Enhancing the Motivation, Opportunity, and Ability of Knowledge Workers to Participate in Knowledge Exchange

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Abstract
The strategic value of knowledge lies in its effective transfer from those who have it to those who need it through a process of knowledge exchange. Organizations invest significant resources in communities of practice, knowledge repositories, and other initiatives to support knowledge exchange; yet, these initiatives do not always succeed. The purpose of this research-in-progress paper is to present an overarching meta-theoretical framework for organizing and informing research and practice in the domain of interpersonal knowledge exchange. A review of the well-known motivation-opportunity-ability (MOA) model of human behavior is presented together with a description of how it can be used as an organizing framework for extant literature and a prescriptive framework for supporting knowledge exchange. The practical and theoretical utility of this model will be tested at a large U.S. energy company where some communities are very successful in their knowledge exchange programs, while others face challenges.

1. Introduction

Knowledge is perceived to be the most important driver of firm performance [e.g., 1]. Yet, the strategic value of knowledge lies not merely in its existence, but in its effective transfer from those who have it to those who need it through an ongoing process of interpersonal knowledge exchange [2]. Recognizing this, many organizations have invested significant money and resources to develop and maintain information systems designed to enhance the knowledge exchange process [3]. While these efforts have met with some level of success, research indicates that many companies still struggle to promote a level of inter-employee knowledge exchange that maximizes benefit to the firm [4].

In the past several years, a substantial literature has developed concerning various antecedents to knowledge exchange among individuals [e.g., 3, 5, 6-9]. These antecedents encompass a wide spectrum of individual, task, technological, and organizational factors that can enhance or inhibit knowledge exchange behavior. While this literature has clearly begun to shed light on the ingredients of knowledge exchange, the sheer multitude of factors studied can be more bewildering than helpful for theoretical development and for practical application among managers seeking to promote such exchange within their organizations. An overarching theoretical framework is needed to inform ongoing efforts to study, manage, and facilitate knowledge exchange within organizations.

The purpose of this research-in-progress paper is to present a meta-theoretical framework for organizing and informing research and practice in the domain of interpersonal knowledge exchange. We first review the well-known motivation-opportunity-ability (MOA) model of human behavior [10] and show how it can be used as an organizing framework for extant literature on knowledge exchange. We then draw upon literature in public health and behavior to propose an MOA-based prescriptive model that offers three mechanisms that can be used by managers to guide their efforts to support and enhance knowledge exchange behavior. We conclude by describing a pending research project at a large U.S. energy company that will be used to test the practical and theoretical utility of the model.

2. Theoretical Background and Framework

2.1 Knowledge Exchange

In its most general form, knowledge exchange refers to the transfer of knowledge from a sender to a recipient [11]. Although knowledge exchange can occur on many levels within an organization, in this paper we focus on the dyadic exchange between two individuals. In such an exchange, the knowledge
source (or sender) imparts her knowledge to a knowledge seeker (or recipient) [12]. Thus, knowledge exchange comprises two acts [e.g., 13]: knowledge sharing on the part of the sender, and knowledge sourcing on the part of the recipient.

Knowledge exchange can occur in many forms and among many types of individuals; however, it is most profitable among those who engage in similar work activities for which a common knowledge base is required. Such a group is commonly referred to as a community of practice (CoP) [14]. CoPs may be formed independently but are frequently sponsored as sub-communities within larger organizations as a means of promoting knowledge exchange among employees who share similar roles and knowledge requirements [15, 16]. Because members of a CoP can be numerous and geographically dispersed, they often rely on electronic tools, such as electronic knowledge repositories (KRs) designed to codify and store knowledge for asynchronous retrieval and use. However, the benefits of such a repository can only materialize to the extent that both knowledge senders and knowledge recipients utilize it to share their knowledge. Unfortunately, literature suggests that many firms still face significant challenges in making this happen [4].

