2006

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THE EFFECTS OF GOAL ORIENTATIONS ON KNOWLEDGE SOURCING, KNOWLEDGE MANAGEMENT SYSTEM USAGE, AND LEARNING OUTCOME

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Abstract

This research investigates individual differences in the context of knowledge management system (KMS) usage, knowledge sourcing and learning outcome. Individual differences are measured for mastery, performance and avoidance goal orientations. Individuals with high mastery goal orientations prefer to master and develop new skills and knowledge. Those with high performance goal orientations prefer to compare their performances with others. Lastly, those with high avoidance goal orientations prefer to avoid a new task if they feel incompetent. User posting and reading activities in a KMS are examined over a 3-month period. Consistent with goal orientation theory, the results show that mastery goal orientation has an effect on reading, knowledge sourcing and learning outcome. In contrast, performance goal orientation has an effect only on posting, but not on reading. To a lesser degree than mastery goal orientation, avoidance goal orientation has an effect on reading, but not posting. These findings have important implications for both knowledge management researchers and practitioners.

Keywords: Knowledge Management, Individual Differences, Goal Orientation, Usage, Knowledge Management Systems, Knowledge Sourcing

1   INTRODUCTION

"Organizations learn only through individuals who learn." (Senge 1990, pp. 139)

Many organizations increasingly regard knowledge management (KM) as important strategic assets (Kogut & Zander 1992, Nonaka 1994, Davenport & De Long & Beers 1998). To build knowledge management organizations, they depend upon individuals who possess life-long learning attitudes, and those who are capable of continuous changes to create and improvise new knowledge (Senge 1990, Cohen & Levinthal 1990, Gray & Meister 2004). As bodies of knowledge grow at an exponential rate, managing and organizing knowledge effectively and efficiently for future use, thus, become very difficult. Many of them turn to Information Technology (IT) to improve the process of managing knowledge. These IT systems are known as knowledge management systems or simply KMS. Document management system, groupware, virtual conference and forum are the examples of KMS (KPMG 2000).

An electronic discussion forum is the most widely used technology for knowledge management. For instance, most of the best KM practitioners in the industry such as Buckman, HP, Teltech, Microsoft, and Ernst & Young depend on the forum to create and distribute knowledge (Buckman 1998, Davenport et al. 1998, Davenport & Prusak 1998, Buckman Laboratories 1999, Dixon 2000, Kankanhalli & Tan & Wei 2005), and they are reaping benefits from it (Davenport et al. 1998). One example of the electronic discussion forums is Lotus Notes discussion forum database (Orlikowski 1993, Wasko & Faraj 2000, Alavi

& Leidner 2001). However, little research focuses on this specific KMS. In addition, studies that observe the activities using this tool are even fewer.

In Information Systems (IS) research, individual differences have been important factors in affecting the usage of information technology. For instance, in the technology acceptance model (TAM), individual differences are important antecedents to the model (Davis 1986). Individual differences are also important antecedents affecting how executives scan and search information in executive information systems (e.g. Vandenbosch & Huff 1997). In addition, individual differences often play significant roles affecting how participants generate ideas in group support systems (e.g. Satzinger & Garfield & Nagasundaram 1999, Garfield & Talyor & Dennis & Satzinger 2001). Individual differences, no doubt, are also believed to be important factors influencing KM. (e.g. Senge 1990, Cohen & Levinthal 1990, Davenport & Prusak 1996, Dixon 2000). Though "the potential payoff from research investigating the relationships between management information systems (MIS) success and individual differences is high" (Zmud 1979, p. 975), few studies investigate the effect of individual differences in the KM context. Some notable exceptions are those by Szulanski (1996) and Gray & Meister (2004). In particular, to our knowledge, none of the studies looks at the effect of individual differences on actual KMS usage.

Motivated by the importance of KMS, the significant contribution of the discussion forum for creating and distributing knowledge, and the magnitude of the role of individual difference, this paper looks at the relationship among individual differences, the usage of KMS and the interaction among these factors. Specifically, it examines the relationship among individuals who possess stable dispositions toward learning, the actual usage of discussion forum by these individuals, knowledge sourcing and learning outcome. In a nutshell, this paper extends the knowledge sourcing model (Gray & Meister 2004) by including detailed analyses on individual differences as well as how these individuals use KMS.

