Acceptance of Professional Web 2.0 Platforms in Regional SME Networks: An Evaluation Based on the Unified Theory of Acceptance and Use of Technology

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Abstract
This paper applies the Unified Theory of Acceptance and Use of Technology (UTAUT) for the understanding of individual acceptance and use of Web 2.0 in the context of regional SME networks. Empirical data were collected from German regional SME network members using a questionnaire. Partial Least Squares was applied to estimate the measurement and structural model and test the hypothesized relationships between the variables. The model explains approximately 39% of the variance of use behavior and thus confirms the role of known factors. Performance and effort expectancy as well as social influence are key determinants to behavioral intention using Web 2.0 in the observed network. Further, our results suggest that behavioral intention and use behavior are influenced by additional factors. Those should be differentiated between three network levels: network management, executives of member firms and employees. Results of the study provide implications for future research and management of SME networks.

1. Introduction

Since small and medium sized enterprises (SMEs) represent 90% of all U.S. Enterprises and 99% of all European Enterprises, they are of high social and economic importance within the U.S. and Europe [19]. With respect to their restricted resources and limited capacities they need to cooperate to meet new challenges in a complex and dynamic competitive environment [44].

Regional networks are an agglomeration of mainly SMEs, which are characterized by a geographical proximity of their partners [41][45]. Their potentials are seen in the locality and social interactions that promote the sustainable development of a region. Innovation potentials range from the maintenance of local markets to collaborative learning about general topics from everyday work (e.g. marketing, energy saving) [48]. This assumes an exchange of information and knowledge across the cooperating actors.

Even though the structure of SME networks is also influenced by customers and business partners beyond the network, we focus on the core partners that cooperate for a certain purpose – in our case the challenges of daily working life.

Information technologies (IT) like Web 2.0 or Social Software provide adequate tools to support collaborative work since they enable an information and knowledge exchange across all actors of the participating firms [14]. In this regard the individual acceptance and use of those technologies are of major importance to strengthening SMEs.

Academic research provides several models that have been developed to explain users’ acceptance and use of information systems. The Unified Theory of Acceptance and Use of Technology (UTAUT) formulated by Venkatesh et al. aims to explain behavioral intentions to use an information system. It successfully integrates constructs of eight previous user acceptance models to a unified model that explains approximately 70% of variance of usage intention [51]. UTAUT has been adopted by several studies [17][53]. Research that uses UTAUT indicates the need to apply the model into specific contexts and thus taking into account the characteristics of the IT artifact there. To this date, there is a lack of publications that explain the individual acceptance and use of collaborative platforms implemented in SME networks. With respect to their increasing importance this paper aims at bridging this gap by empirically testing and analyzing the explanatory power of UTAUT in the SME network context. It aims to present a contribution to the following question: Is the Unified Theory of Acceptance and Use of Technology (UTAUT) suitable to explain the individual acceptance and use of Web 2.0 applications that are implemented in regional SME networks?

The paper is organized as follows. Section 2 introduces the term Web 2.0 as collaborative platform in SME networks. Besides, the underlying theoretical framework UTAUT and related work is discussed. Section 3 describes the research methodology and hypothesis. Then we present descriptive statistics and
causal analysis in Section 4. Section 5 discusses the main results and describes future work. The paper concludes with a summary.

2. Theoretical Background

2.1. General issues about using Web 2.0 platforms in SME networks

The term Web 2.0 describes a phenomenon, which stands for a move to the Internet as an active and vital platform, whereupon users create and distribute content across social networks [30][33][34]. In this regard Social Software comprises technical applications that support human communication, interaction and collaboration in social networks [4]. McAfee describes how Social Software can be used in organizational contexts [30]. Consequently Social Software enables new forms of collaboration as employees can bring in their knowledge and creativity in an internal- and cross-organizational information exchange [30]. In the context of regional networks of SMEs, Social Software provides increased possibilities for collaboration and information and knowledge exchange across the collaborating firms.

