KMS Adoption: The Effects of Information Quality

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Research motivation

- Given the rising importance in considering knowledge as a key organizational asset, interest in knowledge management systems (KMSs) is increasing at a rapid pace (Feng et al., 2004; Lai, 2008; Nevo & Chan, 2007).
- While several KMS success factors have been developed in other studies, most focus on information quality (Halawi et al., 2008; Ong & Lai, 2007 ; Wu & Wang, 2006).
- Basically, information quality refers to the quality of data provided by information systems. The data need fully to record the events happening in business operation processes.
- Yet, KMS outputs have to refine these data and also consider any contextual problems that users are facing (Nonaka & Konno, 1998; Wu & Wang, 2006).

Research purpose

- A well-built KMS must pay more attention to the quality of its outputs and the fit between user tasks and KMS.

- Therefore, this study examines information quality as a variable that affects the acceptance of KMS and further explores the influences of fitness between user tasks and KMS regarding usefulness.

Literature review and hypotheses development

➢ Knowledge Management System (KMS)

- Definition of a KMS:
  - KMS is a type of IS that supports and enhances KM processes of creation, storage, retrieval, diffusion, and application of knowledge within and outside the organization (Lin & Huang, 2008; Quaddus & Xu, 2005; Vitari et al., 2007).
- Knowledge as an organizational asset:
  - Enabling sustainable competitive advantage.
  - Many firms are developing KMSs to facilitate the sharing and the integration of knowledge, thus making a distinction between data and information (Bolloju et al., 2002).
- The challenges of KMS adoption don't only depend on management's technological abilities, but also on how well systems meet the needs of users and organization (Whitfield, 2008).
- Therefore, the quality of the content and output of KMSs have a higher effect on the system adoption (Wu & Wang, 2006; King & Marks, 2008).

Literature review and hypotheses development

➢ Technology acceptance model (TAM)

- TAM, which is widely accepted as a framework for understanding users' IT acceptance processes(King & He, 2006; Venkatesh & Bala, 2008), can serve as a sound basis for investigation of KMS adoption.
  - H1: PEOU will positively affect PU of KMS.
  - H2: PU will positively affect user intention to adopt KMS.
  - H3: PEOU will positively affect user intention to adopt KMS.

Literature review and hypotheses development

➢ Information quality (IQ)

- The notion of information quality was first proposed by DeLone and McLean (1992), who argued that IQ is a significant construct needed to build successful IS.
- IQ represents the user's perception of the output quality generated by IS includes such dimensions as understandability, timeliness, relevance, and meaningfulness.
- Prior studies have argued that IQ has a positive impact on PEOU and PU (Ahn et al., 2007; Chang et al., 2005; Lin, 2007).
  - If a high quality of information is provided by KMS, it will offer the best decision to user jobs in time and reduce the complexity that users need to suffer for huge data processing.
  - Additionally, if KMS provides high quality information, it will be regarded as useful because that knowledge helps users in making decisions and improving their productivity.
- Thus, the following hypotheses are proposed:
  - H4: IQ will positively affect perceived ease of use of KMS.
  - H5: IQ will positively affect perceived usefulness of KMS.

Literature review and hypotheses development

➢ Task technology fit (TTF)

- According to the TTF model (Goodhue & Thompson, 1995), systems will help improve users' performances when the technology is "a good fit with the tasks it supports".
  - In this study, the conceptual argument developed here is how effectively a KMS can be associated with users' tasks.
  - That is, TTF is the degree to which KMS can provide useful knowledge to assist users in completing their jobs.

- In KMS, the distinction between knowledge and information depends on its context with users (Nonaka & Konno, 1998; Wu & Wang, 2006).
  - A user might consider the quality of information appropriate for one task, but not sufficient for another task (Bizer & Cyganiak, 2008).
  - Even though the provided knowledge has high quality, the recipient would not admit the knowledge if they believe it has no relationship or "relevance to practical affairs" (Lee et al., 2007).

