A Comprehensive Instrument for Measuring Knowledge Management System Satisfaction

Ramlee Ab. Ghani, Nur Fazidah Elias, and Masnizah Mohd

***Abstract*— This paper study on measuring the user satisfaction of Knowledge Resources for Science and Technology Excellence Malaysia (KRSTE.my) as a medium for managing knowledge in Science, Technology and Innovation (STI), amongst the registered users. As a Knowledge Management System (KMS), KRSTE.my functions as a collector of STI information related material, provides a platform for collaboration and discussion of the community, and also a receptor of the latest inventions in STI. This study proposes an integrated instrument for the empirical evaluation of user's satisfaction of a KMS. We have consolidated factors from several instruments developed by previous researchers. This effort has resulted in a comprehensive instrument for measuring users' satisfaction of a knowledge management system. The instrument consists of six knowledge factors, namely: content, map, manipulation, community, usefulness, and security, which measure the level of user satisfaction towards the system. The instrument includes 22 items that measure user satisfaction of KRSTE.my. A total of 271 Malaysian citizen registered subscribers that has accessed to the system are involved in this study. Quantitative research methods have been employed in data collection process conducted over a period of seven weeks. This study involved a statistical analysis to determine significant factors that measure user satisfaction on KRSTE.my. Results from the analysis indicate that the instrument is reliable which show all items measuring the six dimensions are correlated. The finding of the study shown that knowledge content and knowledge map gives a high level of satisfaction to the user based on the mean score. While only the knowledge security, knowledge manipulation, knowledge usefulness and knowledge community are at moderate level of satisfaction. Overall, user satisfaction is high on KRSTE.my with the mean score of 3.49 (of the maximum score of 5). This study also makes an important contribution in determining the level of user satisfaction toward KRSTE.my as a KMS. In addition, the study produced a reliable instrument.**

***Index Terms* - Correlation Analysis, Knowledge Management System, KRSTE.my, Reliability Analysis, User Satisfaction.**

I. Introduction

Knowledge management is the process of identifying and leveraging the collective knowledge in an organisation to help the organisation to compete [37]. It is a process that involves various activities, of which the main ones are creating, storing/retrieving, transferring, and applying knowledge. For example, the process includes creation of internal knowledge, acquiring knowledge from outside, keeping knowledge in a document, and updating and sharing knowledge internally and externally [33]. Most knowledge management projects include one of these three aims: (i) to make knowledge visible and show its role within an organisation; especially through maps, yellow pages, and hypertext tools, (ii) to develop a knowledge intensive culture, by encouraging and aggregating behaviours, such as knowledge sharing and proactively seeking offers of knowledge, and (iii) to build a knowledge infrastructure – not only in terms of technical systems and space communications amongst individuals, but time and encouragement to interact and collaborate [12].

Knowledge Management Systems (KMS) is define as a class of information system that is applied to manage the organisation of knowledge. It is an IT based system, developed to support the organisation of knowledge management behaviour [3]. Due to of uncertain business environments, as well as the globalisation of markets and labour pools, organisations worldwide are devoting considerable resources to implement knowledge management systems at an accelerating pace, to develop knowledge as their source of core competency or competitive advantage [3],[15],[35],[39]. Therefore, effective management of organisational knowledge has been recognized as the most important aspect in determining the success of an organisation, and has become an increasingly critical issue for technology implementation and management.

According to Jennex and Olfman [21], there are two approaches to develop a KMS, namely (i) the process/task approach, and (ii) the infrastructure/generic approach. The process/task approach focuses on the use of knowledge by participants in a process, task, or project, in order to improve the effectiveness of the process, task, or project. It identifies the information and knowledge needs of the process, where they are located, and who needs them. This approach requires a KMS to capture minimal context, because users are assumed to understand the environment of the knowledge that is captured and used. Meanwhile, the infrastructure/generic approach focuses on developing a system to capture and distribute knowledge for use throughout an organisation. It is concerned with capturing context to explain the captured knowledge, and the technical detail needed to provide good mnemonic functions associated with the identifications,

Masnizah Mohd, PhD is a Head of Information Science Program, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia (e-mail: mas@ftsm.ukm.my).

Nur Fazidah Elias, PhD is a senior lecturer at the School of IT, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia (e-mail: fazidah@ftsm.ukm.my).

Ramlee Ab. Ghani is a government staff and now studying master of Information Technology at Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia (e-mail: ramlee@mosti.gov.my).

