INITIAL AND CONTINUED KNOWLEDGE CONTRIBUTION ON ENTERPRISE SOCIAL MEDIA PLATFORMS

Research in Progress

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Abstract

In recent years, social media has entered enterprises as a tool for internal communication, collaboration, and knowledge management. However, it has been reported that knowledge contribution rates are low which raises questions on the reasons for it and how to improve the situation. To address these questions, we take a deep look into the individual knowledge contribution process using an integrative model that explains the initial formation of the intention to contribute knowledge and the continued knowledge contribution. Towards this goal, we apply the theory of reasoned action, the social exchange theory, and the belief-adjustment model. In this research in progress, we present our research model and a test covering the first part of the model: the formation of the intention to contribute knowledge. The results suggest that social exchange theory and theory of reasoned action are well suited to explain this phenomenon and that they build a good basis for the second part of the longitudinal study.

Keywords: Knowledge sharing, Enterprise social media, Social exchange theory, Belief-adjustment model.

1 Introduction

About one decade ago, social media started to make the leap from the private realm to use within companies where they become enterprise social media (ESM). ESM include tools such as blogs, social networks, or wikis. They allow employees to communicate with other organization members, to identify particular co-workers, and to jointly create and edit content (Leonardi et al., 2013). This way, ESM offer new, open, and inexpensive alternatives to traditional knowledge management (KM) systems (von Krogh, 2012). Actionable knowledge mainly results from collaboration. ESM provide an appropriate infrastructure to capture the created knowledge and share it with co-workers (Avram, 2006). Although the tools are suitable for various aspects of KM, knowledge contribution on ESM platforms is still very low (e.g., Ebner et al., 2008). This observation and the forecast that 80% of all social business efforts will miss their objectives until 2015 (Gartner, 2013) raise the question about the underlying reasons.

To answer this question in sufficient depth, we focus on the first phase of KM as defined by Alavi and Leidner (2001): knowledge creation. Efficient knowledge creation and the further three main processes storage/retrieval, transfer, and knowledge application are the key objects of KM and should be supported by corresponding systems. Extant research on knowledge sharing will serve as a starting point to identify the determinants of knowledge contribution on ESM platforms while research on IS continuance can help to identify factors fostering or preventing continued contribution (as reviewed in section 2).

Even though traditional KM systems and ESM are mostly used for the same purpose in KM, it is often overlooked that KM has to consider new ways of knowledge collaboration when changing from traditional KM systems (centralized, controlled) to ESM (less-structured, mostly voluntary, emergent uses)

(cf. von Krogh, 2012). While technology acceptance research (e.g., utilizing the technology acceptance model) addresses the changes caused by new technical characteristics, we emphasize the deviating individual motivations behind knowledge creation and sharing in the new environment. Therefore, a context specific and integrative analysis is necessary to get a comprehensive insight into the knowledge contribution process of employees on an ESM platform. The objectives of this study are (1) to identify (de)motivating cost and benefit factors influencing the initial decision to share knowledge via an ESM platform and (2) to examine how training and actual usage affect continued knowledge sharing.

The paper is organized in six sections. The next section gives a brief review of relevant literature on KM using ESM, knowledge sharing, and IS continuance to determine possible research gaps. Then, we develop the research hypotheses and present the research model. In the next following two sections, we describe the research method and present results from our first survey representing the first phase of the research model. Finally, we discuss the results and conclude with a brief summary on limitations and contributions of this research.

2 Previous research

A growing body of research examines the use of ESM in KM by focusing on specific tools such as blogs or wikis (e.g., Raeth and Smolnik, 2010; Wagner, 2004) or processes such as knowledge adoption (e.g., Alpar et al., 2015; Engler, 2014). Additionally, various factors influencing knowledge sharing in ESM have been studied in recent literature: gender (Chai et al., 2011), trust (Chai and Kim, 2010), organizational climate (Kügler et al., 2015), and social capital (Chiu et al., 2006). However, an empirically tested theoretical foundation of cost and benefit factors of knowledge contribution in ESM and knowledge contribution over time has not been presented yet. Two streams of research can build the basis to address this gap: research on knowledge sharing/contribution and research on information systems continuance.

