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# Modeling Microblogging Adoption in the Enterprise

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## ABSTRACT

Despite a broad range of collaboration tools already available, enterprises continue to look for ways to improve internal and external communication. *Microblogging* is such a new communication channel with some considerable potential to improve intra-firm transparency and knowledge sharing. However, the adoption of such social software presents certain challenges to enterprises. Based on the results of four focus group sessions, we identified several new constructs to play an important role in the microblogging adoption decision. Examples include privacy concerns, communication benefits, perceptions regarding signal-to-noise ratio, as well codification effort. Integrating these findings with common views on technology acceptance, we formulate a model to predict the adoption of a microblogging system in the workspace. Our findings serve as an important guideline for managers seeking to realize the potential of microblogging in their company.

## Keywords

Technology Adoption, Enterprise Microblogging, Twitter, Social Software, Focus Groups.

## INTRODUCTION

Since early 2008, microblogging platforms like Twitter have become increasingly popular. The idea of sharing short messages using multiple access points (e.g. mobile phone, web, instant messaging) seems to be appealing to people worldwide. Currently, more than 1 million users generate a total of 3 million messages per day (TechCrunch, 2008) updating each other about their daily occurrences. Not only has Twitter proven to be a convenient mean to exchange trivia, it has also received public attention due to its ability to rapidly spread news. For example, before reaching any major news station, Twitter users have broadcasted about the Hudson River plane crash landing—one of them even being on the ferry boat heading out to rescue the passengers.

In a nutshell, microblogging services allow users to publish brief messages and tag them with keywords. Others may subscribe to these messages based on who publishes them or what they are about. That way, subscribers can design a customized “news feed” through which they receive information relevant to them—bundled up and at a point of time they choose (i.e. “pull”). In addition, users may send messages directly to others regardless of whether they subscribed to the sender’s messages or the particular subject. These direct messages will then appear among the recipient’s subscribed messages.

The length of messages is one of the key aspects differentiating Twitter from other social software such as online social networks, forums, wikis or blogs. Due to its “pull”-nature microblogging is less disruptive than instant messages, text messages, or the telephone. Furthermore, as opposed to email communication or conversations “at the water-cooler”, information shared via microblogging remains available to a definable population outside the sender-recipient sphere facilitating knowledge storage and exchange as well as providing potential for data mining.

Allowing to conveniently share daily updates microblogging helps people to keep in touch. This is of particular value given one of the most consistent findings in the social science literature saying that whom you know is highly correlated with what you come to know (Cross, Parker and Sasson, 2003). Recognizing the tremendous success of Twitter in the personal communication domain, companies have started to investigate a possible transfer of microblogging concepts into the commercial domain. This raises the question for the business value. Indeed, facilitating the work of distributed teams, improving transparency and collaboration, and dealing with the “expert finding problem” are often-mentioned advantages of microblogging. Also, microblogging provides a simple way for quick Q&A issues such as “We are forming a team for a new project and are looking for a marketing expert with expertise in XYZ.” Its potential to decrease email overload is another important benefit. When using a microblogging system, an employee can decide whom (i.e. “by sender”), what (i.e. “by

topic”), and how (i.e. “interface”) to follow. Thereby, he can fine-tune the signal-to-noise ratio according to her/his preferences and choose when and where to be updated. In addition to providing value to employees, microblogging tools provide a way for top management to get a condensed picture of what happens at a grassroots level. Building on this potential, several new start-ups, such as Yammer, seek to reproduce Twitter’s success in an enterprise context by offering an extended set of functions accounting for business needs.

However, issues such as employees’ privacy concerns, attention economics, a multitude of collaboration tools already in use, and lack of compatibility may hinder employees to adopt a microblogging system. Thus, despite its potential to bring value at all organization levels, it is still unclear how microblogging would perform in the workspace. This paper aims to understand the factors playing a role for the microblogging adoption decision. Building on the insights from existing research and the results of four focus groups sessions we formulate a model that seeks to predict employee microblogging adoption. Furthermore, content analysis of the focus group sessions is used to identify the role of different factors in the employee adoption decision.

