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Micro-Blogging Adoption in the Enterprise: An Empirical Analysis

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ABSTRACT

Given the increasing interest in using social software for company-internal communication and collaboration, this paper examines drivers and inhibitors of micro-blogging adoption at the workplace. While nearly one in two companies is currently planning to introduce social software, there is no empirically validated research on employees' adoption. In this paper, we build on previous focus group results and test our research model in an empirical study using Structural Equation Modeling. Based on our findings, we derive recommendations on how to foster adoption. We suggest that micro-blogging should be presented to employees as an efficient means of communication, personal brand building, and knowledge management. In order to particularly promote content contribution, privacy concerns should be eased by setting clear rules on who has access to postings and for how long they will be archived.

Keywords

Keywords: Micro-Blogging, Social Software, Adoption, Privacy, Enterprise 2.0, Twitter, Technology Acceptance

1. INTRODUCTION

More and more companies recognize the power of social software to improve communications and knowledge exchange within their organizations [6, 7]. Almost 50% of businesses are about to introduce social software [42]. Outside corporate infrastructures, user-generated activity streams have proven to be a highly efficient means for filtering, spreading, and allocating information [29]. In this context, micro-blogging is about to become "a standard feature in enterprise social software platforms" and "is earning its place alongside other channels, enabling new kinds of fast, witty, easy-to-assimilate exchanges" [16].

To date, there are no studies investigating return on investment in enterprise micro-blogging. However, discussions in the blogosphere [10, 13, 35, 36] as well as a few documented cases [13, 5, 24] indicate substantial business value. Indeed, micro-blogging is considered to be a light-weight means of enhancing communication and collaboration. By allowing people to share short messages and tag them with keywords, enterprise micro-blogging lets employees determine which information they receive based on who publishes it and what it is about. That way, users keep in touch with specific persons across geographical and functional dispersion and find colleagues who share interests or work on similar issues.

As opposed to email, phone and instant messaging, micro-blogging is non-intrusive as people voluntarily subscribe (and unsubscribe) to other people's feeds. This makes for the evolutionary nature of micro-blogging – which lets employees efficiently spread news or questions and at the same time discharge email and instant messaging traffic. Management can use micro-blogging to keep track of ongoing issues, decisions, solutions, and ideas at the grassroots level.

Recognizing the considerable potential of micro-blogging, more than a dozen vendors are attempting to tap into this market by offering systems that enable employees to micro-blog [19]. At the same time, large IT companies are exploring ways to add micro-blogging functionality to their product portfolio (e.g., SAP's ESME project, Oracle's OraTweet, IBM's BlueTwit).

Analogously to social software in the consumer space, the success of micro-blogging in the enterprise is expected to be user-driven. Indeed, micro-blogging implies social interaction and self-disclosure, as opposed to the use of conventional office software. As a result, bringing social software into the workspace taps into dimensions that go beyond traditional technology acceptance models. Whereas employee participation is essential for the success of micro-blogging in corporate environments, attempts to understand people's motivation to micro-blog has concentrated on the use of Twitter [e.g., 3, 22, 25, 31]. Micro-blogging adoption in the enterprise, on the other hand, has received little academic attention. This paper seeks to fill this gap. It provides an empirical analysis of factors determining an employee's decision to adopt micro-blogging at the workplace.

To this end, we proceed as follows: In the following section, we review related work. Then we derive the research model and test it using a dataset from an online survey with 100 participants. Here we use Structural Equation Modeling with Partial Least Squares (PLS). Finally, we conclude by discussing managerial implications for the introduction of an enterprise micro-blogging system.

2. RELATED WORK

Despite a growing body of research concerning the use of micro-blogging services like Twitter, there have only been a few attempts to investigate micro-blogging in a work environment. Ehrlich and Shami [11] conducted a content analysis and compare the messages of 34 employees posted publicly on Twitter to the ones they posted on an intra-firm micro-blogging platform. They found significant differences in individuals' use of the two systems. Employees used the company-internal system mostly to engage in "Q&A" and personal, directed interaction, whereas Twitter was mostly used to share information with a larger community.

Semi-structured interviews shed more light on the underlying motivation of employees to use micro-blogging. In particular, communication benefits such as the ability to share information in real-time and to be aware of what colleagues are working on were mentioned by the interviewees. At the same time, employees saw micro-blogging as a way to enhance their reputation.

Zhao and Rosson [44] interviewed 11 active Twitter users and built on theories on interpersonal communication and social psychology to explore potential benefits micro-blogging can bring to informal communication at work. Their results hint at relational benefits such as building common ground, managing people perceptions, and creating a sense of connectedness as well as personal benefits such as the acquisition of valuable information.

