How Knowledge Map and Personalization Affect Effectiveness of KMS in High-Tech Firms

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Abstract

The shift from a product-based to a knowledge-based economy has resulted in an increasing demand for organizations to implement knowledge management systems (KMS) at an accelerating pace. However, factors influencing the employee satisfaction with KMS, i.e. one surrogate measure of information system (IS) success/effectiveness, have seldom empirically examined by prior research, particularly how knowledge map and personalization influencing employee satisfaction with KMS. Results from a sample of 139 employees mostly from four international semiconductor manufacturing companies in the Hsin-Chu Science-based Industrial Parks in Taiwan strongly support a more comprehensive understanding in explaining employee satisfaction with KMS. The result shows KMS with a higher level of knowledge map and personalization will satisfy employees through increasing perceptions of ease of use and usefulness with KMS. Our findings could be possibly applied for investigating the related issues regarding the successful implementation of KMS for researchers and practitioners.

1. Introduction

Knowledge has already certainly become the key resource in the Post-industry and represents the wealth of corporate and nation [8, 19]. There is a great agreement that a unique aspect of today's economy is the increasing importance of knowledge. Since knowledge had been considered as a crucial asset for companies to survive in a highly competitive environment, knowledge management is definitely regarded as an essential activity for company to adapt to and survive a volatile environment, Knowledge management (KM) refers to a process that deals with the creation and utilization of valuable information within an organization to create business value in the future [24]. It involves kinds of activities such as identifying, disseminating, categorizing, retrieving and sharing information assets throughout the organization [4, 53, 54] Undoubtedly , KM could be used for improving organizations' performance, and becomes an critical issue for academic research and industrial practices [37, 62]. On the other hand, knowledge management systems are information systems used for enabling organizational learning by catching important knowledge and making it available to employees when required [12]. Alavi and Leidner [1] suggested that KMS is an IT-based system which can facilitate the process of knowledge creation, storage/retrieval, transfer and application. Additionally, it is an essential tool for knowledge generation, dissemination and utilization [32]. Hence, exploring how to implement KMS successfully seems to be a critical issue in knowledge management research. User satisfaction is the one widely-accepted indicator of IS success/effectiveness [22, 45], showing that it is a promising way for us to explore a much better understanding of the success/effectiveness of the KMS. Unfortunately, previous efforts paid on this topic are still not enough, particularly how personalization and knowledge map affecting employee satisfaction with KMS in the context of high-tech firms.

Knowledge map is a tool or technique enabling for visualizing knowledge and relationship in a clear form via a way that the relevant features of the knowledge can be clearly highlighted [57]. It possibly can play a key role in facilitating knowledge management systems more effective and has been becoming an important issue in knowledge management domain [26, 38]. Till now, the majority of past research on the knowledge map has been developed for knowledge managers, rather than for knowledge users [29]. Therefore, we attempt to propose a more comprehensive model describing what

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factors affect employee satisfaction with KMS by taping knowledge map and personalization into our consideration. Thus, an empirical study is conducted to examine proposed model and its hypotheses were tested using structural equation modeling (SEM) based on a survey of several high-tech companies in Taiwan. As a result, user satisfaction will be influenced by knowledge map and personalization through usefulness and ease of use. We believe this comprehensive model proposed here and our findings will be helpful for mangers to implement KMS successfully and valuable in developing related KM theories for researchers.

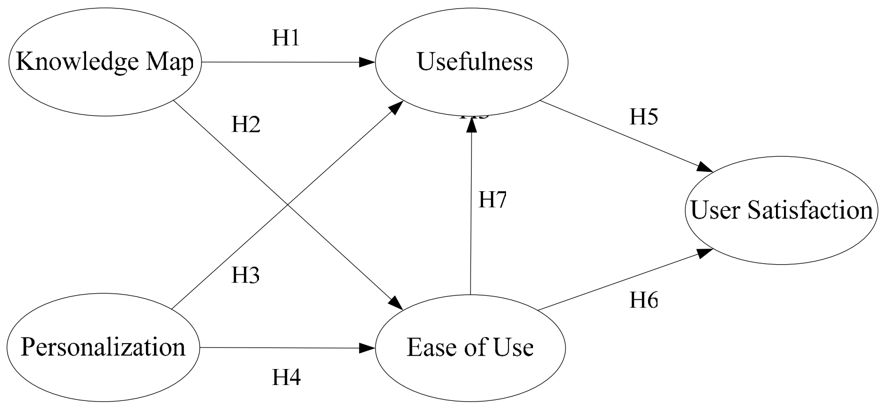

Fig. 1. Research model.

