PROTOTYPE EVALUATION OF E-KNOWLEDGE INTEGRATION SYSTEM: A CASE STUDY IN SMALL MEDIUM ENTERPRISES

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Abstract

Today, knowledge is the single most important source of advantage in business, and it resides within the individual members of the organization. To harness this knowledge and direct it towards the achievement of organizational goals, knowledge should be integrated in a systematic manner. Social media can be considered as a tool to integrate knowledge effectively which can lead to improve the organization performance. Prototype system provides the validation for the conceptual model. E-Knowledge Integration System (EKIS) prototype has been developed as a method for model validation of Knowledge Integration through social media. This article analyzes the prototype evaluation of EKIS in Small Medium Enterprises (SMEs) using Rasch model. The findings indicate that the EKIS prototype is appropriate and significant in supporting propose of KI model and were satisfied in system quality, perceived usefulness and the functionalities. The findings for this study can be used as a guideline for SMEs in integrating knowledge through social media.

Keywords: *Knowledge Integration, Social Media, Prototype, Technology, Organization.*

INTRODUCTION

In the new age, knowledge has been recognized as one of most valuable assets which developed in organization. Moreover, knowledge is acknowledged as a sustainable basis of competitive advantage for many organizations possess (Grant, 1996). Most Small Medium Enterprises (SMEs) have started to realize the importance of Knowledge Integration (KI) in streamlining their operations and processes to improve organizational performance (Mohannak, 2013). All organizations are attempting to promote innovation in their activities, processes, products and services in order to improve their competitiveness by utilizing knowledge management strategies.

KI have efficiency by reducing redundancy of organization knowledge and enhancing consistent representation (Grant, 1996). Redundancy happens when organizations store the multiple or overlap the data in different places. Besides, source is not found when knowledge is needed in a certain situation (Kraajenbrink, 2007)

because of scattered or hidden. Hence, they are under strong pressure to identify, acquired and use knowledge from external resources. Organization needs to be able to combine, integrate, specialized skills in order to deliver new products and services. The effective of integrate the knowledge is significant to innovation that leads to improve organization's performance (Tiwana, 2004; Raban, 2008).

Background

Social Media tools have ability to integrate all information and knowledge that can be obtained (Hong & Liang, 2015). Also, we are moving into a more digital world and people are more engaged through social media, it is seen that the knowledge flow among organizations can be as well facilitated via social media. Currently, social media are most widely used by various organization especially SMEs (Meske & Stieglitz, 2013). Mckinsey Global Institute (2011) showed that organization who are maximum utilize of social media can improve the business performance and exploit new market opportunities.

Technological cooperation among organization is important because large part of knowledge needed in innovation process is tacit that can be transfer through Social Media interaction (Hong & Liang, 2015). Thus, social media offers many possibilities to develop corporate actions if it is utilized in a structured way. A organization should define suitable actions that can be developed through Social Media.

E-Knowledge Integration System

Knowledge Integration System (EKIS) were developed reflected on Knowledge Integration model through social media proposed by Nur Ilyana et al. (2018). This prototype is developed for Bridal Service which provides services for event ceremony especially wedding ceremony. This system aimed to help the wedding organizer to organize their clients' wedding ceremony.

Starting from the clients browsing the wedding packages to the execution of the plans for their wedding by the wedding organizer, this system will assist specifically, the wedding organizer to ensure that the wedding ceremony that will be held will meet client's requirements and expectations. EKIS is implemented to allow collaboration of SMEs (vendor) to provide, discuss, seek, share, store the information and knowledge. This system will provide functionality for the vendor whose working for the wedding organizer to received notification and reminder about the wedding that they have to handle.

