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User-centered design of business communities. The influence of diversity factors on motives to use communities in professional settings

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Abstract

The professional use and implementation of social media or social media related applications are booming. Solutions like business internal communities promise to connect employees in a more flexible way than old-fashioned mailing lists or static network drives ever could. New solutions are perceived to support communication independent from time and space and in allow a more flexible way of communicating direct as well as indirect through the offer of different communication media (chat, voice over IP, mail, blog, etc.). But in contrast to remarkably good application scenarios, reality is not keeping up. Therefore more investigations of usage conditions and acceptance parameters are needed to find out which showstoppers interfere with a successful implementation. Due to the fact that acceptance by future users is one core condition for a successful implementation of software within operational structures and processes, this paper presents a study with focus on motivational issues to use business communities depending on diversity factors. In this study the focus is set on the diversity factors age, gender, social media expertise, achievement motivation, and perceived locus of control over technology (ploc). First results revealed that the classical user diversity variables age and gender do not influence the motives to use business communities. In contrast technology related diversity factors and achievement motivation revealed correlations with usage motives ($r > .3$). The most important motives were the need for information and autonomy. Achievement motivation showed the strongest correlation with the need for social interaction ($r = .51$), indicating that highly motivated people can be motivated to use a SNS if it facilitates social interaction.

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1. Introduction

As the approach of social online communities and networks is perceived to be promising not only in private usage contexts, many enterprises try to adapt this approach for their business purposes. Especially in countries that have to prepare for fundamental changes in the work environment (e.g., Germany), business communities can be helpful to overcome challenges like (a) the loss of knowledge when employees retire (b) an adequate communication in times of new work time models such as parental leaves, sabbaticals, or stays abroad and (c) detection and integration of new employees into the enterprise. In this context, the approach of business communities (see Section 1.1.1) is appearing with specific characteristics that fit to the aforementioned challenges. Three perceived benefits of business communities in this context are: (a) a dynamic tool for the storage of knowledge (documents and other information), (b) an enhancement of communication (direct and indirect) independent from time and location, and (c) an enhancement of the onboarding process of mentoring programs for new employees outside and within an enterprise. But success cannot be taken for granted: To avoid failures and disinvestments, the user-centered design approach [1] [2] [3] (see Section 1.1.2) aims at creating target solutions for business communities.

1.1. User diversity and the acceptance of business communities

To define an initial point for the presented study, the next subsections present in short related work addressing the key components of user diversity and its impact on the acceptance of business communities. In a first step the concept and ideas behind business communities are presented in short. Second an overview about acceptance research in the context of business communities is given. And third the results of two studies that were executed in the context of the presented study are presented to present specific results from research with focus on the impact of user diversity on the acceptance of business communities.

1.1.1. Business communities

Since so called online social networks (SNS) and other social media applications (e.g. Wikis, Blogs etc.) boomed in private usage setting, enterprises are ambitious to use these services for their issues and benefit. In this paper the use of the social network approach for business internal affairs is of interest, while the use of communities for communication with customers or B2B should be excluded from our deliberations.

The focus of business internal communities in the internal communication of enterprises is related to the goals of (strategic) knowledge management [4]. Business Communities are perceived to support and connect employees easily and allow communication independent from time and space, as well as actual working time models [3]. In this context an enhancement of communication in general and information exchange in detail are the perceived benefit. Measures that are related to the enhancement of communication are social media tools e.g. chat, blog, wikis, etc. are connected in one platform and enriched with other social media elements like personal profile pages that can provide general personal information or in the job context job relevant information, the option to connect users to groups with protected areas, and shared calendars. Additionally a fileserver option is often provided to allow and support knowledge storage. These integrated solutions can be implemented for a whole enterprise, but also for project oriented teams or in research alliances [5] [6] [7] or in industry [8].

