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Understanding knowledge management system usage antecedents: An integration of social cognitive theory and task technology fit

Tung-Ching Lin, Chien-Chih Huang *

Department of Information Management, National Sun Yat-sen University, 70 Lien-Hai Road, Kaohsiung 804, Taiwan, ROC

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ABSTRACT

The factors influencing KMS usage are of major concern to the MIS community. Among the diverse theories employed to help understand this is task technology fit (TTF), which considers the needed technological characteristics of the task as a major factor determining usage. This theory, however, ignores the personal cognition dimension, which has been found to affect the use of an IS. By integrating TTF and social cognitive theory (SCT), we attempted to determine the key factors affecting KMS usage in IT, the organizational task, and personal cognition. Through a survey of 192 KMS users, task interdependence, perceived task technology fit, KMS self-efficacy, and personal outcome expectations were found to have substantial influences on KMS usage. Among the key factors, KMS self-efficacy was found to be especially important as it was substantially and positively correlated to perceived task technology fit, personal and performance-related outcome expectations, and KMS usage.

1. Introduction

Knowledge management systems (KMSs) increase organizational learning by capturing internal knowledge and making it available to employees for reuse [9,15]. KMSs maintain corporate history, experience and expertise of long-term employees. Employee knowledge is incorporated into the systems that help them and their successors run the business.

However, KMS are not always successful and this led us to considering the problem *via* theory of task/technology fit (TTF) [10] in which Goodhue and Thompson suggested that technology utilization was governed by the match between technology features and the requirements of the task. Also, as Dishaw and Strong [11] suggested, is the construct of perceived computer self-efficacy [7,8], which examines users' beliefs regarding their ability to perform specific tasks using an IS. In context of knowledge sharing, self-efficacy especially plays a dominant role [18]. Among the types of knowledge that employees can derive from self-reflection, none is more central than their belief in their ability to deal effectively with different situations [32]. The theory that gives prominent explanations to self-efficacy is social cognitive theory (SCT) [4]. It notes that expectation of positive outcomes of a behavior is meaningless if the user feels unable to execute it successfully.

Therefore, our study was intended to extend task technology fit (TTF) with SCT to include major cognitive forces in investigating the determinants of KMS usage. SCT provides personal cognition supplement to TTF and thus, the integrated theory helped us to understand KMS usage from the perspective of organizational task, technology, and personal motivation perspectives.

2. Theoretical background and hypotheses

Knowledge can be treated as either an object or a process. Successful knowledge sharing depends on knowledge contributors populating KMSs with content and knowledge seekers retrieving content for its reuse; the same individual may be a contributor or a seeker at different times. Researchers have generally measured KMS usage by frequency of use [29] without distinguishing whether the interaction was by a contributors or seeker. Such simultaneous inclusion broadens the spectrum and better reflects real condition of KMS usage.

Although KMSs have appeared in various forms and formats, they can be broadly categorized into technologies that support a personalization approach and those that support a codification approach [16]. This corresponds to two models proposed by Alavi [1]: the network and repository. The former emphasizes the linkage among people for the purpose of knowledge exchange, while the latter emphasizes codification and storage of knowledge to facilitate knowledge reuse. Furthermore, Chait [6] argues that a KMS should have four information elements about: (i) staff (to help the organization identify people with skills and knowledge), (ii)

* Corresponding author. Tel.: +886 7 5254713; fax: +886 7 5254799.
E-mail address: tw_cchuang@hotmail.com (C.-C. Huang).

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customers and clients (to help support and serve them), (iii) methodologies and tools (to deliver quality and consistent service in an efficient and effective manner), and (iv) practices and groups (to keeps everyone up-to-date). Based on these elements, we defined a KMS as an IS developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application [3,17].

2.1. TTF and SCT

TTF theories argue that the use of a technology may result in different outcomes, depending upon its configuration and the task for which it is used [14]. TTF models have four key constructs: task characteristics, technology characteristics, which combine to affect the TTF, which affects the outcome (performance or utilization). Tasks are broadly defined as the actions carried out in turning inputs to outputs in order to satisfy information needs. Technology includes a wide range of IT, such as hardware, software, data, user-support, etc.

Table 1 summaries relevant studies on TTF.

Fig. 1 illustrates the research model.

2.2. Linking TTF to KMS Usage

Perceived TTF depends on the agreement between the perceived capabilities of the technology, the needs of the task, and the competence of the users [26]. Goodhue and Thompson developed a ''technology-to-performance chain'' model, in which technology utilization depended on the fit between the technology and the tasks it supported; this is also mooted as true in the use of KMS. Therefore, perceived TTF was predicted to be a significant precursor to KMS usage:

H1. Perceived task technology fit is positively related to KMS usage.