## RELATED WORK

Java, Song, Finin, and Tseng (2007) analyze why and how Twitter is used for private purposes. However, to our best knowledge there are no studies on microblogging adoption within an organizational setting. So, there is a need to close this gap as individuals may be expected to follow another rationale in a workspace environment than they do when forming their adoption decision for private purposes.

Due to the lack of empirical studies related to the acceptance of microblogging, a number of models related to technology adoption have been reviewed with regards to their applicability to our research question. Among these theories were Rogers’ Innovation Diffusion Theory (2003), Decomposed Theory of Planned Behavior (Taylor and Todd, 1995), and Technology Acceptance Model including its extensions (Davis, 1989; Venkatesh and Davis, 2000). Venkatesh, Morris, Davis, and Davis (2003) summarized these and other models and identified similarities among construct operationalizations. As a result, they conceptualized the Unified Theory of Acceptance and Use of Technology (UTAUT), thus integrating performance expectancy, effort expectancy, and social influence as predictors of behavioral intention as well as behavioral intention and facilitating conditions as predictors of the actual behavior in terms of adopting the technology. In addition, gender, age, experience, and voluntariness of adoption were introduced as moderating variables. Taking into account its potential to explain up to 70% of variance in the adoption intention (Venkatesh et al., 2003), we assume UTAUT to serve as a sound foundation for our understanding of microblogging adoption in the enterprise.

Being aware of UTAUT’s value in explaining behavioral intention, we recognize its general nature. Constructs such as perceived usefulness, job-fit, relative advantage, and outcome expectations have proven to be “the strongest predictor of Intention” in their respective models and are subsumed under the umbrella of performance expectancy in UTAUT (Venkatesh et al., 2003, p. 447). A decomposition of this important construct may shed light on the underlying forces constituting individual value and allow for insightful managerial implications. This approach seems especially suitable taking into account a collaborative nature of microblogging applications as opposed to traditionally tested IT applications in the context of technology acceptance (e.g. word processing software (Davis, 1989)).

Indeed, microblogging implies knowledge sharing as information is sent and received. Thus, insights from the knowledge sharing literature might prove useful in explaining the formation of individual performance expectation as well as behavioral intention. Wasko and Faraj (2005) show that anticipated reputation gains form a significant predictor of individual knowledge contribution. Bock, Zmud, Kim, and Lee (2005) show that anticipated reciprocal relationships is an important determinant of attitude towards knowledge sharing in an enterprise context. Also, they provide evidence for the significant influence of organizational climate on individuals’ subjective norm and intention to share knowledge.

Extending UTAUT by integrating relevant constructs from the knowledge sharing literature as well as other relevant determinants may reveal important dynamics behind the individual adoption decision as well as make the model more useful for practitioners who are looking for operable means to ensure technology adoption. To find out about the key factors determining user acceptance, four focus group sessions discussing the adoption and use of an enterprise microblogging system were conducted. The results are presented in the following section.

## FOCUS GROUP RESULTS

In December 2008, participants for four focus groups were recruited via multiple mailing lists and by posting on Twitter and invited to SAP Research in Palo Alto, California. As shown in Table 1, focus groups were male-dominated, differed with regard to their Twitter experience and predominantly included above-average educated participants with IT experience in an age group of 30 to 40. All focus groups were professionally moderated and revolved around the same set of questions aiming

to understand participants' attitude towards the use of microblogging in the workplace. Twitter and Yammer were presented as exemplary implementations of microblogging throughout the discussion sessions.

