Influential Factors of KM Process Adoption: A Social-technological Based Approach

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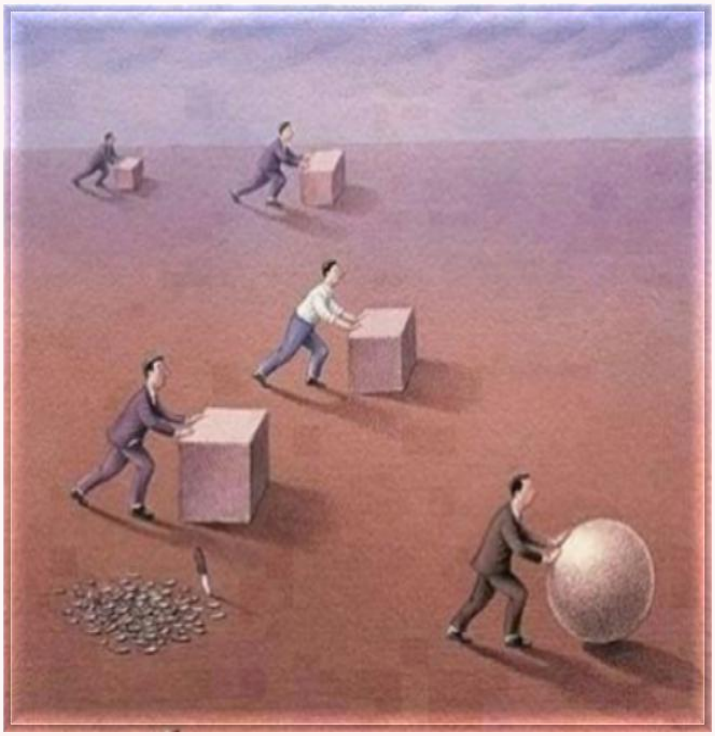

This study seeks to investigate factors that contribute to Knowledge Management processes adoption and implementation in the Sri Lankan telecommunication industry from the socio-technical perspective. In this pursuit, this study used intention to be involved in knowledge creation and sharing based on four SECI processes construct, and identified four domains of factors that contribute to KM process adoption. These four factors are organization structure, organizational culture, IT infrastructure, and individual acceptance. A quantitative survey research approach was conducted on 313 business executives from the selected industry. The findings suggest the reasonably high level of intention to adopt KM processes among the executives surveyed. Several factors are found as significant predictors of intention to adopt KM process. These are trust & collaboration, ICT use & support, performance expectancy of KM process, and effort expectancy of KM process.

Keyword:
- Knowledge management process,
- Knowledge creation,
- Knowledge sharing,
- Knowledge management acceptance,
- Socio-technical approach

I. INTRODUCTION

KM, in a nutshell, means doing what is needed to get the most out of knowledge resources [1]. In an organisational context, KM means, any intentional and systematic process or practice of acquiring, capturing, sharing and using productive knowledge, wherever it resides, to enhance learning and performance in organisations [2]. Evidence from literature indicates that organisations tend to pursue efforts in KM conceptualization and initiatives through either human (personalization) or system (codification) approach [3, 4]. Arguably, this segmented approach to KM could result in low KM implementation success rate due to the nature of high dependency between human and technological factors [5, 6]. This somewhat explains the need for process-oriented approach as suggested by Grover and Davenport [4].

Building from the work of earlier research on KM process such as Lee and Choi [7], Choi et al. [8], Lee and Lee [9], Lin [10], Choi and Lee [11] and the

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behavioral intention theory from TRA [12], TPB [13], adoption and technology acceptance theory (TAM) [14], this study seeks to investigate the effect of various organizational factors (known as enablers), technological factors and individual factors (such as performance expectancy and effort expectancy) on KM processes. In addition, the adoption theory in information system field also provides the strong basis of which KM process adoption can be investigated [14, 15]. This approach can also allow for further investigation to identify the antecedents of the process adoption relevant to KM process. The participants used in pursuing this study were the executives from several selected organizations in the Sri Lankan Telecommunication industry.

