KNOWLEDGE CONTRIBUTION MOTIVATORS – AN EXPECTATION-CONFIRMATION APPROACH

Research-in-Progress

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Abstract

Individual knowledge needs to be shared across IS developing organizations to provide information for all types of decisions. Considering knowledge management (KM) as a two-part process of knowledge contribution and knowledge seeking, we focus on the former one as it is (1) the required condition for knowledge sharing and (2) the greater challenge to accomplish by organizations compared to implementing successful knowledge seeking. Distinguishing different types of individual and organizational extrinsic motivators based on self-determination theory, we use expectation-confirmation theory (ECT) to analyze the extent to which software developers' expectations towards knowledge contributions are fulfilled by organizations. Additionally, showing extrinsic motivators' importance for software developers to contribute to KM systems, we provide organizations a roadmap for setting favorable conditions. Whereas our consolidation of previous research on knowledge contribution provides guidelines for future research on extrinsic motivators, we contribute to existing theory by applying ECT to the context of KM contribution.

Keywords: Knowledge management, knowledge contributors, motivation, self-determination theory, expectation-confirmation theory, software development

Introduction

Organizations have recognized the relevance of knowledge as a strategic resource and thus its importance for competitiveness (Watson and Hewett 2006; Bock et al. 2005). Knowledge is especially important for knowledge-intensive processes, which depend on the generation and deployment of new knowledge solutions (Watson and Hewett 2006). The development of information systems (IS) is such a knowledge-intensive process (Desouza et al. 2006). Individual knowledge needs to be shared across an organization to provide information for all types of technical and managerial decisions (Rus and Lindvall 2002; Courtney 2001).

Knowledge management includes "distinct but interdependent processes of knowledge creation, knowledge storage and retrieval, knowledge transfer, and knowledge application" (Alavi and Leidner 2001, p. 131) and can be interpreted as a two-part process consisting of knowledge contribution (creation and storage) and knowledge seeking (retrieval, transfer, and application) (Watson and Hewett 2006). Whereas knowledge contribution is concerned with individuals enriching an organization's knowledge repository with information that is valuable for reuse, knowledge seeking is about other individuals accessing and using this repository. One way to implement knowledge management in organizations is the use of a knowledge management system (KMS; cf. Pee 2012 and a detailed definition of KMS in section "Contributions to Knowledge Management Systems"). Such systems, like IS in general, can only meet an organization's expectations if the technologies are continually used by the employees (Venkatesh et al. 2003; DeLone and McLean 1992). The continued usage behavior of a particular IS is also referred to as IS continuance (Bhattacherjee 2001).

Organizations applying knowledge management through KMS depend on employees making use of these systems, more precisely, employees' willingness to share their knowledge with other employees or the overall organization (Kankanhalli et al. 2005; Watson and Hewett 2006; Bock et al. 2005). Knowledge, however, is not only a strategic resource for organizations, but also for individuals. Sharing personal knowledge bears the risk of losing a strategic resource and reducing the competitive advantage compared to other individuals (Huber 2001). In this context, hoarding knowledge proves to be natural human tendency (Davenport and Prusak 1998). Moreover, sharing this knowledge cannot be enforced. It is thus important for effective knowledge management to elaborate on how to motivate individuals to contribute knowledge to KMS. Expectation-Confirmation Theory (ECT) fits this context, which considers the extent to which the confirmation of expectations towards a specific product or service has an impact on IS, continuance (Bhattacherjee 2001), more specific, KMS continuance. The motivation to contribute knowledge is reflected in the confirmation of expectations towards KMS usage. A contributor compares perceived performance to initial expectations and determines to which extent expectations are confirmed. The extent of this confirmation then significantly impacts the satisfaction regarding the system usage for knowledge contribution (He and Wei 2009), which is an indicator for the (continued) use of the system.