A significant body of research has been devoted to understanding the factors that enable or inhibit knowledge sharing and knowledge sourcing within an organization. Some of this work has considered knowledge exchange in general [e.g., 17, 18], while other studies have focused more specifically on KR-enabled knowledge exchange [e.g., 6, 19, 20]. This research stream has revealed a multitude of potential antecedents to both knowledge sharing and knowledge sourcing, including personal characteristics of knowledge producers/consumers [13, 19], technical characteristics of knowledge repositories [6, 20, 21], knowledge-related characteristics of the task [19, 22], and contextual variables such as organizational rewards and climate for knowledge exchange [9, 23]. However, while impressive in its diversity and breadth, this research stream lacks an overarching theoretical perspective that (a) organizes and classifies these variables into an explanatory meta-theoretical framework, and (b) offers prescriptive guidance for organizations that seeking to influence knowledge exchange behaviors among their employees. We believe that such a perspective is offered by the MOA framework, which is now discussed.

2.2. The MOA Framework

The MOA [10] is a meta-theoretical framework of human behavior. Originating from industrial and social psychology research [24], the MOA posits that human behavior is a function of an individual’s willingness to engage in particular behavior (motivation), coupled with the internal capability (ability) and external contextual factors that enable performance (opportunity). The three constructs that comprise the MOA framework—motivation, opportunity, and ability—are distinct yet interrelated [25]. Motivation captures the impetus for behavior, and reflects the individual’s desire or readiness to perform. Ability concerns the person’s internal skills or proficiencies that are required to complete the task. Finally, opportunity reflects the presence of enabling environmental mechanisms that facilitate task performance. The fundamental postulate of MOA is that all three of these ingredients must be present for a behavior to occur.

Over the years, a number of studies have applied the MOA to various management-related behaviors such as social capital activation [26, 27], consumer choice [10], and firm-level decision making [28]. However, despite its popularity in the management discipline, to-date few studies have applied the MOA to understanding the mechanisms underlying knowledge exchange. Two exceptions are Argote et al. [29] and Siemsen et al. [24], who respectively introduce and test the MOA as a prospective theoretical basis for explaining knowledge exchange behaviors. Argote et al. [29] offered a conceptual thematic review of knowledge management literature, and proposed that motivation, opportunity, and ability can be viewed as three “causal mechanisms” that enable knowledge sharing among employees. Building on this work, Siemsen [24] applied the MOA in an empirical study in which several competing explanatory MOA models (multiplicative, linear, complementary, constraining) were applied to explain knowledge sharing behavior within an organization. Findings showed that a constraining factor model, in which each of motivation, opportunity, and ability presented a potential bottleneck to the knowledge sharing process, offered the greatest power for explaining knowledge sharing behavior. These results provide an important initial validation of MOA as a promising theoretical framework for explaining knowledge exchange behaviors.

3. Description of Current Research Program

3.1 MOA as an organizing framework
In our research program, we seek to build upon prior MOA knowledge management (KM) research in two important ways. First, we apply the recommendation by prior KM research [29] to use the MOA as a conceptual framework by conducting a literature review that categorizes previously studied knowledge exchange antecedents within the organizing framework of motivation, opportunity and ability. We believe that this meta-review offers conceptual clarity and organization to a research stream that has developed in a sometimes-disjointed way. Importantly, where prior KM MOA research has focused exclusively on the sharing component of knowledge exchange [24], we broaden our perspective to include both knowledge sharing and knowledge sourcing as essential components of the knowledge exchange process.

Table 1 (shown in appendix due to size) summarizes extant research antecedents to knowledge exchange and categorizes each antecedent as primarily relating to motivation, opportunity, or ability to engage in knowledge exchange behaviors. Each antecedent was categorized according to its conceptual correspondence with the definition of the selected MOA factor. For example, anticipated reciprocal relationships and anticipated extrinsic rewards, studied by Bock [6] as antecedents to knowledge sharing, were identified as motivation variables as they constitute elements that induce a desire or willingness to engage in knowledge exchange behavior. Self-efficacy, examined in various forms by several studies [2, 5, 20], was classified as an ability-related variable because it concerns a person’s perceptions of their own skills or proficiencies for engaging in knowledge exchange. Antecedents such as organizational norms [5, 8], intellectual demands of the task [19, 22], facilitating conditions [13, 21], or other climate factors [3, 30] can be viewed as creating enabling environmental mechanisms to support knowledge exchange, and were thus categorized as opportunity variables.