- This implies an important concept that usefulness of a KMS is contextual-dependent.

Literature review and hypotheses development

➢ Task technology fit (TTF)

- Hence, it is possible for TTF to moderate the relationship between IQ and PU. When a user perceives the degree of TTF to be high, there may be a stronger relationship between IQ and PU.

- Thus, the following hypotheses are proposed:
  - H6: Task-technology fit will moderate the relationship between information quality and perceived usefulness.

Research model

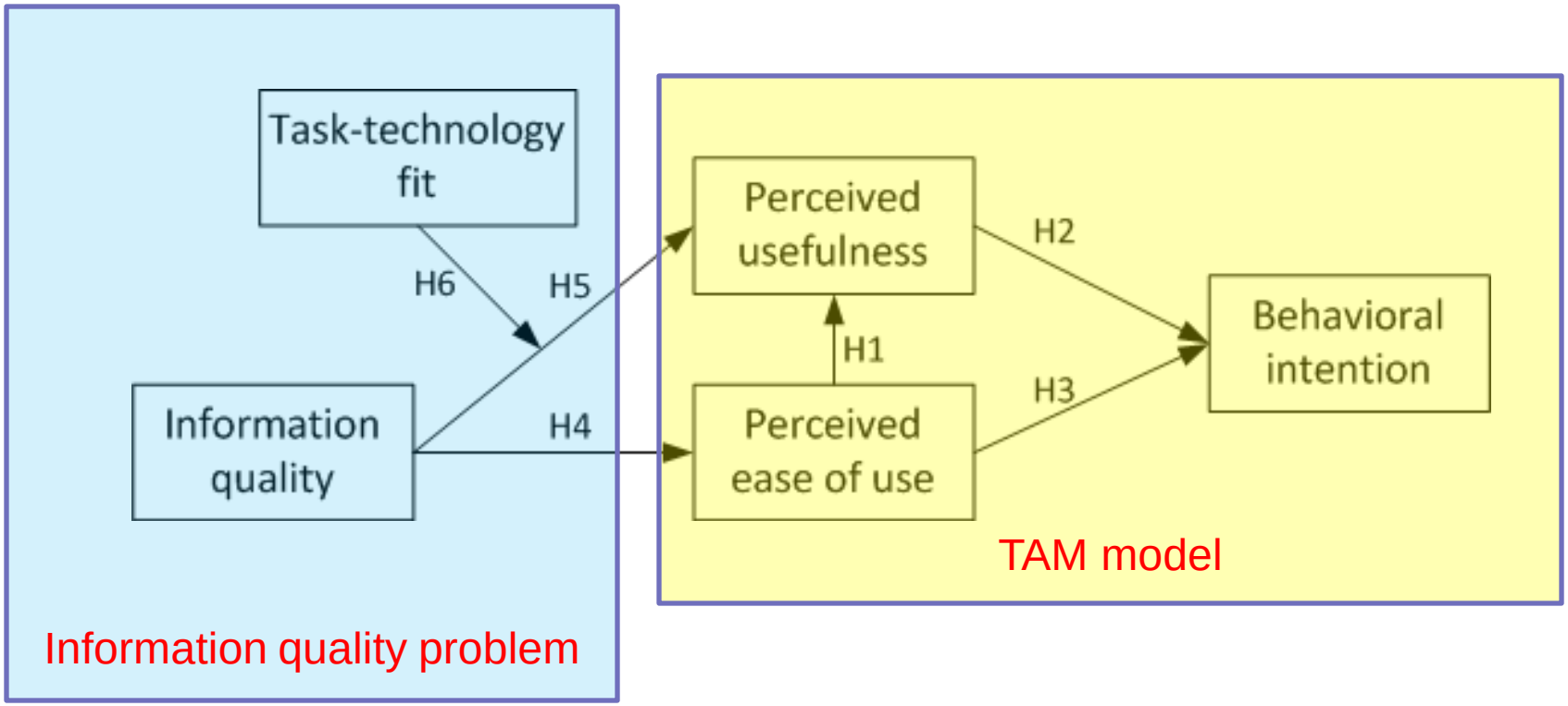


Figure 1. Research model.