The research is expected to contribute significantly to theory and practice in the field of knowledge management through process-oriented approach and the development measurement framework for assessing KM process implementation success. More importantly, this research can also provide to knowledge and understanding to the Sri Lankan Telecommunication industry, by allowing them to assess their KM readiness and capabilities both from social and technological factors.

The Socio-Technical Approach

The socio-technical approach is made on the basis that successful implementation process of KM requires synchronization of human behaviors and attitude as well as organizational and information technology factors [1, 7, 9, 16 -18]. Therefore, a socio-technical approach in combination with process-oriented concept of KM is proposed in benefiting from both segments of human and system [19]. Holt et al. [19] argued that the socio-technical approach is important in providing general overview of KM success, and success is best assessed through the process of KM [4, 7, 9].

Therefore, while many literatures are available in measuring KM through knowledge sharing intention [8, 10, 19, 20] or knowledge sharing behavior [6, 21 - 24], it is time for KM research to be conducted using a more holistic approach of KM through a socio-technical perspectives, and a combination of both knowledge sharing and knowledge creation as components of KM process.

Research Framework

Figure 1 presents the proposed research model. The research model has been developed based on the theories of TRA [12] and TPB [13], which helps explain that the actual behaviors through behavioral intention. The model was conceptualised based on the studies of Lee and Choi [7], Choi et al. [8], Lee and Lee [9], Lin [10], Venkatesh et al. [15], and Choi and Lee [11]. Most of these studies are based on the theory of knowledge creation [25], knowledge sharing intention [8, 10, 20], technology acceptance [15], and the KM process approach [7].

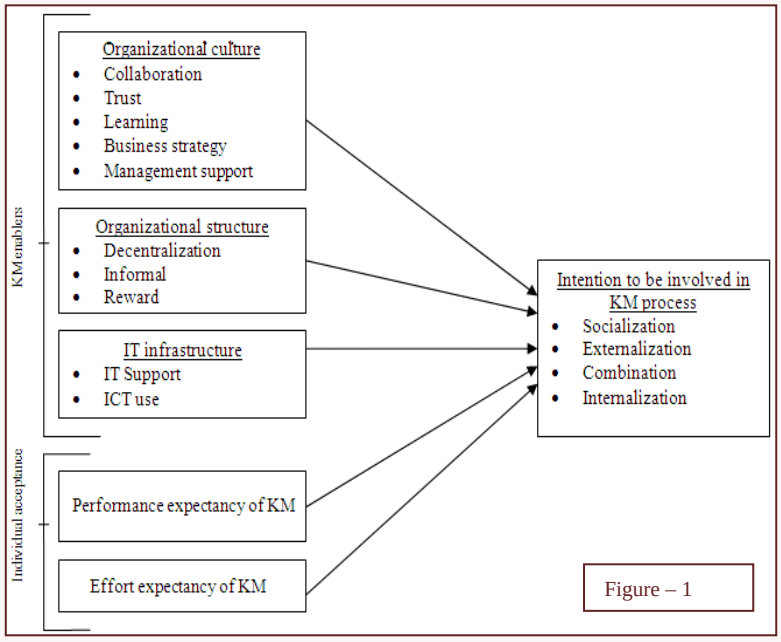


Figure – 1

II. Methodology

Data for this study was collected by the means of a self-administered survey questionnaire conducted on executives in the Sri Lankan telecommunication industry. This industry was selected because it is considered as one of the most knowledge intensive industries [26] in Sri Lanka. The paper-based questionnaires were distributed to a total of 600 executives in the industry with 313 questionnaires returned.