We believe the categorization provided in Table 1 is useful for ongoing research in knowledge exchange by organizing a somewhat disparate collection of previously studied antecedents into a coherent meta-theoretical framework. This framework can be used to inform the design of specific knowledge exchange studies, and also to characterize the literature on knowledge exchange as a whole. For example, it is apparent from the table that among the three MOA factors, ability-related variables have received perhaps the least attention in research studies to-date. This suggests that increased attention to these variables may be warranted in future theory building efforts.

### 3.2 MOA as an prescriptive framework

The second objective of our research program is to offer prescriptive guidance to organizations seeking to influence knowledge exchange behaviors. We believe that the MOA is useful not only as a conceptual and meta-theoretical framework, but also as an analytical tool that organizations can use to diagnose and change knowledge sharing practices (or lack thereof) among their employees. The basis for this belief rests on the premise that if motivation, opportunity, and ability each present a potential bottleneck to knowledge exchange behaviors as suggested by previous research [24], then an organization must (a) identify which factor(s) are causing the bottleneck and (b) employ situation-appropriate measures to induce the desired changes. For example, a case in which employees are capable of exchanging knowledge but simply unmotivated to do so would call for a different course of action than a situation in which employees lacked the capability or supporting resources to exchange knowledge. To inform our examination of this topic, we draw from public policy and behavior research by Rothschild [31] that has also employed the MOA to prescribe appropriate interventions for changing public health-related behavior.

According to Rothschild [31], a manager can influence the behavior of others through three “strategic tools” or levers: education, marketing, and law. Education is defined as providing “messages of any type that attempt to inform and/or persuade a target to behave voluntarily in a particular manner but do not provide, on their own, direct and/or immediate reward or punishment” [31, p. 25]. Education thus focuses on informing the user of the value of a particular behavior without explicitly promising the delivery of this value. In contrast, the second lever, marketing, entails “attempts to manage behavior by offering reinforcing incentives and/or consequences in an environment that invites voluntary exchange” [31, p. 25]. Both education and marketing are similar in that they involve voluntary, uncoerced behavior; however, unlike education, marketing offers an explicit exchange of a defined benefit in return for the desired behavior whereas education only implies or identifies a benefit that the person must derive on their own. Finally, law involves “the use of coercion to achieve behavior in a nonvoluntary manner or to threaten with punishment for noncompliance or inappropriate behavior” [31, p. 25]. Whereas marketing relies on self-monitoring
and self-sanctioning to receive the desired benefit, law relies on external controls to achieve the desired outcomes.

To illustrate how the three levers of education, marketing, and law might operate in the context of knowledge exchange, consider an example of an organization that is seeking to promote knowledge exchange among embedded CoPs. The company has implemented a KR and various other electronic tools to assist CoP members in exchanging their knowledge and expertise with each other. However, the company finds that although these tools are highly utilized to promote knowledge exchange by some CoPs, they remain underutilized by other CoPs. In what ways might management seek to promote the use of these tools for knowledge exchange within its CoPs?

- Through education, the company could inform CoP members of the intrinsic benefits of knowledge exchange (e.g., more efficient problem-solving, more innovation, etc.), perhaps citing examples from other CoPs that have successfully utilized the provided tools to share and source knowledge. Although such efforts can identify potential benefits, these benefits are not expressly promised or provided by the organization but only identified as likely outcomes of knowledge exchange. Because employees are free to adopt or reject the suggested behavior, the organization must be prepared to accept the potential negative consequences of employees’ failure to act in the desired way. As noted by Rothschild [31, p. 26], “Education offers free choice to [employees] and accepts the externality costs that would result from socially undesirable choices.”