KMSs connect people with reusable codified knowledge, and facilitate conversations to create new knowledge. Therefore, KMS characteristics here are designated as the technological dimension that cover business intelligence, collaboration, distributed learning, knowledge discovery, knowledge mapping, and opportunity generation in carrying out their tasks [30].

Obviously, if a KMS quality does not meet the users' expectations, it will be ignored due to lack of perceived usefulness [35]. Therefore, we proposed that satisfaction about KMS characteristics would contribute to the user's sense of fit between task and KMSs.

H2. KMS characteristics are positively related to perceived task technology fit.

According to Kankanhalli, Tan and Wei, two important characteristics for KMS usage are task tacitness and interdependence. The first refers to the degree of perceived implicit to explicit knowledge needed to complete the task. Alavi and Leidner [2] argued that the rate of knowledge transfer may be contingent upon task tacitness. The costs of searching for relevant solutions in KMSs may be higher if these solutions involve more tacit knowledge. Therefore, we proposed:

H3. Task tacitness is negatively related to perceived task technology fit.

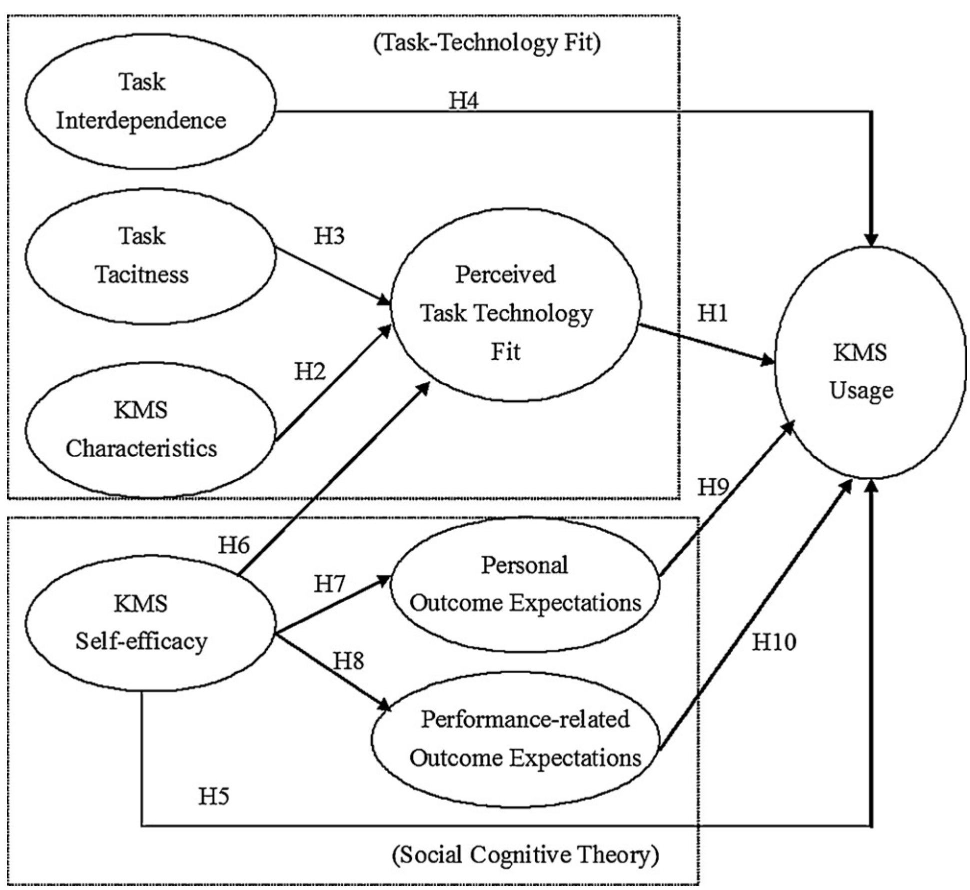

Fig. 1. Research model for KMS usage.

Task interdependence involves the degree to which individuals perceive that they interact with and depend upon others to accomplish their work. People whose task and performance depend highly on others are likely to share information, knowledge, or materials [33]. A higher degree of task interdependence leads to more coordination and innovative information. Although task interdependence might be a precursor to perceived TTF, such correlation lacked empirical support. Therefore, we proposed:

H4. Task interdependence is positively related to KMS usage.

2.3. Linking social cognitive theory (SCT) to KMS usage

Self-efficacy reflects an individual's belief in his or her capability to perform a task and thus that perceived self-efficacy would promote the sharing of knowledge [13]. Therefore, we proposed:

H5. KMS self-efficacy is positively related to KMS usage.