The discussions were transcribed, resulting in a document with a word-count of 44,751 which served as the basis for our content analysis. 20 codebook categories have been identified from both technology acceptance and knowledge sharing literature as well as from a review of the focus group transcripts. Relevant codes have been extracted and independently assigned to the coding categories by two independent coders. Inter-coder reliability constituted 0.950 (P-value < 0.000), suggesting a high level of agreement between the coders (Landis and Koch, 1977). The mentioning frequencies of the matched codes were counted for each category as shown in Table 2.

Group	Male/Female	Dominant Age Group	Twitter Experience	Expressed Sentiment
Group 1	3/1	30-40	low	negative
Group 2	2/2	30-40	middle	rather positive
Group 3	8/1	30-40	high	very positive
Group 4	6/2	20-30	high	very positive

Table 1. Focus Group Overview

Category	Frequency	Relative Importance	Category	Frequency	Importance
Perceived Usefulness	7	3%	User Control	2	1%
Relative Advantage	24	11%	Codification Effort	14	6%
Reputation	5	2%	Ease of Use	5	2%
Expected Relationships	8	4%	Compatibility	9	4%
Incentives	4	2%	Privacy Concerns	18	8%
Fun	1	0%	Critical Mass	4	2%
Improving Communication	42	19%	Self-Efficacy	1	0%
Supporting Distributed Work	8	4%	Social Pressure	3	1%
Speeding Up Communication	12	5%	Organizational Culture	22	10%
Signal-to-Noise Ratio	26	12%	Top Management Support	6	3%

Table 2. Results of the Focus Group Analysis

In combination, categories related to performance expectancy as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989) such as **perceived usefulness** and **relative advantage** had a relative importance of 14% throughout the focus group sessions. This is compatible with previous findings that these constructs are the strongest predictors of individuals' adoption decision (Venkatesh et al., 2003). However, the appraisal went both ways. For example, “*Twitter*” was found to replace “*a lot of e-mail. As most of my emails are only one sentence*”, while another participant asked: “*Why change? You are used to email, people communicate with you via email... So you will have to provide a lot more value*”.

**Expected relationships** were mentioned eight times to play a role in the participants' perception of enterprise microblogging, for example: “*Twitter is a chance to maybe find people in other parts of the company that have similar interests*”. Fewer times, the potential to build a **reputation** was mentioned: “*If you keep posting good ideas, or keep posting knowledgeable replies, you show that you are valuable to the company*”. Also, little importance was attributed to the role of monetary and other extrinsic **incentives**. Just once, **fun** was mentioned as motivator. This finding suggests that whereas perceived enjoyment plays a crucial role in the private social media adoption (Rosen and Sherman, 2006), it has little impact on one's decision to adopt a technology in the workspace.

The biggest benefit of microblogging was seen in its ability to **improve communication** and organizational transparency: *“With Twitter you are making a bigger step in terms of the ambient awareness that Twitter brings people”*. In particular, its ability to speed up communication and support distributed work was mentioned. Combined, communication benefits was the most frequently mentioned construct influencing one’s adoption decision, accounting for more than a quarter of all codes.

On the other hand, participants were concerned that microblogging would cost them time, partly due to expected involvement and, as a result, increased **codification effort**: *“A tool like this I should be following every day, I should be looking at it and contributing to it”*. Another issue related to time costs was the impact on the **signal-to-noise ratio**. While some were concerned about a worsening in that ratio (e.g. *“My concern is always to save time and not to drown in information”*) others attributed microblogging to have the potential to improve it. In this context, the user’s ability to control the system has been mentioned multiple times: *“The value here is in the ability of use it to join a conversation and not join”*.

Using microblogging is simple. That might be the reason why issues related to ease of use in a traditional meaning were barely mentioned. Instead, efforts spent on choosing and maintaining another collaboration tool were seen as significant. In this regard, **compatibility** issues were raised. In particular, smooth system integration was perceived to be important for a successful adoption of microblogging.