Predictors of knowledge contribution have been extensively researched. The most influential papers chose different approaches to explain this phenomenon. Bock et al. (2005) employ the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975) as a theoretical framework and focus on extrinsic motivators, social-psychological factors, and organizational climate. Kankanhalli et al. (2005) look at the topic through the theoretical lens of the social exchange theory (SET). They theorize that perceived intrinsic/extrinsic benefits and costs trigger the use of electronic knowledge repositories. This influence is moderated by contextual factors. Wasko and Faraj (2005) emphasize the social capital perspective of knowledge contribution and model inter alia structural, cognitive, and relational capital to determine the amount of contributed knowledge.

Information systems (IS) continuance research is dominated by the expectation confirmation theory (Bhattacherjee, 2001). The theory posits that IS continuance is a function of the expected performance before and the experience after actual use. A longitudinal approach is presented by Kim and Malhotra (2005) in which they use constructs from technology acceptance research. The results of their empirical test conformed with their assumptions about the change of these variables over time based on the belief-adjustment model developed by Hogarth and Einhorn (1992). He and Wei (2009) combine these two research streams to examine continued knowledge seeking and contribution and emphasize the difference between the predictors of seeking and contributing knowledge.

3 Research model and hypotheses development

To explain the initial formation of the intention to contribute knowledge and the potential changes over time caused by actual contribution and training, we combine TRA (Fishbein and Ajzen, 1975), SET (Thibaut and Kelley, 1959), and the belief-adjustment model (Hogarth and Einhorn, 1992). The resulting research model is presented in figure 1.

TRA builds the central element of the research model. Fishbein and Ajzen's (1975) theory suggests that a behavioral intention is formed by an individual's attitude and subjective norms. Attitude is defined as beliefs about the perceived consequences of performing a behavior and the expected outcomes of these

consequences. Subjective norms represent the influences of the social environment on the thoughts and behavioral intentions of an individual. Behavioral intention then results in actual behavior.

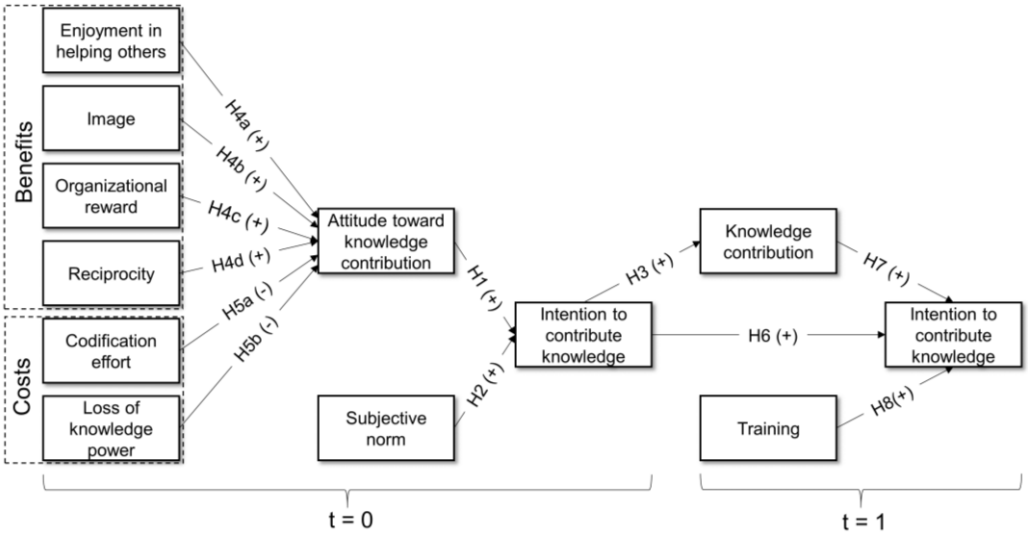

Figure 1. Research model.