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retrieval, and use of knowledge. This approach focuses on network capacity, database structure and organisation, and knowledge classification. Both approaches may be used to create a complete KMS [21]. Morrison and Weiser [25] support this dual approach concept, by suggesting that an organisation-wide KMS be designed to combine an organisation's various task/process based KMS, into a single environment and integrated system.

The increased awareness in the importance of knowledge management has prompted managers to improve knowledge management in the interest of organisations. One of the main reasons for adopting an information technology, which involves the use of a KMS, is the benefits derived from its use, far outweigh the costs. Users use the KMS to acquire knowledge, and only derive benefits when they encounter a situation in which the knowledge can be applied [8]. When a KMS is implemented in an organisation of any kind, success and effectiveness must be determined. According to Turban and Aronson [34], the reasons to measure the success of a KMS is: (i) to provide a basis for valuation of companies (ii) to stimulate management to focus on more important things, and (iii) to justify investments in knowledge management (KM) activities.

From the perspective of KM academics and practitioners, measuring user satisfaction of a KMS is an important element, in order to understand how the system should be developed and implemented. To achieve this, several KMS instruments of user satisfaction, developed by previous researchers, have been studied. The objective of this study is to define the assessment framework. Then, the user satisfaction instruments or models which have been developed will be used to measure KRSTE.my. This is followed by an analysis of correlation and reliability to measure the items relations, stability and consistency.

This paper is organised into six sections. Section II explains briefly on research problem, followed by the instrument generation in Section III. Section IV is elaborates on the methodology of the studies while discussion on the finding is explained in Section V. Finally the conclusion of the studies is reported in Section VI.

II. Research Problem

Knowledge is recognised as one of the most important organisational resources, and knowledge management, is an important agenda for most knowledge based organisations. Many organisations make considerably high investments to develop and perform maintenance of IT facilities, as a medium of information sharing. However, almost all of these developed systems are underutilized; and to some extent, the information contained within them is not relevant to the organisations and their consumers. This has resulted in many organisations making improvements to their existing knowledge management facilities, to be simpler, more efficient, and able to provide complete and comprehensive knowledge, in that it is useful to the organisation and its customers. This can also helps organisations to recognise knowledge management systems as being simple, cost effective, and convenient in the process of collecting, sharing, and disseminating information, among consumers and other interested parties; either within or outside of the organisation.

The Malaysian government has established the Science and Technology Information Centre Malaysia (MASTIC), which is placed under the Ministry of Science, Technology and Innovation (MOSTI). It is centrally responsible for managing documents and information on STI. To enable STI information to be managed in a more systematic and effective manner, MOSTI has taken an initiative to develop the Knowledge Resource for Science and Technology Excellent Malaysia (KRSTE.my) system, as shown in Figure 1 below.

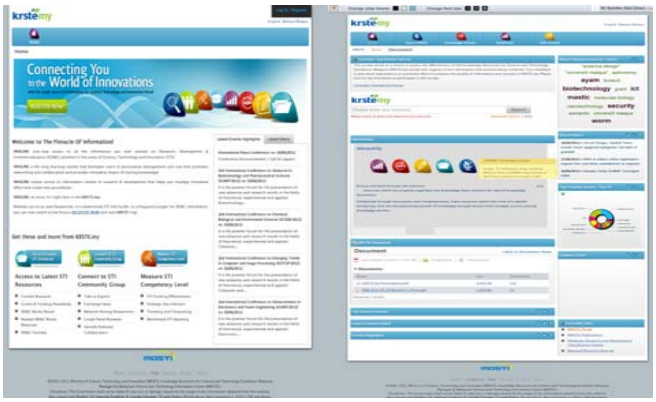

Figure 1. Interface of KRSTE.my for introduction and front pages

Therefore, it is important to recognise that KRSTE.my can serve as a medium of Science, Technology and Innovation (STI) dissemination to its users. The purpose of this study is to examine and determine the factors and items that affect user's satisfaction in visiting STI information provided by the system. Furthermore, this study was undertaken to determine the factors and items that are more comprehensive in influencing users' satisfaction of the KMS, by incorporating relevant instruments developed by previous researchers. Therefore, to measure user satisfaction of this KMS, there must be an appropriate and comprehensive instrument to assess the level of user satisfaction of the system being studied.