Concerning motivation, we need to distinguish between intrinsic and extrinsic motivators (Deci and Ryan 1985). It is unlikely to change intrinsic motivators by external influences as the motivators refer to "the doing of an activity for its inherent satisfactions rather than for some separable consequence" (Ryan and Deci 2000a, p. 56). To motivate knowledge sharing, we therefore consider the various forms of extrinsic motivators that are proposed in the Self-Determination Theory (SDT; cf. Deci and Ryan 1985). Applying SDT to our context, employees' motivation to contribute knowledge and continually use knowledge management systems is a matter of whether their expectations towards external motivators (both on individual (e.g., career advancement) and organizational (e.g. affective commitment) level) are confirmed (He and Wei 2009).

Although the challenge of employees contributing to KMS gets attention in research (He and Wei 2009; Watson and Hewett 2006; Huber 2001), little is known to which extent motivational factors are regarded in practice (Olivera et al. 2008). Especially the issues associated with motivational problems are a matter of discussion and prove the need for more effective knowledge management systems (Huber 2001). Whereas a variety of stakeholders are involved in IS development, software developers are especially interesting for knowledge management. Software developers have a direct impact on the development process (Rasch and Tosi 1992), beginning with their involvement in requirements engineering and ending with quality assurance. Thus, they do not work in isolation, but in cross-functional environments (Aurum

et al. 2008). Accordingly, software developers' knowledge contribution is a critical project success factor (Rus and Lindvall 2002; Schneider et al. 2002). Typical contributions are lessons learned from previous projects and best practices (Dingsøyr et al. 2001; Dybå 2005). Using their knowledge, it is possible to increase the efficiency of the development process, to reduce re-work, and to assess domain knowledge acquired by software developers (Aurum et al. 2008). Due to their importance for IS developments, we in this study focus on software developers. Accordingly, we pose the following research question.

To which extent do organizations fulfill software developers' expectations towards knowledge contributions?

To base our research on extant literature, we first conducted a literature review to identify employees' expectations towards and motivation to contribute knowledge. Second, we empirically validate these findings by sending a questionnaire to software developers. We use the according data to analyze the extent to which expectations concerning knowledge management, especially knowledge contribution, are fulfilled by organizations. The results of this quantitative empirical investigation will provide insights to which extent the expectations of users for knowledge contribution are fulfilled by current knowledge management systems. Our findings are helpful in two ways. On the one hand, researchers gain insights into extrinsic motivators for knowledge sharing. On the other hand, organizations can review their current approaches for motivating knowledge contribution and derive potential approaches for improvement based on our findings. Our results refer to both, individual (e.g., career advancement) and organizational (e.g. affective commitment) motivators.

The remainder of this paper is organized as follows. First, we provide the theoretical background concerning knowledge contribution, SDT, and ECT. We then describe our research design, that is, the literature review and empirical investigation. Finally, we discuss implications and contributions and close with concluding remarks.

Theoretical Background

Contribution to Knowledge Management Systems

Knowledge contribution can be described as the action of voluntarily sharing information with others (Olivera et al. 2008) intending to enhance their effectiveness and efficiency (Watson and Hewett 2006). Knowledge contribution can take place through various communication technologies like e-mail and voice mail (Olivera et al. 2008), or more personal like conversations (King and Marks, JR. 2008). However, knowledge communicated that way is only available to the persons involved in the communication process and not stored for later usage. This problem is solved by KMS with a repository.

KMS can be described as "a class of information systems applied to managing organizational knowledge" (Alavi and Leidner 2001, p. 114). In this context, knowledge comprises among others best practices, lessons learned as well as knowledge about products, customers, and competitors (Kankanhalli et al. 2005; Grover and Davenport 2001). KMS facilitate the processes of knowledge creation, storage, retrieval, transfer, and application by providing IT tools and capabilities (Alavi and Leidner 2001, p. 114). Typically, KMS are based on technologies which enable the editing of and access to knowledge (Grover and Davenport 2001). Such technologies include intranets or wikis supported by search engines and document management tools. In the context of knowledge contribution, we refer to the storage of existing knowledge in a knowledge repository (codification strategy) or the use of an IS to support the communication in knowledge exchange situations (personalization strategy) (Hansen et al. 1998). This study focuses on knowledge contribution to knowledge repositories as this requires an explicit process of sharing. Additionally, we examine to which extent motivational factors regarding knowledge contribution are implemented in organizations' knowledge management systems.