Similarly, Barnes et al. [3] used an interpretive approach to investigate the case of a firm's use of an in-house social software development that shows close similarities to micro-blogging. They found that employees regarded micro-blogging as a good information source and efficient tool to stay aware of activities in

the company. On the flipside, they found hints that employees have concerns regarding privacy aspects such as the monitoring of their work.

While these studies hint at use cases and benefits the subject of adoption has received no particular attention. Meanwhile, the results suggest a number of enabling factors as well as potential inhibitors, which are not considered in traditional technology acceptance theories such as the Technology Acceptance Model [e.g., 37], or the Unified Theory of Acceptance and Use of Technology (UTAUT) [38]. In this context, Günther et al. [18] present the results of four focus group sessions on the adoption of enterprise micro-blogging and argue for modifications and extensions of traditional technology acceptance theory. In the absence of empirically validated research on enterprise micro-blogging, we build on these recommendations and evaluate their respective relevance empirically.

3. RESEARCH MODEL

Venkatesh et al. [18] identify similarities among construct operationalizations in various technology acceptance theories and present an integrated model: the UTAUT. Günther et al.'s [18] model builds around the core constructs of UTAUT. In the following, we present refinements to the model which aim at providing a better understanding of the specific nature of micro-blogging adoption.

3.1 Dependent Variables

Following UTAUT, Günther et al. [18] use *Behavioural Intention* as a major dependent variable in their model. Investigating the case of micro-blogging adoption, Böhringer [5], however, finds that approximately one third of all users contribute less than one message per week. Meanwhile, these users do not necessarily reject the system: "On the contrary many say that they use the micro-blogging system quite often. However, they are mostly passive users and do not actively contribute to a great extent" [5, p. 7]. Yet, successful implementations of enterprise micro-blogging systems require a balance of active and passive users. Indeed, without continuous influx of fresh information the contents of the system will become obsolete – a dangerous development for platform sustainability. At the same time, consumption of the content is a primary goal of micro-blogging introduction in the first place. Both usage patterns – reading and contributing - imply adoption and they are not mutually exclusive. With this discussion in mind, we split the traditional *Behavioural Intention* construct into two independent constructs: *Intention to Contribute* and *Intention to Follow*.

Intention to Contribute (CTB) refers to an individual's intention to actively micro-blog. This implies posting messages to share information, contribute content, and respond to others.

Intention to Follow (FLW) refers to an individual's intention to use the system to retrieve information and read through colleagues' postings. In the following sections we seek to explain the dynamics behind individual micro-blogging adoption with respect to these two dependent variables.

3.2 Independent Variables

Venkatesh et al. [38, p. 447] define *Performance Expectancy* as "the degree to which an individual believes that using the system

would help him or her to attain gains in job performance.” The construct integrates similar concepts, such as perceived usefulness and relative advantage, from other technology acceptance theories. Within these theories the respective constructs related to *Performance Expectancy* are the strongest predictors of intention [38]. As for the use of micro-blogging at the workplace, some people derive utility from being able to conveniently reach people and share information, while others are motivated to use the system because they can access useful content. In the absence of a single *Behavioral Intention* construct, we therefore hypothesize that *Performance Expectancy* will have a significant positive influence on both *Intention to Contribute* (H1a) and *Intention to Follow* (H1b).

Reputation refers to “the degree to which use of an innovation is perceived to enhance one’s [...] status in one’s social system” [30, p. 195]. For an individual employee micro-blogging provides a means to make accomplishments and competences visible. For example, posting news related to some project can give an indication of one’s contributions as well as capabilities. From an individual viewpoint elevated status may contribute to self-assertion in interactions with colleagues and clients. In this context, *Reputation* “provides a general basis for greater productivity” [37, p. 189] and is therefore theorized to have significant positive influence on *Performance Expectancy* (H5a).

Expected Relationships refer to the degree to which one believes one can build or improve mutual relationships through the use of a micro-blogging system. By sharing information on both work-related issues as well as personal interests, micro-blogging allows users to learn about colleagues and lets them get in touch in an unobtrusive manner. Given findings that the scope of one’s network within a company correlates with one’s productivity [41] *Expected Relationships* is hypothesized to have a significant positive influence on *Performance Expectancy* (H5b).