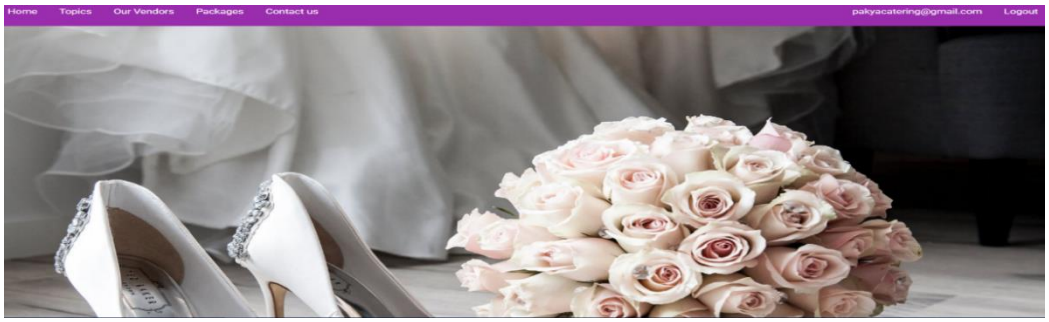

Figure 1: EKIS (Homepage)

EKIS is designed based on Graphical User Interface (GUI) map as shows in Figure 1. The main menus are listed Home, Our Vendor, Packages and Contact us.

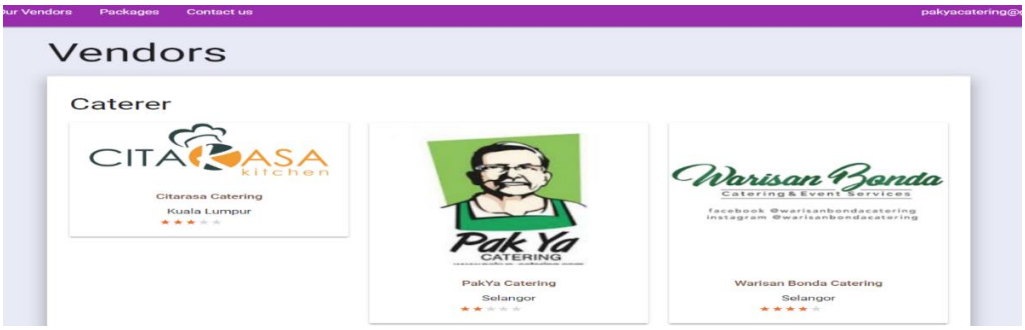

Figure 2: Vendor's page

Figure shows as Figure 2, vendor is listed based on their expertise such as catering, photography, make up, designing, emcee etc. KI element is apply in this system throught collaboration between vendors. Besides, by using this system, the users can minimise their working efforts and maximize the output. The system also acts as middleware and platform for them to store their business data and client's information.

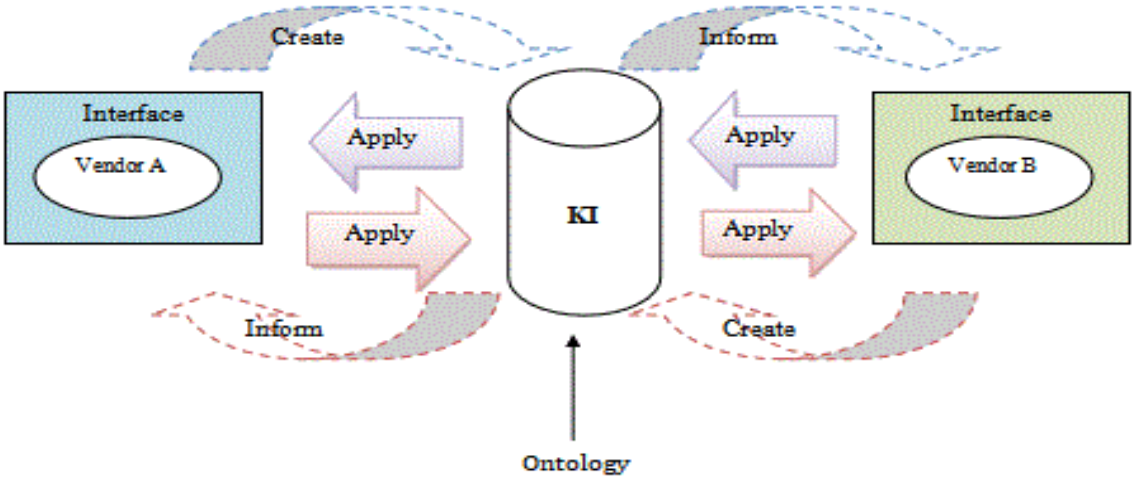

Figure 3: Process of KI

Figure 3 show process of Knowledge Integration (KI) happen between vendors. Integration of knowledge from separate different source enables a common representative of knowledge content. Hence, KI ontology can achieve by integrate of business activity and resources from different vendors to satisfy quickly and efficiency of customer need. In this context, ontology can be defined as share understanding of some domains of interest