**Privacy** emerged as an important issue, in particular among participants with no or little Twitter experience. Privacy concerns have not been an issue in traditional technology acceptance theory as these focused on technologies free of social interactions and/or self-disclosure (e.g. Davis, 1989). However, the use of social software such as microblogging provides others with a whole set of user-related information such as personal interests and/or working routines: *“I don’t want my work tracked, I don’t want to report every step I make”*. Another participant said: *“It’s like a Big Brother... like everybody sees what everybody is doing...”*

The need of a **critical mass** as a requirement to adopt microblogging was mentioned four times, while **self-efficacy** was mentioned just once. This finding indicates that people are not afraid to run out of news to publish.

Little importance was rewarded to the influence of social pressure. Instead, **organizational culture** was regarded as an important factor affecting the adoption decision. Participants differentiated alongside multiple dimensions such as innovative versus traditional (e.g. *“I don’t see it in a conservative or banking environment”*) or collaborative versus competitive (e.g. *“There are companies where diversity of opinion around problems is valuable.”*). Also, the importance of **top management support** was underlined multiple times.

Analysis of the sentiment expressed in the focus groups has shown a high correlation to individual Twitter experience. The focus group with participants who had little familiarity with Twitter had a rather adverse attitude towards enterprise microblogging (see Table 1) with privacy concerns being the most frequently mentioned construct. On the other hand, groups with Twitter experience saw a lot of potential in the use of microblogging at work and emphasized the communication benefits.

We conclude that the focus group sessions confirmed the important role of attributes such as perceived usefulness and relative advantage from the technology acceptance literature. Microblogging’s potential to improve communication may thus be considered as an important antecedent of performance expectancy, even though privacy concerns, low signal-to-noise ratio and concerns regarding codification effort may undermine these advantages. Factors known from the knowledge sharing literature, such as reputation and expected relationships, were mentioned to a lesser extent. Rather than ease of use, which is an important construct in multiple technology acceptance models (e.g. Davis, 1989; Venkatesh and Davis, 2000), the compatibility aspect has been raised. Additionally, organizational culture, especially its collaborative aspect, emerged as an adoption determinant of high importance. Partly, the findings confirm UTAUT’s conceptualization. However, we show that some modifications may lead to an improvement of UTAUT’s explanatory power and its managerial value.

## FORMULATION OF THE MODEL

For the sake of brevity we do not describe hypotheses from Venkatesh et al.’s (2003) original UTAUT which are represented by bold paths in Figure 1 (i.e. negative influence of effort expectancy on intention, positive influence of performance expectancy on intention, positive influence of intention on behavior, positive influence of facilitating conditions on behavior). Also, it goes beyond the scope of this paper to investigate the influence of the moderating variables age, gender, experience, and voluntariness of which we could attain only little insights throughout the focus group sessions.

### Reputation

In the innovation adoption context, Moore and Benbasat (1991) define image as “the degree to which the use of an innovation is perceived to enhance one’s image or status in one’s social system”. The terms “reputation” and “image” may be

used synonymously. The evidence on the impact of reputation on behavioral intention is mixed. Kankanhalli, Tan, and Wei (2005) show that the perception of an increase in reputation due to knowledge contribution had no significant influence on contribution behavior. On the other hand, Wasko and Faraj (2005) show that reputation enhancement is a significant predictor of individual knowledge contribution. Similar results are presented by Donath (1999).

However, throughout the focus group sessions reputation was mentioned just five times. This divergence from the literature's findings may be explained with a certain level of timidity and hence social desirability bias resulting from the face-to-face nature of such sessions. In fact, most jobs require social interaction with colleagues. In this context, reputation is an important asset as it can help an individual "to attain gains in job performance" (Jones, Hesterl and Borgatti, 1997) which is the very definition of performance expectancy. This view is shared by Venkatesh and Davis (2000, p. 189) who regard "increased power and influence resulting from elevated status" as a "basis for greater productivity". It is therefore hypothesized that:

