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A Study of Knowledge Contribution through Electronic Knowledge Repositories among Sri Lankan IT Professionals

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Abstract

Knowledge sharing through ***Electronic Knowledge Repositories (***EKR) can be successful, only if knowledge workers are willing to contribute their knowledge through EKR. ***This paper attempts to identify the significant cost and benefit factors that influence knowledge contribution through EKR among Sri Lankan IT professionals, in order to encourage Sri Lankan IT professionals to contribute knowledge through EKR.Knowledge contribution behaviour is examined by using a model which employs the social exchange theory (SET) to identify cost and benefit factors affecting EKR usage, and social capital theory (SCT) to account for the moderating influence of contextual factors. Ten hypotheses were formulated based on the theoretical framework. An Internet based online survey was used to collect data from 207 IT professionals. Multiple linear regression results reveal that the most significant factors that influence knowledge contribution are: loss of knowledge power, which is moderated by pro-sharing norms; contributor economic reward, which is moderated by identification; and image, which is moderated by pro-sharing norms. A study of the factors that influence knowledge contribution through EKR is vital to better understand the reasons for the reluctance of Sri Lankan IT professionals to contribute knowledge through EKR. By encouraging Sri Lankan IT professionals to contribute knowledge through EKR, Sri Lankan IT companies can retain and reuse valuable knowledge and thereby be more productive and efficient due to the effective use of knowledge.***

Keywords: Knowledge Management, Knowledge Sharing, Knowledge Contribution, Electronic Knowledge Repositories, Sri Lanka, IT Professionals, Social Exchange Theory, Social Capital Theory

1 Introduction

1.1 Background

Knowledge Management (KM) aims to gather, analyse, store and share knowledge and information within an organization. The primary purpose of KM is to improve efficiency by reducing the need to rediscover knowledge [25]. The strategic management of knowledge is a key factor that can help organisations to sustain its competitive advantage. It has been reported that Fortune 500 companies lose at least $31.5 billion a year by failing to share knowledge effectively [7]. More and more organisations are adopting Knowledge Management Systems (KMS) to leverage their knowledge resources effectively. KMS is the central repository of the data, information and knowledge that the organization needs to manage the lifecycle of its services. Its purpose is to store, analyse and present the organisation's data, information and knowledge. The KMS in most cases will be a federated system based on a variety of data sources [25]. It has been estimated that the expenditure on KMS by companies in the United States was close to $85 billion in 2008 [5]. The United States Federal government investment on KMS was expected to reach $1.3 billion by 2010 [24].

In addition to the organisational interest in KM, an increasing number of academic papers are also being published on KM. On September 8th 2004, amazon.com had 3,657 books with "knowledge management" as a part of the title [10]. A search for books on amazon.com with "knowledge management" as part of the title yielded 64,061 results on 28th April 2015. This clearly shows a growing interest in the field of knowledge management, not only by practitioners, but also by academia.

The growing interest and investment in KM can be explained by the current ongoing transition of the world economy, from one offering tangible goods to a knowledge based economy based on intangible goods and services [10]. Globalization, reduced time-to-market, increasing knowledge intensiveness of products and services, and the need to leverage organisational expertise in tight labor markets make KM key to organisational success [4]. To remain competitive in the knowledge based economy, organisations must focus on the efficient creation, transfer and reuse of knowledge. Therefore, organisations worldwide are making KM an important strategy in their attempt to maintain a competitive advantage.

Information technologies, such as KMS are considered to be a key enabler of KM [2]. A typical KMS is the Electronic Knowledge Repository (EKR). EKR are electronic stores of content acquired about all subjects for which the organisation has decided to maintain knowledge [31]. EKR can comprise multiple knowledge bases as well as the mechanisms for acquisition, control, and publication of organisational knowledge. Typical EKR include document management systems, content management systems, company intranet, wiki, organisational shared folders etc.

The process of knowledge sharing through EKR involves knowledge workers contributing knowledge to populate EKR with content and knowledge workers seeking knowledge from EKR for reuse. Knowledge sharing through EKR can be successful only if knowledge contributors are willing to part with their knowledge and knowledge seekers are willing to reuse the codified knowledge [6]. The distinction between knowledge contributors and seekers is conceptual because the same individual can be a contributor and a seeker depending on the context.