1.1.2. Acceptance of business communities

The acceptance information and communication technologies (IKT) in professional usage contexts first came up in the 1980ies when computers found nationwide their way into the offices. In these times topics like ergonomics, usability, but also acceptance in the context of these new artifacts became interesting employer and research. In this context the first technology acceptance model were developed. Two models that are of special importance in this context are the Technology Acceptance Model (TAM) that was introduced by Davis in 1989 [9] and UTAUT, the unified theory of acceptance and use of technology by Venkatesh et al from 2003 [10].

The TAM aims to predict the actual system use by behavioral intention and attitude towards using. The attitude towards using is depending on two central factors perceived usefulness (PU) and perceived ease of use (PEoU). PU stands for the subjective attitude whether the use of the specific technology would enhance someone's performance

at work. PEoU is the perceived effort a person sees in the context of using the system or device. PU and PEoU are furthermore influenced by so called external variables. The approach of UTAUT is another approach to predict use behavior as the external confirmation of acceptance. The UTAUT approach is based on eight theories of technology acceptance (Theory of Reasoned Action [11], Technology Acceptance Model [9], Theory of Planned Behavior [12], Combined Tam and TPB [13], Motivational Model, Model of PC Utilization [14], Innovation Diffusion Theory [15], Social Cognitive Theory) and unifies central findings of all of them into a new technology acceptance model. The UTAUT is focused on the prediction of use behavior and behavioral intention via the factors performance expectancy, effort expectancy social influence, and facilitating conditions. The influence of these factors is additionally influenced by the factors gender, age, experience and voluntariness of use.

All in all the described models did their job so well, that until today there are no comparable alternatives available. But times have changed technology, enterprises as well as user. Therefore it is necessary to rethink the existing models and extend them. In the context of business communities we developed an approach called “user-centered community design” [2][16] in the context of a the project iNec¹. This approach aims to investigate whether diversity factors such as age, gender, achievement motivation, social media expertise or affinity for technology affect the acceptance of business communities and whether diversity specific design criteria can be derived.

1.1.3. The impact of user diversity on motives to use business communities

To find out whether specific patterns in the context of the acceptance of business communities exist, we have run different studies in the past with focus on the impact of diversity on usage motives [2] [17]. In each case some usage motives were kept constant (importance, information, autonomy, contact, self-portrayal). The key findings of the studies revealed, that *gender* and *age* only show little influence (correlation) on usage motives in the context of business communities. *Social media expertise* and *number of contacts* of in social networks were used as technology related diversity factors in our studies to find out whether specific characteristics in the context of social media impact the evaluation of usage motives.

Comparing the results of the studies revealed no clear image: In one study social media expertise revealed positive correlations between nearly all evaluated motives (importance, information, autonomy, contact) [2] and social media expertise, but that was not confirmed though the findings of a second study with the same focus [17]. For *achievement motivation* we also found inconsistent findings. One study revealed correlations between AMI and the motives information, importance, power, and self-portrayal [17], but the other study only revealed a correlation with self-portrayal [2].

All in all we can say that the classical diversity factors age and gender do not seem to play a role in the context of usage motive for business communities. More specific aspects like affinity for technology (here social media) and achievement motivation did revealed more specific results but not consistent across different studies with comparable design.

2. Method

In this study a questionnaire instrument was designed to investigate the attitude of employees towards business communities. The questionnaire consists of two main parts: part one asked for general demographic data, information about the participants' job, use of information and communication technologies (private and job-related), a short version of achievement motivation and perceived locus of control over technology (ploc) [18]. Part two included an introducing scenario, in which the introduction of a new business community in an enterprise was described to set all participants in the position of an employee in this enterprise. After the presentation of the scenario each participant was asked to evaluate 11 usage motives to use business communities, each presented via three items all on a 6-point Likert scale (from 1 total rejection to 6 total confirmation) consisting of.

¹ The project iNec „Innovation through expert communities in times of demographic change“ is focused on the research question whether business communities are an appropriate means to deal with the specific challenges of demographic change in small and medium sized enterprises (<http://www.fir.rwth-aachen.de/en/research/research-projects/inec-01HH11044>).