The questionnaire items were adopted from Lee and Choi [7] for collaboration (4 items) and learning (5 items); Choi et al. [8] for trust (4 items); and Lin [10] for management support (3 items); Lee and Choi [7] for decentralization (4 items); and Lin [10] for rewards (4 items). Similarly, the questionnaire items for Part IV were also adopted from Lee and Choi [7] {IT Support (5 items)} and Lin [10]

{ICT Use (4 items)}. Part V captures the individual acceptance of KM {performance expectancy (4 items) and effort expectancy (4 items)} for which the questionnaire items were adopted from Venkatesh et al. [15]. Part VI captures the respondents' intention to be involved in KM process {socialization (5 items), externalization (5 items), combination (5 items), and internalization (4 items)}; the measures were adopted from Choi and Lee [11], and Lee and Choi [7]. Other than the background information, all other measures use the following seven-point Likert scale: (1) strongly disagree, (2) disagree, (3) slightly disagree, (4) neutral, (5) slightly agree, (6) agree, and (7) strongly agree.

Factor analysis was used to detect if the items under consideration for measuring a construct are related to that particular construct or any others in the theoretical model [27], whereas, the Cronbach alpha provides a reliability coefficient that tells us, in theory, how reliable our estimates are [28]. According to Coakes et al. [29], Principal Components Analysis (PCA) and Principal Axis Factoring (PAF) are the most frequently used methods of factor analysis. Likewise, Warner [28] also reports that PAF is one of the methods that is most widely reported in published journal articles. Thus, this study used the PAF with Varimax rotation for the factor analysis performed. Descriptive analyses were used to assist the researchers described about the phenomena within the context of the study, and correlation and regression analyses were performed to test the hypotheses and generate answers to research questions pertaining to how and the extent to which variables are related.

III. Findings

A. Respondents Profile

The respondents of the study are found varied in terms of gender, age, and work experience. Male respondents make up 73.2% (229) with the remaining 25.6% (80) of the respondents are female. This figure illustrates closely the nature of the working population in Sri Lanka, especially in the corporate sectors. According to the Annual Report (2009) of the Central Bank of Sri Lanka, the corporate sector labour force consists of 67.9% males and 32.1% females.The highest numbers (121 or 38.73%) of respondents have between 5-10 years of experience while 35.1% (110) of the respondents have the experience of below 5 years. Accordingly, about 73.83% (231) of the respondents have equal to or less than 10 years of working experience in the industry.

B. Intention to be involved in KM Process

The results of PAF analysis on intention to be involved in KM are shown in Table 1. With 0.55 thresholds, one item was omitted from 'combination'. A reliability test was then conducted on the remaining items and all of them were found reliable with the results of reliability test α above the 0.7 threshold [30]. 'Socialization' remained with all five items (α = 0.761); 'externalization' also retained all five items (α = 0.738); 'combination' with four items (α = 0.832); and 'internalization' with all four items (α = 0.902), of which most were adopted from Lee and Choi [7].

C. KM Enablers

The results of PAF analysis and the descriptive analysis on KM enablers are shown in Table 1. With 0.55 thresholds, the factors were then revised with some items omitted from each conceptualized factors, while some others were merged to reflect the loadings of items together. 'Trust' and 'Collaboration', being considered as two different factors at the conceptual level, were found loaded together in the analysis, and therefore renamed as 'Trust & Collaboration'. Similarly, one item from 'IT Support' was found loaded together with 'ICT use'. Accordingly the variable was renamed as 'ICT Use & Support'. As the table illustrated (Table 1), the revised KM enablers' variables were found reliable with the results of reliability test α above 0.7 threshold [30].

The descriptive analysis demonstrates the results that vary from one construct to another. The average mean scores are found highest for ICT support, followed by trust and collaboration, and ICT use (means above 5.0). These are followed by learning and management support, which score slightly below 5.0 and above 4.0. These scores are somewhat high and a simple observation to these findings is such that the constructs (that score higher than 4.0) are perceived as highly present by majority of the participants in their organizations. However, the finding shows that decentralization and reward system is perceived as somewhat low through the overall mean score below 4.0. This indicates that decentralization and reward system, as measured in this study, is not common and sufficient in the Sri Lankan telecommunication industry. Findings from

this analysis are then considered for further analysis to find out if the construct identified are significant contributors to the perceive KM process intention.