2. Theoretical development

2.1. Knowledge map

Knowledge representations comprise data of facts, information of summarized data and cases. These representations could be used for procedures, rules, ideas that guide personal and organizational decisions and actions [2, 32, 56]. All these documents can be linked into a network as a knowledge map. A knowledge map is a path for the user of KMS to achieve specific knowledge. The definitions of knowledge maps may be varied from different perspectives in terms of decision-making, education, or information retrieval [7, 9, 43, 48, 51]. For instance, in the domain of decision-making, a knowledge map is a method to elicit the knowledge that a decision maker faces, meanwhile, it is also a method for combing probabilities associated with various factors in order to obtain a final probability [7]; In the domain of education, a knowledge map emphasizes the taxonomy [34]. Many researcher in the education domain have proven that knowledge structure has a significant effect on the learners construction of a cognitive map [9, 43]; In the teaching–learning process, a teacher teaches learners what knowledge is and how knowledge relates one to another; In practice, Lwathrum et al. [36] had employed knowledge map to design an intelligent question system for learning; For information retrieval, a knowledge map represents the document category with concept hierarchy [48, 51]. Some researches and practices have been done through this concept. For example, Lin and Hsueh [34] applied information retrieve algorithm to create and maintain a knowledge map system for virtual communities of practice. Chung et al. [10] proposed a knowledge map framework for exploring business intelligence to mitigate information overload on the Web. Based on earlier literature reviews, knowledge maps typically point to people as well as to documents and databases to facilitate the users to find an appropriate knowledge source [13]. On the other hand, a knowledge map is defined as a visual architecture of knowledge domain that facilitates the users to examine the knowledge on a global scale and from different views [20]. In this study, we adopt the information retrieval perspective of knowledge maps as the basic concept for the development of our research.

A knowledge map can also be regarded as a communication medium using graphical presentation of text, models, numbers or symbols between knowledge makers and users. It represents in a simple, clear visual presentation in the KMS, which can facilitate the end users to utilize the KMS [57, 61]. It is easier for employees to use KMS under the help of knowledge maps. It becomes increasingly imperative and essential for employees to find relevant information right the time in high-tech firms due to overloaded information in the new era of knowledge-based economy. To this end, the knowledge map is intendedly developed to help knowledge users (e.g., employees) find out what they need knowledge in a more easier, convenient, and effective way [29, 46]. In addition, time saving in decision making, finding needful data, and ease for recalling information are common benefits accompanies with using knowledge map in KMS [60]. Conceivably, using KMS with the help of knowledge maps will increase employees' performance and productivity. Therefore we hypothesize:

H1. The knowledge map will have positive effect on usefulness of KMS.
H2. The knowledge map will have a positive effect on ease of use of KMS.

2.2. Personalization

The issue regarding personalization has been studied in many different fields. Surprenant and Solomon [52] redefined the personalization in service industry and proposed optional personalization which means the customers can choose the appropriate service to meet their demand. Similarly in the domain of EC, Colin et al. [11] proposed that personalization is to tailor the web pages in accordance with the affinity tendency individually, that is customized web pages contents. Generally speaking, personalized web indicates the flexible design to meet individual's demands [15]. Furthermore, kinds of personalized web site enable user customize their presentation style of pages, also can automatically record users' transaction logs [40]. Hanson [25] suggested that many browsers like IE®, Firefox®, and Opera® enable users to change some features of their interfaces such as the background color, font style, color, and size. These can be viewed as one kind of personalization. Therefore, based on earlier discussion, we define the personalization as the extent to which a user believe it is convenient for her/him to change some features and functions of KMS based on users' preference. For instance, user can change the format of interface or record transaction logs and clickstream data for further post analyses.