The application of TRA in this research context provides the explanation why individuals are more likely to have a positive intention to contribute their knowledge to the ESM community if they have a favorable attitude toward knowledge contribution: they think that the consequences and outcomes can help to fulfill the initially planned objectives (e.g., improvement of their image in the community or reciprocal knowledge contribution). This works in the opposite direction, too. An employee is less likely to have a strong intention to contribute knowledge if s/he has an inherently negative attitude toward knowledge contribution. Since employees, especially in an ESM community, do not work isolated from each other, social interaction plays an important role in the context of knowledge sharing (Avram, 2006). The influence of the social environment can work through the mechanisms of compliance, identification, internalization, or any combination of these (Kelman, 1961). Thus, an employee who either complies with the company's rules, identifies with the company's values, or internalizes norms in favor of knowledge-sharing is more likely to develop a positive intention to contribute knowledge. In summary, we hypothesize:

Hypothesis H1: The more favorable the *attitude toward knowledge contribution* (ATT) is, the greater is the *intention to contribute knowledge* (INT) in t = 0.

Hypothesis H2: The greater the individual's subjective norm (SUB) to contribute knowledge is, the greater is the *intention to contribute knowledge* in t = 0.

In case the intention to contribute knowledge is strong, the actual knowledge contribution will also be strong. Since we measure the intention at pre-implementation time (t = 0), the actual knowledge contribution can only be measured at t = 1.

Hypothesis H3: The greater the *intention to contribute knowledge* in t = 0 is, the greater is the actual *knowledge contribution in* t = 1.

Previous research has established an economic view of knowledge sharing by considering knowledge sharing as a function of benefits and costs (Cohen and Prusak, 2001; Nahapiet and Ghoshal, 1998). This follows the logic of the SET developed by Thibaut and Kelley (1959). Kankanhalli et al. (2005) seize this idea and model the benefit factors *enjoyment in helping others*, *image*, *organizational reward*, and *reciprocity* and the cost factors *codification effort* and *loss of knowledge power* which influence the usage of electronic knowledge repositories. The definitions of the aforementioned constructs can be found in table 1.

	Construct	Definition
Benefits	Enjoyment in helping others (ENJ)	Intrinsic enjoyment felt to help others (similar to altruism).
	Image (IMA)	Reputation gained from the public demonstration of the ownership of knowledge.
	Organizational reward (ORG)	Expected rewards from the organization such as bonus payments, new job opportunities, job security.
	Reciprocity (REC)	Anticipated future help from community members because of knowledge contributions in the past.
Costs	Codification effort (COD)	Time/effort spent to codify knowledge to fit into the system.
	Loss of knowledge power (LOS)	Fear of knowledge contributors to retain less proprietary knowledge to justify a certain organizational power position.

Table 1. Construct definitions, adapted from Kankanhalli et al. (2005).

We adopt this perspective since the social exchange is especially important for knowledge sharing on ESM (as described above). However, we argue that these factors do not directly influence intention or actual behavior. They rather influence intention indirectly as predictors of *attitude toward knowledge contribution* since they represent the belief about the perceived consequences of contributing knowledge which is in turn the core concept of attitude in TRA. Therefore, we hypothesize:

Hypothesis H4: The greater the expected benefits of knowledge contribution (*enjoyment in helping others (a), image (b), organizational reward (c)*, and *reciprocity (d)*) are, the more positive is the *attitude toward knowledge contribution.*

Hypothesis H5: The lower the expected costs of knowledge contribution (*codification effort (a)* and *loss of knowledge power (b)*) are, the more positive is the *attitude toward knowledge contribution.*

The belief-adjustment model (Hogarth and Einhorn, 1992) provides the theoretical background to explain potential changes over time with regard to the *intention to contribute knowledge*. The main statement of the model is that people do not react directly to new stimuli but rather (partially) adjust their prior knowledge on the specific topic to the stimuli. In this scenario, prior knowledge serves as an anchor and new stimuli as adjustments. The model was firstly applied to the IS context by Kim and Malhotra (2005) who explain continued information systems use. They theorize (and provide empirical evidence) that user evaluations follow the same process.