Research has shown that many knowledge management system implementations, such as EKR have been unsuccessful [40], with a failure rate of 50% or higher [1]. There are several reasons why KMS initiatives fail. A study of 423 organisations reported that about 36% of KM initiatives failed due to lack of attention to adoption even when technological infrastructure was in place [30]. Organisations often ignore organizational structure, process capabilities, culture and/or organizational context factors when implementing KM systems or considering the overall health of their information and knowledge sharing environments [3], [16].

One of the most critical factors to successful KMS implementation is the willingness of employees to contribute knowledge through EKR [22]. Research has shown that KMS implementations succeeded when employees were willing to contribute their knowledge through EKR [23], [48]. Employee contribution to EKR raised the perceived benefits of KM [49]. Employees however are often unwilling to contribute their knowledge through EKR for various reasons. KMS initiatives can fail when employees are unwilling to contribute their knowledge [14].

Sri Lankan IT companies are adopting EKRs to encourage IT professionals to share knowledge in order to retain and reuse knowledge within the organisation. Knowledge retention and reuse is key to organisational success of Sri Lankan IT companies, where there is a high attrition rate (the average attrition rate is about 10% for the IT industry as a whole [35]. In spite of the adoption of EKRs for knowledge sharing, knowledge contribution to EKR by Sri Lankan IT professionals remains inadequate.

1.2 Research Problem

Sri Lankan IT organisations are attempting to manage knowledge sharing effectively by employing EKR. In spite of the introduction of EKRs, a large number of KM initiatives fail, due to the reluctance of the IT professionals to contribute knowledge through these systems.

This study aims to examine the factors that influence knowledge contribution through the use of EKR among Sri Lankan IT professionals. By understanding the impediments to knowledge contribution through EKR, solutions can be proposed and implemented, thereby improving EKR usage by Sri Lankan IT professionals to contribute knowledge. This in turn would lead to increase in productivity due to the effective retention and reuse of knowledge.

1.3 Research Contribution

The advantages of promoting the use of EKR for knowledge contribution among IT professionals are many. By promoting the use of EKR for knowledge contribution, Sri Lankan organisations can increase the knowledge base in the organisation, thereby encouraging knowledge retention and reuse and in turn improving organisational efficiency and productivity.

Thus, the advantages to Sri Lankan IT companies from promoting the use of EKR for knowledge contribution are many, where EKR are commonly used to store knowledge and where employee turnover is high. Therefore, a study of the factors that influence knowledge contribution through EKR among Sri Lankan IT professionals will be useful to promote its usage.

1.4 Objectives

The objectives of this study are to identify the significant cost and benefit factors that influence knowledge contribution through Electronic Knowledge Repositories among Sri Lankan IT professionals and to make recommendations on how to encourage knowledge contribution through Electronic Knowledge Repositories among Sri Lankan IT professionals.

1.5 Scope

This study will be limited to the study of the factors that influence knowledge contribution through EKR by Sri Lankan IT professionals. This study defines an IT professional as a person engaged in IT related professional activities, based in Sri Lanka.

2 Research Design

2.1 Theoretical Framework

The research framework for this study uses the social exchange theory (SET) and the social capital theory (SCT) as its theoretical bases.

SET posits that individuals evaluate alternative courses of action, with the intention of obtaining the greatest benefit, at the lowest cost from any transaction [21].

In [33], the principle for predicting behaviour can be expressed as:

Behaviour (Profits) = Rewards of interaction – Costs of interaction

Social capital is defined as, “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit” [34].

This study conceptualizes three components of the relational dimension of social capital, namely trust, pro-sharing norms, and identification as moderators that will influence the conditions under which the individual cost and benefit factors would impact EKR usage for knowledge contribution.

The constructs from SET and SCT that may affect usage of EKR to contribute knowledge are included in the research model for knowledge contribution. All the independent variables are derived from SET and KM literature and grouped together as individual factors. The dependent variable is the usage of EKR for knowledge

contribution. The relationships between certain independent variables and the dependent variable are hypothesized to be moderated by specific SCT factors.

The research model to explain usage of EKR for knowledge contribution is shown in Figure 1 below.