There exist evidences indicate that a web system with appropriate interface design will affect ease of use and usefulness [31, 35]. Loiacono et al. suggested the design, response time, and intuitiveness will affect ease of use, on the other hand, information, interactivity, trust and customer service will affect usefulness [35]. Furthermore, earlier MIS researches proposed that the flexibility is a part of system quality dimensions [16, 17, 33] and system quality will increase perceived usefulness by related IS success studies [16, 17, 49]. Based on literature reviews mentioned earlier, we believe that the design, information, interactivity, flexibility and customer service are part dimensions of personalization and will affect usefulness and ease of use of KMS. Thus, we hypothesize:

H3. Personalization will have positive effect on usefulness of KMS.
H4. Personalization will have a positive effect on ease of use of KMS.

2.3. Usefulness, ease of use, and user satisfaction

User satisfaction is a major indicator for measuring system performance in MIS/IS literature. It generally employs user satisfaction to assess the system success from the user's view points [23] and is a critical construct because it is related to other important variables in systems analysis and design [30]. Zmud and Boynton [63] defined user satisfaction as the sum of one's feelings regarding an information system. Furthermore, user information satisfaction (UIS) is defined as the extent to which users believe that an information system can fulfill their information requirements [28]. Also, Bailey and Pearson [3] believe that the user information satisfaction is that the users believe in what can be achieved by using information system. Recently in last decades, user satisfaction is commonly used for assessing IS success [3, 64] For example, some researchers has used it to assess IS success and effectiveness [6, 39, 47], the success of decision support systems [5], and office automation success [55]. Undoubtedly, user satisfaction is one of the most critical factor for us to understand the IS/IT success. Hence, in this study, we regard user satisfaction as a surrogate variable of KMS success and try to explore how knowledge map and personalization affect the success of KMS. Till now, there is extensive research which had examined the relationships among ease of use, usefulness, and user satisfaction in the literature of IS/IT. For instance, Seddon and Yip [50] integrated factors influence the success of information system and found that the perceived usefulness, quality of information and system determine the user satisfaction. Furthermore, in the case of users interacting with information systems, the empirical evidence supports the relationship between perceived usefulness and user satisfaction [49]. On the other hand, Doll and Torkzadeh [18] proposed that perceived ease of use of information system will affect the user satisfaction with information system. Also, the effect of perceived ease of use on perceived usefulness obviously has been examined for a long time by many empirical studies [21, 44, 58]. These evidences can be applied in the context of KMS, therefore, we hypothesize:

H5. Usefulness will have a positive effect on user satisfaction with KMS.

H6. Ease of use will have a positive effect on user satisfaction with KMS.

H7. Ease of use will have a positive effect on usefulness of KMS.

3. Data collection

The data used to test the research model was collected from four manufacturing companies located in the Hsin-Chu Science-based Industrial Park in Taiwan, including Taiwan Semiconductor Manufacturing Corporation (TSMC), United Microelectronics Corporation (UMC), AU Optronics Corporation (AUO), and Macronix International (MXIC). TSMC and UMC are the world's top two semiconductor foundries, specializing in the contract manufacturing of customer designed ICs for high performance semiconductor applications. TSMC's revenues represent some 60% of the global foundry market share. It employed over 20,000 people worldwide and had a sales volume greater than US$9.5 billion in 2006. UMC employed over 12,000 people worldwide and had a sales volume greater than US$3.1 billion in 2006. AUO is Taiwan's largest and the world's largest manufacturer of large-sized thin film transistor liquid crystal display panels (TFT-LCD). By the end of 2006 AUO had generated over US$8.8 billion in sales revenues and now housed over 42,000 employees in its global operations – Taiwan, USA, Europe, Japan, South Korea and China. MXIC is a semiconductor manufacturing company. It is an integrated solution provider for a high-quality consumer-based products worldwide utilizing non-volatile memory and other technologies. MXIC hired over 3500 employees and generated over US$0.69 billion sales volume in 2006.