Here, the *initial intention to contribute knowledge* (t = 0) serves as the anchor, and the *intention to contribute knowledge* in t = 1 represents the adjustment.

Hypothesis H6: The stronger the *intention to contribute knowledge* is in t = 0, the stronger is the *intention to contribute knowledge* in t = 1.

Actual *knowledge contribution* is the first stimulus adjusting the *intention to contribute knowledge* over time. Employees who contribute knowledge to the platform learn incrementally how to do it more efficiently and gain experience. This in turn will ease the process of codifying knowledge and lead to a higher perceived usefulness of the system and as a result to a stronger intention to continue contributing knowledge (cf. Bajaj and Nidumolu, 1998). Therefore, we hypothesize:

Hypothesis H7: The greater the actual k*nowledge contribution* is, the greater is the *intention to contribute knowledge* in t = 1.

The uses of ESM platforms should be emergent (McAfee, 2006). However, previous research suggests that employees may not recognize the full potential of newly implemented ESM immediately (Raman, 2006) or they may be overwhelmed by the functionality which results in a reluctance toward the technology (Turban et al., 2011). Therefore, a passive roll-out strategy of ESM without any top-down support may lead to failure (McAfee, 2009). Facilitating conditions, such as the provision of training, can help to overcome these issues (Venkatesh et al., 2003) and increase the *intention to contribute*. The

company where the research took place had a similar experience with the roll-out of the platform in other areas of the company. Thus, training acts as the second stimulus in our research model.

Hypothesis H8: Training has a positive effect on the *intention to contribute knowledge* in t = 1.

4 Research method and data analysis

4.1 Measurement and data collection

To operationalize the theoretical constructs, we adopted scales that were proven to be reliable and valid in extant literature. This and the feedback loop with experts from the company enabled us to ensure content validity. The scales for *codification effort, enjoyment in helping others, image, loss of knowledge power, organizational reward*, and *reciprocity* are drawn from Kankanhalli et al. (2005). We replaced "electronic knowledge repository" with the actual name of the ESM community to improve content validity. The items for *attitude toward knowledge contribution* stem from Bock et al. (2005). *Subjective norm* is measured using a second order construct (formative/reflective first order and formative second order). The first order constructs of *subjective norm* are *compliance* (Bock et al., 2005), *identification* (Kankanhalli et al., 2005), and *internalization* (Malhotra and Galletta, 1999). Finally, *intention to contribute knowledge* was drawn from Venkatesh et al. (2012). The items for *knowledge contribution* for the second survey (t = 1) will be adopted from Kankanhalli et al. (2005) while *intention to contribute knowledge* will be captured using the same measures as in t = 0. *Training* will be measured using a yes/no question that will be coded as a dummy variable. In all other cases, items are answered on a Likert-scale ranging from 1 = "strongly disagree" to 7 = "strongly agree".

Using the instrument in t = 0, we conducted a field study with globally dispersed product managers with an engineering understanding from a big multinational engineering company. The engineering background is needed because business customers usually order customized products. The customization process is guided by the respondents who adjust the base product to customer requirements and discuss the new solution with engineers at the headquarters. This should ensure the feasibility of the solution and enables them to exactly calculate the price of the customized product. To foster collaboration and knowledge sharing between the product managers, the headquarters decided to create a community on an ESM platform which provides the functionality of blogs, a forum, a wiki and a social network (based on IBM Connections). The platform was already used in other areas of the company but none of the product managers was using it before. The expectation was that problem solutions developed in one location would be entered into the system so that they can be discussed and eventually reused in other locations. Data for the first survey (t = 0) was collected in November 2013 via self-administered questionnaires handed out to employees shortly before they were granted access to the platform. The second survey (t = 1) is scheduled for the first quarter 2015, about one year after initial use.