*H1a: REPUTATION is positively related to PERFORMANCE EXPECTANCY.*

In general, people engage in social interaction seeking approval, status or respect (Blau, 1964). The utility derived from attainment of these goals does not diminish as one leaves the company grounds. Therefore, reputation is also hypothesized to have a direct positive effect on intention. For example, someone's job does not require social interactions so that social software is perceived useless for the job. However, the reputation gained from the use of the system might still be a motivator. We therefore hypothesize that:

*H2b: REPUTATION is positively related to INTENTION.*

### **Expected Relationships**

EXPECTED RELATIONSHIPS may be defined as "the degree to which one believes one can improve mutual relationships with others through" (Bock et al., 2005) the use of microblogging. Bock et al. (2005) find that an individual's attitude toward knowledge sharing "is driven primarily by anticipated reciprocal relationships". Social software and in particular microblogging implies human interaction. Even services not necessarily focusing on networking as their main purpose do at least have such component as a side-effect.

Knowing the right people within one's enterprise and being in touch with them is important for many tasks. As a result, EXPECTED RELATIONSHIPS may enhance task performance and is theorized to positively influence PERFORMANCE EXPECTANCY. Even for job profiles which do not directly require a well established network for the task performance, EXPECTED RELATIONSHIPS may be a motivator to adopt a system. The success of social networks such as Facebook and MySpace is based on the idea of networking outside the company. For this reason, we hypothesize both:

*H2a: EXPECTED RELATIONSHIPS is positively related to PERFORMANCE EXPECTANCY*

and

*H2b: EXPECTED RELATIONSHIPS is positively related to INTENTION.*

### **Communication Benefits**

Social software competes with technologies such as phone, and email as well as social institutions like "coffee corner". Even though the latter have proven to be effective communication means in many contexts, microblogging is attributed great potential to improve organizational communication. Benefits of improving and speeding up (e.g. "That speed of sharing of information amongst peer group is a value to me there") communication as well as supporting distributed work (e.g. "In geographical diverse locations – Twitter is an effective tool for quick status broadcasts without flooding people's inboxes") were mentioned 62 times throughout the focus group session. In a recent study 61% of the participating companies stated that they would use Web 2.0 applications in order to improve communication and collaboration (Awareness, 2008).

Improving communication may result in a lower frequency of both incoming and outgoing emails, phone calls, and instant messages as well as meetings. This means less interruptions of the employee's work flow and more time for task performance. We therefore hypothesize that:

*H3: COMMUNICATION BENEFITS are positively related to PERFORMANCE EXPECTANCY.*

### **Signal-to-Noise Ratio**

Employees are already confronted with a lot of "noise" and adding another communication channel increases that amount: "you got your email, you got your cell phone, you got your pager, you got your instant messenger, then you got this". In particular social software may be associated with the exchange of trivial information: "John posts: I wanna sell my old car. Hanna has a guest from the east coast who is looking for a cheap apartment". Overall, focus groups participants attributed a

low signal-to-noise ratio to microblogging: “You will get flooded with information”. This correlates with findings by Gonzalez and Mark (2004) on the negative effects of constant interruption and the role of attention economics on overall performance. However, valuable information (i.e. “signal”) is communicated as well: “When everything is limited to 140 characters, then I would be actually able to go through 200 emails, I mean not the emails but tweets a day”. The perception of whether an increase in signal outweighs the increase in noise reception is assumed to have a significant influence on performance expectancy as a worsening in the signal-to-noise ratio costs time which cannot be spent on task performance.