Table 1: Factor analysis, reliability test, and descriptive analysis of KM enablers.

Items	Mean	Std dev	Factor loading
Trust & Collaboration (a = .702)			
I believe colleagues in my organisation treat others reciprocally.	4.94	1.403	.656
I am satisfied by the degree of collaboration among colleagues in my organisation.	5.04	1.334	.633
I believe colleagues in my organisation are honest and reliable.	4.99	1.372	.556
I wish to accept responsibility for failure.	5.66	1.200	.584
Average 'Trust & Collaboration' score	5.16	0.971	
Learning (a = .879)			
My organisation provides various formal training	5.20	1.505	.731
My organisation encourages people to attend seminars, symposia, and so on.	4.88	1.576	.706
My organisation provides various programs such as clubs and community gatherings.	4.78	1.652	.685
I am satisfied with the contents of job training or self-development programs.	4.73	1.609	.648
My organisation provides opportunities for informal individual development other than formal training.	4.85	1.493	.617
Average 'Learning' score	4.89	1.287	
Management Support (a = .900)			
My senior managers provide necessary help and resources for knowledge creation and sharing initiatives.	4.74	1.559	.787
My senior managers are keen to see my involvement in knowledge creation and sharing initiatives.	4.78	1.527	.769
My senior managers always support the knowledge creation and sharing initiatives.	4.76	1.544	.756
Average 'Management Support' score	4.76	1.408	
Decentralization (a = .902)			
I am encouraged to make my own decisions.	4.11	1.693	.856
I can make decisions without approval.	3.73	1.571	.798
I do not need to refer to someone else.	3.82	1.620	.789
I can take action without a supervisor.	3.86	1.648	.750
Average 'Decentralization' score	3.88	1.437	
Rewards (a = .912)			
My organisation provides higher bonus in return for my contribution to knowledge creation and sharing.	3.33	1.708	.901
My organisation provides promotions in return for my contribution to knowledge creation and sharing.	3.29	1.711	.853
My organisation provides increased job security in return for my contribution to knowledge creation and sharing.	3.52	1.765	.806
My organisation provides higher salary in return for my contribution to knowledge creation and sharing.	3.62	1.620	.734
Average 'Rewards' score	3.44	1.514	
IT Support (a =805)			
My organisation provides IT support for collaborative works regardless of time and place.	4.98	1.554	.869
My organisation provides IT support for simulation and prediction.	4.99	1.572	.684
My organisation provides IT support for communication among colleagues in my organisation.	5.75	0.818	.599
Average 'IT Support' score	5.24	1.138	
ICT Use & Support for Search and Sharing (a =850)			
I use electronic storage (such as online data base and data warehousing) extensively to access knowledge.	4.94	1.623	.793
I use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues.	5.15	1.593	.772
I use the technology to share knowledge with other persons outside the organisation.	4.99	1.563	.694
My organisation provides IT support for searching necessary information and sharing it with others.	5.06	.470	.596
Average 'ICT Use & Support for Search and Sharing' score	5.03	1.297	

D. Factors of Individual Acceptance

The results of PAF analysis and the descriptive analysis on factors of individual acceptance are shown in Table 3. With 0.55 thresholds, the factors were then revised with some items omitted from the original construct. The reliability test performed indicates that both variables, which are performance expectancy (α = 0.816) and effort expectancy (α = 0.763) are highly reliable with the Cronbach alpha value higher than 0.7. The descriptive analysis illustrated in the table suggests that both performance expectancy and effort expectancy are perceived highly by the majority of the executives in the Sri Lankan telecommunication industry (both mean scores higher that 5.0) on KM. The result shows that respondents have high expectation on KM in terms of the benefit it provides and perceived that getting involved with KM is, indeed, easy and requiring less physical and mental efforts.

Table 2: Factor analysis, reliability test, and descriptive analysis of individual acceptance factors.