Motivators: Self-Determination Theory

Various theories of people's motivations exist (e.g., Herzberg 1982; Klandermans 1997; Maslow 1987; Reiss 2000; Deci and Ryan 1985). SDT as one of these (Deci and Ryan 1985, Deci and Ryan 2000, Ryan and Deci 2000b) has recently received a lot of attention in education, health care, and sport domains and

increasingly finds its way into organizational research (e.g., Gagne and Deci 2005; Galia 2008). Based on the three initial needs, namely competence, relatedness, and autonomy, SDT differentiates three types of motivation: intrinsic motivation, extrinsic motivation, and amotivation (Deci and Ryan 1985, Deci and Ryan 2000, Ryan and Deci 2000b). These motivation types vary in their degree of autonomy, that is, to which extent behavior is self-determined. Thus, they can be arranged along a self-determination continuum, which according to SDT (Ryan and Deci 2000a) spans intrinsic motivation (completely self-determined), extrinsic motivation (four types with varying degrees of self-determinism), and amotivation (not self-determined at all). Consequently, SDT is most suitable as motivation theory to our context as it distinguishes between autonomous motivation and controlled motivation (Gagne and Deci 2005). Without being intrinsically (i.e., autonomously) motivated, software developers need to be moved to share their knowledge. To move someone to do something requires the provision of an adequate motivation (Ryan and Deci 2000a). As organizations depend on software developers to share their knowledge, they need to identify motivators that are suitable to control software developers to contribute their knowledge. Based on SDT, we thus focus on extrinsic motivators. In the following, we in detail explain intrinsic motivation, extrinsic motivation, and amotivation to clarify their differences and to illustrate the types of motivators we seek to identify and assess in our study.

Intrinsic motivation as the most autonomous form of motivation refers to "the doing of an activity for its inherent satisfactions rather than for some separable consequence" (Ryan and Deci 2000a, p. 56). Thus, internally satisfying a person is exclusively done for his or her own sake. Examples include interest, fun, pleasure, and enjoyment. A special variant of intrinsic motivation is altruism, where a person is doing something for someone else at his or her own cost without receiving any benefit (Ozinga 1999), for instance an anonymous donation. If this applies to a special community, for instance a company, it is called kin selection altruism (Hoffman 1981).

Extrinsic motivation refers to "a construct that pertains whenever an activity is done in order to attain some separable outcome" (Ryan and Deci 2000a, p. 60). Such instrumental values include tangible rewards (e.g., monetary compensation), intangible rewards (e.g., social capital; Coleman 1988; Nahapiet and Ghoshal 1998), and avoiding punishments. Since extrinsic motivation itself can vary greatly in the degree of autonomy, SDT distinguishes between four different forms of extrinsic motivation (Deci and Ryan 1985):

- *External regulation* is the least autonomous and most controlled form of extrinsic motivation. In this classic form of extrinsic motivation the behavior has been neither internalized nor accepted. It thus has a totally external perceived locus of causality (e.g., tangible rewards or avoiding a punishment).
- In *introjected regulation*, there is little autonomy and strong control. The behavior has been partially internalized but not accepted. Although contingent consequences are administered by the person, behavior is still not self-determined and hence performed with the feeling of pressure (e.g., pride or shame).
- In *identified regulation*, there is clear autonomy and only little control. The behavior has not only been internalized but also accepted. It fits the person's values and enables identification (e.g., conviction of the job).
- *Integrated regulation* is the most autonomous and least controlled form of extrinsic motivation. Behavior is not only internalized and accepted, but represents an integral part of the person's self and identity (e.g., attitude towards life).