- Using marketing, the company could create incentive systems that explicitly reward efforts to engage in knowledge exchange using the provided tools. Such incentives might include financial bonuses, promotions, or public recognition based on specific knowledge exchange activities. Using marketing, the company implicitly or explicitly acknowledges personal costs associated with knowledge exchange [8] and seeks to compensate for these costs by offering a tangible benefit in exchange for the desired behavior. In this way, the company actively seeks to mitigate the negative consequences (or externalities) that accrue from failure to exploit the provided knowledge exchange tools. However, because behavior remains voluntary, management must possibly deal with the effects of apathy or resistance to marketing efforts and be willing to adjust incentives to overcome such responses.

- Using law, the company could require that each CoP member engage in specific knowledge exchange activities using the provided tools. For example, management might mandate that each employee submit a certain number of entries to the KR each month. Or, employees might be required to search the KR for solutions to problems before turning to other knowledge sources such as documents or colleague [22]. Under law, failure to comply with requirements would invoke sanctions such as loss of promotion eligibility, deduction in pay, or even termination. Thus, law “restricts free choice by punishing socially undesirable choices but manages behavior to minimize externality costs” [31, p. 26].

The preceding examples illustrate that organizations face trade-offs in using education, marketing, or law to induce knowledge exchange behavior. Education is perhaps least intrusive and costly to implement, but can be the least effective in the presence of noncompliance and, therefore, negative externalities to the organization. Marketing seems more likely to overcome behavioral resistance by offering an explicit incentive for knowledge exchange, but requires the potentially costly implementation of explicit reward programs that might ultimately fail to produce the desired outcomes. Law offers the highest degree of control to the organization but also places the regulatory and administrative burden on management, who must monitor employees’ behavior and sanction non-compliance. Moreover, because the benefits of knowledge exchange are driven more by the quality than the quantity of the shared knowledge [6, 12], law may be unable to effectively produce the beneficial outcomes sought by the organization in the first place.

How, then, should companies decide on the appropriate mechanisms to promote knowledge sharing and sourcing activities? To answer this question, we return to the MOA, which, coupled with the behavioral levers just described, offers a diagnostic and prescriptive framework for managing knowledge exchange behaviors. Rothschild [31, p. 31] notes that “in considering any public health or social issue, a target may be prone, resistant, or unable to accommodate the manager’s goals” based on the presence or absence of each of the MOA factors. This observation also holds in the context of an organization seeking to promote knowledge exchange among its employees. That is, prospective knowledge senders and knowledge recipients will be prone to engage in knowledge exchange if they
possesses each of the motivation, opportunity, and ability to do so. However, they will resist or be unable to exchange knowledge if they lack certain combinations of MOA factors. The most effective behavioral lever will depend on which combination of factors is present or lacking in a given situation, as shown in the framework presented in Table 2 (adapted from Rothschild [31]).

Table 2. MOA prescriptive framework

<table>
<thead>
<tr>
<th></th>
<th>Motivation</th>
<th>Opportunity</th>
<th>Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Opportunity</td>
<td>1</td>
<td>Education</td>
<td>2</td>
</tr>
<tr>
<td>Ability</td>
<td>Yes</td>
<td>5</td>
<td>Education, Marketing</td>
</tr>
</tbody>
</table>

Table 2 depicts eight possible population segments based on combinations of MOA that produce targets who are prone, unable, or resistant to engage in knowledge exchange activities. For each segment, combinations of one or more behavioral levers are proposed to encourage (motivation) or enable (opportunity/ability) the target to engage in the desired behavior. For example, segment 2 represents cases where employees possess the motivation and internal capability to exchange knowledge but lack the opportunity to do so because of external constraints. Such a case may arise, for instance, from high time pressure associated with the job that prevents the employee from having time to contribute her knowledge to a KR or search through it to find needed knowledge [19]. In this situation, education is not likely to produce change in behavior, as the employee is already motivated (i.e., recognizes the benefits of knowledge exchange) and has the ability (e.g., self-efficacy) to do so. Moreover, mandating the behavior through force of law is likely to produce only frustration, as the target is not unwilling to participate but is impeded by external constraints. Rather, the organization can engage in marketing (i.e., providing an incentive in exchange for the desired behavior) by offering extra pay or alleviating other time-consuming tasks in exchange for time spent engaging in knowledge exchange activities.