If a knowledge contributor/seeker is confident that she or he can use the technology effectively and knows how to solve the problem effectively with a KMS, then the user should be confident with the TTF. Several studies have confirmed such a positive relationship [25]. Therefore,

H6. KMS self-efficacy is positively related to perceived task technology fit.

Outcome expectations may be intrinsic, like the pleasure derived from knowledge sharing, or extrinsic, such as monetary reward and promotion. Compeau and Higgins defined two types of outcome expectations: performance-related and personal computer use.

SCT posits that self-efficacy has direct impact on outcome expectations [5]. The positive expectations will be meaningless if the user doubts his or her ability to execute the behavior; thus in the context of KM, people who believe they are able to use KMSs with great skill are more likely to expect positive outcomes. Thus we hypothesized:

H7. KMS self-efficacy is positively related to personal outcome expectations.

H8. KMS self-efficacy is positively related to performance-related outcome expectations.

Without incentives, people are seldom willing to waste their time and effort in making contributions. According to economic exchange theory, an individual's behaviors are chiefly motivated by self-interest. Social exchange theory also posits that if employees believe they could improve relationships with other employees by offering knowledge, they develop a more positive attitude towards knowledge sharing [36]. We felt that individuals with positive outcome expectations were more likely to share their knowledge through a KMS. Therefore,

H9. Personal outcome expectations are positively related to KMS usage.

H10. Performance-related outcome expectations are positively related to KMS usage.

3. Research methodology

3.1. Sampling procedure

A survey method was used to test our research model. The samples were solicited from 500 people randomly selected from a list of 2000 MIS alumni of a university, who work in either local or multi-national companies in Taiwan.

In the e-mail welcoming and thanking them for participating in the survey, there was a hyperlink to our online survey web pages between 11 May and 8 June 2006. We programmed the web pages to ensure all the participants answered every item. On the cover page, we told our respondents that we would ensure their privacy when filling out the questionnaire and explained that *KMSs are IT-based systems developed to support and enhance the organizational processes of knowledge creation*, *storage*, *retrieval*, *transfer*, *and application*. Furthermore, we gave every

Table 1
Summary of relevant studies on task technology fit

Author	Study content	Findings
First point of view: TTF extended with TAM		
[11]	An integrated model, *TAM and TTF*, for exploring factors that explain software utilization and its link to user performance	The model provides more explanatory power than either model alone
[23]	A combined model, *TAM and TTF*, to determine the merits of workplace technology adoption models in consumer e-commerce	Support for the use of the TAM to predict online shopping activity, both intention to shop online and make purchases. Also found that TTF was a valuable addition for online shopping tasks
[34]	A revised *TAM* and integrated it with *TTF*, network externality, subject norm, computer self-efficacy and computer enjoyment variables to investigate determinants of EUC acceptance	Perceived usefulness, perceived ease of use, and computer enjoyment all directly influenced actual usage. Network externality had a direct effect on perceived ease of use (PEOU). TTF had a direct influence on PEOU
Second point of view: TTF extended with TPB		
[20]	An integrated sociotechnical model, *TPB and TTF*, to investigate the potential antecedents to usage of EKR for knowledge seeking	Perceived output quality directly affected EKR usage for knowledge seeking. Resource availability affected EKR usage for knowledge seeking, particularly when task has little that is tacit and incentives affected EKR usage when task interdependence was high
[24]	Explore influence of *perceived IT beliefs*, *TTF*, *attitude*, *self-efficacy*, and *subjective norm* on behavioral intention (BI) to adopt IT in hotels in Hangzhou, China	Attitude, self-efficacy, and subjective norm were positively related to BI. Perceived IT beliefs had influence on intention through attitude formation. TTF appeared to interact with perceived IT beliefs in attitude formation
Third point of view: TTF extended with Individual ability constructs		
[19]	Synthesize the influence of perceptual factors (*TTF*, goal setting, and *self-efficacy*) in developing a conceptual model and exploring these factors impact on the perceived performance of web-based SDSS	Perceived TTF and goal commitment have a major role in the perceived performance of SDSS. Self-efficacy has strong impact on TTF and on the expected benefits of using SDSS
[25]	Proposed a modified TTF model that focused on *individual differences* to explore the factors affecting the adoption of mobile commerce in the insurance industry	Position experience, cognitive style, and computer self-efficacy were major factors predicting the fit of PDA technology in insurance tasks. Other demographic variables were not found to be significant

participant a small gift to increase the response rate. Of the 500 participants originally solicited, 192 usable data sets were used for analysis (after deleting 2 obviously extreme cases), yielding a response rate of 38.4%.