Each company had implemented their own knowledge management systems. For instance, UMC implemented KMS (UMC-KMS) with several features and advantages. First, it is a document database that enables communication between colleagues, collaboration among teams, and co-ordination of strategic business processes within an organization. This allows employees to work alone or collaboratively for the completion of knowledge contents. Second, it also can contain both structured and unstructured content, thereby surpassing limitations that relational databases impose on the organization. Third, replication technology allows users in diverse locations to access the same knowledge. Fourth, it integrates employees' most valuable messaging, collaborative, and personal information management (PIM) resources (e.g., e-mail, calendar, to-do list, etc) to allow employees to access KMS more flexibly and easily. Fifth, it supports work flow automation. In order to ensure knowledge quality, work flow automation not only requires that most of the contents must be reviewed by at least two experts, but also simplifies the procedures for endorsement. Finally, the UMC-KMS was integrated with enterprise information portal (EIP) to allow employees access KMS anytime from anywhere. Table1 summarizes information about the features of KMS implemented at each of the four firms.

To ensure content validity of the scales, the items must represent the concept about which generalizations are to be made. Therefore, validated items adapted from prior studies were used to measure usefulness, ease of use and user satisfaction [14, 42, 59] and modified to make them relevant to the KMS usage context. There are 139 respondents who self-administered a 18-item questionnaire. For each question, respondents were asked to indicate their agreement or disagreement with the survey instruments using a seven-point Likert-type scale. Appendix lists the items used in this study. Of the 250 surveys, a 55.6 response rate was achieved. Most respondents were engineers (e.g., process, software, and planning engineers, etc.) and all the respondents had prior experience in using KMS. The respondents averaged 30.3 years in age and had 9.8 years of experience with computers; the male-to-female ratio was approximately 3.5 to 1. Thirty-nine percent had completed only one college or university degree; a further 54% had completed postgraduate degrees.

4. Data analysis and result

4.1. Analysis of measurement validity

Reliability and validity of measurement were evaluated. Reliability of the instrument was evaluated using Cronbach's alpha. All the values were above 0.8 (see Table 3), exceeding the common threshold value recommended by Nunnally [41]. The correlation matrix approach and factor analysis were applied to examine the convergent and discriminant validity [18, 27]. As summarized in Table 2, the smallest within-factor correlations are: knowledge map = 0.71; personalization = 0.70; perceived usefulness = 077; perceived ease of use = 0.58; and user satisfaction = 0.80. Meanwhile, each smallest within-factor correlation was considerably higher among items intended for the same construct than among those designed to measure different constructs. This suggests adequate convergent and discriminant validity of the measurement. A principal component factor analysis was performed and five constructs were extracted, exactly matching the number of constructs included in the model. As shown in Table 3, there were no cross-loading items. Additionally, items intended to measure the same construct exhibited prominently and distinctly higher factor loadings on a single construct than on other constructs, suggesting adequate convergent and discriminant validity. The observed reliability and convergent/discriminant validity suggested adequacy of the measurements used in this study.

4.2. Model testing results

The hypothesized relationships were tested using the CALIS procedure of SAS 8.1, a procedure that provides estimates of parameters and tests of fit for linear structural equation model, similar to LISREL. All six common goodness-of-fit indices are summarized in Table 4. Most of they exceeded their respective common acceptance levels, although the Normalized fit index (NFI) didn't meet the recommended minimum level, it's very close to, suggest that the model was reasonably adequate to assess the result for the structure model. Properties of the causal paths, including standardized path coefficients, P-values, and variance explained for each equation in the hypothesized model are presented in Fig. 2. As expected, knowledge map had a significant positive effect on both perceived usefulness ($\gamma = 0.23$, $P < 0.05$) and ease of use ($\gamma = 0.65$, $P < 0.001$), personalization also had a significant positive effect on both usefulness ($\beta = 0.20$, $P < 0.05$) and ease of use ($\beta = 0.15$, $P < 0.05$). Hence, hypotheses H1, H2, H3, and H4 were supported. Knowledge map and personalization explained 33 percent of the variance in usefulness and 44 percent of the variance in ease of use. The total effects of knowledge map and personalization on user satisfaction were 0.49 and 0.15. Usefulness had a significant positive effect on user satisfaction ($\beta = 0.28$, $P < 0.001$). Ease of use was found to be a significant factor in determining user satisfaction ($\beta = 0.56$, $P < 0.001$) and usefulness ($\beta = 0.34$, $P < 0.01$). Thus, hypotheses H5, H6 and H7 were supported.