All members of the unit (220) received the questionnaires and 105 of them responded (response rate = 48%). Out of the 105 responses, 7 had to be eliminated due to suspicious answer patterns (two alternating values or only a single value) resulting in 98 usable data sets. 21% of the respondents were female and 79% were male and the majority was between 31 and 40 years old which approximately mirrors the gender and age characteristics of the group.

4.2 Data analysis

Partial least squares (PLS) (cf. Chin, 1998) was used to analyze the data because it allows to simultaneously compute formative and reflective measurement models, it is less demanding regarding sample size and the distribution of data, and it is generally recommended for sample sizes smaller than 250 (Reinartz et al., 2009; Streukens et al., 2010). We used the software SmartPLS 3.0 (Ringle et al., 2014) to calculate the model. We first evaluate the measurement models and then assess the relationships between the constructs of the research model.

4.2.1 Measurement model

The criteria indicator reliability, composite reliability, convergent and discriminant validity were assessed to evaluate the quality of the reflective measurement models (Hair et al., 2013). The formatively measured constructs *organizational reward* and *subjective norm* are checked for item multicollinearity and indicator weights.

Indicator reliability can be assessed by looking at the indicator loadings. The loadings should surpass a threshold of 0.7 to indicate sufficient reliability. All items fulfill this criterion as indicated in table 2. Composite reliability was evaluated using internal consistency reliability (ICR) since it uses weighted item loadings and is considered a better reliability measure than Cronbach's alpha (Chin and Gopal, 1995; Fornell and Larcker, 1981). All reflective variables show ICR values above the recommended lower limit of 0.7 (Nunnally and Bernstein, 1994). Convergent validity was checked by assessing the average variance extracted by a measure. A value above 0.5 is considered acceptable (Fornell and Larcker, 1981) and fulfilled for all constructs as shown in table 2.

	Indicator loadings / *weights*				**Average variance extracted**	**Composite reliability / *VIF***
	Item 1	**Item 2**	**Item 3**	**Item 4**		
ATT	0.850	0.848	0.910	0.889	0.765	0.929
COD	0.852	0.808	0.928		0.746	0.898
ENJ	0.913	0.888	0.938		0.834	0.938
IMA	0.720	0.776	0.883		0.650	0.881
INT	0.889	0.894	0.925		0.816	0.930
LOS	0.951	0.971	0.968		0.928	0.975
ORG	*-0.261*	*0.703*	*0.616*		*/*	*1.252*
REC	0.861	0.915	0.839		0.761	0.905
SUB	*0.225*	*0.101*	*0.944*		*/*	*1.380*

Table 2. Measurement model assessment.

Discriminant validity was assessed using the Fornell-Larcker criterion (Fornell and Larcker, 1981) which states that the square root of the AVE (shown in the shaded fields in table 3) should be greater than the correlation of the construct with any other construct in the research model. The results in table 3 confirm discriminant validity in our data.

	ATT	**COD**	**ENJ**	**IMA**	**INT**	**LOS**	**ORG**	**REC**	**SUB**
ATT	0.875								
COD	-0.223	0.864							
ENJ	0.480	-0.259	0.913						
IMA	0.304	0.022	0.392	0.806					
INT	0.652	-0.264	0.471	0.246	0.903				
LOS	-0.373	0.236	-0.252	-0.048	-0.267	0.963			
ORG	0.093	0.101	0.182	0.338	0.056	0.197			
REC	0.353	0.116	0.493	0.452	0.385	-0.068	0.318	0.872	
SUB	0.525	-0.238	0.483	0.316	0.758	-0.178	0.060	0.409	

Table 3. Correlations between constructs and Fornell-Larcker criterion.

