intervention for this problem. This corresponds to a typical action research methodology proposed, for example, by Rapoport (1970); Susman and Evered (1978) or Peters and Robinson (1984).

In 2011, Sein et al. (2011) introduced their action design research (ADR) method, that claims to be a process for an action research; however, it focuses solely on an IT artifact as subject of an underlying problem solution. This is what distinguishes it from typical action research, which usually includes non-IT-artifacts as subjects of the problem solution. Thus, we chose ADR as a procedure for our research.

In a first step (**problem formulation**) we systematically formulated the problem, which has already been broached in the introduction of this paper and provides the reason for our research, by defining this problem as an instance of a class of problems. By doing so, we were able to conceptualize our research. This problem formulation provides us with a platform for a circular iteration process each consisting of a design, piloting and evaluation of the UPW, namely our IT artifact (Sein et al. 2011).

In the next step (**first iteration loop** of design, piloting and evaluation), we developed, piloted and evaluated the initial design of the UPW. This first cycle allows for an intervention that is focused on the IT artifact itself, meaning that this iteration loop aims at ensuring the IT-artifact will be designed to later serve as an effective instrument for solving the underlying research problems.

In the next step (**second iteration loop** of design, piloting and evaluation) we built on the initial iteration and results were used for building a more mature artifact piloted into a wider organizational context (Sein et al. 2011). This cycle allows for a comprehensive intervention that involves evaluating the artifact in the use setting. This iteration loop is thus focused on checking if the IT artifact is able to solve this research's underlying problem.

In the last step (**formalization of learnings**), we will apply the leanings from our research to a broader class of problem (generalization) identifying the contributions of our research to the theoretical and practical body of knowledge.
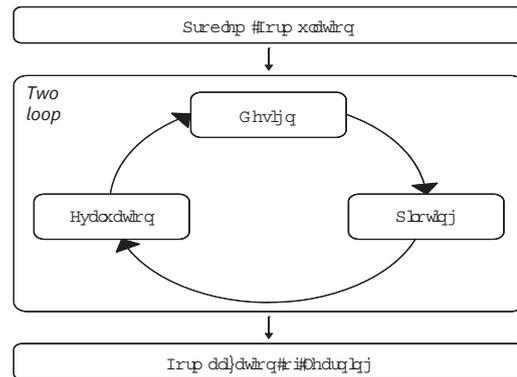

Figure 1. Methodology of this research project based on Sein et al. (Sein et al. 2011)

3. FIRST ITERATION LOOP: INITIAL DESIGN OF THE IT ARTIFACT

3.1 Design

3.1.1 Theoretical Background: Signaling Theory

The basal premise of the signaling theory is that the information distribution between different actors in the market is imperfect (Boulding and Kirmani 1993). By using an example from the second-hand car market, Akerlof (1970) describes in his prominent article "market for lemons" that in a situation where buyers cannot ascertain the quality of products (i.e., certain used cars), markets would collapse because of buyers' accruing aversion to buying these products. In this case, the second-hand car market is characterized by asymmetric information distribution, resulting in the fact that customers do not have the same information that vendors have. Therefore, customers are not able to determine the 'real' quality of a specific car. Cars with a higher quality and correspondingly higher prices do not get sold because buyers are unsure about the true quality of the used cars. "As a result there tends to be a reduction in the average quality of goods and also in the size of the market"(Akerlof 1970).

In his formulation of the signaling theory, Spence (1973b) shows that in markets characterized by information asymmetry (such as the described second-hand car market), reestablishment of effective exchange could be achieved if 'above-average' quality product sellers could engage in (some costly) effort to signal their quality to the market (Ndofor and Levitas 2004). In order to model the signaling mechanism, Spence (1973b) utilizes the labor market and the inherent asymmetric information distribution in his so-called job-market-signaling-model. Here, potential employers (i.e., firms) are insufficiently informed about the quality of job candidates. However, job candidates can utilize their education level as a signal to demonstrate their 'quality' – i.e., their competencies and abilities – to potential employers (Connelly et al. 2011). Such signals are important because they contain and reveal information about unobservable characteristics of a job seeker to the uninformed employer (Ndofor and Levitas 2004). According to Spence (1973b), signals can be considered as "activities or attributes of individuals in a market, which, by design or accident, alter the beliefs of, or convey information to, other individuals in the market" (Spence 1973b). Signals are effective, provided they supply information about the quality of the unobservable characteristics or attributes.