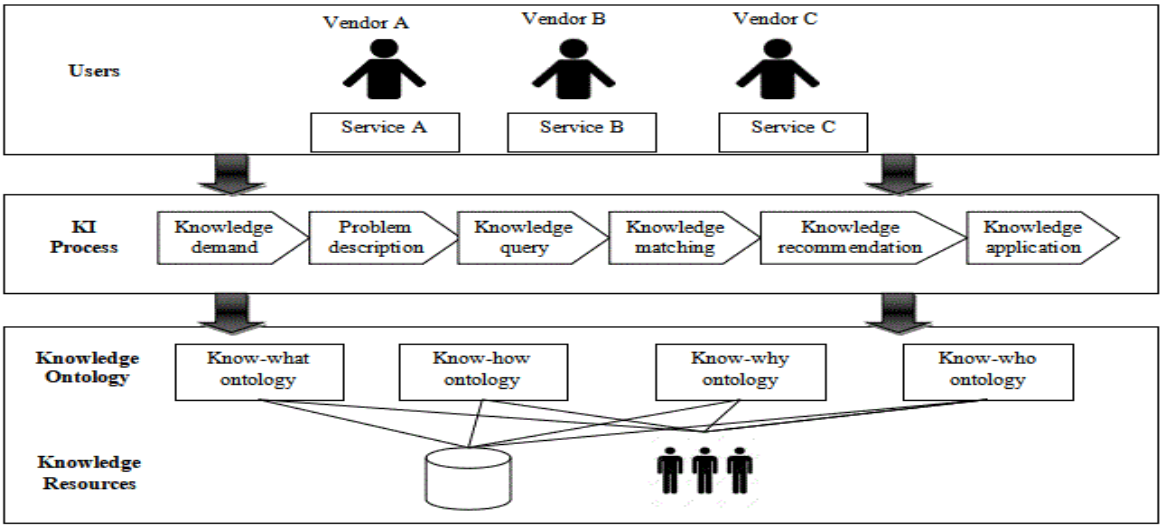

Figure 4: KI Ontology Process adapt from Wu et al. (2014)

The effective of integrate the knowledge is significant to product innovation and service that lead to improve organization's performance (Tiwana, 2004; Raban, 2008, Tsai et al., 2015). Studies by Wu et al. (2014) has develop a framework to enhance the integration and sharing of product knowledge during the development phase (refer Figure 4). Using the knowledge integration method and mechanism, the

represented knowledge ontologies are mapped and integrated into the knowledge integration ontology 'Know-X ontology' through the adaptors.

Ontologies have been used in many knowledge based applications as a means to classify structure and represent the common understanding for the distributed and heterogeneous information spread over from various resources. Using the Know-X ontology, this knowledge integration ontology can connect physical knowledge address. Thus, product developers or service provider can share their own product and service development knowledge with other knowledge owners to increase product or service value.

Therefore, organizations need to manage their knowledge and apply it, modify it and reconfigure it efficiently and across cross functional divisions to come up with various unique capabilities that allow them to acquire competitive advantages in the market place. The validation of EKIS is important in order to improve the features of the system.

METHODOLOGY

The survey evaluation undertaken study. The post survey questionnaire was distributed to get user's perspective and assessment of EKIS. Rasch analysis has been used to analyze the reliability of items and respondents' purpose to acquire the high quality data for model validation. There were 19 respondents who involve has been answered the questionnaire. According to Faulkner (2003), studies to evaluate a prototype of a novel user-interface design reveals severe errors quickly and therefore often require fewer participants.