Communication Benefits refer to improved information flow, i.e. easier and quicker information exchange throughout the organization. Related categories were mentioned 62 times throughout Günther et al.’s [18] focus group sessions and turned out to be the most relevant construct. Being able to keep track on issues within the organization as well as being able to quickly spread information may support task accomplishment and increase one’s productivity. Consequently, *Communication Benefits* is hypothesized to have a significant positive influence on *Performance Expectancy* (H5c).

On the other hand, micro-blogging adds another channel to a multitude of communication channels already in place. Put into perspective to other means of communication, character-limited micro-blogging messages may replace interruptive phone calls and extensive emails. That way, looking at all communication means at an employee’s disposal, micro-blogging could reduce the overall amount of information one has to cope with. However, perhaps with trivial Twitter-postings in mind [28], Günther et al.’s [18] focus group participants attributed micro-blogging a low *Signal-to-Noise Ratio* and expressed fear that useful content would be rare. Therefore, for the purpose of our study *Signal-to-Noise Ratio* refers to the possible negatively shaded perception that using micro-blogging would lead to more incoming information one has to cope with. Negative effects of interruptions and the role of attention economics on overall performance have been shown by Gonzalez and Mark [17]. As a result, it is

hypothesized that *Signal-to-Noise Ratio* will have a significant negative influence on *Performance Expectancy* (H5d).

Günther et al.’s [18] focus group results further suggest individuals’ *Privacy Concerns* to be an important inhibitor for usage intention. The introduction of this construct into technology acceptance research is innovative. Indeed, as each posting is linked to its author colleagues could draw conclusions on someone’s work or private life. Further, superiors could track postings in order to monitor someone’s work. In any event, *Privacy Concerns* derive from self-disclosure and can therefore be theorized to have a significant negative influence on *Intention to Contribute* (H2a) but no significant influence on *Intention to Follow* (H2b).

Günther et al. [18] integrate *Codification Effort* as another antecedent of the *Performance Expectancy*. This construct is, however, omitted from our study for the sake of brevity and due to its close resemblance to *Effort Expectancy*.

Effort Expectancy “is the degree of ease associated with the use of the system” [38, p. 450] as well as related constructs within other models were found to be significant only at the earliest point of time of measurement and became nonsignificant as experience increased [38]. The functionality of micro-blogging systems is very limited as there are just two things one can do: write very short messages and access others’ messages in various ways. Due to the simplicity of micro-blogging systems we expect efforts associated with learning and operating the system to not be a significant factor in an employee’s adoption decision. Consequently, we theorize *Effort Expectancy* to significantly influence neither *Intention to Contribute* (H3a), nor *Intention to Follow* (H3b).

According to Günther et al.’s [18] focus group results, *Organizational Culture* is an important determinant of an employee’s decision to use micro-blogging. If there is a certain degree of consensus to collaborate in an organization, i.e. *Collaborative Norms* [4] one is more likely to use a micro-blogging system to seek information as well as to provide content. Consequently, we theorize *Collaborative Norms* to have significant positive influence on both *Intention to Contribute* (H4a) and *Intention to Follow* (H4b).

Venkatesh et al. [38] show that the influence of *Facilitating Conditions* on *Behavioral Intention* becomes nonsignificant when both *Performance Expectancy* and *Effort Expectancy* are included in the model. Therefore, we exclude the construct from our considerations on determinants of *Intention to Contribute* and *Intention to Follow*.

To provide a better overview, all hypotheses formulated above are summarized in Table 1.

Table 1: Overview Hypotheses

No.	Hypothesis
H1a	Performance Expectancy will have a significant positive effect on <i>Intention to Contribute</i> .
H1b	Performance Expectancy will have a significant positive effect on <i>Intention to Follow</i> .
H2a	Privacy Concerns will have a significant negative effect on <i>Intention to Contribute</i> .

H2b	Privacy Concerns will not have a significant effect on Intention to Follow..
H3a	Effort Expectancy will not have a significant effect on Intention to Contribute.
H3b	Effort Expectancy will not have a significant effect on Intention to Follow
H4a	Collaborative Norms will have a significant positive effect on Intention to Contribute.
H4b	Collaborative Norms will have a significant positive effect on Intention to Follow.
H5a	Reputation will have a significant positive effect on Performance Expectancy.
H5b	Expected Relationships will have a significant positive effect on Performance Expectancy.
H5c	Communication Benefits will have a significant positive effect on Performance Expectancy.
H5d	Signal-to-Noise Ratio will have a significant negative effect on Performance Expectancy.