In general, regional SME networks define a specific form of cooperation that is mainly concentrated on a regional area [41]. This causes a heterogeneous structure of member firms regarding company size and represented industries. The actors of the member firms are the users of Social Software that determine using and accepting IT. This requires a further consideration about the actors involved in cooperation and operating in SMEs. SMEs are companies with less than 250 employees and a maximum turnover of about 50 million Euros [19]. These companies are highly influenced by the personality of their owner and their attitude towards doing business [5][29]. The implementation and distribution of IT across the company as well as the degree and intensity of network activities depends on the owner’s personality, experience and skills [26][29][44]. Hence, the executive’s level is crucial regarding the acceptance and distribution of Social Software within regional networks of SMEs. As employees are valuable resources for idea generation, especially if it is possible to organize them in heterogeneous groups or communities [27], we also have to consider the employees’ level in the context of the usage and acceptance of Social Software within SME networks. Since Social Software provides increased options of knowledge flows and exchange across the firm boundaries, employees might use a Web 2.0-based collaborative platform in order to solve problems of the daily work life.

Thus, two general types of users have to be differentiated: the executives and the employees, each focusing on different intentions and goals using Social Software within a regional network of SMEs.

2.2. The Unified Theory of Acceptance and Use of Technology (UTAUT)

In the previous literature, several theoretical models were proposed that allow an understanding of both factors influencing the acceptance and use of information technology as well as individual user behavior (e.g. [8][12][50]). In 2003, Venkatesh, Morris, Davis and Davis developed the UTAUT, which is based on an extensive literature review on this topic [51]. The model successfully integrates the constructs of the previous models and explains more variance in IT use behavior than the eight previous models. Overall, the UTAUT model presents a more completed picture of the acceptance and use behavior as one of the eight individual models would be able to. (Fig. 1):

![UTAUT Model](image)

**Figure 1. UTAUT Model [51].**

The UTAUT model accounted for 70 percent of the variance in usage intention, better than any of the eight studies alone [51].

2.3. Related Work

Actual research within the area of measuring the acceptance and use of Web 2.0 in SME networks can be assigned to work that deals with UTAUT. An overview based on a systematic review of citations of UTAUTS’s originating article can be found at [17] and [53]. The authors listed 16 studies that provide statistical data values for the independent constructs of originating UTAUT theory with their main findings. Furthermore they found 43 different types of information systems investigated. However UTAUT
of UTAUT model. Baltaci-Goktalay and Ozdilek [2] analyzed the preservice teachers’ perceptions about different Web 2.0 technologies. A bibliometric comparison of the usage of UTAUT and Technology Acceptance Model (TAM) is presented by Dwivedi et al. [16].

Further, relevant research deals with measuring and examining factors of use and acceptance of Web 2.0 applications and Social Media in enterprises, also besides UTAUT. Only few studies have examined factors influencing the adoption of Web 2.0 applications so far. Tarafdar and Gordon [46], Meyer and Dibbern [31], Usluel and Mazman [49], Shen [40] and Wang et al. [52] operate along specific applications namely micro blogging, innovation activities, social shopping sites, wikipedia and distance learning. Other authors study the organizational adoption of Web 2.0 and Social Media ([28][36] [38][39][42]). Further, Dwivedi et al. [18] and Soliman and Beaudry [43] aim at understanding the individual perspective. Summing up, the first steps in this area have been done, also by adopting miscellaneous existing acceptance theories but the greater part is still research in progress. So far, there is only a small knowledge base.

As a result we can state that in academic research the acceptance of Web 2.0 and Social Media across companies and especially in the context of SME networks is not considered so far. This paper starts closing this research gap by expanding the understanding of individual use and acceptance of Web 2.0 platforms implemented into the context of SME networks. Therefore we apply the UTAUT model as an established, widely cited measurement instrument into this specific context and contribute preliminary findings to the research question. The research stream that focuses on the adoption of information technology at the organizational level is not part of this study.