The organization of this paper is as follows. The next section reviews the knowledge sourcing model which has been used to explain why individuals do access others' experience. Subsequently, this paper reviews goal orientation theory from educational psychology research; it also explains the state and trait of goal orientation. Further, it looks at trichotomous goal orientation. Afterwards, the research model and methodology section lists the hypothesized relationships based on these two theories. The result of the study shows support for most of the hypotheses. Lastly, the implication and conclusion section presents the contributions of this paper for both research and practice.

2 THEORETICAL BACKGROUND

2.1 Knowledge Sourcing Theory

Most of the KM literatures focus on both developing KM processes to improve knowledge sharing among individuals who seek and provide knowledge and on the factors why individuals may not be motivated to accept and apply knowledge. Drawing from educational psychology research (Dweck & Leggett 1988, Elliot & McGregor & Gable 1999, McGregor & Elliot 2002), the knowledge sourcing (KS) model uniquely addresses the questions on why individuals intentionally access others' knowledge (Gray & Meister 2004). There are four basic constructs in the KS model: intellectual demand, learning orientation, knowledge sourcing and learning outcome. Intellectual demand is defined as the perception of the normal cognitive load when performing his work. Learning orientation (to be consistent with the educational psychology research, it is known as mastery goal orientation in this paper) refers to individual who believes that his competence can be improved. Knowledge sourcing is defined as "the extent to which individuals intentionally access each others' expertise, experience, insights, and opinions" (Gray & Meister 2004, p. 821). Learning outcome refers to the degree of the enhancement in the cognitive structures of an individual over time. In the KS model, intellectual demand, and learning orientation are hypothesized as direct determinants of knowledge sourcing and as moderating variables from knowledge sourcing to learning outcome. Subsequently, learning orientation and knowledge sourcing are also hypothesized as direct determinants to learning outcome. Additionally, two other dispositional variables, risk aversion and reciprocation wariness, are included as

direct predictors of knowledge sourcing. It is hypothesized that risk-averse individuals tend to source more knowledge (i.e. seek knowledge) to reduce the possibility of making mistakes. On the other hand, individuals with high reciprocation wariness may not source knowledge because they are afraid of being exploited (Gray & Meister 2004).

This paper extends the KS model. Specifically, it extends goal orientation construct from a unidimensional construct in the KS model to a multidimensional construct by including two more goal orientations proposed by educational psychology researchers: performance and avoidance goal orientations (Elliot & Harackiewicz 1996, VandeWalle & Brown & Cron & Slocum 1999). These three dispositional traits are studied for their relationships with knowledge sourcing and learning outcome. Further, it also examines the actual usage of KMS, in particular, an electronic discussion forum.

2.2   Goal Orientation (GO)

Goal orientation theory (also known as achievement goal) has been linked to behavioural intention of individuals in response to achievement activities. Typically, there are two types of behaviours observed in the goal orientation research, one is mastery goal orientation (also known as learning orientation or task-involvement), and the other is performance goal orientation (also known as ego-involvement). Individuals with high mastery goal orientations concern with working hard to develop new skills, and view challenge as an opportunity to learn more. In contrast, individuals with high performance goal orientations concern with comparing their abilities to others, securing favourable judgment and avoiding failure, and they view challenge as a threat (for reviews see Nicholls 1984, Dweck & Leggett 1988, Dweck 1986, Ames 1992).

Particularly in the earlier studies in the field of educational research, goal orientation is conceptualised as a unidimensional construct with high mastery and performance orientations at the opposite ends of a single continuum (e.g. Dweck 1986, Elliott & Dweck 1988). In more recent research, mastery and performance orientations are conceptualised as two different dimensions (Ames & Archer 1988, Elliot & Harackiewicz 1994). Individuals may adopt both mastery and performance goal orientations at the same time; they also may pursue one or the other goal orientation.