The survey consists of 15 questionnaire items which refer the overall evaluation EKIS prototype. A total of 19 respondents participated for this post survey using Google form. Literature suggests that three to twenty participants provide valid results (Turner et al., 2006). Hence, 19 respondents are enough for this survey. Demographic of the respondents are as shown in Table 1.

Table 1: Demographic of respondents for prototype validation

Demographic	Group	Frequency	Percentage (100%)
Gender	Male	5	26.3
	Female	14	73.7
Profession/ Role	Manager	0	0
	Vendor	1	5.3
	User	11	57.9
	Sales/ Marketing team	3	15.8
	research & Development	4	21.1
Social media usage experience	Less than 1 year	0	0

1 to 5 years	4	21.1
6 to 10 years	7	36.8
More than 10 years	8	42.1

Post survey analysis using Rasch

Rasch model has been used to analysis the post survey and validation of EKIS. Three main outputs produced by Rasch model are: summary of item/ person statistic, person-Item distribution map and EKIS item measures

RESULTS AND DISCUSSION

This section describes the results and findings of the prototype validation.

Item and Person Statistic

Table 2 shows statistics summary for person of which Cronbach alpha, person reliability score of 0.84 is good and Cronbach Alpha=0.87. Hence, it means that the responses are reliable for analysis (Fisher, 2007). Individual Mean is *logit*0.39. In other words, the logit shows that respondents endorse most items. The spread of person respondent is 5.19-(-0.91) = 6.1. This is due to very erratic by one of the respondent. The person separation is 2.31 is fair. In Rasch, person separation is used to classify people. Low person separation (< 2, person reliability < 0.8) with a relevant person sample implies that the instrument may not be not sensitive enough to distinguish between high and low performers (Mohd Nor et al., 2010).

Table 2: Summary of Measured Person

SUMMARY OF 19 MEASURED Persons

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	50.5	15.0	1.68	.60	.97	-.1	.95	-.1
S.D.	5.1	.0	1.66	.14	.51	1.3	.53	1.3
MAX.	59.0	15.0	5.19	1.10	2.38	2.8	2.26	2.5
MIN.	42.0	15.0	-.91	.52	.31	-2.1	.15	-2.2

REAL RMSE .66 ADJ.SD 1.52 SEPARATION 2.31 Person RELIABILITY .84
MODEL RMSE .61 ADJ.SD 1.54 SEPARATION 2.52 Person RELIABILITY .86
S.E. OF Person MEAN = .39

Person RAW SCORE-TO-MEASURE CORRELATION = .99
CRONBACH ALPHA (KR-20) Person RAW SCORE RELIABILITY = .87

Meanwhile, reliability of items refers to each specific item which can be clearly described by level difficulty. This means that for each level of item difficulty, there are sufficient respondent to answer the items according to their individual ability. Table 3 shows statistic summary for item reliability score of 0.68 (Fisher, 2007). This might be due to small sample size being used for analysis. Item mean is *logit* 0.39. The spread of item is 2.62-(-1.34) = 3.96. The item separation is 1.44. The three stratas allow us to

identify items which are important to respondents. This indicates overall fitness of the instrument with the Rasch model.

Table 3: Summary of Measured Item

SUMMARY OF 15 MEASURED Items

	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	63.9	19.0	.00	.51	1.00	-.1	.95	-.1
S.D.	3.9	.0	.96	.02	.40	1.2	.43	1.1
MAX.	69.0	19.0	2.62	.56	1.98	2.7	1.93	2.1
MIN.	53.0	19.0	-1.34	.48	.59	-1.5	.53	-1.4

REAL RMSE	.54	ADJ.SD	.79	SEPARATION	1.44	Item	RELIABILITY	.68
MODEL RMSE	.51	ADJ.SD	.81	SEPARATION	1.60	Item	RELIABILITY	.72
S.E. OF Item MEAN = .26								

UMEAN=.000 USCALE=1.000
Item RAW SCORE-TO-MEASURE CORRELATION = -1.00
285 DATA POINTS. APPROXIMATE LOG-LIKELIHOOD CHI-SQUARE: 348.45

Overall, the respondents and item data of EKIS fits the Rasch model.