3. Methodology

3.1. Research Model and Hypothesis

Our study applies the original UTAUT model to study factors that predict the intention to use Web 2.0 platforms implemented in SME networks. One reason for choosing UTAUT is that the model integrates several constructs of previous acceptance models from different research areas and is therefore more powerful in explaining the use behavior. A further reason is that we want to measure individual acceptance and use. The empirical findings will expand the understanding of the model’s robustness and suitability to explain individual acceptance and use. Therefore we adopted the model into our research context:

“Performance Expectancy” is the degree to which an individual believes that the use of the system will help him or her to attain gains in job performance [51]. In the present context, this means that a Web 2.0 platform is able to support a cooperative exchange of knowledge and experiences or the collaborative development of ideas between employees of the participating network member firms. Since the performance expectancy within individual models of technology acceptance is the strongest predictor of intention to use a particular system ([10][13][47][50]) we hypothesize:

H1: Performance expectancy will be positively related to behavioral intention of using a Web 2.0 platform in SME networks.

“Effort Expectancy” is the degree of easy access and easy use associated with using the system [51]. Referred to our context, this means how the individual employee believes that the Web 2.0 platform of the SME network is easy to use or would be easy to learn and thus influences the intention to actually use it. Previous studies have shown that effort expectancy has a significant influence on behavioral intention (e.g. [12]):

H2: Effort expectancy will be positively related to behavioral intention of using a Web 2.0 platform in SME networks.

“Social Influence” is the degree to which an individual perceives that important others believe he or she should use the system [51]. Thus the necessity to use the system depends on the impact of other persons. In the given context, this means how the individual employee tends to be sensitive to opinions of important others. Important others are colleagues or executives from inside or outside the firm. Especially the executives could not only expect but explicit permit and support the use. Altogether, the expectations of both groups of important persons to the individual employee will influence the behavioral intention to use the Web 2.0 platform:

H3: Social Influence will be positively related to behavioral intention of using a Web 2.0 platform in SME networks.

“Facilitating Conditions” are the degree to which the individual believes that organizational and technical infrastructure is available to support the use
of the system [51]. In the present context, this means for example that resources like a computer with Internet access or the necessary knowledge to use the system are available. In addition it states that the availability of a certain organizational or technical instance in case of problems influences the individual behavioral intention:

H4: Facilitating Conditions will be positively related to use behavior of using a Web 2.0 platform in SME networks.

Consistent with existing theories of technology acceptance, it is expected that “Behavioural Intention” to use an information system will have a positive influence on use behavior.

H5: Behavioural Intention will be positively related to use behavior of using a Web 2.0 platform in SME networks.

The operationalization of these latent variables into the measurement model is also based on the original UTAUT model operationalization [51] [anonymous for review]. The items in the questionnaire were measured on a five-point Likert-type scale from one (I do fully agree) to five (I do fully disagree).

3.2 Research Methodology

In order to test the individual acceptance and use of Web 2.0 within SME networks, a prototypic Web 2.0 platform was developed, which was implemented in a German regional network of SMEs in the north of Rhineland-Palatinate [anonymous for review]. The implementation of the platform was expected to foster (1) collaboration, (2) information and knowledge exchange and (3) the exchange of creativity and ideas in order to enhance the innovative potential of the region. This password-protected Web 2.0 platform was based on technical and organizational requirements that resulted from interviews with executives of selected member firms. The requirements cover perceived needs, risks and benefits for using Web 2.0 for supporting the collaborative work [anonymous for review]. The Web 2.0 platform aimed at fostering the knowledge and information exchange on the employees’ level and thus was divided into three areas:

- ‘Who is doing what?’: General overview of the member structure which provides information about branches, business areas and services of the participating companies in order to find cooperation partners on a business level.
- ‘My personal profile’: Information about the employees of the member firms comprising contact details and details about the position and subject area in order to find experts according to a specific topic on an individual level.
- ‘Rooms’: Area for sharing and exchanging information and knowledge as well as creating ideas and innovations in order to discuss actual and general problems such as demographic change and energy saving across the companies.