Category	Mastery/ Learning GO	Performance GO	Avoidance GO
Preference	Prefer to master and develop new skills and knowledge	Prefer to compare his performance with others	Prefer to avoid a new task if he feels incompetent to others
Viewing success/ failure on a task	Success in a task is only a part of learning	Success in a task is doing better than others	Avoid failure, take easier task
Intrinsic/Extrinsic Motivation	Achievement or learning behaviour is usually intrinsically initiated	Achievement or learning behaviour is usually extrinsically initiated	Achievement or learning behaviour is usually extrinsically initiated
Focus	Focus on increasing his ability	Focus on securing favourable judgment for his competence	Focus on avoiding to be seen as incompetent
Social/Individual Norm	Individual reference norm	Social reference norm	Social reference norm

Table 1.   Trichotomous Goal Orientation

Researchers have also treated goal orientation as either a dispositional trait or a situational / state variable (Dweck 1986, Ames & Archer 1988, Dweck & Leggett 1988). The former treats goal orientation as a relatively stable individual characteristic. The latter argues that goal orientation may be influenced by situational characteristics such as competition, rewards, evaluation standards and others. In more recent literature, Button & Mathieu & Zajac (1996) have conceptually and empirically identified and summarised goal orientation as a state and as a trait. They explain that goal orientation as a trait could be a proximate antecedent of goal orientation as a state. For instance, if the external environment (situational) does not play a part in influencing which goals are preferred, the trait will regulate the behaviour. However, if the external environment takes effect, the trait could be superseded.

2.3   Trichotomous Goal Orientation

Elliot & Harackiewicz (1996) proposes a trichotomous framework for goal orientation. Citing inconsistent findings of performance goal orientation from prior literature, they propose that performance goal orientation may not be always related to maladaptive outcome. Therefore, they separate performance goal orientation construct into two different constructs. One is performance goal orientation, which is more adaptive; the other is avoidance goal orientation, which is more maladaptive. Individuals with high performance goal orientations concern with doing better than others, and securing favourable judgment. On the other hand, individuals with high avoidance goal orientations concern with avoiding negative judgment about their inability (for review see Vandewalle 1996, Elliot 1999). Table 1 summarises the trichotomous framework.

2.4   Knowledge Management Systems (KMS)

KMS is defined as "a class of information systems applied to managing organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (Alavi & Leidner 2001, p. 114). These IT-based systems include yellow pages (knowledge map/corporate directory), discussion forum, intelligent agent software, video conferencing, knowledge repository and knowledge discovery (KPMG 2000, Alavi & Leidner 2001, Gold &Malhotra & Segars 2001). These KMS are further divided into distributive (also known as repository, integrative) and collaborative applications (also known as network, interactive) (Zack & Serino 1996). Table 2 summarises the differences between these two applications.

Differences in	Distributive Application	Collaborative Application
Content	Once published, the content is stable	The content is dynamic and emergent
Object stored in KMS	Memos, reports, presentations, articles, research reports, product-oriented marketing materials, and techniques and methods	Like Notes, discussion databases full of know-how, also called "lessons learned."
Knowledge type	More explicit	More tacit
Example	Electronic knowledge repository	Notes discussion database, electronic discussion forum
Implemented in	Xerox	HP, Buckman, Ernst and Young
How the organizations apply the technology	To transfer explicit knowledge, organizations classify the reports, techniques, methods, and systematically put it in the storage. This is similar to the mnemonic functions of organizational memory which focuses more on description at the subsystem level **(Kankanhalli et al. 2005)**	To transfer tacit knowledge, organizations, such as HP's corporate education division, use community-based electronic discussion to capture tips, tricks, insights, and experiences into a Lotus Notes database and make them available to over 2,000 trainers and educators. **(Davenport et al. 1998)**
Other Terminologies	**Distributive Application is known as**	**Collaborative Application is known as**
In Alavi 2000	Repository	Network
In Zack 1999	Integrative	Interactive
In **Davenport et al. 1998**	Structured Internal Knowledge	Informal Internal Knowledge