Non-participation mostly resulted from invalid e-mail addresses or time constraints (some stated that they did not have time to complete the survey). Independent t-test did not show any statistically significant difference between respondents and non-respondents in terms of gender, age, or work experience. Early and late respondents did not differ on these measures either. Therefore, non-response biases were minimal.

Since the analysis unit for the research model was the individual employee from different organizations, common method variance was reduced (though all, were, of course in Taiwanese companies). Additionally, questionnaire items were so arranged that dependent variables followed rather than preceded the independent variables, and some reverse coded items were also included. Finally, Harman's single-factor test was assessed, showing that eight factors with an eigenvalue greater than one and no single factor explained most of the variance (the variances explained range from 3.8% to 15.9%). Such results proved the absence of a significant variance common to the measures, so common method bias was minimized.

Table 2 lists the demographic information collected from respondents on his/her work position, industry area, educational level, gender, work experience, work experience with KMS, age, and number of employees in the company. Most of the participants (22%) worked in IT-related industry (22%), followed by those in manufacturing (21%), and in a service industry (16%). The job position of respondents show a well-mixed distribution, including senior managers (14%), middle managers (22%), supervisors (23%), and non-managers (40%). Participants with over 4 years' experience in using KMS accounted for 85%, indicating that most of them were familiar with KMS. About half of the respondents were in companies with over 500 employees.

Table 2
Demographic characteristics of the sample

Demographic variable	Sample Composition (N = 192)
Gender	
Male	123 (64.1%)
Female	69 (35.9%)
Education	
College (2 years)	27 (14.0%)
Bachelor (4 years)	77 (40.1%)
Master	85 (44.3%)
Ph.D.	3 (1.6%)
Age	
21–30 years	9 (4.6%)
31–40 years	105 (54.7%)
41–50 years	61 (31.8%)
51 years or above	17 (8.9%)
Work experience	
2 years or below	12 (6.3%)
3–5 years	17 (8.9%)
6–10 years	54 (28.1%)
11–15 years	50 (26.0%)
16–20 years	31 (16.1%)
21 years or above	28 (14.6%)
Work experience with KMSs	
1 year or below	9 (4.7%)
2–3 years	19 (9.9%)
4–6 years	58 (30.2%)
6–9 years	71 (36.9%)
10 years or above	35 (18.3%)
Work position	
Senior manager	27 (14.1%)
Middle manager	43 (22.4%)
Supervisor	45 (23.4%)
Clerical	35 (18.2%)
Technical	42 (21.9%)
Industry	
Manufacturing	40 (20.8%)
Service	30 (15.6%)
Hospital	12 (6.3%)
Government	18 (9.4%)
Information technology	42 (21.9%)
Finance	11 (5.7%)
Education	27 (14.0%)
Others	12 (6.3%)
Number of employee	
Under 50 people	44 (22.9%)
51–100 people	21 (10.9%)
101–500 people	43 (22.5%)
501–1000 people	35 (18.2%)
10,001 people or above	49 (25.5%)

3.2. Operationalization of constructs

To ensure content validity of the scales, we used previously tested questions, some modified for our use, to measure our model constructs. Table 3 summarizes the definition and their sources. The questionnaire was administered in Chinese and thus it had to be translated; backward translation was therefore used to ensure consistency between the Chinese and the original English versions of the instrument. Three research assistants majoring in English linguistics were employed in this effort; versions were then compared and discrepancies resolved by a committee including an English professor and the three RAs.

We pre-tested our Chinese questionnaire by asking five professionals in the KM area to assess its logical consistency, ease of understanding, sequence of items, and contextual relevance. Based on the collected comments, we made several minor modifications in the wording and readjusted the item sequence.

After that, a pilot study was conducted; in this, five Ph.D. students whose individual research area was related to KM and thirty MIS-major master degree students gave their comments and suggestions on the item contents and instrument structure.

All answers were provided on a Seven-point Likert scale varying from "strongly disagree" (1) to "strongly agree" (7). The questions for measuring task tacitness were directly adopted from those designed [20] to reflect the three key dimensions of codifiability, observability, and complexity of task knowledge. The five items for measuring task interdependence and items for measuring KMS characteristics were based on the definitions of Pearce and Gregersen and were modified from Gold et al. [12]. The questions for measuring perceived task technology fit and KMS self-efficacy were adopted from Jarupathirun and Zahedi's study and were modified to fit in the context of KMS. Items for measuring performance-related and personal outcome expectations were adapted from Compeau and Higgins's study, modified for KMS usage. We adopted [21,22] for measures of employees' frequency of KMS usage in contributing and searching for knowledge.