The evaluation concerning the individual acceptance and use of the Web 2.0 platform was conducted four month after its implementation within the network and the instruction of the executives. A survey was designed based on the operationalization of the latent variables of the UTAUT model developed by Venkatesh [51] to capture information about the constructs. Within the questionnaire, the relevant constructs and moderator variables were operationalized in line with [anonymous for review]. All items were minimally modified and translated into German language to be understood by the survey participants. Data was collected from 15th of February 2011 through 1st of April 2011. The research subjects were managers, senior executives and employees of the participating member firms, regardless of whether they already know or use the Web 2.0 platform. Managers were asked explicitly to allow also filling in the questionnaire by their employees. The questionnaire was distributed both online and paper based to all member companies of the network. It was followed up by telephone and in writing. In the survey thirty-eight people attended, twenty-seven of them have finished the questionnaire completely. Only those completed questionnaires are included in subsequent analysis sections.

The online survey form was designed using Unipark [35]. After adding the paper based questionnaires and exporting the raw data SPSS Statistics V17.0 was used to obtain descriptive statistics for the manifest variables. The predicted research model was evaluated with partial least square path modeling (smartPLS, V2.0 M3 [37]). smartPLS is a tool for path modeling with unobservable (latent) variables as a prediction-oriented structural equation modeling technique based on the partial least squares (PLS) algorithm.

We used PLS path modeling for our analysis because our research attempted to predict factors that influence the individual acceptance and use of information technology. In addition the PLS method is quite robust against skewed distributions and multicollinearity of manifest variables and misspecification of the structural model [6][7]. It simultaneously assesses the measurement model and the structural model. Examining the reliability and validity of the items that measure the constructs ensures that we have
reliable and valid measures of constructs before interpreting the relationships among the constructs. Further, the method is robust to small sample sizes. The recommended sample size is ten times the number of maximum arrowheads pointing on a latent variable. The arrows can belong to the structural model or to the measurement model [3]. Technically the number of observations may be even smaller than the number of variables or the number of parameters. In our research thirty-eight people attended the survey. Removing the incompletely filled questionnaires, we got a sample size of twenty-seven. Following the rule of ten, a sample size of seventy would be necessary because we have seven items measuring the latent construct “Performance Expectancy”. All other latent variables have less arrows pointing on themselves. Since we do not have that adequate sample size and it is not possible to get the required amount of data, but the research area needs preliminary findings in this field, we decided to analyze the given sample size. Within our research we also calculated two alternatives to match the rule of ten retrospectively: Using all thirty-eight questionnaires with mean replacement of missing values and remove incoming arrowheads pointing on latent variables. Both alternatives didn’t provide significantly other results. In summary we considered PLS method the better alternative for our research than covariance-based structural equation modeling.

Within smartPLS the PLS-SEM algorithm was calculated with the following settings: path weighting scheme, maximum number of iterations of 300, sum of outer weights changes between two iterations $10^{-05}$ as stop criterion, 1.0 as initial weight and standardized data metric. The Bootstrapping algorithm was calculated with the following settings: no sign changes, 5000 bootstrap samples and 27 bootstrap cases (equal to the number of valid observations) [23].

4. Data Analysis and Results

4.1 Descriptive Statistics

The following descriptive results are also reported by [anonymous for review]. One third of the participants are female and two-thirds are male. The age of the participants was reported with intervals: up to age 25 (3.7%), age 26 to 35 (7.4%), age 36 to 45 (33.3%), age 46 to 55 (37.0%), age 56 to 65 (14.8%) and age above 65 (3.7%). The median is in the interval of age 46 to 55.