Finally, the indicators of the formative constructs show a low multicollinearity which is indicated by variance inflation factor (VIF) values of 1.252 and 1.380 lying well below the recommend upper limit of 10 (Reinartz et al., 2009). All but one indicator weight show effects in the postulated direction. Item

1 for *organizational reward* shows a negative sign. Since the bivariate correlation with the construct is high and the items cover different facets of one construct item 1 was kept in the model (c.f. Cenfetelli and Bassellier, 2009).

We checked for common method bias (CMB) using Harman's single-factor test because all variables were measured using data from one survey. A substantial amount of common method variance would be indicated, if a single factor would explain the majority of the variance of all measured constructs (Podsakoff et al., 2003). A single factor explains 22.95% of the variance in this study which indicates that CMB is not a considerable issue.

4.2.2 Structural model

With the measurement models being valid and reliable, the hypotheses of the research model in t = 0 were tested (H1, H2, $H4_{a-d}$, and $H5_{a,b}$). The results of the evaluation are summarized in figure 2. We divided the level of hypothesis confirmation into three groups: those which are unambiguously significant (meet the common standard in IS research of $p < 0.05$), those which have high effect sizes (expressed by path coefficients) and would have been significant with a slightly larger sample size ($p < 0.10$, marked with a t in figure 2), and those which are clearly insignificant.

Starting from this premise, the examined relationships of TRA are significant (H1 and H2 confirmed) showing a stronger effect for *subjective norm* than for *attitude*. The explained variance of *intention to contribute knowledge* can be classified as substantial ($R^2 = 0.67$) according to Chin (1998). The evaluation of the costs and benefits as predictors for attitude shows mixed results. Both cost factors *codification effort* and *loss of knowledge power* lower the *intention to contribute* with the latter having the stronger influence. *Enjoyment in helping others* has the strongest positive effect. *Reciprocity* also increases the *intention to contribute* knowledge as posited. However, no significant effects are obtained for *organizational reward* and *image*.

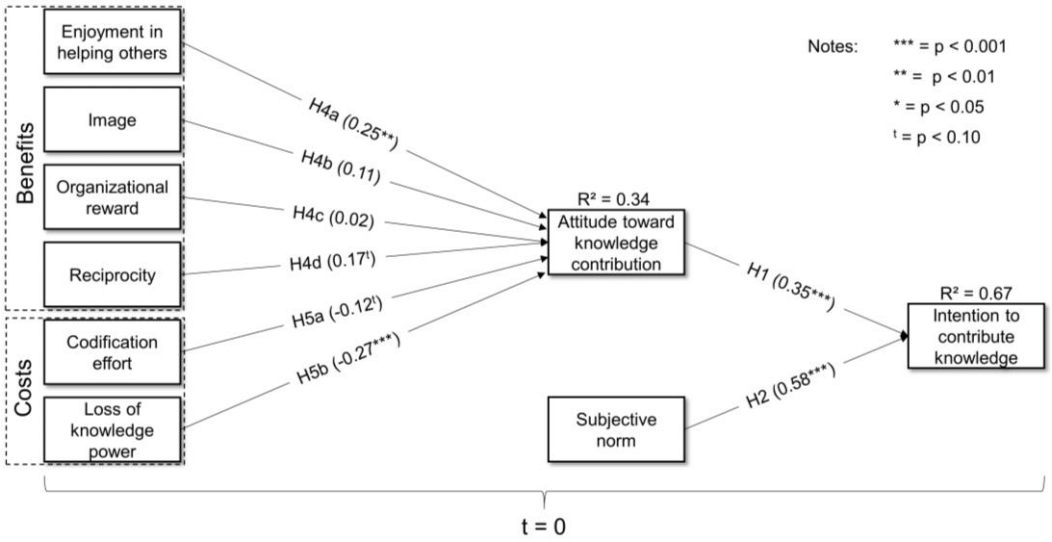

Figure 2. Results of the PLS analysis in t = 0.