Although integrated regulation is the most autonomous form of extrinsic motivation, it needs to be distinguished from intrinsic motivation. The difference rests on the purpose of the behavior. While the former is still motivated by instrumental goals separated from the behavior, in the latter a person is really interested in the behavior and shows it exclusively for his or her own sake.

Amotivation "is the state of lacking an intention to act" (Ryan and Deci 2000a, p. 61). Thus, the person is neither intrinsically nor extrinsically motivated to do the activity.

In general, the more autonomous one person's motivation is (compared to the degree of control) the greater is this person's engagement and performance (Ryan and Deci 2000a; Galia 2008). Moreover, extrinsic motivation is said to undermine intrinsic motivation, that is, intrinsic motivation decreases if

extrinsic motivation increases (Ryan and Deci 2000a, p. 60). However, as intrinsic motivation is unlikely to be externally influenced (cf. our introduction), in this study we focus on individual and organizational extrinsic motivators as companies' means to ensure KMS contributions.

Expectation-Confirmation Theory

ECT's origin is in the marketing discipline where it has been used in service marketing to study consumer satisfaction and predict post-purchase behavior (Bhattacherjee 2001). The theory is based on initial consumer expectations (Oliver 1980). The comparison of these expectations with performance perceptions concerning consumption leads to the confirmation of expectations (or disconfirmation, that is why the theory has also been called expectation-disconfirmation theory). Upon this (dis-)confirmation, the consumer builds an attitude of (dis-)satisfaction towards a product or service and thus decides upon repurchase or further usage.

ECT has first been applied in IS research to explain the usage intention of IS users (Bhattacherjee 2001). Since then, ECT has gained wide popularity in IS research (Hossain and Quaddus 2011). Whereas this theoretical model has been most often used to explain IS users' satisfaction and continuance intentions, there are also examples of its application concerning the management of user expectations (Petter 2008) and the analysis of personnel skill discrepancies (Tesch et al. 2003) in IS projects.

Considering learning and knowledge, there are also recent studies in which ECT has been applied to explain continued use of IS in the context of internet-based learning (Limayem et al. 2008), behavioral intention towards e-learning services (Liao et al. 2007), and e-learning continuance intentions (Chiu et al. 2005; Roca et al. 2006). Moreover, satisfaction of users in a knowledge-based virtual community has been investigated (Jin et al. 2008). We continue this research stream by analyzing whether software developers' expectations towards knowledge contribution are fulfilled by knowledge management currently applied in organizations. We believe that only in cases where extrinsic motivators are applied by management, software developers will actively engage in KMS usage.

Study Design

Our study design is two-sided. First, we conducted a systematic literature review to identify initial extrinsic motivators enabling contributions to KMS. Second, we conduct a quantitative empirical study to analyze which of the motivators are most important. Therein, we ask respondents whose companies use a KMS to state their perceptions concerning the fulfillment of their expectations, their satisfaction towards the KMS, and their intention concerning its future use. Below, we describe our literature review, data collection and analysis, and the measures we use for the validation of the ECT model in our context.

Literature Review

We started our literature review with a keyword-based search in EbscoHost and ScienceDirect databases to identify a first set of articles (Webster and Watson 2002). The search term was built on combinations of the keywords *motivation*, *knowledge management*, and *information systems* and variations of those (cf. Appendix A for the detailed search string). A problem was that the search term motivation and its variations are often not explicitly mentioned in title, abstract, or keywords. Thus, we could only partially use resulting articles. We analyzed these articles and identified two highly relevant ones (He and Wei 2009 and Kankanhalli et al. 2005) that include an overview of articles related to knowledge contribution and seeking. We used these articles as basis for searching backward and forward (Webster and Watson 2002) using *Google Scholar* and *Web of Science*. This search resulted in 1014 articles, which two researchers analyzed by reading their titles, keywords, and abstracts. Overall, we identified 231 articles generally relevant for our context.