Three items, because of their low loading, were ultimately deleted: the measurement for complexity of task knowledge (for task tacitness), the measurement for business intelligence of KMS (for KMS characteristics), and one for performance-related outcome expectation measurement for less reliance on clerical support staff (for performance-related outcome expectations).

Table 3
Formal definitions of constructs

Construct (abbreviation)	Definition	Authors
KMS characteristics (KMSC)	The technological dimensions that are part of effective knowledge management include business intelligence, collaboration, distributed learning, knowledge discovery, knowledge mapping and opportunity generation in carrying out their tasks	[12]
Task interdependence (TI)	The degree to which individuals perceive that they interact with and depend upon others to accomplish their work	[28]
Task tacitness (TT)	The balance of tacit versus explicit knowledge required to effectively complete the task	[20]
Perceived task technology fit (TTF)	The perception that the KMS capabilities match with the user's task requirements	[19]
KMS self-efficacy (KMSE)	The belief of having the ability in using KMSs to execute courses of action required to attain designated types of performance	[19]
Personal outcome expectation (OEPR)	Expectations associated with using KMSs related to expectations of change in image or status or to expectations of rewards, such as promotions, raises, or praise	[8]
Performance outcome expectation (OEPF)	Expectations associated with improvements in job performance (efficiency and effectiveness) associated with using KMSs	[8]
KMS usage (USA)	The degree of use of KMSs in searching and contributing knowledge	[21,22]

All measurement scales and their loadings are summarized in Table 4.

4. Data analysis and results

PLS, which utilizes a correlational, principle component-based approach to estimation, was used to test the model. We preferred this to LISREL because our interest was in assessing the predictive validity of KMS usage antecedents measured separately from technological, task and cognitive responses; this made us focus more on the paths. In addition, lower sample sizes, such as 30 observations provide robust results. Therefore, the sample of 192 was adequate.

The analysis involved two stages: (1) assessment of the measurement model for item reliability, convergent validity, and discriminant validity, and (2) assessment of the structural model. The item weights and loadings indicated the strength of the measures, while the estimated path coefficients indicated the strength and sign of the theoretical relationships. In addition, path significance levels, were estimated by the bootstrap method. Finally, the predictive validity was assessed by examining the R^2 and the structural paths.

4.1. Assessment of the measurement model

The internal consistency of each dimension was assessed by computing the Cronbach's alpha; the lowest value was 0.70 for task tacitness; all the others were well above Nunnally's criterion of 0.70.

In our study as summarized in Table 4, all of the items had loadings over 0.70 for their corresponding constructs except KMSC2 (with a loading of 0.62, still acceptable and included in further analysis).

As summarized in Table 5, the CRs for the constructs with multiple items ranged from 0.87 to 0.97, and AVEs ranged from 0.64 to 0.85, both of these are well above the approved cutoff, exhibiting acceptable convergent validity.

Discriminant validity verifies whether each construct is unique. Table 5 shows the diagonal elements representing the square root of the variance shared between the constructs and their measures; the off-diagonal elements are the correlations among the constructs. All diagonal elements are greater than their corresponding off-diagonal elements and thus the respective constructs exhibit acceptable discriminant validity.

However, some constructs might be multicollinear; there is a high correlation (0.75) between OEPF and OEPR. Their items, nonetheless, still load higher on their own construct than on others in the model. Therefore, the items demonstrate satisfactory convergent and discriminant validity.

Criterion-related validity shows how closely the items in the instrument are related to the KMS usage construct. The item measuring this could be assumed to be a valid measure and used as a criterion scale provided that all other KMS usage items in the measurement correlated with it. All correlation coefficients were positive (>0.7) and significant at the 0.01 level. Thus criterion-related validity was acceptable.

4.2. Assessment of the structural model

The path significance of each hypothesized association in the research model and the variance explained (R^2) by each path was then examined. All hypotheses except hypothesis 10 were supported. Fig. 2 shows the result of path coefficients. As can be seen, task interdependence ($\beta = 0.13$, t-value = 2.19), perceived task technology fit ($\beta = 0.28$, t-value = 3.15), KMS self-efficacy ($\beta = 0.39$, t-value = 4.10) and personal outcome expectation ($\beta = 0.17$, t-value = 2.21) all demonstrated significant relationships with KMS usage. Therefore, hypotheses 4, 1, 5, and 9 were supported. The relationship between performance-related outcome expectation and KMS usage ($\beta = -0.05$, t-value = -0.89) was not significant. Thus Hypothesis 10 was not supported. The R^2-value for KMS usage was 0.497, indicating approximately half of the variance in usage was explained by the model.

