Knowledge Management Enablers and Knowledge Management Implementation

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***Abstract*— The importance of Knowledge Management (KM) process implementation for business success is well accepted. Evaluation of organizational members' intention toward KM and the factors that influence on their intentions are considered important for KM success. Thus, this work attempts to correctly define the variables that can be used to measure intention towards KM and the influencing factors on intention through factor analysis. The analysis was done using data collected from 313 executives in the Sri Lankan telecommunication industry.**

Keywords- KM Enablers, KM Intention, KM implementation

I. INTRODUCTION

The initiation for KM process (knowledge creation and sharing) implementation should come from the individuals in the organisation. As such, their intention and attitude towards KM play a major role in KM process implementation and its success. Therefore, the factors that influence on organizational members' intention towards KM process implementation should be investigated as very limited information is available in this regard in the literature. Hence, the present researchers, in this paper propose a research model that depicts the influence of KM enablers on organizational members' intention towards KM process implementation and attempt to define the relevant variables therein based on factor analysis.

II. KM ENABLERS

For a successful implementation of KM process in an organisation, the organisation itself should be prepared with some physical and logistical capabilities. Lee and Choi [1] termed these capabilities as KM enablers, while diverse terms have been used in the KM literature by different authors to categorise similar kinds of factors, for example, KM infrastructure [2] KM capabilities [3], critical factors [4], knowledge infrastructure capability [5], social enablers & technical enablers [6], and knowledge capability [7]. In general, these studies have exhibited the socio-technical nature of KM and have given focused mainly on three major areas. These were (i) organisational culture, (ii) organisational structure, and (iii) IT infrastructure, as keys to successful KM process implementation.

The importance of KM oriented organisational culture for a successful KM implementation is well documented in the KM literature. Number of variables has been suggested in the literature to measure organisational culture. Considering the relevancy and empirical support, collaboration [1], trust [6] learning [1, 3], knowledge centred business strategy [8], and management support [9] were considered to measure KM oriented organisational culture in this study.

Similarly, KM process implementation related studies have given much weight to the organisational structure as well. The nature of the structure might encourage or inhibit KM process implementation. In the same way with the organisational culture, different kinds of variables were emphasized in the literature as elements of organisational structure. Considering the relevancy and empirical support of these variables, decentralisation of decision making [1, 3], informal organisational structure [1], and KM oriented rewarding system [9] were considered in this study to measure KM oriented organisational structure.

Nowadays, almost every organisation depends on information technology (IT), and as such, IT is considered as the core for the KM process implementation. Higher usage of IT leads to collaboration among employees, which, in turn, promotes the knowledge sharing. Number of technology related variables have been emphasised in the literature on KM implementation. Considering the relevancy and empirical support of these variables, IT support [1, 3], and ICT use [9] were considered to measure KM oriented IT infrastructure in this study.

III. SECI PROCESS

The route process of knowledge creation and sharing, the two main KM processes focused in this study, are the SECI process (socialization, combination, externalization, and internalization) presented by Nonaka [10]. Socialization means conversion of tacit knowledge to tacit knowledge; externalization means conversion of explicit knowledge to explicit knowledge; combination means conversion of tacit knowledge to explicit knowledge; and internalization means conversion of explicit knowledge to tacit knowledge.

This study measures the intention of the executives in the organization to be involved in KM process by tailoring the indicators of SECI from perceived behavioural dimension [1] to perceived behavioural intention for the following reasons. Firstly, Karim et al [11] have proved the applicability of SECI process to measure the intention to be

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involved in KM. Secondly, the SECI process has become widely accepted [1] and used in variety of management fields [12]. Thirdly, it includes not only knowledge creation but also knowledge sharing [1, 12]. There are many studies, such as Lee and Choi [1], Choi and Lee [12], Nonaka et al. [13], Teerajetgul and Charoenngam [14] that show the relationship between the SECI process and knowledge creation. In addition Beccera- Fernandez et al. [2] and Becerra-Fernandez and Sabherwal [15] have also shown the relationship between the SECI process and KM. Therefore, the intention to be involved in the SECI process can be considered as an indication to be involved in the KM process.

Based on the above discussion (under sub headings of KM enablers and SECI process) a research model has been developed (see figure 1).