*H4: Beliefs regarding the SIGNAL-TO-NOISE RATIO are negatively related to PERFORMANCE EXPECTANCY.*

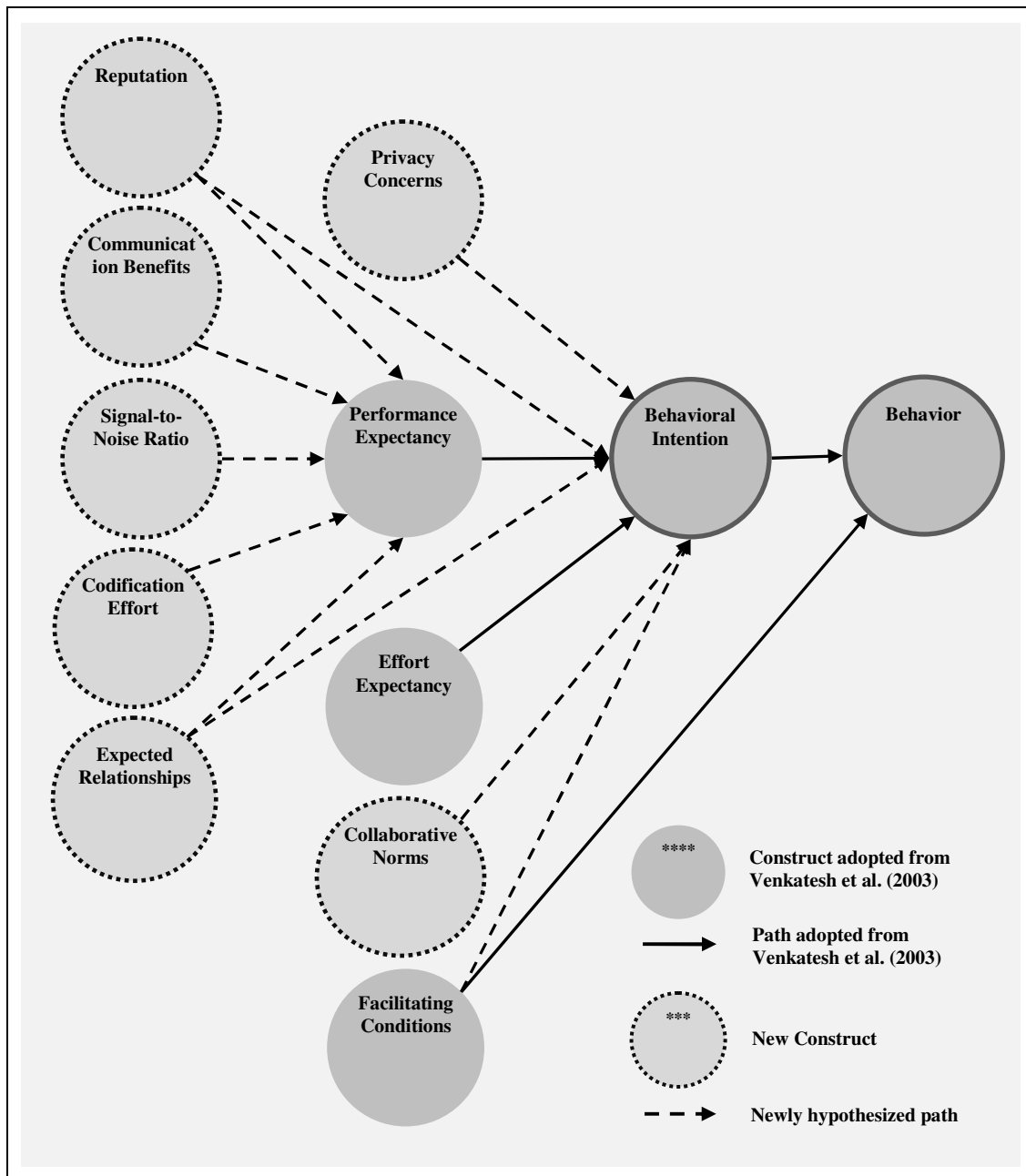


Figure 1. Modified and Extended Version of UTAUT

### Codification Effort

The actual act of putting information into the system costs time as well: “*You have to now service another tool on a daily basis all the time*”. Moreover, social software tools often result in a high level of user involvement as “the user is the content” (Ebner, Holzinger and Maurer, 2007). One participant put it this way: “*But I used to the technology as something that saved me time rather than constantly getting me involved in answering and putting more information out*”. On the other hand, microblogging may save time as opposed to communicating via means such as email or phone: “*Maybe it's easier to reply to something or to put something on Twitter than to call a meeting and get the idea out*”. Also, microblogging is less formal (e.g. “*On Twitter you can be very casual*”) which decreases codification effort.