In addition, both personal outcome expectations ($\beta = 0.56$, t-value = 8.73) and performance-related outcome expectations ($\beta = 0.66$, t-value = 13.5) were significantly influenced by KMS self-efficacy. Therefore, hypotheses 7 and 8 were supported. This was consistent with the proposition of SCT. The percentages of the variance explained (R^2) of personal and performance-related outcome expectation were 31.7% and 42.9%, respectively.

Finally, as for the predeterminants of perceived task technology fit, KMS characteristic ($\beta = 0.32$, t-value = 3.55) and KMS self-efficacy ($\beta = 0.38$, t-value = 4.98) showed a significant positive relationship with perceived task technology fit. Furthermore, task tacitness ($\beta = -0.173$, t-value = -2.02), as hypothesized, showed significantly negative relationships with perceived task technology fit. Hypotheses 3, 2 and 6 were all supported. Therefore, the results supported the theory of TTF.

Table 4
Summary of measurement scales

Construct	Measure	Mean	S.D.	Loading
Task interdependence Cronbach's alpha = 0.87				
TI1	I work fairly independently of others in my work (reverse code)	6.12	1.02	0.72
TI2	I frequently must coordinate my efforts with others	5.87	1.15	0.90
TI3	In order to do my job, I need to spend most of my time talking to other people	5.76	1.02	0.87
TI4	I can plan my own work with little need to coordinate with others (reverse code)	5.14	1.37	0.72
TI5	My own performance is dependent on receiving accurate knowledge from others	5.32	1.11	0.82
Task tacitness Cronbach's alpha = 0.70				
TT1	Knowledge used is codifiable (reverse code)	3.30	1.35	0.88
TT2	Knowledge used is observable (reverse code)	3.39	1.22	0.88
KMS Characteristic Cronbach's alpha = 0.93				
My organization uses KMSs that allow. . .				
KMSC1	Employees to collaborate with other persons inside the organization	5.14	1.20	0.77
KMSC2	Employees to collaborate with other persons outside the organization	4.22	1.41	0.62
KMSC3	Employees in multiple locations to learn as a group from a single source or at a single point in time	4.76	1.49	0.78
KMSC4	Employees in multiple locations to learn as a group from a multiple source or at multiple points in time	4.93	1.51	0.81
KMSC5	Employees to search for new knowledge	5.09	1.27	0.85
KMSC6	Employees to map the location (i.e., an individual, specific system, or database) of specific types of knowledge	4.91	1.30	0.83
KMSC7	Employees to retrieve and use knowledge about its products and processes	5.03	1.29	0.85
KMSC8	Employees to retrieve and use knowledge about its markets and competition	4.52	1.44	0.82
KMSC9	Employees to generate new opportunities in conjunction with its partners	4.43	1.41	0.82
Perceived task technology fit Cronbach's alpha = 0.97				
In helping me to perform the assigned task(s), . . .				
TTF1	The functionalities of KMSs were very adequate	5.18	1.17	0.94
TTF2	The functionalities of KMSs were very appropriate	5.09	1.20	0.93
TTF3	The functionalities of KMSs were very useful	5.19	1.12	0.93
TTF4	The functionalities of KMSs were very compatible with the task	5.01	1.13	0.94
TTF5	The functionalities of KMSs were very helpful	5.15	1.14	0.93
TTF6	The functionalities of KMSs were very sufficient	4.58	1.28	0.85
TTF7	The functionalities of KMSs made the task very easy	4.92	1.18	0.89
TTF8	In general, the functionalities of KMSs were best fit the task	4.86	1.21	0.86
KMS Self-efficacy Cronbach's alpha = 0.94				
In achieving the assigned task(s), I feel that. . .				
KMSE1	The level of my capability in using KMSs to successfully finish the job is very high	5.08	0.96	0.89
KMSE2	The level of my understanding about what to do in using KMSs is very high	5.17	0.95	0.91
KMSE3	The level of my confidence in using KMSs is very high	5.18	0.96	0.93
KMSE4	The level of my comfort in using KMSs is very high	5.09	0.98	0.88
KMSE5	In general, the level of my skill in using KMSs for accomplishing the assigned task(s) is very high	5.23	0.98	0.91
Performance outcome expectation Cronbach's alpha = 0.94				
If I use KMSs, . . .				
OEPF1	I will be better organized	5.45	0.93	0.90
OEPF2	I will increase my effectiveness on the job	5.45	0.85	0.94
OEPF3	I will spend less time on routine job tasks	5.26	1.03	0.84
OEPF4	I will increase the quality of output of my job	5.39	0.93	0.91
OEPF5	I will increase the quantity of output for the same amount of effort	5.44	0.95	0.90
Personal outcome expectation Cronbach's alpha = 0.92				
If I use KMSs, . . .				
OEPR1	My co-workers will perceive me as competent	5.29	1.03	0.86
OEPR2	I will increase my sense of accomplishment	5.29	1.00	0.87
OEPR3	I will increase my chances of obtaining a promotion	4.65	1.26	0.87
OEPR4	I will be seen as higher in status by my peers	4.91	1.05	0.90
OEPR5	I will increase my chances of getting a raise	4.38	1.28	0.84
KMS Usage Cronbach's alpha = 0.94				
USA1	I frequently use KMSs to search knowledge in my work.	5.05	1.19	0.90
USA 2	I frequently use KMSs to contribute knowledge in my work	4.79	1.21	0.92
USA 3	I regularly use KMSs to search knowledge in my work	4.86	1.21	0.93
USA 4	I regularly use KMSs to contribute knowledge in my work	4.67	1.20	0.94