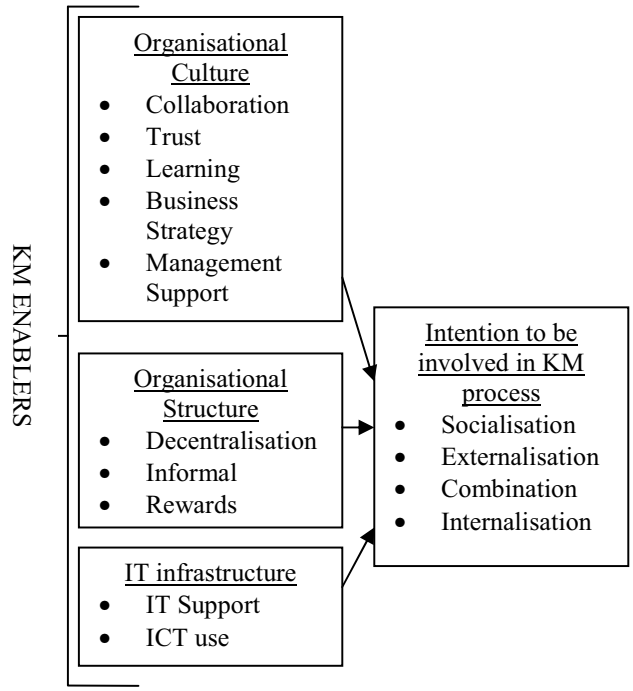

Figure 1. Research Model

IV. DATA COLLECTION AND FACTOR ANALAYSIS

Self-administered survey method was used to collect data from 313 executives in the Sri Lankan Telecommunication Industry. This industry was selected because it is considered as one of the most knowledge intensive industries [8] in Sri Lanka. Upon completion of data collection all responses were coded into a computer-readable format. Statistical Package for Social Sciences (SPSS) 16.0 was used for factor analysis.

Factor analysis is a search for and attempts to define the fundamental constructs or dimensions assumed to underlie the original variables [16]. Through factor analysis one can detect if the items under consideration for measuring a construct are related to that particular construct and none of the others in the theoretical model [17]. According to Coakes et al. [18] Principal Components Analysis (PCA) and Principal Axis Factoring (PAF) are the most frequently used methods for factor analysis. Likewise, Warner [19] also reports that PAF is one of the methods that most widely reported in published journal articles. Thus, this study used the PAF for factor analysis with varimax rotation. The analyses were performed separately on all variables of organisational culture, organisational structure, IT infrastructure, and intention to be involved in KM process.

To determine which factors to extract, this study adopts a cut-off loading point with eigenvalues greater than 1.0. Eigenvalue is a term used to describe the amount of variance accounted for by a factor. To decide which factors to be considered, Hair et al. [16] suggest a factor loading of 0.35 for a sample size of 250-350. However, Tabachnick and Fidell [20] advocate that the greater the loading, the more the variable is a pure measure of the factor. They suggest that loading in excess of 0.71 as excellent, 0.63 as very good, 0.55 as good, 0.45 as fair, and .32 as poor. Hence, this study adopts the loadings of 0.55 that is considered as good.

V. FINDINGS

A. *Organizational Culture*

Twenty items measuring five independent variables namely, collaboration, trust, learning, business strategy, and management support were entered into principal axis factoring with Varimax rotation resulting four being extracted. Table 1 shows the summary of item loadings for organisational culture.

All five items adopted from Lee and Choi [1] to measure 'learning' were loaded on factor 1 with the highest eigenvalue of 8.028 and explain 38.2% of the variance; accordingly this factor is defined as 'Learning'. Similarly all three items adopted from Lin [9] to measure 'management support' loaded on factor 2 with the eigenvalue of 1.873 and explain 6.4% of the variance; thus the factor is defined as 'Management Support'. Two of the four items adopted from Choi et al. [6] to measure 'trust' and one of the four items adopted from Lee and Choi [1] to measure 'collaboration' loaded together on factor 3 with the eigenvalue 1.306 and explain 4% of the variance. At the same time, one of the four items that measures the 'collaboration' loaded alone on factor 4 with the eigenvalue of 1.083 and explains 3.4% of the variance. Though Choi at el. [6] and Lee and Choi [1] consider 'trust' and 'collaboration' as two different variables, Holton [21] believes that trust indicate the collaboration while Cai and Squicciarini [22] who proposed a unified theory of trust and collaboration, also believe that collaboration and trust are

tightly coupled. Therefore, the third factor which is a combination of items loaded to factor 2 and factor 3 is defined as 'Trust & Collaboration'. All four items on business strategy adopted from Wei et al. [8] and two items each from 'collaboration' and 'trust' which do not meet the cut-off point are eliminated.