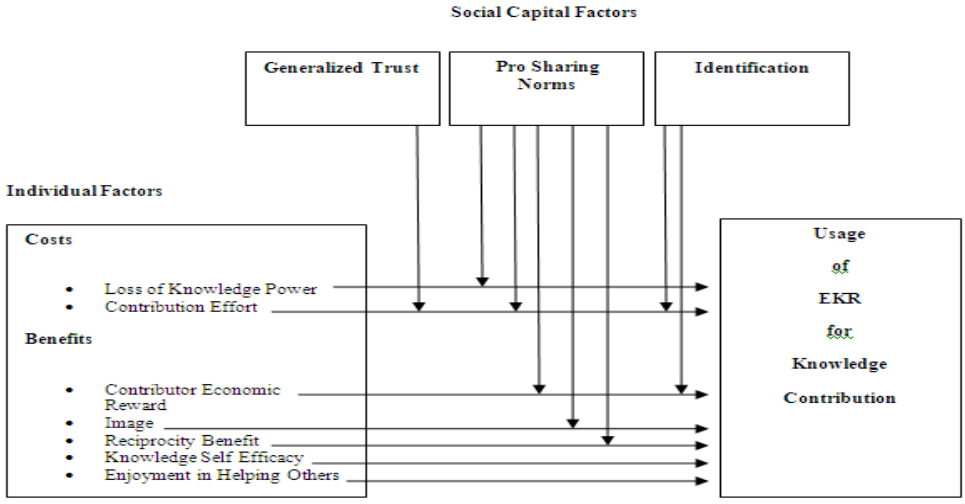

Figure 1: Framework for the Usage of EKR for Knowledge Contribution
Source: Kankanhalli, Tan and Wei (2005)

Based on the above theoretical framework, hypotheses can be formulated to assess the factors that influence the usage of EKR by knowledge contributors.

2.2 Hypotheses

The hypotheses presented in this section about the factors that influence knowledge contribution through EKR are derived from Kankanhalli et al. [28].

2.2.1 Loss of Knowledge Power

The loss of power due to contribution of unique knowledge is a barrier to knowledge contribution [19], [15]. Thus, based on SCT, a negative relationship between loss of knowledge power and EKR usage for knowledge contribution is postulated, moderated by pro-sharing norms. If other employees are seen to be sharing their knowledge then the deterrent effect of the loss of knowledge power on EKR usage is likely to be less. Therefore, we can formulate the following hypothesis:

H1: The negative relationship between loss of knowledge power and usage of EKR for knowledge contribution will be weaker under conditions of high pro-sharing norms.

2.2.2 Contribution Effort

Knowledge contribution by codifying knowledge and entering it into an EKR takes time and effort [6]. Knowledge contribution can be hindered, if the amount of time required for knowledge contribution is high [38]. However, there can be contextual factors that influence this hindering effect. Based on SCT, it is possible to postulate that the negative relationship between contribution effort and usage of EKR for knowledge contributed is moderated by generalized trust. A high degree of trust implies belief in the good intent of others, which from the point of view of knowledge contributors may mean that knowledge recipients will give them due credit for the knowledge contributed. Therefore, in a high trust environment, knowledge contributors may be prepared to put in more effort towards knowledge contribution, since they may perceive that appropriate credit will be given to them. Thus, the following hypothesis can be formulated:

H2: The negative relationship between contribution effort and usage of EKR for knowledge contribution will be weaker under conditions of high generalized trust.

In an environment of high pro-sharing norms, the majority of employees may collaborate and cooperate with each other. Since, the knowledge contributor is conscious of the fact that other colleagues are contributing knowledge and that knowledge contribution is encouraged by the organisation, he/she is more likely to contribute knowledge despite the effort required to do so. Therefore, the deterrent effect of contribution effort can be expected to be reduced under conditions of high pro-sharing norms. Thus, the following hypothesis can be formulated:

H3: The negative relationship between contribution effort and usage of EKR for knowledge contribution will be weaker under conditions of high pro-sharing norms.

Individuals who have a strong identification with the organisation, would choose the behaviour which best promotes the perceived interests of the organisation [27]. Employees, who have a high degree of alignment with organisational values, may be motivated to contribute knowledge, regardless of the effort required to do so. Therefore, the following hypothesis can be postulated:

H4: The negative relationship between contribution effort and usage of EKR for knowledge contribution will be weaker under conditions of high identification.