Slightly more than 50% of the participants are working as executives. 25.5% hold an executive position and the remaining 22.2% are working as employees within the SME network. In order to request the Internet and Web 2.0 routines of the participants, several applications with relation to business or private purposes have been investigated. 79.4% of the participants use the Internet daily, 18.5% of the participants uses the Internet several times a week and 11.1% use the Internet several times a month. In contrast to that, a daily Internet use for business purposes has been reported by 92.6% of the participants and 7.4% use the Internet several times a week for business purposes. The use of Web 2.0 applications for business and private purposes has been requested binary (“yes” or “no”) and is distributed as follows (only “yes”):

Table 1. Web 2.0 usage for private and business purposes

<table>
<thead>
<tr>
<th>Web 2.0 application</th>
<th>Private purposes</th>
<th>Business purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>48.1%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Xing</td>
<td>22.2%</td>
<td>25.9%</td>
</tr>
<tr>
<td>VZ-Group</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Wer-kennt-wen¹</td>
<td>44.4%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Wikipedia</td>
<td>81.5%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Blogs</td>
<td>11.1%</td>
<td>14.8%</td>
</tr>
</tbody>
</table>

¹ a regionally well-known social platform similar to Facebook.

The Web 2.0 area of the regional networks’ platform is known by 59.3 % of the participants. 50% of the participants that know the Web 2.0 platform use it several times a month, 43.75% less often and 6.25% never. Almost every participant (96.3%) has access to the required resources (computer with Internet access) in order to be able using the Web 2.0 platform. Furthermore, the participants have been asked for the degree of acceptance of various intentions: 44.4% fully agreed that they intend to use the Web 2.0 platform within the next two months, 22.2% rather agreed and 3.7% rather disagreed. Around one third of the participants are undecided. When asked, whether they intend to use the Web 2.0 platform within the next two months certainly, a third of the participants fully agreed, a further third is undecided and 7.4% intend not to use the Web 2.0 platform within the next two months. The influence of colleagues to the intention to use is distributed as follows: 7.4% fully agree that influential colleagues influence the intention to use. In each case 18.5% agreed or are undecided or rather disagree that influential colleagues influence their intention to use the Web 2.0 platform. More than a third (37%) did strongly disagree, that influential colleagues influence their intention to use the Web 2.0 platform. 37% reported, that personally important colleagues could influence the intention to use the Web 2.0 platform. 11.1% rather disagreed with this statement. 25.9% rather agreed to this statement and
7.4% did fully agree. 53.9% of the participants fully agreed to the statement, that the executives allow the use of the Web 2.0 platform. 18.5% rather agreed to this statement. 14.8% are undecided and 7.4% agree. 44.4% fully agree that the executives support the use of the Web 2.0 platform. 22.2% rather agreed to this statement. 22.2% are undecided, 7.4% rather disagree and 3.7% disagree.

In order to check correlations between the statements, Chi-Square-Test have been performed. The first Chi-Square-Test explores, whether the Web 2.0 platform’s degree of popularity depends on the business position of the participant. The results are Pearson Chi-Square 9.347, p=0.009. Cramer’s V supports with 0.588 a medium-strength correlation. Hence the Web 2.0 platforms’ degree of popularity depends on the business position of the participant.

The second Chi-Square-Test analyses whether the intention to use the Web 2.0 platform depends from the business position of the participant. The results are Pearson Chi-Square 16.152, p=0.013. Cramer’s V supports with 0.547 a medium-strength correlation. Hence also the intention to use the Web 2.0 platform depends on the business position of the participant.

### 4.2 Causal Analysis

#### 4.2.1 Measurement model evaluation

Within the following section we want to assess the reflective measurement model. Therefore we report several quality criteria: indicator and composite reliability as well as convergent and discriminant validity.

The indicator reliability denotes the proportion of indicator variance that is explained by the respective latent variable. The factor loadings should be higher than 0.7, in exploratory studies loadings of 0.4 are acceptable [23][25]. Except of three indicators all outer loadings exhibit values greater than the acceptable level of 0.7 indicating that the measurement errors were relatively small (Table 2) [20][32]. The loading of the indicator F3 of the latent variable “Facilitating Conditions” (FC) is also acceptable. The loadings of SI3 and SI4 to Social Influence (SI) construct are below 0.3. This result is discussed when presenting convergent validity further down. However, to maintain an extensive replication of the UTAUT model no items from any construct were deleted or changed to improve the internal consistency.