Table 2.   A Summary of Two Different Types of KMS Applications

Discussion forum database, which is one of the collaborative applications and exists in a groupware technology such as Lotus, is among the most popular KMS tools (Orlikowski 1993, Wasko & Faraj 2000, Alavi & Leidner 2001). For instance, Buckman Laboratory, one of the leading practitioners in KM, uses the discussion forum extensively (Buckman Laboratories 1999, Dixon 2000). The company compares the forum to a message board or a conference area: "Think of the forum as a town where the inhabitants greet each other at the message board...not always there at the same time. Messages are left on the message board...subdivided into areas (sections) where messages relevant to specific topics are concentrated...collected together as a thread…function of the forum is the conference area where members can meet at a prearranged time...." (Buckman Laboratories 1999, p. 6).

3   RESEARCH MODEL AND METHODOLOGY

Figure 1 shows the general view of the research model for this study. Consistent with the KS model, we hypothesize:

H1a. *Knowledge sourcing will have an effect on learning outcome.*
H1b. *Risk aversion will have an effect on knowledge sourcing.*
H1c. *Reciprocation wariness will not have an effect on knowledge sourcing.*
H1d. *Mastery (learning) goal orientation will have an effect on learning outcome.*
H1e. *Mastery goal orientation will have an effect on knowledge sourcing.*

Instead of conceptualizing goal orientation as a unidimensional construct as in the KS model proposed by Gray & Meister (2004) (learning goal orientation in their terminology), this paper extends goal orientation to include the other two dispositional variables: performance and avoidance goal orientations. The learning behaviours of these two orientations are extrinsically initiated, and both rely on social reference norms. Further, educational psychology researchers have shown that these two orientations are only related to surface processing and disorganization, but unrelated to effort, persistence and semester grade (c.f. mastery is related to deep processing, effort, persistence and semester grade, but unrelated to disorganization) (Elliot et al 1999, Harackiewicz et al 2000). Therefore, consistent with the prior research in the field of educational psychology, we hypothesize:

H2a. *Performance goal orientation will not have an effect on knowledge sourcing.*
H2b. *Avoidance goal orientation will not have an effect on knowledge sourcing.*
H2c. *Performance goal orientation will not have an effect on learning outcome.*
H2d. *Avoidance goal orientation will not have an effect on learning outcome.*

In figure 1, the arrow from individual differences to actual usage of KMS describes the effects of mastery, performance and avoidance goal orientations on actual usage (measured by posting and reading activities). This line of inquiry is consistent with prior research where goal orientation theorists study the relationship between goal orientation and effort, time on task, study strategies, and preparedness (Ames & Archer 1988, Elliot et al. 1999, McGregor & Elliot 2002). Since individuals with high mastery goal orientations are self-referential and focus on learning, they will have more reading and posting activities in the discussion forum than others with low mastery goal orientations. On the other hand, (high) performance-oriented individuals focus on showing competence and securing favourable judgment from others. The way to show competence and secure favourable judgment from others in a KMS is through posting. Therefore, they will post messages more than others with low performance goal orientations. As avoidance orientation is maladaptive, it is unlikely to be related to posting and reading. This research builds and extends the theory to knowledge management (KM) study, and we formulate the following hypotheses:

H3a. *Mastery goal orientation will have an effect on reading.*
H3b. *Mastery goal orientation will have an effect on posting.*
H3c. *Performance goal orientation will have an effect on posting.*
H3d. *Performance goal orientation will not have an effect on reading.*
H3e. *Avoidance goal orientation will not have an effect on posting and reading.*

In the KS model, to minimise the possibility of committing errors, risk-averse individuals will tend to source more knowledge (i.e. seek knowledge) (see H2). However, posting and reading from KMS do not minimise the possibility of committing errors. Further, individuals with high reciprocation wariness are afraid of being exploited when they source knowledge from other people. Thus, they do not source knowledge (see H3). Similarly, these individuals also prefer not to post and read to avoid exploitations from others (Gray & Meister 2004). Therefore, consistent with the KS model, we hypothesize that

H4a. *Risk aversion will not have an effect on posting and reading.*
H4b. *Reciprocation wariness will not have an effect on posting and reading.*