The percentage of the variance explained (R^2) of perceived task technology fit was 40.3%.

5. Discussion

5.1. Summary of results

5.1.1. Academic and practical implications

This study has extended TTF by adding aspects of SCT. Outcome expectations are then similar to 'perceived usefulness', 'relative advantage' and 'image' and 'behavioral beliefs'; they are, to some sense, equivalent to the addition of TAM to the TTF. Our integrated model explains about 50% of the variance in KM system usage, showing an excellent reflection of TTF and facets of personal cognitions in studying KMS usage.

The 24-item KMS TTF instruments that emerged were demonstrated to produce acceptable reliability estimates, and the results supported their content, convergent, and discriminant validity. In summary, our study can help organizational managers set up policies and take corrective actions that would make employees not only voluntary but even enjoy using a KMS.

Based on our results, we offer some suggestions to KMS managerial personnel and practitioners:

1. Since task interdependence is significantly correlated to KMS usage, KMS should be deployed at places where the jobs or tasks

Table 5
Discriminant validity and correlations

Construct	AVE	CR	TI	TT	KMSC	TTF	USA	OEPF	OEPR	KMSE
TI	0.65	0.90	**0.81**							
TT	0.77	0.87	−0.09	**0.88**						
KMSC	0.64	0.94	0.17	−0.14	**0.80**					
TTF	0.82	0.97	0.07	−0.28	0.49	**0.91**				
USA	0.85	0.96	0.27	−0.05	0.45	0.54	**0.92**			
OEPF	0.80	0.95	0.30	−0.26	0.26	0.52	0.52	**0.89**		
OEPR	0.75	0.94	0.21	−0.16	0.29	0.45	0.51	0.75	**0.87**	
KMSE	0.82	0.96	0.24	−0.17	0.38	0.53	0.63	0.66	0.56	**0.91**

CR, composite reliability; AVE, average variance extracted; TI, task interdependence; TT, task tacitness; KMSC, KMS characteristic; TTF, perceived task technology fit; USA, KMS usage; OEPF, performance outcome expectation; OEPR, personal outcome expectation; KMSE, KMS self-efficacy. Diagonal elements are the square root of AVE. These values should exceed the inter-construct correlations for adequate discriminant validity.

call for interdependence. Management can increase tacit knowledge sharing by providing opportunities for person-to-person communication, such as occasions for brainstorming, collaboration, group discussing and sharing. The more that a workplace shares tacit knowledge, the greater the KMS users' perception of fitness between technology and task. KMS should be versatile and diverse in providing functions to match an individual task. Also, the KMS should have flexibility so that they it can be customerized.

2. Personal outcome expectation was found to be significantly influenced by KMS usage. This positively enhances the user's sense of accomplishment and competence as perceived by co-workers. In addition to personal outcome expectation, self-efficacy plays a crucial role in KMS usage. Through excellent training, frequent uses, and sufficient resources the KMS users' confidence and willingness to use will be enhanced.

5.2. Limitations

Even though this study has offered some insights into KMS usage, there are some limitations. First, the measurement of KMS usage was based on the individual's self-administered questions. This may result in limited validity, since any research methodology relying on volunteers depends on their ability and willingness to volunteer and this can introduce bias. Second, we did not discriminate among different KMS but placed them all in a single category. Different KMS have different functionalities, and this may lead to different user perception. Finally, the study was based on a sample of 192 respondents. Although several significant results were yielded, a larger sample would provide the model with more statistical power.