The composite reliability measures the reliability of a set of indicators. For the reflective measurement models the composite reliability can be assessed with Dillon-Goldstein’s rho that is considered to be a better indicator than Cronbach’s alpha (according to Chin [9]). The value is suggested to be higher than 0.7, in exploratory values above of 0.6 are acceptable [1][23]. It is determined by PLS for each construct. In our study all values are greater than the suggested threshold of 0.7 (Table 3).

#### Table 3. Quality criteria: composite reliability and convergent validity

<table>
<thead>
<tr>
<th>UTAUT Construct</th>
<th>Composite Reliability</th>
<th>Convergent Validity</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectancy</td>
<td>0.91</td>
<td>0.60</td>
<td>7 (PE1-PE7)</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>0.94</td>
<td>0.84</td>
<td>3 (EE1-EE3)</td>
</tr>
<tr>
<td>Social Influence</td>
<td>0.74</td>
<td>0.50</td>
<td>4 (SI1-SI4)</td>
</tr>
<tr>
<td>Facilitating Conditions</td>
<td>0.83</td>
<td>0.63</td>
<td>3 (FC1-FC3)</td>
</tr>
<tr>
<td>Behavioural Intention</td>
<td>0.97</td>
<td>0.94</td>
<td>2 (BI1-BI2)</td>
</tr>
</tbody>
</table>

According to Gefen and Straub [21] the convergent validity has been determined to establish the validity of the latent constructs and thus the goodness of fit of the measurement model. Convergent validity is shown when the t-values of the outer model loadings are above 1.96. The bootstrapping of smartPLS provides the result, that at a p=0.05 level, only two outer model loadings of the reflective measurement items do not show significant t-values.
An alternative way to determine convergent validity is the average variance extracted (AVE). According to Hair [23], Bagozzi and Yi [1] as well as Fornell and Larcker [20] the AVE should be higher or equal than 0.5. In our model the AVE’s are greater than the acceptable level with the exception of the AVE of Social Influence (Table 3).

The noticeable phenomenon of the analysis of the outer model and its construct “Social Influence” can be described as follows: The indicator SI1 asks if colleagues who influence the user’s behavior think that the user should use the system (mean = 3.59). The indicator SI2 asks if people that are important to the user think that he or she should use the system (mean = 3.44). The indicator SI3 asks if the executives allowed the use of the Web 2.0 platform (mean = 1.78). The indicator SI4 asks if the executives supported the use of the Web 2.0 platform (mean = 2.04). SI3 and SI4 do not reach significant t-values (Table 3). One possible explanation for this phenomenon is that the items SI1 and SI2 do refer to colleagues (employee’s level) whereas SI3 and SI4 do refer to executives. The means of both question classes do differ. Most of the participants belong to the group of executives. Either they do not consider their co-workers as colleagues or they do not count on their opinion or they are not influenced by their opinion. This could reason the result at this point.

Last, the discriminant validity in the form of the Fornell-Larcker criterion was determined. The idea of that criterion is that a latent variable should explain the variance of its own indicators better than the variance of other latent variables. It indicates the extent to which a construct is different from other constructs. Therefore the each construct’s AVE should be higher than its squared correlations between the latent variable and all other latent variables. [20] The result of our study is shown in Table 4.

Table 4. Quality criteria: discriminant validity

<table>
<thead>
<tr>
<th></th>
<th>BI</th>
<th>EE</th>
<th>FC</th>
<th>PE</th>
<th>SI</th>
<th>UB</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI</td>
<td>0.971</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE</td>
<td>0.610</td>
<td>0.917</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td>0.675</td>
<td>0.817</td>
<td>0.793</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>0.463</td>
<td>0.158</td>
<td>0.402</td>
<td>0.776</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>0.588</td>
<td>0.174</td>
<td>0.269</td>
<td>0.298</td>
<td>0.703</td>
<td></td>
</tr>
<tr>
<td>UB</td>
<td>0.598</td>
<td>0.580</td>
<td>0.537</td>
<td>0.063</td>
<td>0.269</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Bold numbers on the diagonal of the table show the square root of the AVE of the construct. Numbers below the diagonal represent construct correlations. For adequate discriminant validity the bold numbers should be greater than the off-diagonal elements in the same column. A diagonal value of 1.0 indicates that the construct was associated with only one measurement item. As a result, all constructs are closer to their indicators than to other constructs.