4. EMPIRICAL STUDY

4.1 Survey Design and Sampling

As of today, established micro-blogging implementations at enterprises are still rare. Therefore, we followed the approach of Zhao & Rosson [44] and conducted a survey among users of Twitter. Before proceeding to the survey questions, participants were asked to imagine that a Twitter-like system was introduced in their place of employment. All subsequent questions related to this hypothetical situation.

Invitations to participate in the online survey were spread through various News Groups and Twitter accounts. Also, people were asked to “re-tweet” the invite so that the survey link could spread across social networks. Each participant had a 50% chance to get a 5 Euro Amazon.com gift certificate.

The responses were collected in August 2009. The overall gross sample consisted of 100 participants. After deleting unusable data sets, a final net sample of 82 observations was obtained. The respondents were between 19 and 65 years old with an average of 32 years. Men were overrepresented with 72%. 46% of the respondents worked for companies with less than 500 employees 31% were employed by companies with more than 500 employees, 23% did not provide information about their company size.

As familiarity with Twitter was a precondition for participation in the study, we expect our respondents to have above average open-mindedness toward social software, at least in the private domain – a possible limitation of our study.

4.2 Development of Measurement Scales

All constructs in the study involved multiple items as reflected in Table 2. Content validity of the constructs was ensured by relying on pre-tested scales where possible. In order to maintain content validity of the adopted and self-developed scales, experts in the field of social software as well as ordinary users were asked to verify them. Additionally, during the pre-test phase, unclear items with low inter-item correlation coefficients were removed. All items were anchored on a seven-point Likert scale.

Table 2: Overview Items

Construct	Items (source)
Intention to Follow, FLW	<ol style="list-style-type: none"> 1. I would keep myself updated through the system. 2. I would read through the messages of others. 3. I would check out the postings of others. (self-developed)
Intention to Contribute, CTB	<ol style="list-style-type: none"> 1. I would use the system to share snippets of information. 2. I would use the system to contribute. 3. I would take an active part in discussions on the system. 4. I would provide content on the system. (self-developed)
Performance Expectancy, PE	<ol style="list-style-type: none"> 1. I would find the system useful in my job. 2. Using the system would enable me to accomplish tasks more quickly. 3. Using the system would increase my productivity. (Based on: [38])
Signal-to-Noise Ratio, SN	<p>Looking at all communication means at my disposal (e.g. email, phone, instant messaging), if I used the system...</p> <ol style="list-style-type: none"> 1. I would have to cope with more useless information. 2. I would receive more irrelevant messages. 3. I would spend more time on handling incoming information. 4. I would be confronted with higher amounts of unnecessary information. (self-developed)
Communication Benefits, CBE	<p>If I used the system...</p> <ol style="list-style-type: none"> 1. I could keep myself better informed about issues within my organization. 2. I would be more aware about what is going on within my organization. 3. I could communicate more quickly with my colleagues. 4. I could exchange knowledge more quickly. (self-developed)
Expected Relationships, ER	<p>Using the system...</p> <ol style="list-style-type: none"> 1. would strengthen the ties between other employees and me. 2. would establish new contacts with other employees in my organization. 3. would help to create stronger relationships with other employees in the organization. 4. would expand the scope of my association with other employees in the organization. (Based on: [23])
Effort Expectancy, EE	<p>My interaction with the system would be clear and understandable.</p> <ol style="list-style-type: none"> 1. It would be easy for me to skillfully use the system. 2. I would find the system easy to use. 3. Learning to operate the system would be easy for me. (Based on: [38])
Reputation, RE	<p>If I used the system...</p>

	<ol style="list-style-type: none"> 1. I would make my accomplishments more visible to others.a 2. I would improve my status among my colleagues. 3. my specific competences would be more visible to others. 4. I would gain more recognition in my organization. <p>(Based on: [30, 39])</p>
Privacy Concerns, PV	<p>If I used the system, someone in my organization...</p> <ol style="list-style-type: none"> 1. may be able to learn more about my private life than I am comfortable with. 2. may be able to deduce some information that I consider private. 3. may be able to learn something about me which will invade my privacy. <p>(Based on: [43])</p>
Collaborative Norms, CN	<ol style="list-style-type: none"> 1. Cooperation is encouraged in my organization. 2. Collaboration is considered important in my organization. 3. Knowledge sharing is considered important in my organization. 4. Knowledge sharing is encouraged and frequent in my organization. <p>(Based on: [12, 27])</p>

4.3 Research Methodology

Structural Equation Models (SEMs) may be estimated based on the analysis of either the covariance structure [26] or the variance structure [40]. Both approaches are suitable to empirically evaluate the relations among latent variables. However, the conceptual and methodological differences make the latter approach, i.e. PLS, most suitable for the purposes of our study. First of all, the sample size of 82 meets PLS's requirements of having at least 10 times the number of observations as there are exogenous constructs influencing the most complex endogenous construct [2]. Consequently, we expect the results not to be affected by sample size limitations. Secondly, in the absence of theory on the adoption of social software at the workplace our research is of rather exploratory nature than of a confirmatory one. This makes the case for the variance-based PLS approach which is generally preferred for theory building and prediction and requires fewer statistical assumptions [14].