III. Instrument Generation

A preliminary study was conducted to identify factors for measuring user satisfaction of the KMS. A number of available instruments that have been introduced by previous researchers were taken as the basis for the development of a user satisfaction instrument to measure KRSTE.my satisfaction. These instruments are the User Information Satisfaction (UIS) introduced by Ives, Olson and Baroudi [20],[4]; End User Computer Satisfaction (EUCS) introduced by Doll and Torkzadeh [13],[14]; Customer Information Satisfaction (CIS) introduced by Wang, Tang, and Tang [38]; and User Satisfaction with Knowledge Management System (USKMS) introduced by Ong and Lai [27][28].

Based on the preliminary study, six factors and 22 items are found to be relevant for measuring user satisfaction of a KMS; therefore, these items are included in our instrument. Most of these items were adapted from the USKMS, and we added 11 items that measure overall satisfaction and behaviour. We have also included four items that measure satisfaction that were adapted from the Knowledge Content factor, in the EUCS instrument [13], [14]. Meanwhile, three items of Knowledge Security factor from the CIS instrument [38] were adapted; one item was created for the usefulness factor, which was adapted from the UIS [20]. The final three items, adapted from Davis [11], are widely used by researchers, and were subsequently received and confirmed as a scale to measure usefulness.

Descriptions of the variable factors are as follows: (i) **Knowledge Content** is defined as the fact representatives of knowledge. Unauthorized content from managers and professionals will potentially lead to misuse. High-quality knowledge content is the right information, accurate, logical, easy to read, and implemented where it can add value to a KMS and encourage consumers to use it [18],[27],[28],[29],[39]. (ii) **Knowledge Map** is a relevance diagram constructed to capture the individual document and its authors [19]. Similarly, the classification structure of the document allows the user to understand the classification of knowledge. This is because most documents in an organisation are not classified in their respective fields, which makes knowledge management applications useful in classifying documents in their appropriate field [30]. Classification is not only able to collect and integrate documents during the early process of determining knowledge management, but can be extended by combining it with other fields in the classification of different knowledge [6],[14][19],[27],[30],[35]. (iii) **Knowledge Manipulation**, which is the main objective of knowledge management activities within an organisation, allows users to create, access, and use documents in storage. The repository of a knowledge management system requires a combination of features that are required by the public, such as to create, manage, and use knowledge; including the intranet, document/content management systems, search engines, office applications, and web portals. In matters related to knowledge management, users will use their skills to manipulate existing documents. Therefore, the mechanism and results of knowledge manipulation activities, include acquiring, selecting, finding, creating, and retrieving knowledge that will affect customer satisfaction [5],[18],[27],[36]. (iv)**Knowledge Community** is where members of the community are allowed to communicate freely without fear of criticism and take part in everything they run. Furthermore, the community also allows members to contribute ideas and views on their respective areas of expertise, so as to provide benefits to the community, of what has been brought up or produced. Furthermore, the modelling community can also encourage cooperation amongst its members to prevent complications. This is because members of the community work happily and comfortably without being asked to do so, and they feel more appreciated [9],[15],[16],[27],[28],[29],[32]. (v) **Knowledge Usefulness** is a very broad concept in the design of a knowledge system. In general, usefulness refers to information that can be used practically by consumers. The knowledge system will be more useful to managers, if the information provided is of quality and is available to help carry out their daily tasks [10]. In addition, this research study suggests that the usefulness of particular knowledge is an element included in measuring customer satisfaction of knowledge systems. User satisfaction has a strong relationship with the usefulness of knowledge in a KMS [4],[11],[20],[24],[38]. (vi) **Knowledge Security** refers to the extent to which the system can protect documents from being hacked or abused by individuals who are irresponsible. The information security system serves to reduce the risk of carelessness and system attacks, and thus, it can avoid the loss of information [1]. Knowledge security is divided into two main areas involving protection from the slovenly and leakage of information to individuals who do not want it [22]. Currently, there are many issues involving the laws of assurance that information security is implemented [38].

Determination in theory and concepts is essential in developing an appropriate measurement and to obtain valid results. According to scientific references, the overall evaluation of user satisfaction of knowledge management systems varies according to the intensity of information knowledge activity. User satisfaction is also stimulated by several aspects involving knowledge content, knowledge map, knowledge manipulation, knowledge community, knowledge usefulness, and knowledge security.

All of the 22 specified items were modified to ensure consistency with the use of KRSTE.my. In short, Table 1 shows all of the items included in the KRSTE.my user satisfaction survey, mostly adapted from previous researchers.