For our analysis we have chosen age, gender, perceived locus of control over technology (ploc), achievement motivation (AMI), social media experience (SME) as *independent variables* to picture user diversity. As *dependent variables* the following eleven usage motives were chosen: fun, control, financial rewards, social interaction, acknowledgement, ease of use, autonomy, information, self-portrayal, feedback, institutional fit. For motives the final sales reached Cronbachs α values higher than .700 (see Table 1).

Table 1. Cronbachs α for the 11 motive scales.

Usage Motives	Cronbachs α
fun	.814
control	.756
financial rewards	.728
social interaction	.723
importance	.766
autonomy	.704
information	.774
self-portrayal	.724
feedback	.766
institutional fit	.874

3. Results

In order to find out whether there are correlations between user diversity variables (age, gender, achievement motivation, social network experience, ploc) we have run bivariate correlations (Pearson and Spearman). The level of significance was set to $\alpha = .05$. Effect sizes are reported using Pearson's R or Spearman's Rho.

In the following subsection the results of the study are presented. Section 3.1 gives a sample description. Afterwards Section 3.2 presents the core results of the presented study in form of results addressing the influence of user diversity on motives to use business communities.

3.1. Sample description

A total of $N = 72$ participants answered the questionnaire, the youngest volunteer being 21 and the oldest 63 ($M = 40.31$, $SD = 11.65$). *Gender* is distributed quite symmetrical, 53% are male ($N = 38$) and the other 47% are female ($N = 36$). Due to the fact that business communities are only relevant in the working context we additionally asked for *job-relevant information*. In this context we could reveal the following facts for our sample: The *educational level* within our sample is quite high with 50% ($N = 36$) having completed at least one university degree, 3% ($N = 2$) even finished their PhD. 4 participants have a general certificate of secondary education, another 17 completed their general qualification for university entrance and 13 participants did an apprenticeship. Some of the respondents just started their employment relationship; others are already working for about 41 years ($M = 18.63$, $SD = 12.42$). According to the *duration of their current employment* the sample is quite diverse. The time differs from 1 to 40 years as well ($M = 8.86$, $SD = 8.66$).

In addition to job relevant information we asked the participants for their technical and social media expertise: In this context the participants' *perceived locus of control over technology* was evaluated. Results revealed that in average the participating volunteers have a high self-reported level of control over technology ($M = 4.36$, $SD = 1.13$), which is measured with eight items on a 6-point Likert scale (1 = "I don't agree at all", 6 = "I fully agree"). Concerning the *use of social network services* (SNS) it could be revealed that the sample prefers using social networks like facebook in private in comparison to using them for working context. While many respondents use SNS "several times daily" ($N = 12$) or at least "daily" ($N = 16$) in private, the usage in a working context is far below (several times daily $N = 6$, daily $N = 2$). For *achievement motivation* we can report a mean value of $M = 4.15$ ($SD = 0.68$) which is above average.

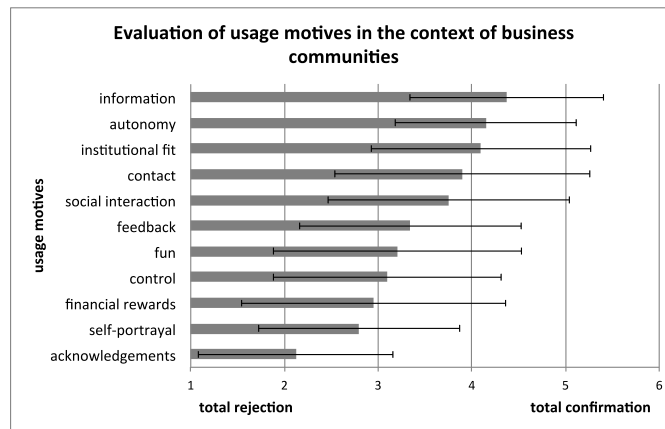


Fig. 1. Means of usage motives in the context of business communities. Error bars denote standard deviation.