5.3. Conclusions

Prior research on KMS has consisted primarily of discussion of general and conceptual principles and case studies based in a few organizations [27,31]. Studies on KMS usage thus provide a distinctly new angle to provide a better understanding and a fuller picture of KMS. The complexity and diversity implicit in a KM task, together with the multi-function and various tools with which

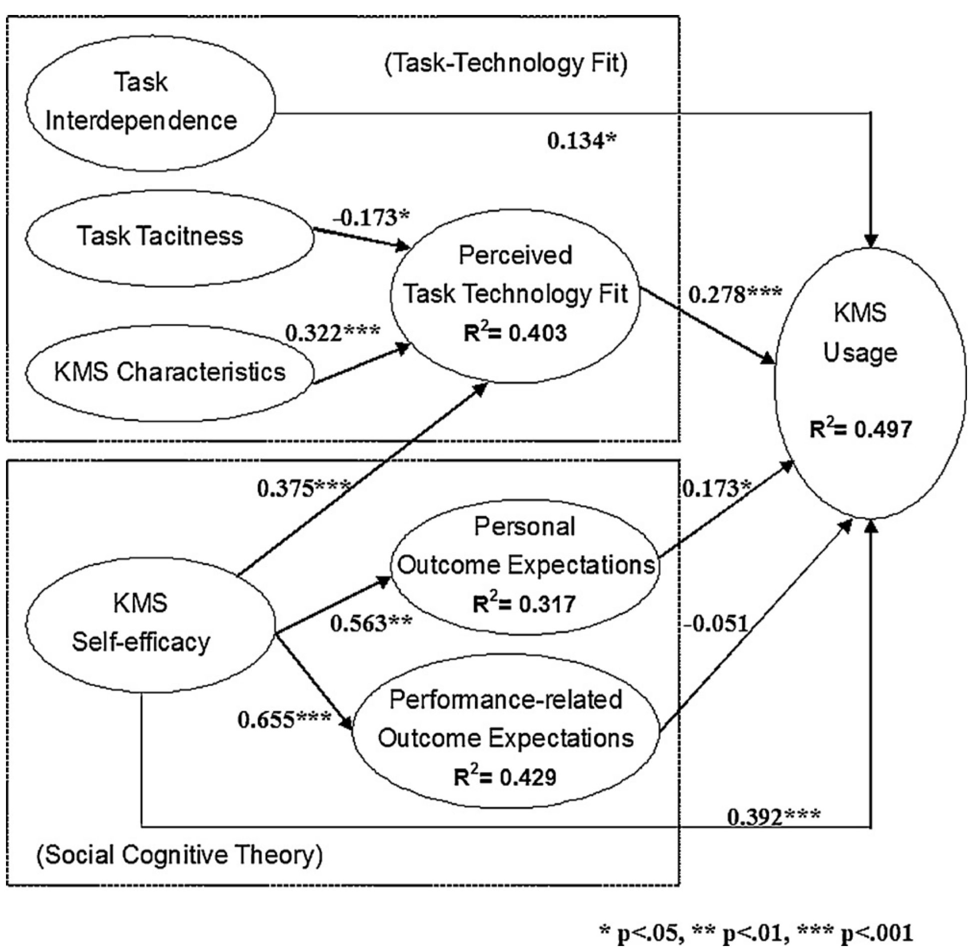

Fig. 2. KMS usage structural model result.

KMS are equipped justify the use of TTF as a tool to analyze KMS usage. The users have to negotiate and familiarize themselves with various complex KMS applications, but have to contribute and share their own knowledge. Self-efficacy and outcome expectation are thus found to be a cogent and suitable theoretical bases on which to probe the intricate working of KMS users' motivation and behavior.

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Tung-Ching Lin is a professor of Information Management at National Sun Yat-Sen University in Taiwan. He received his Ph.D. in MIS from University of Wisconsin-Milwaukee. He has published two books (Management Information Systems: The Strategic Core Competence of e-Business, Knowledge Management) and numerous papers in professional journals such as Computers & Education, Journal of Information Science, Expert Systems with Applications, International Journal of Innovation and Learning, and others. His current research interests include knowledge management, Web2.0, electronic commerce and management of information systems.

Chien-Chih Huang is a doctoral candidate in the Department of Information Management at National Sun Yat-Sen University in Taiwan. His works have been published in journals such as Journal of Information Science and presented at conferences such as Pacific Asia Conference on Information Systems, European Conference on Knowledge Management, and others. His current research interests include knowledge management, Web2.0, electronic commerce and management of information systems.