MIS success is usually measured by user satisfaction, user performance, or actual usage (Zmud 1979). However, in the KS model and KM research in general, MIS success could not only be measured by whether people do intentionally access others' knowledge or by actual usage (i.e. whether people post to and read from KMS), but also by learning outcome. Consistent with the KS model, the dependent variables in this model include learning outcome. Specifically, for individuals who intentionally seek knowledge and get knowledge that they require (knowledge sourcing), their learning outcome can be improved (i.e. H1). However, posting activities in the KMS may not lead to better learning outcome. Similarly, according to KS model, unless individuals intentionally search for something that they want and read it (i.e. intentionally seek knowledge), arbitrary reading may not improve their learning outcome. Therefore, we hypothesize:

H5a. *Posting will not have an effect on learning outcome.*
H5b. *Reading will not have an effect on learning outcome.*
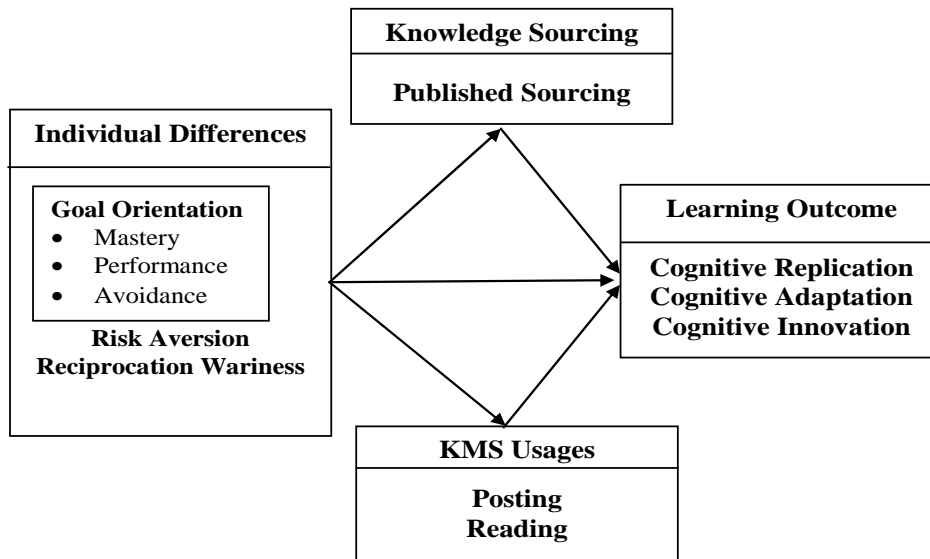

Figure 1.   The general view of the research model (For a more detailed model please refer to Figure 2)

3.1   Survey

A survey research is conducted with undergraduate students in Singapore who take a basic course about information systems. They come from different faculties, and they are required to use an electronic discussion forum to share and discuss information in the course. To motivate them to use the discussion forum, forum participation is evaluated. To prevent subjects from posting just to get incentives (i.e. mark), they are informed that the discussion is evaluated based on quality, and not on quantity. This control is similar to the KM practice where organizations (e.g., Buckman Labs) give incentives to the participants based on the quality of their postings.

The system design characteristics of this discussion database provide the participants with two main activities: post and read. All users are allowed to post and read messages about certain topics when it is convenient for them rather than at a specific time. The discussion forum puts together the same related posting by different people in a threaded discussion. For instance, if a person posts a message in the forum, others' comments on the message are grouped with the original note, and each person's comment is displayed for everyone to see.

3.2   Construct Measurement

Most instrument items are adapted from previous research. Some items are modified to fit the context of the research. Thirteen items of goal orientation construct which consist of five items for mastery, four for performance and four for avoidance goal orientations are from VandeWalle at al. (1999). Two items each for

risk aversion, reciprocation wariness and knowledge sourcing, and six items for learning outcome are from Gray & Meister (2004). In the KS model, originally there are six items for knowledge sourcing, which comprise three dimensions: published, dyadic, and group sourcing. As the discussion forum is an online forum, only two items for published sourcing are adapted. Six items for learning outcome are adapted from the KS model, and they consists of three dimensions: cognitive replication (i.e. the propagation of existing cognitive structure), adaptation (i.e. incremental change), and innovation (i.e. radical, discontinuous change). Posting and reading activities are taken directly from the computer logs (i.e. computer record) for a period of one semester. All items, except posting and reading usages, are rated either using a seven-point Likert scales ranging from not like me at all (1) to very much like me (7) (only for goal orientation questions) or using strongly disagree (1) to strongly agree (7) (for the other questions).