Methodology

➢ Sample and data collection

- The population for this study consisted of IT managers in Taiwanese companies.
  - Because of their ability to answer questions related to e-business systems adoption (Lin & Lee, 2005).
- Two rounds of rigorous pre-testing:
  - First step: Focused on instrument clarity, question wording, and validity. Four MIS doctoral students and three MIS professors conducted the first round of pre-testing to ensure that both content and wording of the questionnaire were problem free.
  - Second step: A revised questionnaire was pre-tested by fifty EMBA students from NTUST to validate that the sentence structure of the questions was clear and understandable.
- The sample was the “Corporate 500” (the 500 largest manufacturing and service companies in Taiwan), published by Commonwealth Magazine in 2008.

Methodology

➢ Measure development

- To ensure content validity, items were mainly adapted from previous researches and modified for use in a KMS context.
- All questionnaire items used a five-point Likert- type scale that varied from “strongly disagree” (1) to “strongly agree” (5).

Table 1. Formal Definitions of the Constructs

Constructs	Definition	References
Perceived usefulness (PU)	The extent to which a person believes that using a KMS will enhance his or her job performance.	Mao & Palvia (2008) ; Venkatesh & Bala (2008)
Perceived ease of use (PEOU)	The extent to which a person believes that using a KMS will be free of effort.	Elena et al. (2006); Venkatesh & Bala (2008)
Behavioral intentions (BI)	The strength of one's willingness to adopt a KMS.	Davis (1989); Dishaw & Strong (1999)
Information quality (IQ)	The quality of the information provided by KMS. That measure includes such dimensions as understandability, timeliness, relevance, and meaningfulness.	Beverly et al., (2002); DeLone & McLean (1992); Lee et al.(2002); Michnik & Lo (2009); Wu & Wang (2006)
Task technology fit (TTF)	The extent to which a KMS meets the information needs of the user’s task.	Klopping & McKinney(2004); Susan & Howard (2006)

Methodology

➢Statistical analysis

- Several statistical procedures were adopted to examine the hypotheses:
  - Factor analysis and Cornbach's α were used to evaluate the degree of validity and reliability
  - Correlation analysis was conducted to understand the relationships between the variables.
  - Regression analysis was used to test the hypotheses.
- To reduce the problem of multicollinearity, the analysis centered PEOU, IQ and TTF while testing the moderating effects proposed by H6 (Aiken & West, 1991).

Data analysis and results

➢Sample characteristics

- A total of 151 usable questionnaires were returned for a response rate of 30.2 percent after deleting 16 questionable cases.

Table 2. Demographic Characteristics

Demographic variable	Sample Composition(N=151)
Gender	
Male	119(78.8%)
Female	32(21.2%)
Work experience	
1 year or less	3(2%)
1-3 years	15(9.9%)
3-5 years	17(11.3%)
5-7 years	13(8.6%)
7 years or above	105(68.2%)
Industry	
Information technology	61(40.4%)
Manufacturing	39(25.8%)
Wholesaling	8(5.3%)
Finance	26(17.2%)
Service	6(4%)
Other	11(7.3%)
Number of Employees	
Under 100 people	5(3.3%)
101-500 people	31(20.6%)
501-1000 people	24(15.8%)
1000 people or above	91(60.3%)