All calculations were carried out using SmartPLS 2.0 [34], a statistical package developed for the estimation of SEMs using the PLS approach.

4.4 Model Evaluation

We follow Chin [8] and Ringle [33] and analyze the measurement model and the structural model separately in order to evaluate the overall quality of the model.

4.4.1 Evaluation of the Measurement Model

In order to examine the measurement model, Convergent Validity and Discriminant Validity were assessed. In line with Bagozzi and Philips [1, p. 468] "convergent validity is the degree to which two

or more attempts to measure the same concept are in agreement". Convergent validity was ensured via three criteria: (1) Indicator Reliability, (2) Composite Reliability (CR), and (3) Average Variance Extracted (AVE).

In our model, Indicator Reliability is assured as all indicators have loadings higher than 0.8 [21]. For Composite Reliability, all values by far exceed the minimum required threshold of 0.6 [20, 33]. Further, all latent variables had AVEs of well over a recommended threshold of 0.5 [15]. Finally, Internal Consistency was evaluated by calculating Cronbach's Alpha (CA). For all latent variables, Cronbach's Alpha is above 0.7 confirming Internal Consistency [32]. Taken together, Convergent Validity can be assumed as summarized in Table 3.

To ensure Discriminant Validity square root AVE values for each latent variable must exceed the correlation between the respective and all other latent variables of the model [15]. This requirement is met for all latent variables as shown in Table 4. Hence, Discriminant Validity can be assumed.

Table 3: Quality Criteria of the Constructs

Construct	Indicators	AVE	CR	CA
CBE	4	0,685	0,897	0,847
CN	4	0,762	0,927	0,921
CTB	4	0,824	0,949	0,929
EE	4	0,877	0,955	0,932
ER	4	0,847	0,957	0,940
FLW	3	0,768	0,908	0,847
PE	3	0,828	0,935	0,896
PV	3	0,961	0,987	0,980
RE	4	0,853	0,959	0,943
SN	4	0,820	0,948	0,926

Table 4: Latent Variable Correlation, Respective Square Roots of AVE in *bold italic*

	CBE	PE	CN	CTB	EE
CBE	<i>0,827</i>				
PE	0,765	<i>0,910</i>			
CN	0,079	0,137	<i>0,873</i>		
CTB	0,593	0,515	0,133	<i>0,908</i>	
EE	-0,010	0,029	0,305	0,132	<i>0,936</i>
ER	0,612	0,571	-0,183	0,267	-0,155
FLW	0,634	0,697	0,132	0,488	-0,018
PV	-0,110	-0,035	0,097	-0,306	-0,090
RE	0,600	0,595	0,102	0,561	0,186
SN	-0,286	-0,337	0,061	-0,131	0,063
	ER	FLW	PV	RE	SN
ER	<i>0,920</i>				
FLW	0,534	<i>0,876</i>			
PV	-0,173	-0,100	<i>0,980</i>		
RE	0,528	0,522	0,006	<i>0,923</i>	
SN	-0,290	-0,267	0,347	-0,041	<i>0,906</i>

4.4.2 Evaluation of the Structural Model

The R² measure describes how much of the respective endogenous variable's variance is explained by the model's exogenous

variables. A good R² value should be above 40% [33]. Given the explorative nature of our research 50% for *Intention to Follow* is good, a value of 36% for *Intention to Contribute* is acceptable. The proposed decomposition of the *Performance Expectancy* construct explains 64% of its variance.

In the next step, path coefficients and their significance levels were evaluated on the basis of bootstrapping results as summarized in Table 5 and Figure 1.

We find that *Communication Benefits*, *Reputation*, and *Signal-to-Noise Ratio* are significant determinants of *Performance Expectancy*. Furthermore, *Communication Benefits* have a stronger influence on *Performance Expectancy* than *Reputation* and *Signal-to-Noise Ratio* (the comparison of the relative strength of the path coefficients has rendered t-values exceeding the benchmark of 1.96). the *Expected Relationships* construct, however, has no significant impact on *Performance Expectancy*.