Table 1. Summary of Item Loadings for the Organisational Culture

	Items	1	2	3	4
Learning_1	My organisation provides various formal training	**.731**	.210	.049	.233
Learning_3	My organisation encourages people to attend seminars, symposia, and so on.	**.706**	.279	.223	.152
Learning_4	My organisation provides various programs such as clubs and community gatherings.	**.685**	.244	.184	.105
Learning_5	I am satisfied with the contents of job training or self-development programs.	**.648**	.399	.221	.017
Learning_2	My organisation provides opportunities for informal individual development other than formal training.	**.617**	.239	.296	.141
Mgt.Sup_2	My senior managers provide necessary help and resources for knowledge creation and sharing initiatives.	.333	**.787**	.215	.074
Mgt.Sup_3	My senior managers are keen to see my involvement in knowledge creation and sharing initiatives.	.266	**.769**	.167	.109
Mgt.Sup_1	My senior managers always support the knowledge creation and sharing initiatives.	.363	**.756**	.191	.097
Trust_2	I believe colleagues in my organisation treat others reciprocally.	.356	.132	**.656**	.048
Collab_2	I am satisfied by the degree of collaboration among colleagues in my organisation.	.168	.202	**.633**	.246
Trust_1	I believe colleagues in my organisation are honest and reliable.	.333	.181	**.556**	.163
Collab_4	I wish to accept responsibility for failure.	.114	.067	.155	**.584**
Collab_1	Colleagues in my organisation are supportive.	.002	.095	.452	.203
Collab_3	I wish to collaborate across organisational units within my organisation.	-.041	-.082	.224	.456
Trust_3	I believe colleagues in my organisation are knowledgeable and competent in their area.	.070	.112	.231	.202
Trust_4	I believe colleagues in my organisation will act towards the best interest of the organisational goals.	.340	.274	.515	.223
Bus.Str_1	I understand the importance of knowledge.	.122	.048	.022	.483
Bus.Str_2	My organisation formulates strategic plans for knowledge creation and sharing.	.530	.456	.387	-.128
Bus.Str_3	My organisation has specific objectives for knowledge creation and sharing.	.482	.457	.463	-.154
Bus.Str_4	My organisation's mission statement reflects the importance of knowledge creation and sharing.	.324	.462	.370	-.041

B. Organizational Structure

Twelve items measuring three independent variables namely, decentralisation, informal structure, and rewards were entered into Principal Axis Factoring with Varimax rotation resulting three being extracted. Table 2 shows the summary of item loadings for organisational structure.

All four items adopted from Lin [9] to measure 'rewards' loaded on factor 1 with the highest eigenvalue of 4.999 and explain 39% of the variance; accordingly this factor is defined as 'Rewards'. In the same way, all four items adopted from Lee and Choi [1] to measure 'decentralization', loaded on factor 2 with the eigenvalue of 1.984 and explain 14.1% of the variance; thus the factor is defined as 'Decentralization'. Two of the four items adopted from Lee and Choi [1] to measure 'informal' structure loaded on factor 3 with the eigenvalue 1.592 and explain 9.5% of the variance; the factor is defined as 'Informal'. Two other items from 'informal' which do not meet the cut-off point are eliminated.

Table 2. Summary of Item Loadings for the Organisational Structure

	Items	1	2	3
Reward_2	My organisation provides higher bonus in return for my contribution to knowledge creation and sharing.	**.901**	.134	.148
Reward_3	My organisation provides promotions in return for my contribution to knowledge creation and sharing.	**.853**	.213	.060
Reward_4	My organisation provides increased job security in return for my contribution to knowledge creation and sharing.	**.806**	.142	.135
Reward_1	My organisation provides higher salary in return for my contribution to knowledge creation and sharing.	**.734**	.206	.176
Decentr_2	I am encouraged to make my own decisions.	.176	**.856**	.138
Decentr_1	I can make decisions without approval.	.116	**.798**	.223
Decentr_3	I do not need to refer to someone else.	.196	**.789**	.151
Decentr_4	I can take action without a supervisor.	.227	**.750**	.198
Inform_2	I can ignore the rules and handle some situation informally in my organisation.	.103	.173	**.798**
Inform_3	Rules and procedures are not that emphasized in my organisation.	.040	.037	**.655**
Inform_1	There are many activities in my organisation that are not covered by formal procedures.	.256	.178	.526
Inform_4	I can make my own rules on my job.	.083	.225	.472