As stated previously, in Michael Spence's exposition, the **educational level** serves as one possible way to signal an applicant's unobservable qualities. However, there are also other possibilities to signal personal skills: **postgraduate trainings** (Sieben 2007) or **advanced vocational trainings** (Hämäläinen 2002) that are provided by universities, municipal consultancy operations or education companies. Successfully completed trainings demonstrate potential to employers of the worker quality or other attributes, such as high motivation and abilities. As a third way of signaling, **work experience** in general or work experience with specific artifacts (Häkkinen 2006; Rich 1996) may also function as a signal. For instance, nowadays employers very often demand a specific level of knowledge or an amount of experience with certain software programs. In this connection, specific training courses regarding the required (software) program may also highlight further personal qualities or skills (Blundell et al. 1996; Booth 1993; Richardson and Van den Berg 2002).

3.1.2 Theory-ingrained Design of the UPW
According to Sein et al.'s (2011) ADR process, we initiated the first iteration by developing an initial design of our UPW. This first design was theory-ingrained, meaning that our artifact is informed by theory (Sein et al. 2011). In this context, we built on the signaling theory, which can be categorized as an explanation and prediction theory according to Gregor (2006). Thus, signaling theory helped us to **structure** our underlying problem and to **identify** solution possibilities for it. By doing so, we ensured that we inscribed in our artifact theoretical traces that reflect the sociopolitical context of the SAPiens VIC (Hanseth and Monteiro 1997; Sein et al. 2011).

In accordance to **structuring** the problem, we first took a deeper look at the underlying problem, described in the Introduction, against the background of the signaling theory. There is evidence from the survey by Bretschneider et al. (2013) that most of the SAPiens members aim at participating not only for purposes of submitting ideas but also for seeking for new job opportunities. The fact that SAPiens members' ideas are prominently visualized together with the idea submitter's name onto SAPiens' platform is perceived by SAPiens members as an opportunity to demonstrate personal capabilities and skills mirrored in their ideas. Audiences of such signals could be both SAP and hundreds of other SAPiens members in other firms. Here, we have a setting that typically underlies the signaling theory, or more specifically Spence's job-market-signaling-model, in which potential employees send a signal about their experiences and skills to potential employers (Spence 1973b). However, the effectiveness of this indirect way of signaling seems to be more than questionable, as skills and experiences hide behind the ideas, that is, they are not obvious to the receiver of these signals. Hence, in order to be able to satisfy SAPiens members' wish for sending signals, community members have to be provided with possibilities that enable them to signal their proficiencies more effectively.

To **identify** solution possibilities for this structured problem, we propose designing a UPW for each individual member of the SAPiens community. Such UPWs are known from professional Social Networking Platforms, such as "Linkedin" allowing members of such communities to display their level of professional experiences and skills. This UPW constitutes our IT artifact that will be embedded into the SAPiens platform as follow: The overall SAPiens Website includes a special Web page that lists all registered members of the SAPiens VIC. Each member's name is listed together with a photo and some basic information, such as information about how many ideas are submitted by this member and the date this person became a member of the SAPiens VIC. Clicking on a member's name or photo leads one to a sub webpage showing detailed information of this member. This sub webpage shows not only basic information, such as member's name, occupation and so on, but also contact information, such as Skype, email etc., which makes it possible for other members to get in contact with this person, for example, to discuss submitted ideas. We further developed this special sub webpage to our planned UPW. We retained the basic information as well as the contact information section but added the section "education", "working experience" and "further trainings." The education section offers the possibility of indicating various educational levels, such as a Bachelor's, Master's or Ph.D. level. In greater detail, users are able to indicate the school or university from which they received their educational level, the dates they attended this school or university, the degree they received and the field of study. The education section mirrors the educational level in Spence's job-market-signaling-model introduced above (Spence 1973b).