IV. Methodology

The instrument used to measure user satisfaction for the KMS consists of six factors and 22 items. All items were modified to make them relevant in a KM usage context. All items used in this study are presented in the Appendix. The instrument is then ready for pilot testing, the purpose of which is to provide feedback to help improve the effectiveness of the questionnaire to be used in collecting data for the actual study. Moreover, the pilot study can enhance the tangibility and level of understanding of the questions in the questionnaire. The items in the instrument were measured using a five-point LIKERT type scale, with ‘strongly disagree’ and ‘strongly agree’ as the end values.

TABLE 1
LIST OF MEASUREMENT ITEMS

Factor	Authors / Measurement items	Bailey, et al., 1983	Ives, et al., 1983	Doll, et al., 1988	Davis , F.D., 1989	Cronin, et al., 1992	Venkatesh, et al., 1996	Wang, et al., 2001	Ong et al., 2004
1.	**Knowledge Content**								
a.	Up-to-date and comprehensive information	✓		✓					✓
b.	Correct content	✓		✓					✓
c.	Integral content	✓		✓					✓
d.	Logical content	✓		✓					✓
2.	**Knowledge Map**								
e.	Classification of knowledge domain is clear and easy to understand			✓					✓
f.	Classification of knowledge domain is consistent with need and requirement			✓					✓
g.	Structure of domain knowledge and follow standard			✓					✓
3.	**Knowledge Manipulation**								
h.	Easy to search/retrieve knowledge document						✓		✓
i.	Easy to create knowledge document						✓		✓
j.	Easy to upload and download knowledge documents						✓		✓
k.	Easy to transfer knowledge documents						✓		✓
4.	**Knowledge Community**								
l.	Convenient to discuss with other people					✓			✓
m.	Convenient to give comments and feedback					✓			✓
n.	Convenient to share knowledge with other people					✓			✓
o.	Convenient to access the share content					✓			✓
5.	**Knowledge Usefulness**								
p.	Provide knowledge that make easy to do decision making	✓	✓						
q.	Provide knowledge that make easy to do strategic planning				✓			✓	
r.	Provide sufficient knowledge to rise job performance				✓			✓	
s.	Allowed users choose their own domain knowledge				✓			✓	
6.	**Knowledge Security**								
t.	Level of access according to the type of documents							✓	
u.	Level of access according to task of the individual							✓	
v.	Documents will be protected from hacked or misused							✓	

All questions in the questionnaire were made mandatory in the survey. The first part of the survey collected basic demographic information from the respondents. The second part consisted of six knowledge factors and 22 items measuring user satisfaction of the knowledge system, and an independent variable.

The targeted participants of this survey were KRSTE.my registered users. The survey forms were distributed to the selected users through email. Respondents were asked to complete all questions in the questionnaire. The pilot survey was carried out over three weeks and involved six KRSTE.my registered users. Reactions, suggestions, and comments, were gathered, after the exercise had completed. Nine of the 22 items were corrected or modified in the pilot study.

During the three week pilot study, the 22 items were refined through analysing the pooled data, which came from the suggestions, comments, and views of the respondents. Most of the corrected and modified items came from the Knowledge Map, Usefulness, and Security factors. Out of 22 items, nine items of measurements were amended, one from the

Knowledge Usefulness factor was found to be redundant with an item in the Knowledge Manipulation factor, and therefore, the item statement was changed.

Meanwhile, one item each from the Knowledge Security and Usefulness factors was deemed unsuitable for that group and was changed to present relevant measure of security and usefulness measurement. The remaining six items for measuring Knowledge Mapping, Usefulness, and Security, were corrected, because the words used for measuring the items were not clearly understood. Figure 2 illustrates the KMS user satisfaction model with 22 items.

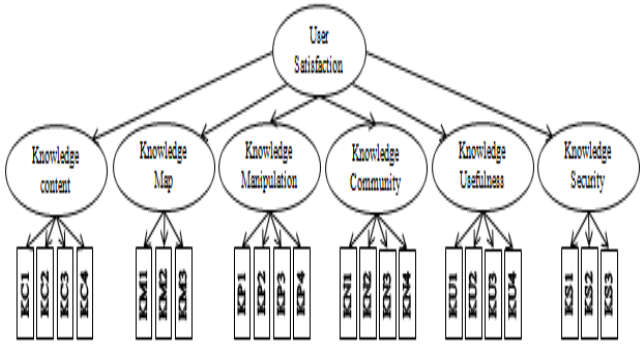

Figure 2. User satisfaction measurement instrument with 22 items measuring the KMS

A survey was then conducted to the registered user of KRSTE.my. There are 860 registered user and about 271 users have responded to the survey. Data are gathered using an online survey system and the questionnaire was distributed using email to all identify users in various sectors.