3.3 Instrument Administration

The survey is administered to students two weeks before the end of semester. The computer logs (more than three months) are taken after they have finished filling out the questionnaires. Out of 91 responses, 80 are usable.

4 DATA ANALYSIS AND RESULT

The research model described in figure 1 is analyzed using SPSS and Partial Least Squares (PLS graph). SPSS is used to analyze the descriptive statistics and factor analysis. PLS, a second generation multivariate method, is suitable for a small sample size and is not sensitive to normal distribution requirement (Chin 1998, Gefen & Straub & Boudreau 2000). It could also assess the measurement model and the structural model simultaneously in one operation. For testing path coefficients in PLS, t-values are assessed with a nonparametric test of significance known as bootstrapping.

Construct	#items	Alpha	Minimum	Maximum	Mean	Std. Dev
Mastery Goal Orientation	5	0.89	2.80	7.00	4.75	1.07
Performance Goal Orientation	4	0.86	1.50	7.00	4.23	1.25
Avoidance Goal Orientation	4	0.76	1.33	6.33	3.96	1.16
Risk Aversion	2	0.85	1.00	7.00	4.26	1.36
Reciprocation Wariness	2	0.64	1.00	6.00	3.30	1.11
Learning Outcome	6	0.80	4.00	7.00	5.48	0.77
Knowledge Sourcing	2	0.77	1.00	7.00	4.29	1.04
Posting (Actual Usage)	N/A	N/A	0.00	18.00	2.60	3.18
Reading (Actual Usage)	N/A	N/A	0.00	47.00	5.83	9.06

Table 3.   Descriptive Statistics

Table 3 shows the descriptive statistics for all constructs. Reliability (alpha) is calculated for all constructs except posting and reading. The reliabilities for all constructs are relatively high except for reciprocation wariness (0.64). As this two-item construct is derived from the KS model, it is kept for further analysis. Table 4 presents the factor analysis for all reflective constructs. Item loadings on their own constructs are much higher than loadings on others. None of the cross loadings on other constructs is higher than 0.40. Table 5 shows the average variance extracted (AVE) — all constructs share more variance with their indicators than with others. The results shown in table 3 (reliability), 4 (factor analysis), and 5 (AVE from PLS) confirm that the constructs have adequate convergent and discriminant validity.

Figure 2 shows the results of the structural model. The path coefficients from mastery (learning) and risk aversion to knowledge sourcing are significant, but the path coefficient from reciprocation wariness to

knowledge sourcing is not. The path coefficients from mastery goal orientation to learning outcome and reading are significant (especially to reading, with $p<0.01$), but the path coefficient from mastery goal orientation to posting is only marginally significant ($p=0.058$). Additionally, the path coefficient from performance goal orientation to posting is also significant, but not to reading. Consistent with the hypothesis, the path coefficient from avoidance goal orientation to posting is not significant, but contrary to the hypothesis, the path coefficient from avoidance goal orientation to reading is significant. The explained variance in knowledge sourcing (18.3%) is comparable with that for the KS model (17.1%) (Gray & Meister 2004). The explained variance in learning outcome is a high 44 percent. Individual differences constructs also explain approximately 17.2% and 19.4% of the variations in posting and reading respectively. Table 6 summarises the results of all hypotheses.