Consider another example of an employee who possesses the motivation to exchange knowledge, but lacks the ability and opportunity (segment 6). An illustration of this situation might be an employee who is willing to share knowledge but works in a demanding position and has low self-efficacy for using the electronic tools provided for knowledge exchange. In this case, education on how to use the provided tools can help the target overcome real or perceived limitations in her ability to engage in knowledge exchange. Moreover, marketing can be employed as described above to remove any external barriers that may impair her ability to share and source knowledge with other employees. As in the first example, simply mandating knowledge exchange (law) is unlikely to produce the desired behavior because it does not address the root cause of the target’s failure to behave.

It is important to note that law is employed in the framework only when motivation is absent (segments 3, 4, 7, and 8), and even then as a measure of last resort. In other words, when any absence of ability or opportunity accompanies lack of motivation, these should be addressed first through education and marketing. As observed by Rothschild [31, pp. 32-33], “often when opportunity and ability problems are remedied, motivation follows; in these cases, it may be proper for the manager to resist the temptation to resort quickly to the use of law... There are cases in which an unnecessary overuse of the law leads to resentment” This resonates with extant knowledge management literature, which suggests that effective knowledge exchange can rarely be achieved through organizational mandate [32]. Thus, even in segment 3 where targets do not exchange knowledge simply because they are unmotivated to do so, law should be used judiciously. In many cases “marketing provides opportunity, and with the onset of opportunity, motivation may increase” [31, p. 33].

In general, managers should employ education, marketing, and law according to the degree to which the self-interest of the target in performing the behavior aligns with the interests of the organization. In cases where the individual and the organization possess mutual interests but the individual is merely uninformed, education is the most appropriate tool. In cases where the target’s self-interest is at least somewhat consistent with that of the organization but additional persuasion is required, marketing is a useful tool to reinforce desired behavior. Law is most appropriate when the interests of the individual and the organization are not aligned and cannot be brought into alignment though information or the provision of rewards or other incentives.

The variables identified in the appendix and the eight cells identified in Table 1 provide the groundwork for research propositions that we plan to empirically validate in the context of knowledge exchange. This validation will proceed on two fronts: First, based on the alignment of knowledge exchange antecedents and MOA variables presented in the Appendix, the diagnosticity of the framework
will be tested by exploring how different levels of each antecedent relate to employees’ perceptions of their respective motivation, opportunity, and ability to engage in knowledge exchange. Another element of this validation concerns the relative salience of each antecedent in determining each MOA factor and the boundary conditions of these effects. For example, under some circumstances certain antecedents (e.g., extrinsic rewards) may be more relevant to knowledge exchange motivation than under others. Understanding how and when various antecedents are operant will help to refine knowledge exchange theory and offer practical insights to managers as they strive to identify knowledge exchange bottlenecks.

The second front for validating the framework concerns its prescriptive guidance relating to the three identified behavioral levers. While there is strong theoretical support, for example, that opportunity-related obstacles to knowledge sharing are best overcome through marketing efforts [31], such prescriptions have not yet been empirically tested. Our ultimate objective is to undertake an action research initiative that empirically links behavioral levers with knowledge exchange activities, thus providing a “knowledge exchange handbook” that will guide managers’ efforts to promote knowledge exchange within their organizations.

In short, we view the empirical validation of the proposed model as a long-term research goal that will require ongoing study among multiple organizations. As a first step, however, we have initiated collaboration with a large U.S. energy firm that will provide the initial test bed for the framework we have proposed. This firm and the associated data collection plan are described in the following section.

4. Research Site and Data Collection Plan

Our research site is a major energy company located (ENCo) in the Midwest US. ENCo is internationally integrated and has thousands of remote job sites spread across 30 countries. The company has ten thousand employees, about one-third of whom work globally. Approximately 10 years ago, ENCo rolled out an electronic KR that supports knowledge exchange among 100+ embedded CoPs each consisting of between 100 and 700 employees. Membership in the CoPs is voluntary, and approximately 30 percent of employees have participated.