V. Result and Analysis

There was 147 male (54.2%) and 124 female (45.8%) participated in this study with the age range between18 to 25 years (23, 8.3%), 26 to 35 years (132, 48.7%), 36 to 45 years (68, 25.1%) and over 45 (48, 17.7%). Out of these 271 respondents, professional group represents the highest number of respondents with 75 user representing 27.7% of the total respondents. Entrepreneur group has the lowest number of respondents with 6 respondents, representing 1.5% of the total respondents. Other respondents are comprise of academic group involving 55 people (20.3%), 46 people are MOSTI staff (17.0%), 45 researchers (16.6%), 28 students (10.3%), and 18 people from various employment background. In terms of education background, 48.3% hold a bachelor degree or a diploma, 47.3% hold a master or a PhD, 2.6% have a certificate and, 1.8% have at least high school education.

In terms of KRSTE.my membership, the study found that the majority of the respondents are registered users for less than 6 months which is 103 respondents. Meanwhile, 60 of the remaining respondents has been a member of KRSTE.my for at least 6 months to almost one year and 59 respondents are registered member for more than two years. Meanwhile, 49 respondents are registered member of KRSTE.my for one to two years as shown in Figure 3.

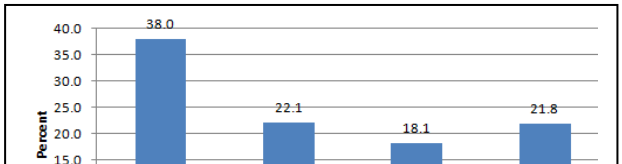

TABLE 4
Correlation of Items in Knowledge Map

Items		B2e	B2f	B2g
B2e	Knowledge classification is clear & easy to understand	1.00		
B2f	Knowledge classification is consistent with need & requirement	0.77*	1.00	
B2g	Knowledge structure & follow standard	0.81*	0.83*	1.00

*Correlation is significant at 0.01 (2-tailed)

Figure 3. Graph of respondents were registered as KRSTE.my members

A. Reliability of the Knowledge Factors

Analysis of reliability is performed to assess the consistency of the instrument while ensuring a reliable instrument to measure the variables of study. The Cronbach Alpha coefficient provides the reliability measure for relationship between the items in an attribute. Coefficient has a value between 0 to 1, where value close to 1 indicates high reliability. In general, the coefficient of 0.60 is considered poor but acceptable. Coefficients in the range of 0.70 is consider modest, and well-regarded value exceeds 0.80 [7].

Results of the reliability test indicate that the coefficients are between 0.912 to 0.935 as show in Table 2. From the table, a number of factors exceed 0.8 threshold thus indicate high reliability namely *knowledge content* and *knowledge map* (0.923), *knowledge manipulation* (0.927), *knowledge community* was (0.935), *knowledge usefulness* (0.932) and *knowledge security* (0.912). Therefore, the scale of measurement used in this study was proven consistent and reliable to be used to measure the satisfaction of KRSTE.my.

TABLE 2
Analysis of Reliability of Six Attribute of Study

Num	Attribute	Number of Items	Cronbach's Alpha
1.	Knowledge Content	4	0.923
2.	Knowledge Map	3	0.923
3.	Knowledge Manipulation	4	0.927
4.	Knowledge Community	4	0.935
5.	Knowledge Usefulness	4	0.932
6.	Knowledge Security	3	0.912

B. Relationship between User Satisfaction Variable of KMS

A sample of 271 is adequate for data analysis, as the recommended minimum is 100 [23]. Analysis of the results includes performing a Factor Correlation (FC) test to assess

the construct validity by way of the relationship between two items of measurement.

In this study, bivariate correlation is used to test the relationship between the variables. The r value indicates correlation coefficient between variables. Value of r refers to three conditions or objectives, which are:

1) To determine whether items are statistically correlated;
2) To determine the strength of the variable studied, and
3) To determine the relationship between the variables is either positive or negative [17].