Rotated Component Matrix					
	Component				
	1	2	3	4	5
Master1	**0.84**	0.14	0.05	-0.15	0.01
Master2	**0.89**	0.20	-0.04	0.02	0.06
Master3	**0.83**	0.21	-0.18	-0.09	-0.01
Master4	**0.75**	0.14	0.19	-0.10	0.29
Master5	**0.68**	0.37	0.19	-0.13	0.11
Perfor1	0.26	**0.72**	0.07	-0.11	-0.02
Perfor2	0.20	**0.85**	0.11	-0.04	0.14
Perfor3	0.22	**0.76**	0.32	0.13	-0.08
Perfor4	0.19	**0.79**	0.32	0.10	0.24
Avoid1	0.25	0.09	**0.80**	0.00	0.15
Avoid2	-0.17	0.19	**0.64**	-0.08	0.18
Avoid3	-0.02	0.13	**0.79**	0.26	-0.01
Avoid4	0.05	0.23	**0.69**	0.23	-0.08
RiskAd1	-0.07	-0.09	0.19	**0.91**	0.09
RiskAd2	-0.22	0.09	0.11	**0.89**	0.04
ReciproWa1	0.34	0.08	0.07	0.04	**0.77**
ReciproWa2	-0.03	0.07	0.08	0.08	**0.87**
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					

Table 4.   Factor Analysis for Individual Differences (all reflective items).

	Learn	Perform	Avoid	RiskAd	ReciproWa	Sourcing	Outcome	Post	Read
Learn	**0.70**								
Perform	0.26	**0.71**							
Avoid	0.04	0.20	**0.68**						
RiskAd	0.05	0.00	0.07	**0.87**					
ReciproWa	0.14	0.04	0.02	0.00	**0.56**				
Sourcing	0.01	0.01	0.01	0.04	0.04	N/A			
Outcome	0.15	0.09	0.00	0.00	0.00	0.29	N/A		
Post	0.10	0.14	0.06	0.00	0.01	0.01	0.07	N/A	
Read	0.12	0.09	0.10	0.00	0.02	0.00	0.01	0.50	N/A

- *The bold typeface number on the leading diagonal are the square root of the variance shared between the constructs and their measures. Off diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements*
- *N/A = not available due to formative constructs and actual usages (post and read)*

Table 5.   Average Variance Extracted for each Construct

Hypotheses	Supported
H1a. Knowledge sourcing will have an effect on learning outcome.	Yes
H1b. Risk aversion will have an effect on knowledge sourcing	Yes
H1c. Reciprocation wariness will not have an effect on knowledge sourcing.	Yes
H1d. Mastery goal orientation (GO) will have an effect on learning outcome	Yes
H1e. Mastery GO will have an effect on knowledge sourcing	Yes
H2a. Performance GO will not have an effect on knowledge sourcing	Yes
H2b. Avoidance GO will not have an effect on knowledge sourcing	Yes
H2c. Performance GO will not have an effect on learning outcome.	Yes
H2d. Avoidance GO will not have an effect on learning outcome.	Yes
H3a. Mastery GO will have an effect on reading.	Yes
H3b. Mastery GO will have an effect on posting.	Marginally
H3c. Performance GO will have an effect on posting.	Yes
H3d. Performance GO will not have an effect on reading	Yes
H3e. Avoidance GO will not have an effect on posting and reading.	Partial
H4a. Risk aversion will not have an effect on posting and reading	Yes
H4b. Reciprocation wariness will not have an effect on posting and reading.	Yes
H5a. Posting will not have an effect on learning outcome	Yes
H5b. Reading will not have an effect on learning outcome	Yes