In the working experience section, users have the possibility of listing the organizations for which they have worked for. This list of organizations signals their amount of practical experience according to Spence's job-market-signaling-model (Spence 1973b). The surveys of Häkkinen (2002) or Rich (1996) also both provide empirical evidence of Spence's theory: For example, users can state each organization they worked for, the date they attended the corresponding organization and the positions they held in the corresponding organization.

In the further trainings sections, users can name each postgraduate or advanced vocational training that they have received from universities, municipal consultancy operations or education companies, e.g., an Executive Masters, etc. We added this section based on Spence's job-market-signaling-model (Spence 1973b) in combination with surveys from Sieben (2007) and Hämäläinen (2002), who found evidence that such successfully completed trainings serve as signals, as they demonstrate to potential employers the worker quality or other attributes, such as high motivation and abilities. Comparable to the education section, users are able to indicate the organization from which they received its training, the dates they attended this organization, the degree they received and the field of training. The resulting theory-ingrained IT artifact is illustrated in the following figure.
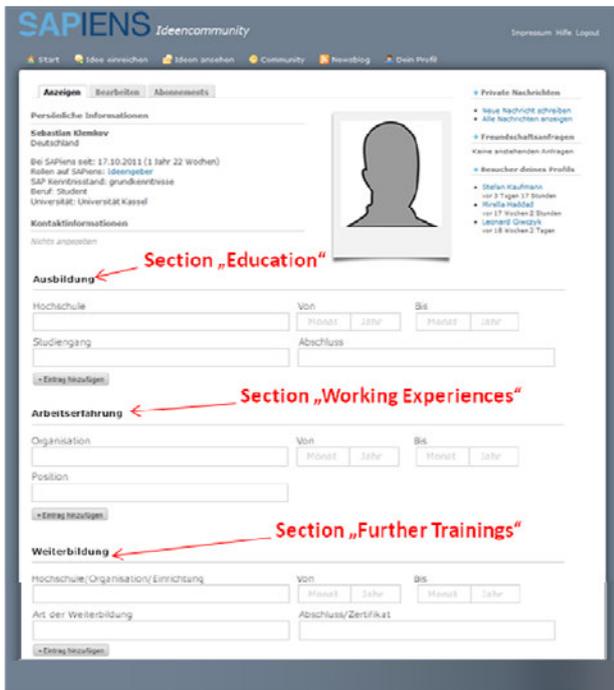
Figure 2. IT-artifact after the first iteration loop

3.2 Piloting and Evaluation

This early design of our IT artifact serves as lightweight intervention, meaning that this intervention is focused on the UPW itself. It aims at ensuring that the IT artifact will be designed to later serve as an effective instrument for solving the underlying research problem. We conducted this intervention in a limited organizational context, which means that we asked ten SAPiens users to attend a focus group. More specifically, the aim of the focus group was to challenge participants' existing ideas and assumptions about the artifact's specific use context in order to create and improve the usability (Nielsen 1993). Furthermore, this highly participatory process builds organizational commitment.

One round of the focus group has been conducted. To ensure that users' signaling was being motivated, we used the data from the survey by Bretschneider et al. (2013). In their study on motivation of the SAPiens users Bretschneider et al. (2013) conducted a standardized questionnaire survey. Bretschneider et al. (2013) measured eight motives of which one was the so-called signaling motive. The signaling motive said that SAPiens users see in submitting ideas an opportunity to send signals of competences, knowledge and skills not only to SAP but also to hundreds of other participants in other firms, thereby supporting a search for job opportunities at SAP or other firms. Using a rating scale ranging from 1 (strongly disagree) to 5 (strongly agree), customers were asked to rate the degree to which extent each motive made him or her participate. A total of 87 took part in the survey. Out of these datasets, we filtered those survey attendees (N=57) that self-declared to being signaling motivated. We invited ten of these to our focus group.