Both *Privacy* and *Performance Expectancy* are significant determinants of *Intention to Contribute*. Comparison of the absolute values of path coefficients (disregarding the sign of the effect) reveals no significant difference in the strength of their impact on *Intention to Contribute* (t-value=1.54). Further, *Performance Expectancy* has a significant effect on *Intention to Follow*.

Interestingly, *Collaborative Norms* and *Effort Expectancy* have no significant effect at all, neither on *Intention to Contribute*, nor on *Intention to Follow*.

Table 5: Path Coefficients. Significance Levels, Hypothesis Evaluation

Dep. Var.	Ind. Var.	Path Coeff.	Hypothesis
CTB	CN	0,072	H4a: rej.
CTB	EE	0,070	H3a: supp.
CTB	PE	0,493**	H1a: supp.
CTB	PV	-0,290**	H2a: supp.
FLW	CN	0,067	H4b: rej.
FLW	EE	-0,066	H3b: supp.
FLW	PE	0,686**	H1b: supp.
FLW	PV	-0,089	H2b: supp.
PE	CBE	0,540**	H5c: supp.
PE	ER	0,078	H5b: rej.
PE	RE	0,224*	H5a: supp.
PE	SN	-0,151*	H5d: supp.
*significant at 5% level, **significant at 1% level			

4.4.3 Ad hoc Analysis of Direct Effects

Even though our model is strongly based on theory, the presence of direct effects from antecedents of *Performance Expectancy* to *Intention to Contribute* and *Follow* cannot be excluded. In order to check for this possibility, ad hoc analysis of direct effects has been conducted. To limit other influences, only one path was checked at a time. Results of our evaluations are presented in Table 6. We find that desire to gain *Reputation* as well as expectations regarding *Communication Benefits* will also directly motivate users to *Follow* and *Contribute*. Furthermore, *Expected Relationships* will positively influence users' *Intention to Follow*.

Table 6: Path Coefficients for Direct Effects

Dep. Var.	CTB	FLW
RE	0,408**	0,201*
CBE	0,444**	0,244*
SN	0,171	0,059
ER	-0,071	0,224*
*sign. at 5% level, **sign.at 1% level		

Implications of our findings are discussed in the following sections.

5. DISCUSSION AND IMPLICATIONS

5.1 Theory Implications

Much more than conventional office software, social software, and in particular micro-blogging, support social interaction and imply self-disclosure. As a result, bringing applications like micro-blogging into the workspace goes beyond traditional technology acceptance theory. Against this background, the aim of this study was to extend the classical technology acceptance research in order to help companies in integrating social software products in employees' daily routines. Results of our study have significant implications for theory.

First, a number of new constructs were introduced and empirically tested. The results show that *Communication Benefits*, *Reputation*, and *Signal-to-Noise Ratio* are reliable and valid constructs that are significant in predicting the formation of employees' *Performance Expectancy* (R² amounts to 64%). This deepens the understanding of the rather abstract concept of *Performance Expectancy* in the domain of social software adoption. Additionally, ad hoc analysis of direct effects has shown that *Reputation* and *Communication Benefits* have a direct impact on employee's intention to adopt micro-blogging, expressed in both *Intention to Follow* and *Intention to Contribute*. Further, even though *Expected Relationships* do not influence *Performance Expectancy*, we find them to have a direct impact on the *Intention to Follow*.

Further, we introduce *Privacy Concerns* construct into technology acceptance theory and show that the construct is a significant determinant of an employee's decision to contribute content. It turns out that there is no significant difference in the strength of its impact compared to the *Performance Expectancy* construct which is at the core of traditional technology acceptance models [e.g., 38]. This indicates the necessity to include *Privacy Concerns* into technology acceptance theory when social applications are explored in the work context.

Finally, our results show that when investigating acceptance of a system that provides a platform for both content contribution and content consumption, adoption becomes a two-dimensional variable, with distinct dynamics behind its formation. For example, *Privacy Concerns* determine employees' intention to contribute content, but do not exert a significant effect on their intention to follow others' contributions.

Overall, considering that our model was built by closely following existing theory, the presence of significant direct effects identified in our ad hoc analysis is interesting. On a more general level, this

result calls for more theory-building efforts in the area of social software adoption.