Items	Mean	Std dev	Factor loading
Performance Expectancy of KM (α =816)			
Creation and sharing of knowledge would enable me to accomplish task more quickly.	5.88	1.096	.867
I would find creation and sharing of knowledge useful in my job.	5.75	1.215	.718
Average 'Performance Expectancy of KM' score	5.82	1.063	
Effort Expectancy of KM (α =763)	5.65	0.924	.690
Learning the initiatives of creation and sharing of knowledge would be easy for me.	5.61	0.920	.687
I would find the involvement in the process of knowledge creation and sharing is easy.	5.66	0.958	.648
It would be easy for me to become skillful in knowledge creation and sharing initiatives.	5.64	0.769	
Average 'Effort Expectancy of KM' score			

Table 3: Stepwise multiple regression.

Predictors	Standardized Coefficient	t-value	p-value
Effort Expectancy of KM	.300	6.351	.000
Performance Expectancy of KM	.258	5.108	.000
Trust & Collaboration	.207	3.911	.000
ICT Use & Support for Search and Sharing	.161	3.254	.001

Dependent variable: Intention to be involved in KM process

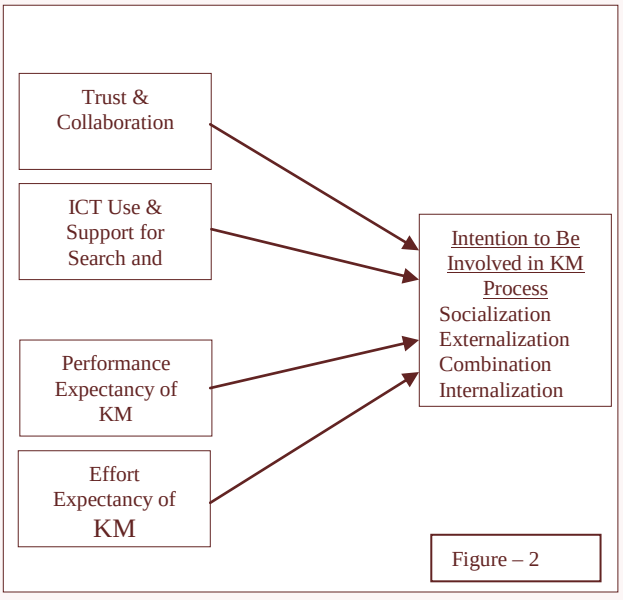
E. Analysis of Relationship

A stepwise multiple regression analysis was later performed to determine the simultaneous effects of independent variables (factors) on a dependent variable. A multiple regression model is simply a model that has two or more independent variables [31], which can be used to analyse the relationship between a single dependent variable and several independent variables [30]. Argyrous [32], and Cramer and Ebrary [33] emphasise that a stepwise multiple regression technique is a method that determines the combination of the independent variables that best explain the dependent variable through percent variance accounted for. Table 6 shows the result of the stepwise multiple regression analysis of independent variables (KM enablers and individual acceptance factors) on dependent variable ('Intention to Be Involved in KM Process').

The summary result of stepwise multiple regression analysis shown in table 6 provides support that 'Performance Expectancy of KM', 'IT Support", 'Effort Expectancy of KM', and 'ICT Use & Support for searching and Sharing' are the combination of key predictors of 'Intention to Be Involved in KM Process'. Therefore, although all the antecedent variables investigated in this research indicate significant correlation with KM process intention, only these four are found strong predictors of intention. These key predictors explain 44.7% (R^2 = .447) of the variance accounted for in the variable 'Intention to Be Involved in KM Process'.

The coefficient values provide insights into how each variable contributes to explaining 'Intention to Be Involved in KM Process'. 'Effort Expectancy of KM' is found to be the strongest predictors (beta = .30), followed by 'Performance Expectancy of KM', 'Trust & Collaboration' and ICT use and Support for searching and sharing'. This finding suggests that people need to perceive KM process and activities are easy and requiring less efforts to learn and do in order to engage in the behavior; and they need to perceive the KM activities and the process as beneficial to their job in order to be willing to engage in the KM process. The organizational factors emerged indicate that trust and collaborative culture and ICT use in support for KM are needed to facilitate the successful KM process implementation. As a summary, after the stepwise regression analysis, the basic research model appears as in Figure 2.