In a first step of the focus group session, the UPW was presented to the participants and the scope and purpose were introduced. After that, participants were asked about their perceptions, opinions, beliefs and attitudes towards the UPW according to the methodological principles of focus group interviews in the scope of usability engineering (Nielsen 1993). The analysis of focus group qualitative data revealed the following: The overall impression of the UPW was good. All participants were sure that they would use such a UPW in the SAPiens VIC. However, the results of the interviews also revealed a need for refining our IT artifact. First, it was criticized that the working experience section offered limited space for additional entries, e.g., when one is engaged for a certain time in a project during hiring in an organization, temporal employment abroad, or taking a sabbatical leave for writing a book, etc. These aspects are only a few examples of those mentioned in the focus group interviews. However, such aspects would all reflect additional working experiences, in other words, important signals. Second, nearly all participants of the focus group remarked that the UPW did not offer explicit space for work on apprenticeship. As doing an apprenticeship, especially in Germany, is established as a highly regarded way of education, successfully completing an apprenticeship should not become less of a concern on the UPW, said the majority of the focus group members. Successful completion of an apprenticeship would also serve as a relevant signal.

4. SECOND ITERATION LOOP: RESHAPING THE IT ARTIFACT

4.1 Design and Piloting

To refine our IT-artifact, we build on the results of the first iteration's evaluation results. First, we added a text area to the working experience section. This text area allows for additional entries, such as successful acquisition of external funding for the organization one worked for, patent application based on one's own invention, etc. Second, we implemented the so-called "apprenticeship" ("Berufsausbildung") section, which we have added between the "higher education" ("Hochschulausbildung"; former "education") and the "working experience" ("Arbeitserfahrung") section (see Figure 1). This section allows for entries indicating user's apprenticeships. We designed this section following the example of the "Higher education" section (see Figure 3). The results of these refinements are illustrated in Figure 3.

Building on this more mature artifact, we aim at piloting it into the wider organizational context of the SAPiens community. This means that we will embed the UPW into the website to give SAPiens users an opportunity to test our IT artifact over a considerable period of time. This step will allow for a comprehensive intervention that involves a large-scale evaluation of the UPW in the use setting.

Figure 3. IT-artifact after the second iteration loop

4.2 Evaluation

Evaluation of the earlier version of our UPW was formative, contributing to its refinement (Remenyi and Sherwood-Smith 1999; Scriven 1996). According to Sein et al.'s (2011) ADR, evaluation of a later version of an IT-artifact should be "summative, assessing value and utility outcomes." Consequently, evaluation during the second iteration of our research will focus on assessing the UPW's efficacy, namely, its ability to do what it was designed to do. To evaluate our IT artifact we will conduct a quantitative survey among SAPiens users being signaling motivated. For this, we first have designed an adequate research model.

4.2.1 Research Model

We built our research model on the Technology Acceptance Model (TAM) that was originally proposed by Davis (1985). TAM proposes that system use in general is a response that can be explained or predicted by user motivation, which, in turn, is directly influenced by an external stimulus consisting of the actual system's features and capabilities (Chuttur 2009).

This correlation is a reflection of the motivation model from motivation psychology, which explains how people's motives cause a certain behavior. In the research field of motivation psychology, a motive is seen as an individual's psychological disposition (Heckhausen and Heckhausen 2006). A relatively stable set of motives is developed during an individual's socialization process (Heckhausen and Heckhausen 2006). In a particular situational context, an adequate motive will be activated and subsequently cause a certain behavior. A situational

context as whole or certain parts of it, that an individual perceive, will serve as incentive that stimulates corresponding motives.

The latest refinement of TAM suggests that this interplay of stimulus and user's motives can be explained by three factors: Perceived Ease of Use, Perceived Usefulness and Behavioral Intention to Use the System. There is evidence that Behavioral Intention to Use is a major determinant whether the user will actually use the system (Actual System Use). The Behavioral Intention to Use, in turn, is considered to be influenced by Perceived Ease of Use and Perceived Usefulness, with Perceived Ease of Use having a direct influence on Perceived Usefulness. Against this theoretical backdrop, TAM seems to be an adequate model to measure whether signaling motivated SAPiens users perceived our IT artifact as an effective channel to send signals of competences, knowledge, experiences and skills to third parties.