The proposed model accounted for 55 percent of the variance in user satisfaction. According to the path coefficients, knowledge map exhibited the stronger direct effect on ease of use than personalization did. Additionally, ease of use exhibited stronger direct effect on user satisfaction. The total effect of knowledge map on user satisfaction was 0.49. Meanwhile, the total effect of ease of use on user satisfaction was 0.66 high. The direct, indirect, and total effects of knowledge map, personalization, usefulness and ease of use on user satisfaction were summarized in Table 5.

5. Discussion and conclusion

Till now, there is rare attention paid on how knowledge map and personalization affect the success of KMS. This study attempts to extrapolate the relationships among knowledge map, personalization, ease of use, usefulness, and user satisfaction on this topic. The results of this research demonstrate good fit indices with each constructs in addition a comprehensive causal model explaining what factors influence user satisfaction with KMS. According to our findings, knowledge map and personalization appear to be significant determinants of ease of use and usefulness. Conceivably, a KMS with a well-designed knowledge map and personalized interface will make employees experience the KMS more useful and easier in high-tech firms, therefore, contributes to a higher level of satisfaction. User Satisfaction is always used as an surrogate variable of IS success [3, 22, 45], increased user satisfaction, in other words, might increase the probability of successful implementation of KMS. The researchers and practitioners possibly could apply our findings for investigating the issue about KMS success or developing related theories in the future.

Here, there are two factors, i.e., knowledge map and personalization, affect the ease of use directly. However, knowledge map shows a higher influence on ease of use compared with personalization. This can be explained that employees need to spend a lot of time browsing and seeking the specific knowledge they really need due to the overloaded information and documents in the repositories of KMS. They can save much time on searching information and filtering the knowledge by the help of knowledge maps. Since knowledge map has been found to be the one significant determinant of KMS success, showing a second largest effects on user satisfaction. This result suggests that using knowledge map for employees to search/retrieve in a more effective and efficient way is an important antecedent of KMS success. From an enterprise perspective, utilizing knowledge map might not only enable knowledge workers obtain knowledge and understand domain concepts well, but also can facilitate knowledge diffusion, sharing, and creation. It may be helpful for increasing employees' job satisfaction. On the other hand, the burden and workload of knowledge experts on helping employees to find their required/necessary knowledge might be reduced. Besides, decision-making, problem-solving processes, and response time for customer could be improved by providing an applicable knowledge map. Ultimately, firms can generates core competitive advantages by implementing knowledge map.

Judged by its direct effects on user satisfaction, ease of use and usefulness both have positive effects on user satisfaction. This result is consistent with Seddon's (1997) [49] and Doll and Torkzadeh's (1988) [18] findings. On the other hand, ease of use has stringer significant effects than that of perceived usefulness. This suggests that a user-friendly interface in KMS context is necessary and imperative. To this end, researchers could attempt to explore what factors influence ease of use in the future, such as system interface design, computer self-efficacy, on-line instant guiding/helping, etc..

As expected, personalization has been found to become other important factor influencing user satisfaction with KMS. This implies that when a firm implements a KMS, it is not sufficient to have advanced functions and ideal knowledge taxonomies. It should also consider the preference and the needs of each individual user of the system to accomplish higher satisfaction. An implication for software vendors and system developer, it should take the buyer and end-user's particular preference into account when developing and marketing a KMS product. In sum, this study raises attention on what factors affect the success of KMS using the specific model proposed in this research, particularly knowledge map and personalization These findings can help practitioners and researchers understand how employees will satisfy the KMS by improving the knowledge map and personalization functions. They also will be valuable to researchers in developing and evaluating KMS theories.

There are four limitations of this study should be noted. First, the data selections of this study focus on high-tech industry singly in Taiwan. Thus, the future research can develop a wider investigation across industries to generalize our findings. Second, since every enterprise uses different approaches to deal with the personalization in KMS, it is hard for us to take them into account when designing the instrument. Third, although we conducted exploratory factory analysis and structural equation modeling to examine our measurement and research framework, a much larger sample is required for greater precision. Finally, responses to this study were voluntary and thus inevitably subject to self-selection biases. Conceivably, users who had used, were currently using or were interested in KMS might have been more likely to respond to the survey. Future research efforts should consider using a random sampling approach to test this proposed model.