Figure 2 Revised research model:



IV. DISCUSSION AND CONCLUSION

The final analysis using multiple regression has led to the refinement of the factors that significantly contributes to the importance of KM oriented organisational culture (trust & collaboration, earning, and management support), ICT use and support, performance expectancy and effort expectancy as significant predictors of KM process behavior. These are, indeed, in line with those studies conducted earlier, especially in the Asian regions [7 - 10, 34 - 38].

The significance of performance expectancy and effort expectancy of KM are in line with previous study by Li [39]. In addition, a number of studies in the area of information systems (IS) in different cultural settings and with different types of technology adoption have empirically proven that both performance expectancy and effort expectancy are, indeed, significant predictors of behavioral intention. Venkatesh et al. [15] has also proven that performance expectancy and effort expectancy are important contributors of behavioral intention. Likewise, Abu Shanab and Pearson [40] have found the influence of these two factors on the intention to use Internet banking in Jordan, while Al-Gahtani et al. [41] have found the influence of these two factors on the intention to use Desktop computer application in Saudi Arabia. Furthermore, Chiu et al. [42] who studied antecedents of kiosk system intention in Taiwan's largest convenience retailer confirmed the impact of these variables. Therefore, the findings of this study substantiate the importance of both performance expectancy and effort expectancy in shaping the behavioral intention of both technology and process, even in the context of KM.

On these bases, it is suggested that companies expecting to implement KM process devote considerable efforts to establish trust and collaboration in its culture, better technology use support especially with the use of KM systems and related technology, and better training and awareness programme to ensure understanding and salient benefit of KM. Better trusting relationships among employees can be enhanced by facilitating norm of reciprocity, sharing experiences, dialoguing and confiding personal information in organisations [35]. Among others, Al-Alawi et al. [23] recommend social events and occasional outdoor discussions to reinforce trust, building friendship and more collaboration between co-workers. IT, being another significant factor, is basically the backbone in organizational KM success. In addition to providing sufficient IT facilities and support, encouraging the intensive use of IT such as KM information system (KMS) is also very important. This study also confirms the positive relationship between KM and ICT Use & Support for Search and Sharing, which in other words can be referred to as the use of KM or related technologies. Many KM researches are dedicated to enhancing the effective use of ICT such as KMS in organizations [43 - 45].

The result of this study also verifies the role of performance expectancy and effort expectancy of KM as predicting variables of KM process intention. Therefore, the benefits of involving in KM process must be both extrinsic and intrinsic to the executives. If involving in KM process is perceived to help them finish their respective jobs effectively and efficiently, then it is necessary for organization to create effective training and awareness programme for the employees to better understand the concept of KM and support the process. According to Li [39], performance expectancy and compatibility with job needs are critical factors influencing participants' intention to be involved in KM. Therefore, the executives need to understand how KM can be compatible with the jobs and the organization mission and vision. Indeed, literature in information system research has unanimously agreed that performance expectancy is what motivates people to use the systems [15]. Hence, organizations should provide sufficient support in the form of reward and training to the executives to keep them motivated and informed on how the KM process can fit to their job, and how it can make them productive, and benefit the organization in general. Similarly, if the executives feel that the KM process can be easily learned and implemented, their willingness to participate can be further enhanced, and thus motivate their increased participation. In this case, organizations need to provide proper training on the concept prior to embarking on the process, so that employees are ready to adopt it.

The resulting research model can be a starting point for many similar future researches in the area. From the methodological point of view, this study was derived from both knowledge creation and sharing, and information system research of technology acceptance. While past works on acceptance are focusing on technology, this research has proven that the theory is also applicable for process adoption. Therefore, the validated the instrument resulted from the measurement model can be replicated and used by researcher in a different environment. Future endeavour that the researchers would like to embark on is to use the analysis technique using Partial Least Square to compare with the conventional method of multiple regressions.

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