Overall, the results of measurement analyses demonstrated reasonable reliability and validity of the measurement model.

4.2.2 Structural model evaluation and hypothesis testing results

Structural model evaluation is the assessment of predicted or causal relationships between the constructs in the model. The evaluation of the structural model is reported by two parts: the $R^2$ value of the endogenous variables [22] and the path coefficients estimates [9][24].

Endogenous variables are the dependent latent variables of the inner model. For example the $R^2$ value for the construct “Performance Expectancy” is not predicted by any other latent variable. Consequently the $R^2$ value is zero. The variable of interest is “Use Behavior”. With a value of 0.39 the $R^2$ value of the construct means that 39% percent of the variance can be explained by the independent variables. The acceptable level of $R^2$ depends on the research context. According to Chin [9] this result can be described as “moderate”.

Estimated path coefficients from the original data in combination with the T Statistics from the bootstrapping algorithm suggest significance of four estimates. All path coefficients are in the direction proposed. Table 4 summarizes the results of hypothesis testing.

Table 5. Hypothesis testing results

<table>
<thead>
<tr>
<th>H</th>
<th>Effect</th>
<th>Path Coefficient</th>
<th>T Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PE &gt; BI</td>
<td>0.258</td>
<td>2.1957</td>
</tr>
<tr>
<td>H2</td>
<td>EE &gt; BI</td>
<td>0.495</td>
<td>4.0194</td>
</tr>
<tr>
<td>H3</td>
<td>SI &gt; BI</td>
<td>0.428</td>
<td>3.6984</td>
</tr>
<tr>
<td>H4</td>
<td>FC &gt; UB</td>
<td>0.244</td>
<td>1.1245</td>
</tr>
<tr>
<td>H5</td>
<td>BI &gt; UB</td>
<td>0.433</td>
<td>2.0120</td>
</tr>
</tbody>
</table>

The path coefficients have to be interpreted as standardized regression coefficients. According to the hypotheses, the sign is positive in all cases. The estimated values for those path relationships should be at significant levels, which were evaluated using the bootstrapping procedure of smartPLS. Table 5 reports the results in form of the empirically t-values in the column T Statistics. The theoretical t-value at a confidence level of 0.95 and 4.999 degrees of freedom provides a value of 1.96. In our results all hypotheses can be supported except for H4. Since the empirical t-value is smaller than the theoretical one, this hypothesis can only partly be supported. The structural
model analysis indicated that some of the variance in use behavior was explained by the measures. None the less, the results require a more extensive discussion.

5. Discussion

5.1 Main Results

The study aims to identify factors that predict the individual’s intention to use Web 2.0 in SME networks. Further, it aims at expanding the understanding of the UTAUT model's robustness and suitability to explain individual acceptance and use in this context.

The results indicate a partial support for UTAUT to explain the individual acceptance and use of Web 2.0 platforms in regional SME networks. The present study shows that 39 percent of the variance in “Use Behavior” (dependent variable) is explained by the independent variables “Performance Expectancy”, “Effort Expectancy”, “Social Influence” and “Facilitating Conditions”, while the original UTAUT model accounted for approximately 77 percent (adjusted $R^2$ of 70 percent) of the variance in use intention and 52 percent (adjusted $R^2$ of 48 percent) of the variance in use behavior [51]. These results require further consideration regarding the present research context in order to provide approaches for further research.

In general, the implementation of a Web 2.0 platform is expected to foster collaboration and information and knowledge exchange within regional networks of SMEs. As mentioned before, the Web 2.0 platform provides support for two different types of users, each focusing on distinctive goals: (1) the executives of the participating firms in order to generate immediate benefits for the companies, (2) the employees of the participating firms in order to solve problems of the daily work life.