Appendix. Questionnaire items

Knowledge map (KMP)

- KMP1 The knowledge classification of expertise in the knowledge management system is clear and easy to understand.
- KMP2 The classification of expertise in the knowledge management system is consistent with my cognition.
- KMP3 The branch structure of expertise in the knowledge management system is clear and easy to understand.
- KMP4 The branch structure of expertise in the knowledge management system is consistent with my cognition.

Personalization (P)

- P1 The knowledge management system enables me to control the settings of knowledge documents, e.g., timeliness.
- P2 The knowledge management system enables me to control the presentation of knowledge documents.
- P3 The knowledge management system enables me to define my favorite knowledge.
- P4 The knowledge management system can record my retrieval and reading history.

Usefulness (U)

- U1 Using the knowledge management system improves my job performance.
- U2 Using the knowledge management system my effectiveness in my job.
- U3 Using the knowledge management system in my job improves my productivity.
- U4 I find the knowledge management system to be useful in my job.

Ease of use (EOU)

- EOU1 Interacting with the knowledge management system is clear and understandable.
- EOU2 Learning how to use the knowledge management system does not require a lot of my mental effort.
- EOU3 I find the knowledge management system to be easy to use.
- EOU4 I find it easy to get the knowledge management system to do what I want it to do.

User satisfaction (US)

- US1 As a whole, I am satisfied with the knowledge management system.
- US2 As a whole, the knowledge management system is successful.

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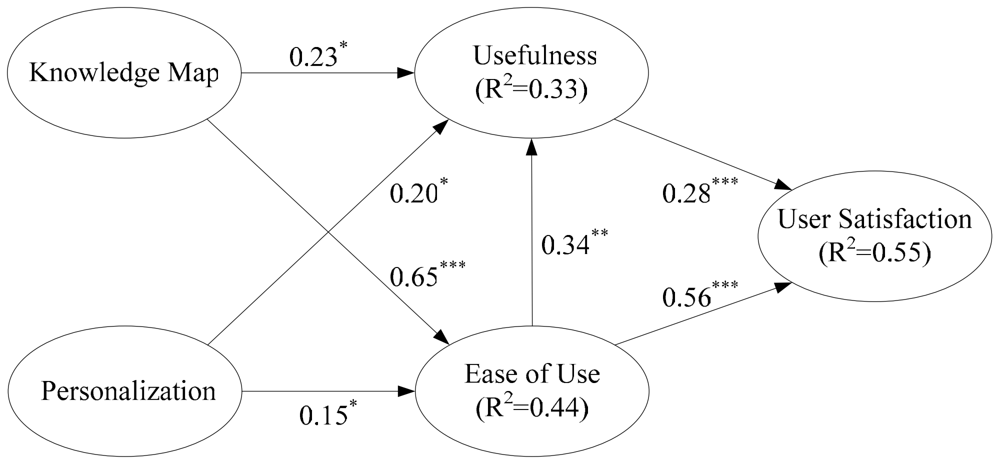

$^{*}P < 0.05$; $^{**}P < 0.01$; $^{***}P < 0.001$

Fig. 2. Model testing results

Table 1. Functions of the KMS that were implemented at each the four firms

	TSMC	UMC	AUO	MXIC
Document database	✓	✓	✓	✓
Unstructured content	✓	✓	✓	✓
Web technology	✓	✓	✓	✓
PIM integration		✓		✓
Work flow automation		✓		✓
EIP integration	✓	✓	✓	✓