5.2 Managerial Implications

In our study, we distinguish between adoption in terms of following posts from colleagues and adoption in terms of writing messages. We find that that an employee's perception whether micro-blogging would "help him or her to attain gains in job performance" [38, p. 447] has a strong positive influence on adoption in terms of both contributing and following. Given the key role of *Performance Expectancy* construct, also in other technology acceptance models, it is important to understand which factors are crucial for its formation. Our results allow us to derive practical recommendations on how to foster adoption:

5.2.1 Communication Benefits

We find that expected *Communication Benefits* of micro-blogging constitutes the most crucial component in employees' formation of *Performance Expectancy*. In addition, desire to contribute and follow may be motivated as shown in our ad hoc analysis. Therefore, micro-blogging's usefulness should be promoted by presenting its advantages to employees. Examples of these communication benefits are the fast spreading of relevant messages, the social filtering which increases the signal-to-noise ratio, the ease of using micro-blogging when compared with other social media channels, and the implicit collective assignment of relevance to messages by the mechanism of "re-tweeting" them.

5.2.2 Signal-to-Noise Ratio

Concerns that micro-blogging would lead to information overload (i.e. worsening of *Signal-to-Noise Ratio*) have a significant negative impact on *Performance Expectancy*. It is imperative to ease these objections in order to foster adoption. Management should promote the use of filtering tools as well as help clarify the potential misunderstanding that employees must follow every posting—this is not true and consequently, utilizing a micro-blogging service promises to require less attention than using email, in comparison. Given that employees can attune their use in reaction to how much they get out of the service, much of the fear of a low *Signal-to-Noise Ratio* is unfounded. Therefore, the "natural selection" mechanism of following and un-following other users should be illustrated carefully upon the introduction of the system: users choose freely whose messages they follow. That way, users can fine-tune information inflow while users who are excessively posting irrelevant information will shortly have no followers.

At the same time, public recommendations on how to use the micro-blogging system could reduce concerns that colleagues could excessively post irrelevant messages.

5.2.3 Reputation

Our results show that an individual employee's possibility to increase his/her status in an organization by posting messages has a significant positive influence on his/her *Performance Expectancy*. In addition, direct effects on the Intention to

Contribute and Follow have been confirmed. However, while this is a driver for individuals to adopt micro-blogging, it may be an inhibitor on an organizational level as executives may fear increased transparency. The introduction of micro-blogging in the enterprise thus becomes a political issue. This is also true for other "Enterprise 2.0" technologies that affect hierarchies and power structures.

The introduction of internal micro-blogging should be viewed as a move towards increased transparency of communication, not only top-down, but across the organization. Top management needs to lead the way, as micro-blogging is no panacea to turn a secretive organization into a transparent Enterprise 2.0 firm.

Management needs to understand (and act accordingly) that micro-blogging can lay open the role of important communication hubs in organizations—people who spend time on connecting other people but are usually not recognized (nor rewarded) for such activity. Being able to make such contributions visible provides another incentive for employees to adopt micro-blogging.

5.2.4 Expected Relationships

Ad hoc analysis reveals that expectations that one can build or improve mutual relationships through the use of a micro-blogging system will motivate users to follow each other's contributions. Research shows that whom people know is highly correlated with what they come to know [9]. Hence, opportunities to maintain and extend one's network should be communicated as a key benefit of the system.

5.2.5 Privacy Concerns

Concerns that colleagues and superiors could deduce private information from one's postings turned out to be a significant inhibitor for people to actively use micro-blogging on the job. Giving employees control on who can access their postings and for how long they will be archived could mitigate these concerns. More over, helping users better understand how to use a tool like micro-blogging should help them overcome fears of unintentionally misbehaving and harming themselves.

Yet, *Intention to Follow* colleagues' messages turned out to not be significantly affected by *Privacy Concerns*.

5.2.6 Collaborative Norms

A common understanding to share knowledge and collaborate in an organization (i.e. *Collaborative Norms*) does neither significantly facilitate *Intention to Contribute* nor *Intention to Follow*. While this result seems surprising, it shows that enterprises with a rather competitive organizational climate are not excluded from implementing micro-blogging successfully.

5.2.7 Effort Expectancy

The nonsignificance of *Effort Expectancy* confirms our hypothesis that the use of an application as simple as micro-blogging is not inhibited by efforts related to operating or learning the system.