Thus we can assume that the use and acceptance of a Web 2.0 platform within a network of SMEs also depends respectively on the goals of the different user types. These user types were previously analyzed by means of descriptive analysis and explorative interviews [anonymous for review].

Additionally, since collaboration within SME networks is primarily determined on the executives’ level of a firm, our study denotes a return of 77.78% executive answers and a return of 22.22% employee’s answers. Thus we can assume that the use and acceptance of the Web 2.0 platform is primarily referred to the goals of the executives’ level here. On the basis of these assumptions, we discuss further aspects for refining the independent variables of the UTAUT model.

In the context of our study the “Performance Expectancy” can be defined as degree to which an individual (executive) believes that the system will help his/ her company to attain immediate benefits from collaborative work. This presumes implicitly both the cognition of areas for cooperation and a willingness to cooperate:

(1) Since SME networks are concentrated on a regional area and exhibit a heterogeneous member structure, areas for cooperation are rarely perceived. The lack of perceived cooperation fields, and hence the lack of perceived benefits from collaborative work might negatively affect the utilization of the Web 2.0 platform. Besides the “Effort Expectancy” might also depend on the perceived benefits from collaborative work: The less benefit is perceived, the more effort might be supposed when using the platform.

(2) The willingness to cooperate depends on the mutual willingness to collaborate and to share information and knowledge. As a consequence a ‘Wait-and-see attitude’ arises within the network with consequences on the variable “Social Influence”: Individuals might perceive the necessity to use the system only when other firms also use it.

5.2 Limitations and Recommendations for Future Research

The presented research on hand is based on several potential limitations and hence leaves improvement potential for further research. One potential limitation might concern the number of participants that completed the survey. A sample size of twenty-seven might be prone to outliers. A recommendation for future research is hence to repeat the survey with more participants. Moreover, as the evaluation was conducted shortly after the implementation and introduction of the Web 2.0 platform, the platform was less widely known in the SME network. As lead users were primarily executives, the Web 2.0 platform was mostly known between them. This could be a reason why most percentage of the questionnaire has been finished by executives. A recommendation for future research is hence to repeat the survey at a later time. A general recommendation for further research concerns the design and evaluation of a refined model for acceptance and use of Web 2.0 technologies in regional SME networks as the known UTAUT is not able to explain all variance for the given context. Future research models should also address the linkages between the individual and organizational level of Web 2.0 adoption to develop a more complete model.
6. Summary

The study adopted the UTAUT model to understand factors that influence the acceptance and use of Web 2.0 artifacts implemented in SME networks. The goal of this paper was to examine the suitability of UTAUT to explain the individual acceptance and use of those IT artifact in this context. In order to do so, we proposed a research model based on the original UTAUT model.

Knowledge acquired from the study is beneficial to both theory and practice. The research question could be answered in a way that UTAUT is partly suitable in order to explain the individual acceptance and use of Web 2.0 applications implemented in regional SME networks. The reached level of explanation of variance in use behavior (39%) is lower than in the original UTAUT model. Consequently, additional research is necessary. The proposed model should be enhanced and afterwards evaluated empirically. None the less, the study provides evidence for the UTAUT model in that it confirmed the relationships between the core constructs as existing and in the same direction as the model proposes. The study also demonstrated that the partial least squares modeling method works well in exploratory research.

Beneath the contribution to the theoretical understanding of factors that enable individual acceptance and use of Web 2.0 applications implemented in regional SME networks management recommendations can be derived. Executives and employees who currently work in enterprises that participate in SME networks and individuals who are responsible on the network management level benefit from the knowledge acquired. In turn, the implementation of these recommendations can influence the acceptance and use of Web 2.0 in regional SME networks positively. The successful adoption of Web 2.0 information technologies and use behavior can support the utilization of economic aspects for SMEs in regional networks.

References