By reviewing these articles, we distinguished between factors representing enabling conditions (e.g., trust) and those that reflect motivators (see below) (Hall 2001). Whereas we believe the first ones to be essential conditions inherent in an organization's culture, we focus on the second ones which actively encourage software developers to share their knowledge. According to the definitions provided, we found a variety of denotations for same concepts (referred to as correspondence; cf. Shaw and Gaines 1989). Thus, we

applied qualitative content analysis (Flick 2009) to consolidate the initial set of motivators and finally identified 19 distinct extrinsic motivators. Table 1 provides an overview of these motivators motivating knowledge contributions, their definition, and related previous research. Whereas the list of extrinsic motivators is exhaustive, we do not provide all according references as this is out of our paper's scope.

We do not assign the motivators to the four different types of extrinsic motivation (cf. section "Motivators: Self-Determination Theory") as this is not suitable for our context. According to SDT, the "orientation of motivation concerns the underlying attitudes and goals" (Ryan and Deci 2000a, p. 54). People do not only vary in their level of motivation but also concerning their orientation of that motivation (i.e., type of motivation; cf. Ryan and Deci 2000a). Depending on their personal attitudes and goals, two software developers may perceive the same motivator on different levels of extrinsic motivation. Career advancements, for instance, can be an *external regulation* for a software developer who has no autonomous drive to contribute knowledge, while at the same time being an *identified regulation* for a second software developer who has a tendency to contribute knowledge. Considering the extreme, assigning a motivator to a specific type of extrinsic motivation might be valid for a single individual only. Moreover, personal motivation may change through experience (Gagné and Deci, 2005; Ryan and Deci, 2000) and can thus not be seen as constant relation.

Table 1. Extrinsic Motivators for Knowledge Contribution

Motivator	Definition	References
Accountability	Contributors' perception of the need to justify or defend a decision or action to someone who has reward and sanction power and where such rewards and sanctions are perceived as contingent on accountability conditions.	(Wang et al. 2011; Zhang et al. 2010)
Affective commitment	Employees' emotional attachment to, identification with, and involvement in the organization.	(Pee 2011; Pangil and Nasurdin Aizzat Mohd. 2009)
Autonomy	The degree to which a job provides substantial freedom, independence, and discretion to an individual in scheduling work and determining the procedures for carrying out work.	(Pee 2011, Pee 2012)
Career advancement	Incentives related to increased promotion chances.	(Hall 2001; McCreless et al. 2006; Lee and Ahn 2005)
Commitment	Strong belief in and acceptance of a group's goals, a willingness to exert considerable effort to facilitate the goals, and a strong desire to maintain membership in the group.	(Ye et al. 2006; Fan et al. 2009; Orhun and Hopple 2006; Pee and Kankanhalli 2008)
Economic Rewards	Economic incentives like increased pay or bonuses in form of cash or stock options.	(Kankanhalli et al. 2005; Lin et al. 2012; Kang et al. 2010)
Fairness	Employees' perceptions of whether their contributions are treated fairly within the organization.	(Lin and Huang 2010; Lee and Ahn 2005)
Identification	Individuals seeing themselves identified with another person group.	(Ho et al. 2012; Pee 2011; Zheng 2009)
Organizational Support	The degree to which the organizational managers provide resources (e.g., knowledge, time, access, capability) to use the KMS.	(Tsai et al. 2010; Ho et al. 2011; Pee 2011)
Ownership	Knowledge is owned by the employees rather than by the organization.	(Wang and Noe 2010; Zheng 2009)