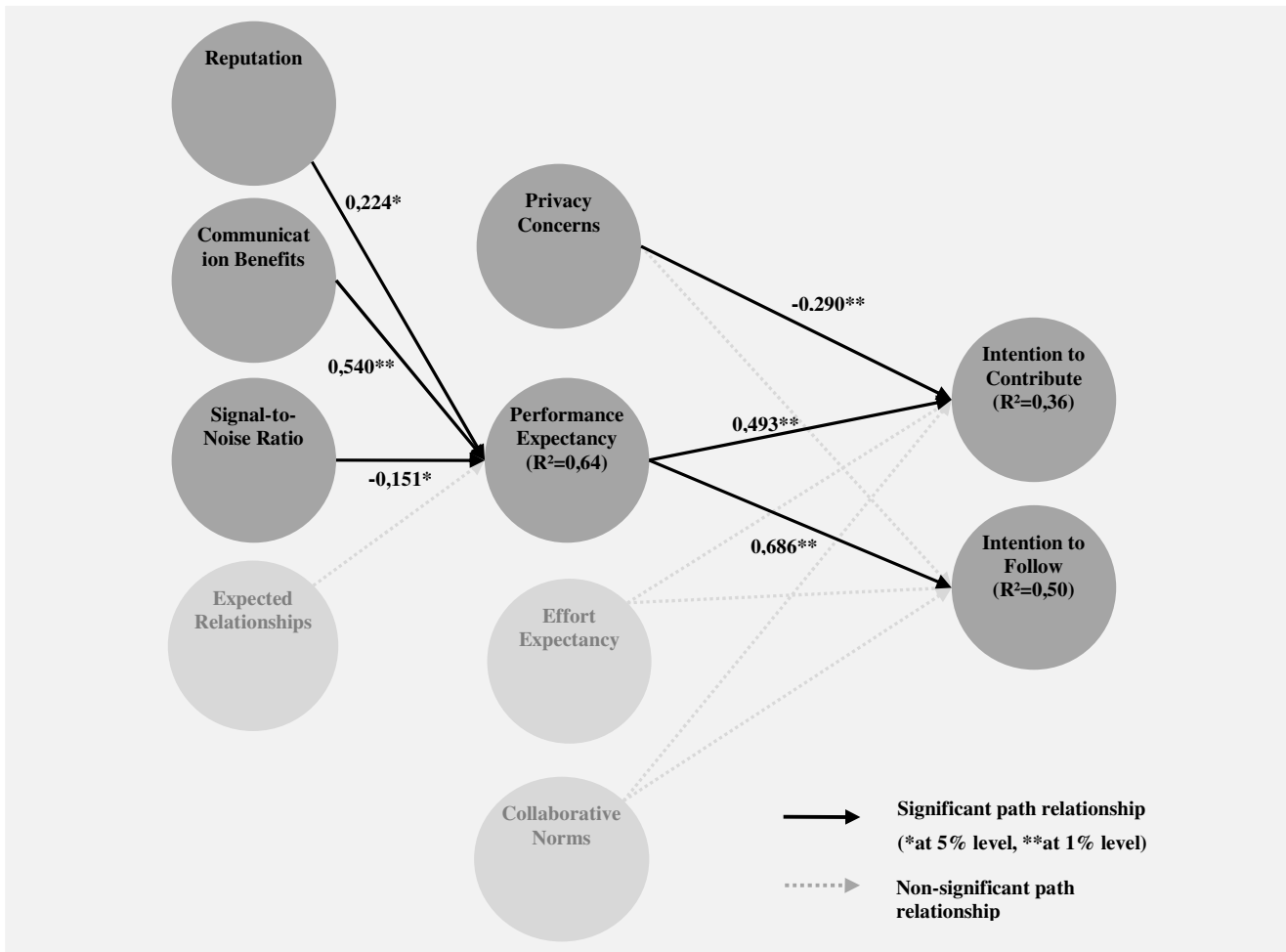


Figure 1: Results, Path Coefficients

6. CONCLUSION

A successful implementation strategy needs to point out the utility of micro-blogging. We suggest to position the system as an efficient means for communication, personal brand building, and knowledge management. While users can be won over by advertising improved communications and personal brand building, management may be more interested in the knowledge management aspects of the application.

In order to particularly facilitate contributions, and thereby content generation, privacy concerns should be eased by setting up clear rules on who has access to one's postings and for how long they will be archived.

In contrast to conventional office software, micro-blogging implies social interaction and self-disclosure. This applies to social software in general. As a result, bringing applications like micro-blogging into the workspace goes beyond traditional technology acceptance theory. Our findings show that technology

acceptance models need to be adjusted in order to account for this new paradigm.

Meanwhile, the results underline the need to limit employees' exposure to information input and indicate the growing importance of personal brand building and privacy issues in today's enterprises.

While recruiting participants from Twitter allowed us to investigate employees from a variety of company backgrounds, our future research will further test the model presented here in real enterprise settings. It will also take other micro-blogging paradigms into account.

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