In other circumstances, if the value of r is under 0.33, this shows a weak relationship between the variables. Meanwhile value of r between 0.33 and 0.66 indicates a moderate relationship, and value of r that exceeds 0.66 indicates a strong relationship between the variables under study [17]. While for the third, if there is a positive correlation coefficient between X and Y, the value of X is associated with an increase in the value of Y or otherwise. The analysis of convergent and discriminant validity is looking at the relationship between the items within and between factors.

C. Convergent Validation

Convergent validation of measurement refers to the relationship between two variables that are associated in a same group [26]. .

The correlation coefficients of all items in the Knowledge Content factor are statistically significant with high level of relationship with each other. All items relationships in the Knowledge Content factor are strongly correlated with the highest value of r = 0.88 and the lowest value of r = 0.68 as shown in Table 3. On the whole results show high positive correlations between the items in the Knowledge Content factor.

TABLE 3
CORRELATION OF ITEMS IN KNOWLEDGE CONTENT

Items	B1a	B1b	B1c	B1d
B1a Up-to-date and comprehensive information	1.00			
B1b Correct content	0.69*	1.00		
B1c Integral content	0.70*	0.78*	1.00	
B1d Logical content	0.68*	0.79*	0.88*	1.00

*Correlation is significant at 0.01 (2-tailed)

The correlation coefficients of all items in the Knowledge Map factor are statistically significant with high level of relationship with each other. All items relationships in Knowledge Map factor are strongly correlated with the highest value of r = 0.83 and the lowest value of r = 0.77 as shown in Table 4. On the whole results show high positive correlations between the items in the Knowledge Map factor.

Table 5 shows the correlation coefficients of all items in the Knowledge Manipulation factor which are statistically significant with high level of relationship with each other. All items relationships in the Knowledge Manipulation factor are strongly correlated with the highest value of r = 0.84 and the lowest value of r = 0.70. On the whole results show high positive correlations between the items in the Knowledge Manipulation factor.

Similar with other factors, the correlation coefficients of all items in the Knowledge Community factor are statistically significant with high level of relationship with each other. All items relationships in this factor are strongly correlated with the highest value of r =0.87 between items B4m and B4l, and between items B4o and B4n. The lowest value of r = 0.69 is between items B4o and B4m. On the whole results show high positive correlations between the items in the Knowledge Community factor.

Table 7 shows the correlation coefficients of all items in the Knowledge Usefulness factor which are statistically significant with high level of relationship with each other. All items relationships in the Knowledge Usefulness factor are strongly correlated with the highest value of r = 0.86 and the lowest value of r = 0.73. On the whole results show high positive correlations between the items in the Knowledge Usefulness factor.

TABLE 5
CORRELATION OF ITEMS IN KNOWLEDGE MANIPULATION

Items	B3h	B3i	B3j	B3k
B3h Easy to search documents	1.00			
B3i Easy to create documents	0.82*	1.00		
B3j Easy to upload/download documents	0.73*	0.74*	1.00	
B3k easy to transfer documents	0.70*	0.74*	0.84*	1.00

*Correlation is significant at 0.01 (2-tailed)

TABLE 6
CORRELATION OF ITEMS IN KNOWLEDGE COMMUNITY

Items	B4l	B4m	B4n	B4o
B4l Convenient to discuss	1.00			
B4mConvenient to give comments & feedback	0.87*	1.00		
B4n Convenient to share	0.75*	0.80*	1.00	
B4o Convenient to access the share content	0.71*	0.69*	0.87*	1.00

*Correlation is significant at 0.01 (2-tailed)

Table 8 shows the correlation coefficients of all the items in the Knowledge Security factor which are statistically significant with high level of relationship with each other. All items relationships in the Knowledge Security factor are strongly correlated with the highest value of r = 0.82 between items B6f and B6u and the lowest value of r = 0.73 between

TABLE 7
CORRELATION OF ITEMS IN USEFULNESS KNOWLEDGE

Items	B5p	B5q	B5r	B5s
B5p Facilitate decision-making	1.00			
B5q Facilitate to make strategic planning	0.86*	1.00		
B5r Sufficient knowledge to rise performance	0.79*	0.78*	1.00	
B5s Allowed users choose own domain knowledge	0.73*	0.77*	0.73*	1.00

*Correlation is significant at 0.01 (2-tailed)

items B6v and B6u. On the whole results show high positive correlations between the items in the Knowledge Security factor.

D. Discriminant Validity

Discriminant validation refers to the measurement of the correlation between the two variables, i.e. the level of relationship between the variables with other variables in different groups or factors but had links with them [26].