5 Discussion

Since only the data collection for t = 0 is completed until now, we proceed with the discussion of hypotheses H1, H2, $H4_{a-d}$, and $H5_{a,b}$. The predictors of the central part of the research model, that follows TRA, show strong effects on *intention to contribute*. Similarly to comparable studies (e.g., Bock et al. (2005)) we obtain a higher effect of *subjective norm* than *attitude*. However, deviating from Bock et al.'s result, the difference between the path coefficients is considerable. We attribute the substantially higher effect of subjective norm to the application environment. In contrast to traditional knowledge

repositories, the contributions in internal ESM platforms are highly visibly linked to the contributor (identified, e.g., by photo or name) and, therefore, contributors may be more susceptible to their social environment.

The hypotheses concerning the cost factors *codification effort*, *loss of knowledge power*, and the benefit factors *enjoyment in helping others*, and *reciprocity* were confirmed, suggesting that the variables influence *attitude to contribute knowledge* in the theorized manner.

Contrary to the theorized assumptions and previous findings (e.g., Ba et al., 2001; Wang et al., 2009), we found that an *organizational reward* would not foster the *attitude to contribute knowledge*. This result can be very well explained by looking deeper at the nature of extrinsic rewards. On the one hand, rewards may motivate in the short term but, on the other hand, they may harm personal relationships because for each person who wins, there is a number of people who perceive a loss. When employees compete for a limited number of incentives, they will very likely begin to see each other as competitors rather than collaborators (Kohn, 1999) contradicting the original idea of ESM platforms for knowledge exchange. Furthermore, rewards on the basis of measured indicators (e.g., number of posts) can lead to the perception of a close monitoring (e.g., by supervisors) which in turn might undermine the motivation to share knowledge.

Similarly, the possibility to build up a reputation by showing the ownership of knowledge (*image*) was not found to be a significant predictor of *attitude* as opposed to findings from (Hall, 2001; Kankanhalli et al., 2005; Wasko and Faraj, 2000). Two reasons may cause this counterintuitive but interesting result. First, when published knowledge is trivial or flawed and eventually publicly revised, image may suffer so that respondents weigh the potential loss more than a potential gain in image (Raeth et al., 2012). Second, strong teamwork and collaboration norms may reduce the need for an improved image in such a way that it is no longer a motivating factor for knowledge contribution (Kankanhalli et al., 2005).

6 Conclusion, limitations, and implications

The presented study aims to uncover both the factors determining the initial intention to contribute knowledge and the causes for continued contributions. For this, we develop an integrative model explaining the predictors of knowledge contribution and continued contribution and present empirical results on the attitudes to contribute knowledge in the pre-implementation phase of an ESM. We show that SET and TRA build a solid foundation for step two of our study. However, our study has two limitations. First, all respondents are employees of one company which limits the generalizability. However, the product managers stem from different countries and work in different locations all over the world. Second, the completion of the questionnaire was voluntary and, hence, a self-selection bias can occur. Since we found that age and gender distributions in the survey are very similar to their distributions in the whole population of product managers in that firm, we assume that self-selection is not a major issue in this study.

The completed research project (including step two in t = 1) seeks to advance theoretical knowledge by helping to get a comprehensive understanding of knowledge contribution on ESM platforms. Besides identifying individual costs and benefits of knowledge sharing on ESM, the study will be among the first to longitudinally observe ESM use and the success of ESM training.

In practice, our results can have important implications for the management of knowledge centered ESM communities. At this point in time, the most important implication for practice is that only intrinsic factors play an important role when considering sharing knowledge within the company. Extrinsic motivators in the form of reward systems do not promise to foster knowledge contribution. Due to the large influence of intrinsic factors and the individual subjective norm, managers should try to embody the intention to contribute knowledge and promote the intrinsic benefits rather than extrinsic rewards. Furthermore, we expect the results of step two to answer the question which factors influence continued knowledge contribution on ESM platforms.

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