2.2.3 Contributor Economic Reward

In order to encourage employees to contribute their knowledge, organisations may need to create various rewards to encourage employees to share their knowledge. Research has shown that different reward systems suit different people and the management must therefore choose the most suitable reward system based on the employees' intention and attitude towards knowledge

contribution [32]. Tangible rewards may include money, promotions, and substantial gifts [21]. The rewards could be tied to formal measures of knowledge contribution and performance appraisal. In several organisations, extrinsic rewards have been found to encourage knowledge contribution to repositories [45], [9]. However, the positive relationship between economic rewards and usage of EKR for knowledge contribution is likely to be moderated by contextual factors.

SCT suggests that the motivation to contribute knowledge can be significantly influenced by collaboration and cooperation norms [34]. If such norms by themselves provide sufficient motivation for knowledge contributors, the need for economic rewards may be less in high pro-sharing norm environments. Thus, the following hypothesis can be postulated:

H5: The positive relationship between contributor economic rewards and usage of EKR for knowledge contribution will be weaker under conditions of high pro-sharing norms.

It can be postulated that in contrast to the effect of pro-sharing norms, when identification is high, the effect of economic rewards on knowledge contribution to EKR is likely to be stronger. Therefore, conditions of strong identification with the organisation can reinforce the positive effect of economic rewards, as employees feel more inclined to contribute knowledge. Thus, the following hypothesis can be formulated:

H6: The positive relationship between contributor economic reward and usage of EKR for knowledge contribution will be stronger under conditions of high identification.

2.2.4 Image

An increase in status or reputation due to knowledge contribution can be an important reward for the knowledge contributor [21], [29]. A desire to be recognized by their peers as key contributors or experts has been found to be a motivator for employees to share their knowledge [38]. Employees are more likely to contribute knowledge to EKR, if their contribution is visible to the organisation and they gain respect and recognition for their effort.

However, in environments with high pro-sharing norms, the need for extrinsic benefits like enhanced image is likely to be reduced. Also, knowledge contributors may experience a reduction in their image, if there are mistakes or omissions in their contribution to EKR. In such circumstances, the presence of strong pro-sharing norms that encourage tolerance for failures and mistakes could alleviate the problem. Hence, the following hypothesis can be postulated:

H7: The relationship between image and usage of EKR for knowledge contribution will be weaker under conditions of high pro-sharing norms.

2.2.5 Reciprocity Benefit

An individual may be motivated to contribute knowledge to EKR, with the expectation that he/she will receive useful help in return, in the future [12], [15], [29]. Thus, knowledge contributors will contribute knowledge expecting reciprocation, when they are in need of assistance. This anticipation seems to be justified, since researchers have observed that people who regularly helped others in a virtual community seemed to receive help more quickly when they asked for it [41].

Based on SCT, it can be postulated that when norms of collaboration and cooperation are strong, the need for others to reciprocate knowledge may be reduced. Since norms of knowledge sharing already exist, the need for direct reciprocation may not exist because individuals may help each other anyway. Thus, we can formulate the following hypothesis:

H8: The positive relationship between reciprocity benefit and usage of EKR for knowledge contribution will be weaker under conditions of high pro-sharing norms.

2.2.6 Knowledge Self Efficacy

Self-efficacy is the perception of people about what they can do with the skills they possess [8]. Employees may be inclined to contribute their knowledge because of a sense of self-efficacy, that they are able to make a positive difference to their organisation [12], [29], [43]. Similarly, if individuals feel that they lack knowledge that is beneficial to the organisation, they may decline from using EKR to contribute knowledge, since their contribution would not have a beneficial impact. The effect of knowledge self-efficacy on EKR usage is not expected to be moderated by social capital factors, since the benefit is likely to be a strong enough motivation on its own. Thus, the following hypothesis can be formulated:

H9: Knowledge self-efficacy is related to usage of EKR for knowledge contribution.

2.2.7 Enjoyment in Helping Others

Enjoyment in helping others is one reason why individuals like to contribute knowledge [12], [13]. Another reason is the pleasure gained by demonstrating one's own altruistic and pro-social behaviour [43]. The effect of enjoyment in helping others on EKR usage is not expected to be moderated by social capital factors, since this benefit is likely to be an intrinsic reward independent of such conditions. Therefore, the following hypothesis can be postulated:

H10: Enjoyment in helping others is related to usage of EKR for knowledge contribution.