3.2. Motives to use business communities

In order to find out which usage motives are relevant for business community usage we selected ten motives (see Section 2) to find out which are of importance in the context of business communities. As Figure 1 shows *information* ($M = 4.37$; $SD = 1.03$) was evaluated as the central usage motive followed by *autonomy* ($M = 4.14$; $SD = .96$), *institutional fit* ($M = 4.09$; $SD = 1.17$), and *contact* ($M = 3.89$; $SD = 1.36$), all with means above average (i.e. 3.5). The motives that revealed a slight rejection with regard to their importance in the context of business communities were *feedback* ($M = 3.34$; $SD = 1.18$), *fun* ($M = 3.2$; $SD = 1.132$), and *control* ($M = 3.1$; $SD = 1.21$). Motives that revealed a clear rejection were *financial rewards* ($M = 2.95$; $SD = 1.41$), *self-portrayal* ($M = 2.95$; $SD = 1.07$) and *acknowledgement* ($M = 2.12$; $SD = 1.03$).

Summing this section up we can summarize that this sample revealed three “top” motives (information, autonomy, institutional fit) with means above 4, which stands for a clear confirmation. Furthermore two motives revealed a low level of confirmation (contact, social interaction). In contrast to that three motives (feedback, fun control) revealed low rejection and further three motives (financial rewards, self-portrayal and importance) rejection. In the next subsection correlations of usage motive evaluation and user diversity factors are examined to find out whether the evaluation differs depending on user diversity.

3.3. The influence of user diversity on motives to use business communities

After the evaluation of usage motives for business communities now the focus is set on correlations between user diversity factors (age, gender, social media experience, achievement motivation (AMI), and ploc. Depending on the scale of the variables either Spearman’s rank correlation coefficient, or Pearson’s correlation coefficient was used. In the following subsection the results for the five diversity aspects are resented separately.

3.3.1. Gender

We could not reveal any relationships between gender and the presented usage motives.

3.3.2. Age

The correlation analysis revealed a significant correlation ($r_s(63) = -.250$; $p < .05$) between age and the motive *control*. As the correlation is negative one might expect that the older the user is, the less he or she feels the need to control their colleagues workers via the community.

Concerning the motive *contact*, it appears that older users reported to be less motivated than younger ones ($r_s(63) = -.251$; $p < .05$).

3.3.3. Perceived locus of control over technology (ploc)

Technically experienced and self-confident participants are more motivated to use business communities in the context of the motive control ($r_s(63) = .278$; $p < .05$) and contact $r_s(63) = .250$, $p < .05$) than less affine participants. The higher a person's ploc the more important are both usage motives.

3.3.4. Achievement motivation

According to achievement motivation (AMI) we could reveal several correlations with the usage motives. The higher a participants score in AMI, the more important is their need for social interaction ($r_s(63) = .510$; $p < .0001$), autonomy ($r_s(63) = .469$; $p < .005$), contact ($r_s(63) = .385$; $p < .005$), feedback ($r_s(63) = .366$; $p < .05$), information ($r_s(63) = .316$; $p < .05$), and self-portrayal ($r_s(63) = .345$; $p < .005$). Getting financial rewards ($r_s(63) = .326$; $p < .05$) and a institutional fit ($r_s(63) = .318$; $p < .05$) also revealed positive correlations with the level of AMI of our participants.

3.3.5. Social media expertise

Concerning correlations between the usage of social media experience and motives to use business communities we revealed correlations for *contact* ($r(63) = .414$; $p < .005$), social interaction ($r(63) = .302$; $p < .05$) and self-portrayal ($r(63) = .294$; $p < .05$). The higher the level of AMI, the higher the evaluation of these usage motives.

Table. 2. Bivariate correlations of user diversity factors (age, social media expertise (SNS), Achievement Motivation (AMI), ploc) and motives to use business communities sorted according to mean of the motives (from highest to lowest (see. Fig.1).