Person-Item Distribution Map (PIDM)

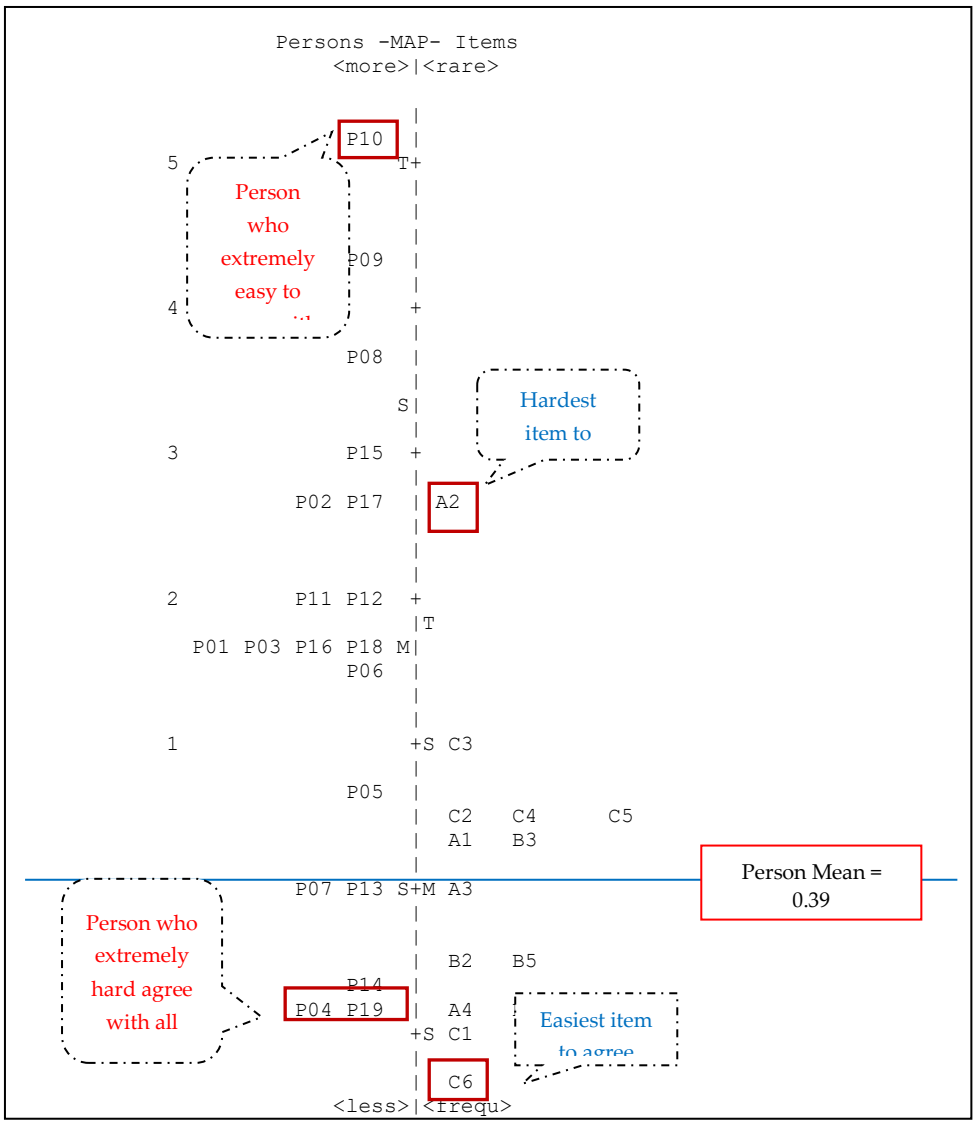

Figure 5: EKIS Person-Item Map

Person-item distribution map (PIDM) shows in Figure 5 provides the graphical distribution of the item difficulty measures against person ability measures. The Rasch model showed the persons on the left and items on the right side of the map. Based on this map, A2 is the most difficult item for EKIS. Meanwhile, C6 is the easier/ agreeable item. On the left side, person P10 being the highest in PIDM show tendency to give highest significance rating to most of questionnaire items. In contrast, person P04 and P19 show tended to give lower rating.