For a CoP to be established, it needs a sponsor (senior mid-level manager), leader (mid-level manager selected by the sponsor who guided the CoP), coordinator (responsible for monitoring the knowledge exchange), and a critical mass of core members (responsible for driving connectivity). It also needs a clear business case that lays out a specific set of deliverables that directly promote the business’s strategic objectives. To ensure proper functioning of each CoP, ENCo “network health checks” are regularly performed. These health checks involve measuring members’ engagement (number of active members sharing and sourcing knowledge), assessing the number of transfers of lessons learned (to other CoPs that might be find this knowledge useful), and providing motivation, recognition and rewards to high-performing members. Within 10 years of inception of these CoPs, ENCo has been able to document annual cost savings and revenue generation in the millions of dollars.

Although the CoP-based knowledge exchange initiative has met with some success, the success has not been universal. Most of the CoPs have performed reasonably well, and many have excelled; however, several others are relatively stagnant. The chief knowledge officer has been troubled by this inconsistency and would like to understand reasons behind the disparity in CoPs’ performance. Compounding his concern, most of the senior engineers at the ENCo are in their mid-50s and will retire in the next 5-10 years, posing an imminent “brain drain” on the company if their collective expertise is not successfully captured and shared. Thus, the focus on understanding and promoting better knowledge exchange practices is of urgent and timely concern.

We plan to use the MOA-based knowledge exchange framework presented herein to identify barriers to knowledge exchange within ENCo and recommend an appropriate course of action for enhancing CoP performance to the senior management team. We are currently working with ENCo executives on a data collection plan that will include: (1) computer-recorded data of CoP members’ engagement within their respective CoP (number of requests posted and number of responses posted, number of knowledge thread transfers for the last 6 months); (2) user location, position, workgroup, and specialty, and basic demographic information; and (3) survey data that will focus on variables from the MOA framework. This data collection will allow us to test the MOA framework and determine its boundary conditions by exploring different CoPs while keeping other contextual variables constant.

5. Conclusion
This research-in-progress paper presents an overarching meta-theoretical framework for organizing and informing research and practice in the domain of interpersonal knowledge exchange. We present a review of the motivation-opportunity-ability (MOA) model of human behavior and show how it can be used to categorize previously studied knowledge exchange antecedents. Preliminary analysis of this literature review suggests that most of the research so far has focused on motivation and opportunity-related variables, with less attention devoted to ability-related variables. Applying Rothchild’s [31] approach, we also propose a prescriptive framework that characterizes eight MOA-based segments of a knowledge exchange population, and identifies ways that an organization can promote knowledge exchange through the mechanisms of education, marketing, and law. We believe that this novel perspective offers both theoretical structure and practical applicability for KM scholars and practitioners.

6. References


## Appendix

### Table 1. Knowledge exchange antecedents within the MOA framework (variables found to be significant shown in bold)

<table>
<thead>
<tr>
<th>Study</th>
<th>Knowledge Exchange-Related DVs</th>
<th>IVs</th>
<th>Ability (individual’s skills or proficiencies to engage in knowledge exchange)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray and Meister [22]</td>
<td>- Learning outcomes</td>
<td>- Intellectual demands</td>
<td>- Learning orientation</td>
</tr>
<tr>
<td>Bock et al. [3]</td>
<td>- Intention to share knowledge</td>
<td>- Knowledge sourcing [from documents, individuals, or groups]</td>
<td></td>
</tr>
<tr>
<td>Kankanhalli et al. [8]</td>
<td>- Use of KR for knowledge contribution</td>
<td>- Knowledge sharing norms</td>
<td></td>
</tr>
<tr>
<td>Wasko and Faraj [33]</td>
<td>- Knowledge contribution to community of practice (helpfulness1 and volume2)</td>
<td>- Perceived output quality</td>
<td></td>
</tr>
<tr>
<td>Bock et al. [5]</td>
<td>- Use of KR for knowledge seeking</td>
<td>- Image</td>
<td></td>
</tr>
<tr>
<td>DeSouza et al. [34]</td>
<td>- General intention to reuse knowledge</td>
<td>- Reciprocity</td>
<td></td>
</tr>
<tr>
<td>Gray and Durcikova [19]</td>
<td>- Knowledge sourcing from colleagues, documents, KR</td>
<td>- Reputation2</td>
<td></td>
</tr>
<tr>
<td>Kulkarni et al. [9]</td>
<td>- General knowledge use</td>
<td>- Perceived risk of knowledge consumption</td>
<td></td>
</tr>
</tbody>
</table>