Motive	Age	SNS	AMI	ploc
information	-	-	.316*	-
autonomy	-	-	.469**	-
institutional fit	-	-	.318*	-
contact	-.251*	.414**	.385**	.250*
social interaction	-	.302*	.510**	.278*
feedback	-	-	.366*	-
fun	-	-	-	-
control	-.250*	-	-	-
financial rewards	-	-	-	-
self-portrayal	-	.294*	.345**	-
importance	-	-	-	-

Level of significance * $p < .05$, ** $p < .01$

Summing the result section up we can say, that we found clear preferences for usage motives: Information, autonomy and institutional fit were evaluated as the three most important motives to use business community in the context of the presented scenario. These three are followed by the motives contact and social interaction, which also revealed confirmation above average. In opposite to these, the motives financial rewards, self-portrayal and importance revealed a clear rejection in our sample.

According to the question whether there are correlations between user diversity factors and the usage motives for business communities, we could identify some pattern (see Table. 2). For age we found negative correlations with the motives contact and control, which means that the older the participants were, the lower they evaluated the importance of the motives. For the factors social media experience we could reveal correlations with the motives contact, social interaction and self-portrayal. Most of the correlations were revealed between achievement motivation and the usage motives. Seven of the eleven evaluated motives show a correlation with achievement motivation. Under these seven there are all top motives (see Figure 1). For ploc as another technology related diversity factor we found correlations for contact and social interaction. In this context results revealed that the

higher the perceived locus of control over technology, the higher the evaluation of the importance of these usage motives.

4. Conclusion, discussion and future work

Due to the fact that business communities come along with attractive potential for enterprises it was to investigate, which parameters are relevant in the context of their implementation. The applied approach of user-centered community design aims to consider diversity factors of potential users as predictors or moderators for target business community design aspects. Based on the hypothesis that the acceptance of future users is the central key for a successful implementation of business communities, we set the user in the center of all deliberations in this study. Based on this alignment, this study was focused on an evaluation of motives to use business communities and correlations with user diversity factors.

All in all findings revealed that there are only few correlations between the classical diversity factors age and gender and the usage motives: Gender did not reveal any interaction with the usage motives and age correlated only negatively with contact and control. More technology related aspects like ploc and social media expertise revealed a correlation with the motives contact and social interaction. The higher a person's expertise with social media and technology, the higher was their evaluation of both motives. Reasons for this pattern could be an enhancement of the awareness that social media are appropriate to support social interaction and contact triggered by positive experience with social media or technology in general. Another hypothesis is that the participants with more social media experience feel a stronger need for this way of interconnectedness. Social media experience additionally revealed a correlation with self-portrayal, which would also underline the argument, that people that have experienced the benefits of social media feel a stronger need for their specific advantages in the context of business communities.

The level of achievement motivation of our participant revealed correlations with all usage motives except, fun, control, financial rewards, and importance. This finding leads to the assumption that people with a higher level of achievement motivation are generally more inclined to motivational aspects even in the context business related affairs.

Comparing the results of this studies with other studies presented in the related work part [2] [17] has shown some matches. All studies revealed that the classical diversity factors only play a minor role in the evaluation of usage motives of business communities. The same was true for the general evaluation of usage motives that were evaluated in all studies (importance, information, autonomy, contact, self-portrayal). In all studies information and autonomy were evaluated as the central usage motives, whereas self-portrayal and feedback were evaluated as less important in all studies.

According the interdependencies of other diversity factors like perceived locus of control over technology, social media experience, or achievement motivation, the conducted studies reveal no unified picture. In two [17] (this included) of the compared studies achievement motivation revealed correlations with several of the usage motives, but only one in the third study [2]. The same is also true for social media experience, which has shown correlations reveal correlations with the evaluation of few usage motives in this study and also one of the others [2].

All in all this study, in comparison to the other two studies, has shown that the impact of diversity factors on the acceptance of business communities is not finished yet. Future studies will have to show whether the identified patterns are valid and whether other diversity factors play a role in the context of the acceptance of business communities. In this context especially personality aspects and communication relevant information should be considered to find out which user characteristics determine requirements for the user centered community design.

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