EKIS item Measures

Table 4 shows the item measure of EKIS. According to Fisher (2007), in order to verify for fit and misfit items or persons, the following criteria must be satisfied: Point Measure Correlation (PMC) must be range of $0.4 < x < 0.8$, Outfit Mean Square (MNSQ) should be in the range of $0.5 < y < 1.5$ and Outfit Z standard (ZSTD) must be range of $-2.0 < Z < +2.0$. PMC value shows in the fit range of requirement. All value of Outfit MNSQ and ZSTD seem in the range except item C2. However, since it is already within the critical value, items C2 (*EKIS has attractive presentation*) can be remained (Fisher, 2007).

Table 4: EKIS Item Measures

					INFIT		OUTFIT		
No	Item	Description	Measure	S.E	MNSQ	ZSTD	MNSQ	ZSTD	PMC
		EKIS quality							
1	A1	The system is easy to use and meets the organization's needs	0.26	0.49	0.98	0	1.01	0.2	0.57
2	A2	The system generating the error free record	2.6	0.49	0.65	-1.1	0.6	-1.3	0.7
3	A3	The system offer prompt service to organization/ customer	0.02	0.49	1.77	2.3	1.93	2.0	0.55
4	A4	The system have convenient operating hour at all	-0.75	0.52	0.70	-1.0	0.56	-0.8	0.67
		Perceived Usefulness							
5	B1	Using EKIS in my organization enables me to accomplish tasks more effective and efficient	-0.75	0.52	0.69	-1.0	0.56	-0.8	0.67
6	B2	I am willing to cooperate with others to accomplish task through EKIS	-0.49	0.51	0.95	-0.1	1.04	0.2	0.51

7	B3	EKIS saves my time for searching relevant information and knowledge	0.26	0.49	0.59	-1.5	0.53	-1.4	0.65
8	B4	EKIS helps me acquire new knowledge needed	-0.75	0.52	0.93	-0.1	0.73	-0.4	0.68
9	B5	Using EKIS improves my job performance	-0.49	0.51	1.13	0.5	1.01	0.2	0.73
		Functionalities of EKIS							
10	C1	EKIS allows the users to seek the knowledge through searching or posting a question	-1.04	0.54	0.88	-0.3	0.87	0.0	0.57
11	C2	EKIS has a attractive presentation	0.50	0.49	1.98	2.7	1.88	2.1	0.52
12	C3	EKIS allows the users to discuss and communicate the knowledge with others.	0.97	0.48	0.61	-1.4	0.57	-1.4	0.66
13	C4	It is relatively easy to move from one menu to another	0.50	0.49	0.65	-1.3	0.64	-1.1	0.56
14	C5	EKIS allows the users to share knowledge though posting, leaving a comment, and replying.	0.5	0.49	0.65	-1.3	0.65	0.5	0.46
15	C6	EKIS provides the functions of managing, organizing and storing the knowledge	-1.34	0.56	1.28	0.9	1.16	0.5	0.55

EKIS prototype validation has been conducted to validate the proposed KI model. Rasch analysis was used to analyze the item reliability and fitness. The result shows the item reliability of EKIS = 0.69 (fair) which indicated the acceptance for proposed KI model. Overall, the result of post survey on EKIS is more meaningful to indicate the more successful Knowledge Integration model through social media and were satisfied in system quality, perceived usefulness and the functionalities.

CONCLUSION

In conclusion, a prototype namely E-Knowledge Integration System (EKIS) developed and evaluated based on proposed model. The EKIS is beneficial for SMEs in manage their organization knowledge effectively. These findings contribute to the

improvement of technology in the practice of knowledge integration and improving and making improvements of the existing knowledge integration system. However, EKIS is only focusing on one organization which is bridal service. In future, developers can enhanced the marketability of the system by making more general function that covered all the necessary needs of the people in the diffrent industry.

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