Data analysis and results

➢Measure validity and reliability

- Factor analysis

Table 3. Results of factor analysis

Items	Factor					Eigen value	Variance explained (%)	Cumulative variance (%)
	1	2	3	4	5			
TTF03	**0.827**		0.106	0.132	0.246	3.454	19.19	19.19
TTF05	**0.810**		0.229	0.115				
TTF01	**0.807**	0.139			0.139			
TTF02	**0.742**		0.142	0.203	0.273			
TTF04	**0.647**		0.262	0.373	0.198			
IQ01		**0.856**				2.876	15.98	35.17
IQ03	0.104	**0.815**		0.295				
IQ02		**0.810**	0.114	0.113				
IQ04		**0.802**			0.116			
PU02	0.170	0.128	**0.867**	0.241		2.843	15.80	50.97
PU03	0.159		**0.852**	0.246	0.216			
PU01	0.222		**0.834**	0.262	0.141			
UI01	0.112	0.150	0.320	**0.764**	0.243	2.319	12.88	63.85
UI02	0.256	0.210	0.284	**0.762**	0.277			
UI03	0.269	0.141	0.424	**0.727**	0.195			
PE01	0.203	0.140		0.153	**0.848**	2.118	11.77	75.62
PE02	0.348		0.248	0.191	**0.692**			
PE03	0.234		0.253	0.259	**0.672**			

Data analysis and results

➢Measure validity and reliability

- Internal consistency reliability to test unidimensionality was assessed by Cronbach's α. Its values ranged from 0.79 to 0.92, which were above the acceptable threshold of 0.70 suggested by Nunnally and Bernstein (1994).

Table 4. Means, standard deviation, intercorrelations, and internal reliability

Construct	Descriptive Statistics		Correlations(N=151)				
	Mean	SD	PU	PEOU	BI	IQ	TTF
PU	3.9316	0.56479	(0.92)				
PEOU	3.6380	0.52626	0.477	(0.79)			
BI	3.8720	0.53867	0.675	0.596	(0.89)		
IQ	4.0613	0.48215	0.244	0.237	0.347	(0.86)	
TTF	3.4225	0.56263	0.455	0.582	0.518	0.211	(0.88)

Numbers in parentheses are the Cronbach's α of the scales.
PU, Perceived usefulness; PEOU, Perceived ease of use; BI, Behavioral intention;
IQ, Information quality; TTF, Task technology fit.

Data analysis and results

➢Hypothesis tests

- Table 5 summarizes the results of the regression analyses and Figure 2 shows the standardized regression coefficients, p-value, and coefficients of determination (R^2) of variables.

Table 5. Results of Regression Analyses

Variables	BI M1	PEOU M2	PU M3	PU M4
Main effect				
Perceived usefulness (PU)	0.505***			
Perceived ease of use (PEOU)	0.355***		0.444***	0.291**
Information quality (IQ)		0.237**	0.139	0.165*
Moderator				
Task technology fit (TTF)				0.207*
Interaction				
IQ*TTF				0.179*
Adjusted R^2	0.546***	0.05**	0.235***	0.298***
F-value	91.324***	8.857**	24.086***	16.895***

Note. Standardized coefficients of regression analyses are reported here.
*p<0.05, **p<0.01, ***p<0.001