Table 1. Extrinsic Motivators for Knowledge Contribution (Continued)		
Power Structure	Contributors' perceptions whether sharing knowledge will result in a loss of value and power.	(Ye et al. 2006; Pee 2011)
Quality Evaluation	Assessment of knowledge quality (e.g., expert review, rate of downloading) to provide different levels of reward to contributors.	(Zhang et al. 2010; Kayhan and Bhattacherjee 2009; Zalk et al. 2011)
Reciprocity	Belief that current contribution leads to own requests for knowledge being met in the future.	(Kankanhalli et al. 2005; Chang and Chuang 2011; Ye et al. 2006; Pee 2011)
Reputation	Contributors' perceptions that their status or image increase by sharing useful and valuable knowledge.	(Fan et al. 2009; Pee 2011; He and Wei 2009)
Supervisory control	Social constituents (e.g., managers and supervisors) influencing employees' belief of whether they are expected to contribute knowledge to repositories.	(Pee 2011; Pee and Kankanhalli 2008)
System Quality	High level of system quality (e.g., ease of use, reliability, usefulness).	(Pee 2011; Phang et al. 2009; Ho et al. 2012)
Motivator	Definition	References
Top Management Commitment	Top management providing vision, guidance, and support in sharing information.	(Li and Lin 2006; Wang and Noe 2010)
Visibility	Supervisor awareness of how much effort is exerted for knowledge sharing.	(Zhang et al. 2008; Wang et al. 2011)

ECT's Constructs

We used the systematic overview (Hossain and Quaddus 2011) to analyze previous ECT studies in IS research. We aimed to identify constructs and measures relevant for our study's context. Figure 1 illustrates the model we apply in our study. We use perceived usefulness as measure of expectations of knowledge contributions. "Although expectation theoretically may be a broader construct, encompassing many additional beliefs (e.g., ease of use), based on TAM-based studies, perceived usefulness is an adequate expectation in the IS continuance context" (Bhattacherjee 2001, p. 355). The expectations along with their confirmation positively influence users' satisfaction. Based on the satisfaction, users build an intention for continued use.

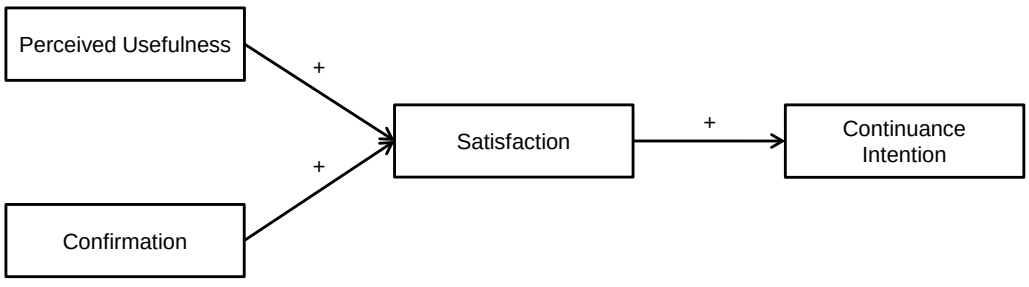

Figure 1. Structural Model of the Expectation-Confirmation Theory to Explain KMS Contributions

The model has been previously proposed to explain continuance intentions (Bhattacherjee 2001) and subsequently adapted to the context of internet-based learning technologies (Limayem et al. 2008). The according items are shown in Table 2. Since the measures have been used in other contexts, we adapted the wording to fit the KMS context.

Data Collection and Analysis

We use a questionnaire to collect data from software developers' perspective. We assess the importance of motivators (cf. Table 1) from the perspective of software developers by asking them to rate these on a 7-point Likert scale. Moreover, we ask them to rate the extent to which these motivators are granted by their organization's knowledge management. Thus, we are able to directly identify motivators that are missing in practice and thus constrain knowledge contributions. This admittedly rather subjective perspective is helpful as solely software developers will only continue to use the KMS if they are satisfied (from their personal perspective). We contact randomly selected companies to avoid a pre-selection bias. In cases of organizations without KMS, we collect data about participants' expectations only. For data analysis and testing of our hypothesized model, we apply covariance-based structural equation modeling (Gefen et al. 2000). In case of theoretically substantiated models like ours, the covariance approach is especially adequate (Bentler and Bonnet 1980).