C. *IT Infrastructure*

Nine items measuring two independent variables; namely 'IT support' and 'ICT use' were entered into Principal Axis Factoring with Varimax rotation resulting two being extracted. Table 3 shows the summary of item loadings for IT infrastructure.

Three of the four items adopted from Lin [9] to measure 'ICT use' and one of the items barrowed from Lee and Choi [1] to measure 'IT support' loaded together on factor 1 with the highest eigenvalue of 4.225 and explains 42.6% of the variance. Accordingly this factor is defined as 'ICT Use & Support for Search and Sharing' to reflect the combination of these items together. Three of the five items adopted from Lee and Choi [1] on 'IT support' loaded onto factor 2 with the eigenvalue 1.222 and explains 8.7% of the variance; accordingly this factor is defined as 'IT Support'. One item each from 'ICT use' and 'IT support' which does not meet the cut-off point is eliminated.

Table 3. Summary of Item Loadings for the IT Infrastructure

	Items	1	2
ICTuse_1	I use electronic storage (such as online data base and data warehousing) extensively to access knowledge.	**.793**	.269
ICTuse_2	I use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues.	**.772**	.191
ICTuse_4	I use the technology to share knowledge with other persons outside the organisation.	**.694**	.228
ITsupp_5	My organisation provides IT support for searching necessary information and sharing it with others.	**.596**	.491
ITsupp_1	My organisation provides IT support for collaborative works regardless of time and place.	.256	**.869**
ITsupp_3	My organisation provides IT support for simulation and prediction.	.431	**.684**
ITsupp_2	My organisation provides IT support for communication among colleagues in my organisation.	.142	**.599**
ITsupp_4	My organisation provides IT support for systematic storing of valuable records.	.107	.297
ICTuse_3	I use the technology to share knowledge with colleagues in my organisation.	.413	.155

D. *Intention to be involved in KM process*

Nineteen items measuring four dependent variables; namely, 'socialisation', 'externalisation', 'combination', and 'internalisation' were entered into Principal Axis Factoring with Varimax rotation resulting four being extracted. Table 4 shows the summary of items loadings for intention to be involved in KM process.

Three of the five items adopted from Choi and Lee [12] to measure 'combination' loaded on factor 1 with the highest eigenvalue of 7.062 and explains 34.5% of variance; accordingly this factor is defined as 'Combination'. Two of the four items adopted from Choi and Lee [12] to measure 'internalization' loaded on factor 2 with the eigenvalue of

1.665 and explains 6.4% of the variance; accordingly this factor is defined as 'Internalisation'. Two of the five items barrowed from Choi and Lee [12] to measure 'socialisation' loaded on factor 3 with the eigenvalue 1.260 and explains 4% of the variance. Another two items of 'socialisation' loaded on factor 4 with the eigenvalue 1.007 and explain 2.6% of the variance. Therefore, to verify whether there is a correlation among the items loaded on factor 3 and factor 4, a correlation analysis was performed. The results of the correlation analysis show that there is a significant correlation between items loaded to factor 3 and factor 4. Hence, the third factor which is a combination of items loaded to factor 3 and factor 4 is defined as 'Socialisation'. All five items on externalisation adopted from Choi and Lee [12] do not meet the cut-off point. Items which do not meet the cut-off point are eliminated from further analysis.