Results of model

- Hypothesis tests

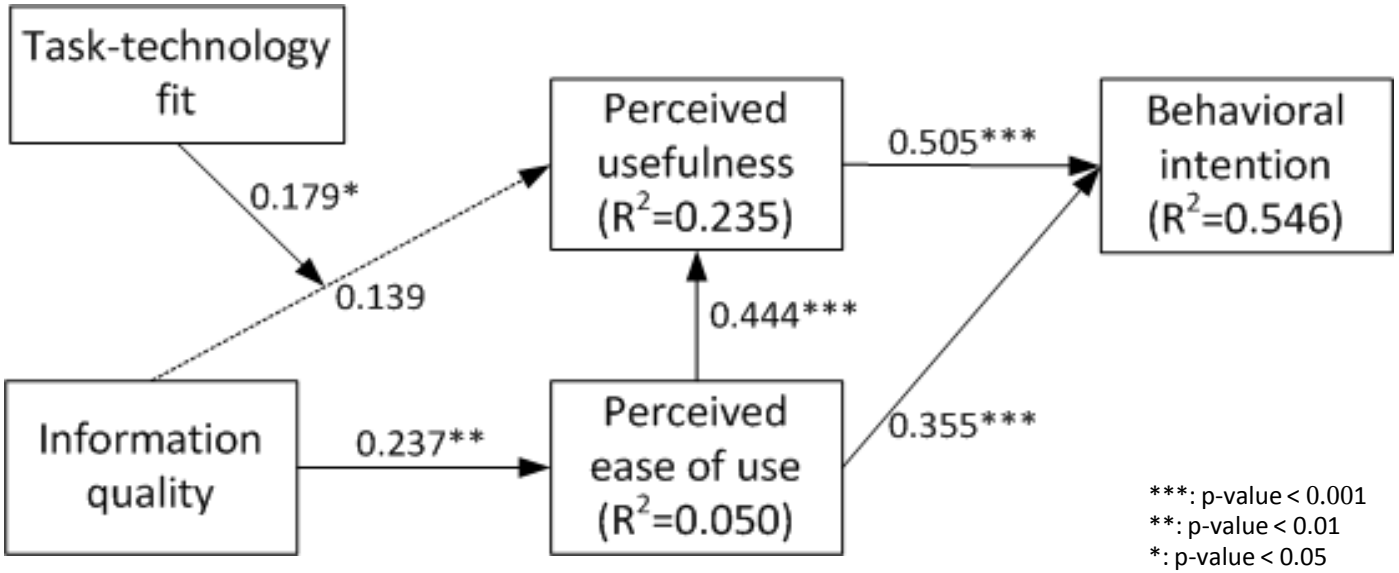


Figure 2. Results of model.

Discussion

- The findings of this study strongly support the appropriateness of using TAM to understand the factors that contribute to the adoption of KMS.

- The effect that IQ produced on PEOU supports H4 if information retrieved from KMS is easy to read, relevance, meaningful, and sufficiently timely.
  - The higher quality of information provided by KMS has led to better outcomes and reduced the complexity that users need to suffer for huge data processing with appropriate interfaces, which in turn enhances the perceived usefulness of KMS.