Similar to Orlikowski’s (1993) findings regarding opportunity costs and knowledge contribution, it is assumed that if one perceives overall codification efforts to increase due to the use of a microblogging it will have negative influence of performance expectancy as there would be less time to spend on for task performance:

*H5: Beliefs regarding CODIFICATION EFFORT are negatively related to PERFORMANCE EXPECTANCY.*

### Privacy Concerns

The introduction of privacy concerns as a direct determinant of intention forms an extension to UTAUT. Privacy concerns in the corporate context involve different connotations than in the context of private communication. Thus, focus group participants were mainly concerned that the information they reveal through microblogging will give more control means to the employer: “*In my experience people are very opposed that management can track what they do*”. All in all, participants expressed high need for control means to ensure their information is confidential and is seen only by authorized people: “*In the Enterprise you should know who is following what*”. Generally, the focus groups have shown to associate negative utility with such self-disclosure. Therefore, it hypothesized:

*H6: PRIVACY CONCERNS have a negative effect on INTENTION.*

### Collaborative Norms

Venkatesh et al. (2003) define SOCIAL INFLUENCE as “the degree to which an individual perceives that important others believe he or she should use the new system”. Bock et al. (2005) refer to Yoo and Torrey (2002) who show that knowledge sharing behaviors are likely to be influenced by contextual forces such as social norms. However, social influence as such did not emerge as a relevant factor throughout the focus group sessions. Instead, organizational culture in terms of collaboration norms was mentioned multiple times. For example, one participant feared that when helping out a co-worker using microblogging superiors might ask: “*Why the hell are you working on her problem? We have this problem... what were you being here for?*”

Collaborative norms have been suggested to have a positive influence on both knowledge contribution and seeking (Orlikowski, 1993; Bock, Kankanhalli, and Sharma, 2006). We therefore modify the original UTAUT model and replace social influence with collaborative norm as a factor directly influencing individuals’ decision to participate in microblogging (or not):

*H7: COLLABORATIVE NORMS is positively related to INTENTION*

### Facilitating Conditions

Facilitating conditions is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh et al., 2003) and combines constructs such as perceived behavioral control and compatibility.

Throughout the focus group sessions the necessity of tight job and system integration has been emphasized: “*It would have to integrate tightly with the tools I am using. I do not want to have to go to another application to update Twitter*”. Therefore, given an operationalization that slightly deviates from Venkatesh et al. (2003) and puts more weight on the compatibility aspect (e.g. Moore and Benbasat, 1991), facilitating conditions is assumed to have a significant effect on behavioral intention..

*H8: FACILITATING CONDITIONS has a positive effect on INTENTION*

### CONCLUSION AND OUTLOOK

Compared to traditional objects of analysis in technology acceptance research (e.g. the adoption of word processing software or spreadsheets), the introduction of microblogging into the workspace presents particular challenges that arise from its collaborative nature. We started to investigate these challenges by conducting four focus groups with participants from



different cultural and technical backgrounds. Our findings indicate the importance of a number of related concepts, including reputation, expected relationships, expected codification effort, signal-to-noise ratio, and privacy concerns. Based on these findings, we argue for several modifications and extensions to the UTAUT model in order to account for the specific nature of microblogging adoption in an enterprise context. In particular, the introduction of privacy concerns as a relevant construct is seen as an important step. Even though our model is tailored to the specific needs of microblogging, we expect it to perform well in explaining social software adoption in general as similar issues arising from self-disclosure and social interaction are involved.

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