✓ The function implemented

Table 2. Analysis of intermeasurement correlation

	KMP				P				U				EOU				US	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
KMP1	**1.00**																	
KMP2	**0.71**	**1.00**																
KMP3	**0.80**	**0.73**	**1.00**															
KMP4	**0.74**	**0.80**	**0.80**	**1.00**														
P1	0.46	0.37	0.42	0.46	**1.00**													
P2	0.48	0.37	0.39	0.40	**0.84**	**1.00**												
P3	0.51	0.35	0.46	0.42	**0.85**	**0.86**	**1.00**											
P4	0.42	0.33	0.43	0.38	**0.70**	**0.72**	**0.77**	**1.00**										
U1	0.40	0.40	0.35	0.38	0.31	0.32	0.36	0.31	**1.00**									
U2	0.47	0.42	0.46	0.36	0.36	0.33	0.42	0.34	**0.81**	**1.00**								
U3	0.45	0.49	0.48	0.44	0.35	0.28	0.40	0.42	**0.76**	**0.78**	**1.00**							
U4	0.44	0.43	0.48	0.35	0.34	0.36	0.42	0.34	**0.77**	**0.81**	**0.71**	**1.00**						
EOU1	0.57	0.53	0.49	0.48	0.39	0.38	0.40	0.37	0.54	0.53	0.52	0.50	**1.00**					
EOU2	0.41	0.38	0.39	0.37	0.21	0.24	0.19	0.18	0.29	0.25	0.25	0.29	**0.58**	**1.00**				
EOU3	0.50	0.37	0.39	0.37	0.24	0.26	0.24	0.21	0.39	0.34	0.32	0.35	**0.62**	**0.76**	**1.00**			
EOU4	0.57	0.53	0.54	0.51	0.41	0.39	0.41	0.39	0.50	0.44	0.46	0.47	**0.66**	**0.64**	**0.66**	**1.00**		
US1	0.62	0.59	0.60	0.54	0.37	0.37	0.42	0.38	0.47	0.50	0.47	0.44	0.51	0.41	0.46	0.64	**1.00**	
US2	0.60	0.59	0.60	0.53	0.27	0.32	0.34	0.32	0.46	0.50	0.53	0.49	0.48	0.40	0.42	0.57	**0.80**	**1.00**

Table 3. Factor analysis results: principal component extraction

	Factor					Cronbach's alpha
	1	2	3	4	5	
Knowledge Map (KMP)						0. 93
KMP 1	**0.72**	0.30	0.21	0.28	0.25	
KMP 2	**0.80**	0.14	0.24	0.19	0.24	
KMP 3	**0.80**	0.23	0.22	0.18	0.25	
KMP 4	**0.86**	0.23	0.16	0.18	0.14	
Personalization (P)						0.94
P1	0.21	**0.88**	0.15	0.11	0.04	
P2	0.17	**0.90**	0.12	0.13	0.09	
P3	0.18	**0.90**	0.21	0.07	0.13	
P4	0.15	**0.82**	0.18	0.06	0.15	
Usefulness (U)						0.93
U1	0.12	0.15	**0.87**	0.21	0.14	
U2	0.17	0.18	**0.88**	0.12	0.19	
U3	0.27	0.17	**0.81**	0.09	0.18	
U4	0.18	0.19	**0.84**	0.15	0.14	
Ease of use (EOU)						0.88
EOU1	0.30	0.23	0.41	**0.62**	0.10	
EOU2	0.19	0.07	0.07	**0.88**	0.13	
EOU3	0.17	0.09	0.18	**0.86**	0.15	
EOU4	0.27	0.25	0.27	**0.65**	0.36	
User Satisfaction (US)						0.88
US1	0.33	0.20	0.25	0.26	**0.79**	
US2	0.35	0.11	0.30	0.21	**0.79**	
Cumulative variance explained (%)	50.25	62.34	72.03	79.31	83.26	

Table 4. Goodness-of-fit measures of the research model

Goodness-of-fit measure	Recommended value	Model statistic
Goodness-of-fit index (GFI)	≧0.90 or ≧0.80	0.82
Root mean square error of approximation (RMSEA)	≦0.1	0.09
Normalized fit index (NFI)	≧0.90	0.88
Nonnormalized fit index (NNFI)	≧0.90	0.91
Comparative fit index (CFI)	≧0.90	0.93
Normed Chi-square	≦3.00	2.32

Table5. The direct, indirect and total effect of dominants on user satisfaction

	Direct effect			Indirect effect			Total effect		
	U	EOU	US	U	EOU	US	U	EOU	US
KMP	0.23	0.65		0.22		0.49	0.45	0.65	0.49
P	0.20	0.15		0.05		0.15	0.25	0.15	0.15
U			0.28						0.28
EOU	0.34		0.56			0.10			0.66