### References
- Gray and Meister [22]
- Bock et al. [3]
- Kankanhalli et al. [20]
- Kankanhalli et al. [8]
- Wasko and Faraj [33]
- Bock et al. [5]
- DeSouza et al. [34]
- Gray and Durcikova [19]
- Watson and Hewett [2]
- Kulkarni et al. [9]
<table>
<thead>
<tr>
<th>Reference</th>
<th>Constructs</th>
</tr>
</thead>
</table>
| Bock et al. [6] | - Perceived usefulness of KR  
                     - User satisfaction with KR  
                     - Extrinsic rewards  
                     - Intrinsic rewards  
                     - Perceived output quality  
                     - KR quality  
                     - Organizational trust  
                     - Perceived searchability |
                     - KR knowledge contribution continuance  
                     - Intention  
                     - Attitude  
                     - Satisfaction  
                     - Confirmation  
                     - Image  
                     - Enjoyment in helping  
                     - Reciprocity  
                     - Organizational reward  
                     - Perceived usefulness  
                     - Management influence  
                     - Facilitating conditions  
                     - Social relationships  
                     - Seeking/contribution effort  
                     - Habit |
| He et al. [35] | - Knowledge seeking continuance intention  
                     - Perceived usefulness  
                     - Satisfaction  
                     - Seeker knowledge growth  
                     - Organizational reward  
                     - Perceived trust in KR users (mediated via perceived usefulness)  
                     - Normative Influence  
                     - Posters  
                     - Lurkers |
| Marett and Joshi [36] | - Information¹ and rumor sharing²  
                     - Intrinsic motivation¹  
                     - Extrinsic motivation¹,²  
                     - Normative Influence¹,² |
| Bateman et al [37] | - Reading threads, posting replies, moderating the discussion in an online community  
                     - Continuance community commitment  
                     - Affective community commitment  
                     - Normative community commitment  
                     - Posters¹,²  
                     - Lurkers² |
| Durcikova et al. [30] | - Solution innovation  
                     - Solution reuse  
                     - KR access [for knowledge sourcing]  
                     - Autonomy  
                     - Innovation |
| Kankanhalli et al. [7] | - Performance benefits  
                     - Knowledge reuse [from KR]  
                     - Intrinsic motivation  
                     - Extrinsic reward  
                     - Perceived KR capability [for capturing, packaging, distributing knowledge] |
| Kuo and Lee [21] | - Intention to use KR [general use intention]  
                     - Perceived usefulness  
                     - Empowering leadership  
                     - Perceived ease of use  
                     - Compatibility  
                     - Task-technology fit |
| Hung et al. [38] | - Knowledge sharing usefulness and creativity  
                     - Economic Reward  
                     - Reputation Feedback  
                     - Reciprocity  
                     - Altruism |
| Majchrzak et al. [39] | - Perceived reuse of knowledge for organizational improvement  
                     - Reputation  
                     - Assessment of KR  
                     - Adding contribution  
                     - Shaping contribution  
                     - Knowledge contribution  
                     - Knowledge depth  
                     - Knowledge breadth |
| Wang et al. [40] | - Current KR sourcing  
                     - Prior KR use by superiors  
                     - Prior KR use by peers  
                     - Prior KR use by subordinates  
                     - Prior KR use by extended professional population  
                     - Prior KR use |