Table 6.   A Summary of All Hypotheses
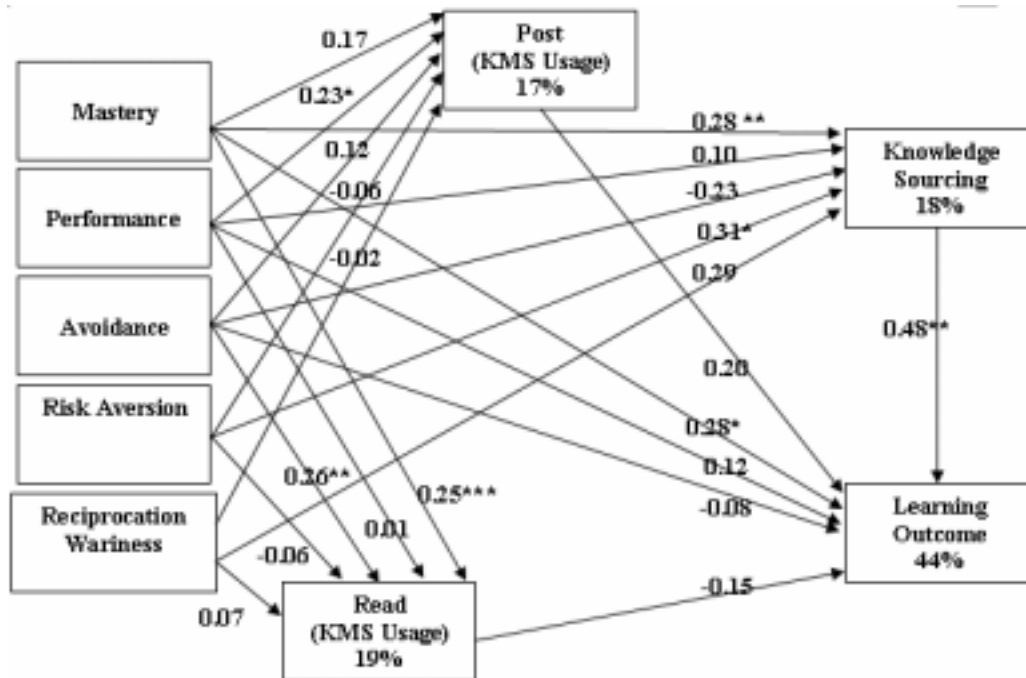
Significance: * means $p < 0.05$;   ** means $p < 0.025$;   *** means $p<0.01$

Figure 2.   Results of PLS Structural Analysis

5   IMPLICATIONS AND CONCLUSION

This paper has several implications for theory development: firstly, this paper shows the important individual differences that have effects on knowledge sourcing, system usage and learning outcome. For knowledge sourcing, only mastery goal orientation and risk aversion have significant effects. For learning outcome, only mastery goal orientation has a significant effect. The results show that performance goal orientation is related positively to posting usage while both mastery and avoidance goal orientations are related positively to

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reading usage. The model shows that it is important to distinguish two different types of usage. KM researchers should also consider different goal orientations, as the findings show that these are important for different types of usage.

This paper also contributes to the KM practice in the following ways. It highlights the importance of understanding individual differences in using KMS. Though this paper describes three different goal orientations, it does not suggest that individuals with any particular goal orientations (e.g. a high avoidance goal orientation) are extremely maladaptive. Rather, it points out that different orientations may lead to emphasis of different activities in a KMS. For instance, high performance orientation leads to more posting, and high mastery or avoidance orientations lead to more reading. A study in the field of marketing demonstrates that goal orientations could be altered through supervisor feedback (Sujan & Barton & Nirmalya 1994). Thus, organizations can influence goal orientations as an approach to encourage KMS usage.

This paper also calls attention to managers that "organizations learn only through individuals who learn" (Senge 1990). The result shows that only mastery goal orientation has an effect on reading and learning outcome. Furthermore, the result also indicates that only performance goal orientation has an effect on posting. In a KMS, reading can be sustained only if there are good postings. Therefore, only by emphasizing both mastery and performance goal orientations can learning organizations be built successfully.

Future research may investigate more on the relationship between state and trait goal orientations. Treating goal orientation as situational characteristics (i.e. state) which can be influenced by competition, rewards, or evaluation standards is feasible as researchers point out that the trait could be superseded by external environments (Button et al. 1996). Further, the potential payoff of investigating situational goal orientation in KM would be high since researchers and practitioners may be able to influence goal orientations to the desired values. Future research may also investigate whether goal orientations have effects on posting and reading content. For instance, researchers may use content analysis to categorise and scrutinise postings (Hara & Bonk & Angeli 2000, Garrison & Anderson & Archer 2001). Additionally, though the electronic discussion forum used in this study is similar to those used in organizations, and though the incentives given to the subjects and the forum evaluation may be corresponding to those in organizations, the study can be replicated in organizational settings.

*** As the space is limited, the survey items are not included. However, they are available upon request from the first author*.

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