TABLE 8
CORRELATION OF ITEMS IN KNOWLEDGE SECURITY

Items	B6t	B6u	B6v
B6t Level of access according to the type of documents	1.00		
B6u Level of access according to of the individual	0.82*	1.00	
B6v Documents will be protect from hacked/misused	0.78*	0.73*	1.00

*Correlation is significant at 0.01 (2-tailed)

Discriminant validity requires that a measure does not correlated too highly with measures from which it is supposed to differ [40]. Normally discriminant validity tests the correlations between two items in different groups whether the relationship between the two items is significant and strongly correlated or whether the relationship exists.

Table 9 shows the correlation coefficients of the items in a factor with other items in different factors. For any items to be discriminant, we expect items to have moderate to low correlations with items in different factors. Results indicate that most items are discriminant with other items in different factor. However, there are 12 items with high correlations coefficient. One possible reason for these high coefficients is probably due to the redundancy of the statements used in the survey that had caused the two items in two different factors to measure the same thing at the same time.

VI. DISCUSSION AND CONCLUSION

The purpose of this study is to examine and determine the factors that most affect user satisfaction in searching and browsing for STI information provided by KRSTE.my as a knowledge management system. Therefore, to measure the user satisfaction of KRSTE.my, there must be a method or a suitable instrument to assess the user satisfaction of that system. Besides making an overall assessment, the developed instrument can be used to compare user satisfaction for different KMS and websites, with specific factors (that is information content, information usefulness, security, community forum, data manipulation, and mapping). This instrument was designed to be applicable across a broad spectrum of knowledge related applications. In the future, this developed instrument can provide a common framework for comparative analyses. Furthermore, the framework can also be adapted or supplemented to fit the specific research or practical needs of a particular environment, when needed. Consequently, future research efforts could develop and test research hypotheses and theories relating to user behavior in knowledge management contexts.

This research emphasizes the value of user satisfaction of KRSTE.my as a KMS. It has discussed the operational definition of knowledge management, knowledge management systems, and dependent and independent variables. It also discussed the development and evolution of instruments relating to user satisfaction, by previous researchers; in addition to describing the factors used to measure each of the developed items. The discussion was not only focused on the variables used, but also on the instruments developed previously to study the user satisfaction of information/knowledge systems. The instrument used in this study is consists of items that were mostly taken from a combination of instruments of UIS, EUCS, CIS, and USKMS in order to produce an instrument that can be used in the KMS context.

TABLE 9
ANALYSIS OF CORRELATION BETWEEN ITEMS MEASUREMENTS

Item	Content				Map			Manipulation					Community				Usefulness			Security		
	B1a	B1b	B1c	B1d	B2e	B2f	B2g	B3h	B3i	B3j	B3k	B4l	B4m	B4n	B4o	B5p	B5q	B5r	B5s	B6t	B6u	B6v
B1a	1.00																					
B1b		1.00																				
B1c			1.00																			
B1d				1.00																		
B2e	0.59	0.60	0.60	0.64	1.00																	
B2f	0.59	0.57	0.62	0.66		1.00																
B2g	0.60	0.66	0.66	**0.71**			1.00															
B3h	0.60	0.63	**0.67**	**0.69**	0.66	0.65	**0.68**	1.00														
B3i	0.59	0.60	0.65	0.66	0.62	0.66	0.65		1.00													
B3j	0.59	0.59	0.65	0.62	0.55	0.61	0.61			1.00												
B3k	0.61	0.65	0.64	0.61	0.56	0.64	0.65				1.00											
B4l	0.52	0.43	0.49	0.43	0.43	0.46	0.43	0.49	0.51	0.54	0.55	1.00										
B4m	0.46	0.46	0.50	0.44	0.42	0.53	0.43	0.49	0.49	0.51	0.52		1.00									
B4n	0.53	0.49	0.54	0.53	0.48	0.53	0.48	0.57	0.56	0.61	0.59			1.00								
B4o	0.55	0.47	0.52	0.51	0.46	0.53	0.50	0.61	0.60	0.63	0.61				1.00							
B5p	0.61	0.56	0.62	0.61	0.58	0.66	0.62	0.66	0.66	0.60	0.64	0.57	0.53	0.61	0.66	1.00						
B5q	0.60	0.58	0.63	0.64	0.57	0.64	0.63	0.64	0.66	0.61	**0.68**	0.57	0.53	0.62	0.65		1.00					
B5r	0.59	0.57	0.60	0.57	0.54	0.60	0.58	0.62	0.65	0.63	0.66	0.62	0.58	0.66	**0.69**			1.00				
B5s	0.56	0.56	0.59	0.62	0.55	0.56	0.56	0.64	0.60	0.60	0.61	0.61	0.59	**0.67**	**0.68**				1.00			
B6t	0.57	0.58	0.59	0.59	0.60	0.62	0.61	**0.67**	0.63	0.61	0.62	0.51	0.53	0.58	0.58	0.63	0.62	0.58	**0.72**	1.00		
B6u	0.55	0.55	0.55	0.55	0.54	0.57	0.55	0.64	0.60	0.56	0.60	0.58	0.58	0.65	**0.70**	0.61	0.64	0.64	**0.77**		1.00	
B6v	0.54	0.58	0.50	0.54	0.52	0.53	0.56	0.53	0.52	0.49	0.57	0.52	0.52	0.57	0.59	0.59	0.57	0.58	0.64			1.00