A review of research on technology acceptance revealed that impacts of perceived usefulness and perceived ease of use on IT adoption and usage remain consistent and significant across different settings (Lee et al. 2003). In fact, these two factors are widely employed in research studies on technology acceptance, from e-mail (Davis 1989) and voice mail (Chin and Todd 1995) to online shopping (Gefen et al. 2003). Similar to any new technology, we expect that SAPiens users' decision to adopt and use the UPW is also determined by their perception of usefulness and ease of use. So, this argumentation guides us to come up with the following hypotheses:

H1: Perceived usefulness has a positive impact on behavioral intention to use the UPW.

H2: Perceived ease of use has a positive impact on behavioral intention to use the UPW.

H3: Perceived ease of use has a positive impact on perceived usefulness.

However, we suppose that Perceived Ease of Use as well as Perceived Usefulness will not solely affect SAPiens user's Behavioral Intention to Use our IT artifact. We believe that perceived number of potential receivers of signals will also influence Behavioral Intention to Use. The more people serve as potential receiver of signals, the more valuable our UPW is to each user. This aspect can be compared to the critical mass phenomenon, which was introduced to the research field of social dynamics by game theorist Thomas Schelling (1978) and sociologist Mark Granovetter (1978). It also can be compared to the network effect phenomenon (Shapiro and Varian 1999). The classical example of the latter is an online social network, such as Facebook. Facebook, for example, becomes more valuable and useful for individuals the more users join this network. Thus, when considering what affects the use of our IT artifact we also have to take user's view on Perceived Number of Signal Receivers as a possible predictor into account. Furthermore, we propose in line with above argumentation that Perceived No. of Signal Receivers will be positively associated with Perceived Usefulness of the UPW, as users probably will assess the usefulness of the UPW in dependent on the amount of potential receivers of signals in the SAPiens community. Therefore, we come up with a fourth and fifth hypothesis:

H4: Perceived number of signal receivers has a positive impact on behavioral intention to use the UPW.

H5: Perceived number of signal receivers has a positive impact on perceived usefulness of the UPW.
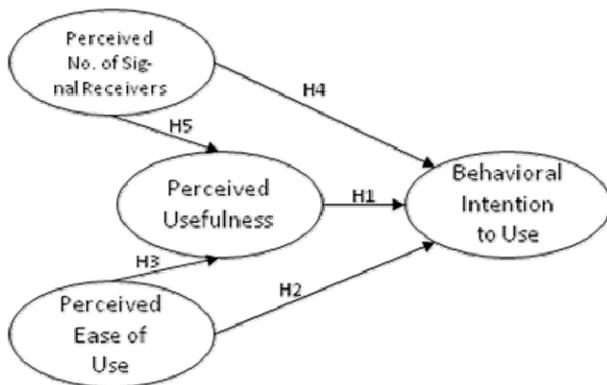
Figure 4. Proposed Research Model

4.2.2 Survey Design

In a next step, we will conduct a standardized questionnaire survey among those SAPiens users that are signaling motivated. Using a Likert rating scale, participants will be asked to rate the items that have to be formulated for each of the variables from our research model. Before bringing it to the field, the questionnaire will be structured, tested and consequently adapted to the needs of the target audience. To analyze gathered data we will apply an adequate structural equation model (SEM) approach. Which one to choose depends on the characteristic of the gathered data; either we will revert to a covariance-based method or to the variance-based PLS approach.

5. FORMALIZATION OF LEARNINGS: EXPECTED CONTRIBUTIONS TO PRACTICE AND THEORY

Our action research leads us to suggest that UPWs can enrich participation of certain user in VIC. Thus, managers of VIC might lean on the insights from this research, as other VIC certainly suffer from the same class of problem that underlies this research. Implementing UPWs into VIC platforms certainly have relevance, as the SAPiens case demonstrates, and thus, it is expected that our research will make a highly practical contribution.

But our research might also make a theoretical contribution. In response to the ongoing call for a holistic model explaining acceptance of new technologies (Legris et al. 2003) our empirical research model adopts the critical mass-, respectively the network effect-perspective to explain user acceptance. To our knowledge, our study is one of the first that will attempt to investigate this phenomenon in the context of TAM. By doing so, our research likely will enrich the emerging IT adoption literature. More specifically, our research likely will contribute by expanding the body of knowledge and thereby, will assist researchers in better understanding how users form their intention to use IT.

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