Table 2. Constructs and Corresponding Items

Construct	No.	Measurement Item	References
Perceived Usefulness	PU1	Contributing to the KMS is of benefit to me.	(Bhattacherjee 2001; Limayem et al. 2008)
	PU2	The advantages of contributing to the KMS outweigh the disadvantages.	
	PU3	Overall, contributing to the KMS is advantageous.	
Confirmation	Con1	My experience with contributing to the KMS was better than what I expected.	(Bhattacherjee 2001)
	Con2	Overall, most of my expectations from contributing to the KMS were confirmed.	(Bhattacherjee 2001)
	Con3	The benefit provided by contributing to the KMS was better than what I expected	(Bhattacherjee 2001; Limayem et al. 2008)
Satisfaction	How do you feel about your overall experience of contributing to KMS:		(Bhattacherjee 2001)
	Sat1	Very dissatisfied . . . Very satisfied	
	Sat2	Very displeased . . . Very pleased	
	Sat3	Very frustrated . . . Very contented	
	Sat4	Absolutely terrible . . . Absolutely delighted	
Continuance Intention	CI1	I intend to continue using KMS rather than discontinue its use.	(Bhattacherjee 2001)
	CI2	All things considered, I expect to continue to contribute to KMS in the future.	(Limayem et al. 2008)
	CI3	All things considered, it is likely that I will continue to contribute to KMS in the future.	

Conclusion and Contributions

Identifying software developers' extrinsic motivators, their prioritization of these, and their perceptions of their expectations of existing KMS' usage being met, this study identifies means to improve KMS contributions. More specifically, we aim to identify means on individual and organizational level how to motivate software developers to share their personal knowledge to preserve the knowledge for the organization and thus ensure the organization's competitiveness. Although we gain insights into how many organizations apply systematic knowledge-sharing procedures as well, the more important finding concerns the application effectiveness. The employees' motivation to actively engage in knowledge contribution is crucial for this effectiveness (Bock et al. 2005).

Considering motivation usually requires the distinction between intrinsic and extrinsic motivation (cf. section "Motivators: Self-Determination Theory"). As it is unlikely to change intrinsic motivators by external influences (cf. introduction), we focus on extrinsic motivators. As previous research revealed, even open-source developers are not motivated by intrinsic factors only but also by external ones (Hars and Ou 2002). However, organizations should not totally neglect the effect of intrinsic motivation as it has "great advantages in areas where prices and markets play a minor role" (Osterloh and Frey 2000, p. 546).

Our study provides a manifold contribution. With regard to SDT's continuum of self-determinism, we consider different degrees of autonomy and thus present a general and comprehensive set of motivators. Moreover, we are able to gain insights into the confirmation or disconfirmation of expectations for each of these motivators with regard to KMS contributions. With our quantitative study, we can then reveal the effectiveness of organizations and related mechanism in motivating software developers to contribute knowledge. The conjoint application of ECT and SDT enables the provision of guidelines to design organizational structure and incentives on different levels of self-determinism. As we show extrinsic motivators for software developers to contribute to KMS, we provide organizations a roadmap for setting favorable conditions. While our consolidation of previous research on knowledge contribution provides guidelines for future research on extrinsic motivators, we contribute to existing theory by applying ECT to the context of KMS.

Appendix A – Search String

(("Knowledge retention" OR "knowledge sharing" OR "information sharing" OR "knowledge contribution" OR "data contribution" OR "information contribution" OR "knowledge participation" OR "data participation" OR "information participation" OR "knowledge distribution" OR "information distribution" OR "data distribution" OR "information transfer" OR "knowledge transfer" OR "data transfer" OR "organizational learning" OR "Learning organizations" OR "knowledge#sharing" OR "information#sharing" OR "knowledge creation" OR "information creation" OR "Knowledge integration" OR "Information Integration" OR "knowledge management" OR "information management" OR "Managing Knowledge" OR "Managing information" OR "knowledge collaboration" OR "information collaboration" OR "workplace learning" OR "organizational learning") AND ("software" OR "information system#") AND ("motivator#" OR "motivation" OR "incentive#" OR "motive#" OR "encouragement#" OR "reason#"))

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