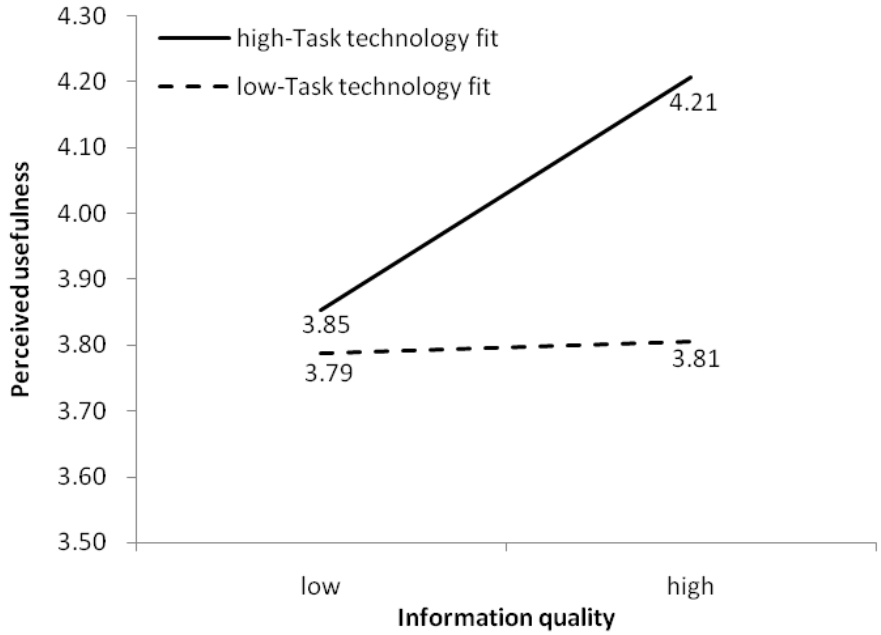
Discussion

- In the study, IQ was found to have a significant effect on PEOU instead of PU. That finding is different from the findings of Ahn et al. (2007) and Chang et al. (2005).
  - For general IS, the consequences that users might anticipate are those IS can provide high data/information quality to fulfill their routine job.
  - Oppositely, for KMS users, they may not only require highly information quality, but also ensure that this information/knowledge can be captured and available at the right time to accomplish their specific tasks.
- This finding led us consider the reasons from the intrinsic of KM. The distinction between knowledge and information depends on its context with users (Nonaka & Konno, 1998; Wu & Wang, 2006).

Discussion

- Furthermore, we examined the moderating effects of TTF on IQ and PU.
  - The relationship between IQ and PU became significantly (0.139 n.s → 0.165*).
  - In other words, the insignificant effect from IQ to PU would be caused when a KMS is not clearly designed for tasks that users do.

- The shape of this IQ×TTF interaction was investigated further in Figure 3.
  - When TTF was relatively high, IQ was positively related to PU. In contrast, when TTF was relatively low, the relationship became insignificant.



Discussion

- Therefore, a well-built KMS should provide appropriate functions to support user tasks.
  - To help capture the right information with sufficient content to accomplish their tasks and improve their job performance.

- If users perceive the KMS does not benefit their jobs, they will perceive the system is useless regardless of IQ.

Conclusions

- Managers must pay more attention toward improving the quality of information that is provided and implement the right KMS for users to help them conquer the challenges they meet.

- It is important for KMS to effectively facilitate users to absorb new knowledge (Alavi & Leidner, 2001; Garry & Bruce, 2003; Lien et al., 2007).
  - To achieve such capability, two presuppositions should be required:
    - First, KMS is not a general IS, but a system based on the specific needs for the target groups.
    - Second, to enhance the effects of knowledge absorption, it is necessary to consider the design of interfaces and functionalities for KMS.

Conclusions

- Therefore, there are two implications for KMS practitioners.
  - First, the quality of information is critical for the usefulness that KMS should be.
    - Managers should pay attention to improve the quality of information, which can indirectly enhance the usefulness of KMS.
    - Moreover, it is also a crucial point for KMS designers to develop need-centric interfaces and functions to present the right information more clearly and effectively, which in turn helps its users' perceived usefulness.
  - Second, KMS would be a task-centric information system for a targeted group of users.
    - Because even though information provided by a KMS is highly qualified, users will not perceive directly the KMS is usefulness if they think the information from KMS has no relevance to their tasks.

Questionnaire

Perceived usefulness

- PU1: Using KMS can improve my working performance.
- PU2: Using KMS can increase my job productivity.
- PU3: I can find KMS useful in my job.

Perceived ease of use

- PEOU1: My interaction with KMS can be clear and understandable.
- PEOU2: I can find KMS to be flexible to interact with.
- PEOU3: I can find KMS easy to use.

Behavioral intention to use

- BI1: I will use KMS rather than manual methods to complete my job.
- BI2: My intention is to use KMS enable me to accomplish my tasks more quickly.
- BI3: My intention is to use KMS enable me to enhance my effectiveness on jobs.

Information quality

- IQ1: The content representation provided by KMS is logical and understandable.
- IQ2: The knowledge or information provided by KMS is available at a time suitable for its use.
- IQ3: The knowledge or information provided by KMS is important and helpful for my work.
- IQ4: The knowledge or information provided by KMS is meaningful.

Task technology fit

- TTF1: I can get the data that is current enough from KMS to meet my jobs.
- TTF2: The data from KMS is up to date enough for my purposes.
- TTF3: The data maintained by KMS is pretty much what I need to carry out my tasks.
- TTF4: KMS contains critical data that would be very useful to me in my job.
- TTF5: KMS maintains data at an appropriate level of detail for my group's tasks.

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