Table 4. Summary of Item Loadings for the Intention to Be Involved In KM Process

	Items	**1**	**2**	**3**	**4**
Comb_3	I intend to create databases on products and services.	**.788**	.150	.162	.116
Comb_2	I intend to create documents on product and services.	**.734**	.162	.122	.152
Comb_4	I intend to build up materials by gathering literature and technical information.	**.665**	.220	.241	.075
Intern_3	I intend to be involved in searching and sharing new values and thoughts with colleagues.	.232	**.664**	.070	.167
Intern_4	I intend to share and try to understand management vision through communications with colleagues.	.157	**.630**	.093	.092
Social_3	I intend to be engaged in dialogue with competitors.	.192	.013	**.589**	.352
Socail_5	I intend to be involved in creating a work environment that allows colleagues to understand the craftsmanship and expertise.	.370	.240	**.588**	.282
Social_2	I intend to be involved in sharing information and experiences with others within my organisation.	.149	.225	.085	**.829**
Social_1	I intend to be involved in gathering information and experiences from others within my organisation.	.048	.171	.253	**.619**
Social_4	I intend to be involved in finding new strategies and opportunities inside the organisation.	.192	.203	.291	.349
Extern_1	I intend to be involved in creative dialogues with colleagues.	.070	.365	.416	.356
Extern_2	I intend to use deductive (top down) and inductive (bottom up) thinking for strategy formulation.	.328	.286	.543	.104
Extern_3	I intend to use metaphors (images/description) in dialogue for concept creation.	.445	.262	.418	.126
Extern_4	I intend to exchange various ideas with colleagues.	.114	.450	.167	.307
Extern_5	I intend to provide subjective opinions in dialogues.	.154	.424	.283	.273
Comb_1	I intend to use published literature, computer simulation and forecasting to formulate strategies.	.500	.170	.455	.217
Comb_5	I do not intend to transfer newly created concepts to my colleagues	.117	.134	.126	.217
Intern_1	I intend to be involved in liaisoning activities with other departments by developing cross functional teams.	.184	.420	.229	.267
Intern_2	I intend to be involved in setting teams as a model for conducting experiments, and sharing results with entire departments.	.438	.383	.386	.147

E. Reliability

The Cronbach alpha provides reliability coefficients that tell us, in theory, how reliable are our estimates that we are trying to measure [19]. Accordingly a reliability analysis was performed. The results are shown in Table 5. Hair et al. [16] agreed upon a lower limit for Cronbach's alpha i.e. 0.7, although it may decrease to 0.6 in exploratory research. As the Cronbach's alpha values for all variables are higher than the minimum value of 0.6, the measures are reliable.

VI. CONCLUSION

Based on the findings of factor analysis and reliability analysis the research model can be revised as shown in figure 2. The model has to be empirically tested to confirm the relationship between independent and depended variables. The authors suppose to report the finding of such study in some other forum.

Table5. Reliability of Instruments

Measures	Cronbach's Alpha
Trust & Collaboration	0.702
Learning	0.879
Management Support	0.900
Decentralization	0.902
Informal	0.684
Rewards	0.912
IT Support	0.805
ICT Use & Support for Search and Sharing	0.850
Intention to be involved in KM process	0.819

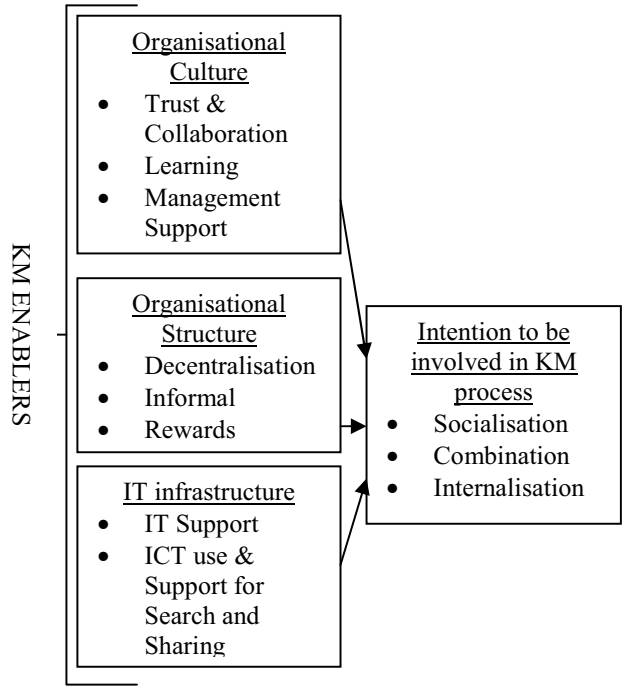

Figure 2. Revised Research Model

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