* All items were significant correlation at 0.01 (2-tailed).

APPENDIX

The User Satisfaction Scale with 22 items used.

Knowledge Content

KC1. KRSTE.my provides up-to-date and comprehensive information

KC2. KRSTE.my provides correct content

KC3. KRSTE.my provides integral content

KC4. KRSTE.my provides logical content

Knowledge Map

KM1. The classification of knowledge domain in KRSTE.my is clear and easy to understand

KM2. The classification of knowledge domain in KRSTE.my is consistent with my need and requirement

KM3. KRSTE.my provide the branch structure of STI domain knowledge and follow the standard

Knowledge Manipulation

KP1. KRSTE.my makes it easy for me to search/retrieve knowledge document

KP2. KRSTE.my makes it easy for me to create knowledge document

KP3. KRSTE.my makes it easy for me to upload and download knowledge documents

KP4. KRSTE.my makes it easy for me to transfer knowledge documents

Knowledge Community

KN1. KRSTE.my makes it convenient for me to discuss with other people in the community

KN2. KRSTE.my makes it convenient for me to give comments, feedback in the community

KN3. KRSTE.my makes it convenient for me to share knowledge with other people in the community

KN4. KRSTE.my system makes it convenient for me to access the share content from the community

Knowledge Usefulness

KU1. KRSTE.my provides knowledge/information that makes me easy to do decision making in the STI

KU2. KRSTE.my provides knowledge/information that makes me easy to do strategic planning in the implementing of STI policy.

KU3. KRSTE.my provide sufficient knowledge/information to enable me rise my job performance

KU4. KRSTE.my allowed users choose their own domain knowledge

Knowledge Security

KS1. KRSTE.my provides a level of access according to the type of documents

KS2. KRSTE.my provide a level of access according to task of the individual

KS3. Documents uploaded to KRSTE.my will be protected from hacked or misused.

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Ramlee Ab. Ghani is a student of Faculty Information Science and Technology, Universiti Kebangsaan Malaysia (UKM) and is in the process of completing master degree. He had received his first degree from Universiti Pertanian Malaysia (UPM). Currently, he is having served as government officer at Ministry of Science, Technology and Innovation (MOSTI). His interests are in human computer interaction particularly in user satisfaction and knowledge management system (KMS) applications.

Nur Fazidah Elias had received BCompSc and M.Eng from Universiti Teknologi Malaysia (UTM). She obtained her PhD in Information Systems from Queensland University of Technology (QUT), focusing in the area of IS Success or IS Impact. Presently she is a senior lecturer at School of IT, Universiti Kebangsaan Malaysia (UKM), Malaysia and a researcher with the Industrial Computing research group at the Centre for Artificial Intelligence Technology, UKM. She has more than 10 years of academic and research experience and has spoken at various seminars and conferences. She specializes in information system impact and optimization, and her research interests include optimizing IT usage in manufacturing industry, machining performance and evaluation, the impact of IS/ES to organisations, system user satisfaction, and survey design and validation. She has published a number of articles in top rated conferences and journals in those areas.

Masnizah Mohd is a lecturer in the School of Information Technology, Faculty of Information Science and Technology at the Universiti Kebangsaan Malaysia (UKM). She currently serves as the Head of Information Science program. Her main research interests are in the areas of Information Retrieval, Topic Detection and Tracking and Natural Language Processing; with particular focus on aspects such as user interaction, user interface, named entity recognition, user tasks and evaluation