3. Methodology

An online survey was used to collect data from the respondents. The survey purposively targeted IT professionals in Sri Lankan IT companies. The only criteria for eligibility to participate in the survey was that the respondent be an IT professional based in Sri Lanka. This study defines an IT professional as a person engaged in IT related professional activities. This study purposively targeted IT professionals in Sri Lankan IT companies who represent the total population as accurately as possible. Thus, the research results can be accurately generalised to represent all IT professionals in Sri Lankan IT companies.

3.1 Questionnaire Design

The questionnaire used the seven point Likert scale, to collect data from the respondents. The questionnaire items in the form of statements to assess the knowledge contribution variables and the moderating social capital variables were derived from [28] and are given in Appendix 1. A pilot test was conducted prior to the survey administration. Selected respondents were asked to comment on the clarity and conciseness of the survey. The selected respondents understood the purpose of the survey and were satisfied with its clarity and conciseness and therefore the questionnaire was deemed ready for distribution. The survey was conducted in English, since Sri Lankan IT professionals are proficient in the English language.

3.2 Response Rate

The population of this study is comprised of all Sri Lankan IT professionals, estimated to be about 75,000 in 2013 and projected to reach 83,000 by 2014 [35]. In multivariate research, the minimum sample size should be several times, (at least 10 times) more than the variables in the study [42]. Therefore, for this study, a buffered sample size of 200 was selected. A total of 600 purposively selected IT professionals who represent the overall population as accurately as possible were sent email invitations to participate in the survey. After a lapse of four weeks, a total of 207 valid responses were received from 40 different Sri Lankan IT companies. The response rate for this survey was 35% (207 valid responses received out of a total of 600 email invitations sent). The demographic details of the respondents are given in Appendix 2. The majority of the respondents were male (81%), aged between 21-30 years (59%), with a Bachelor's degree (69%) and with a total work experience of 0-3 years (43%). The demographic profiles of the respondents corresponds well with the overall population of the IT workforce, where the majority of the IT professionals are male (72%), having less than 5 years of work experience (67%) and holding a Bachelor's degree or above (63%) [35].

4 Analysis and Findings

Prior to data analysis, the research instrument was assessed for reliability and construct validity. Thereafter, correlation analysis and moderated multiple regression analysis were conducted to test the validity of the hypotheses.

4.1 Reliability and Validity Assessment

The reliability of the constructs used in the survey was established by conducting factor analysis with principal components analysis and by calculating Cronbach's coefficient. Inter-item correlations between the construct items revealed that all items correlate adequately within the construct. Constructs with factor loading values above 0.5 are considered to be acceptable [20]. All the constructs in this study have factor loading values of 0.7 and above. The Cronbach's alpha values obtained for the variables in this study are in the range of 0.9, as shown in Table 1. In [37], Nunally suggested that a minimum alpha of 0.7 was sufficient as a benchmark for reliability. Thus, the constructs are deemed to have high reliability.

Table 1: Cronbach's Alpha Values

Factor	Variable	Cronbach's Alpha
Cost	Loss of Knowledge Power (LOKP)	0.941
	Contribution Effort (CEFF)	0.884
Benefit	Contributor Economic Reward (CREW)	0.920
	Image (IMAG)	0.902
	Reciprocity Benefit (RECB)	0.893
	Knowledge Self Efficacy (KSEF)	0.940
	Enjoyment in helping others (EHLP)	0.954
Usage	Contributor Usage (CUSG)	0.887

Construct validity focuses on the extent to which a measure performs in accordance with theoretical expectations [11]. Therefore, to ensure construct validity, the theoretical relationship between the constructs should have been previously established and empirically tested and supported. The research instrument used in this study has been assessed and empirically tested over the years by different studies, such as [28] and others. Thus, the construct validity of the research instrument used in this study can be considered to be valid.

4.2 Correlation Analysis

The Pearson correlation coefficient between each independent variable and the dependent variable was computed using IBM SPSS 20.0. The results are shown below in Table 2.

Table 2: Correlation Analysis Results

Factor	Variable	Correlation Coefficient	Sig.
Cost	Loss of Knowledge Power (LOKP)*	-0.209	0.002
	Contribution Effort (CEFF)	-0.116	0.095
Benefit	Contributor Economic Reward (CREW)*	0.184	0.008
	Image (IMAG)*	0.284	0.000
	Reciprocity Benefit (RECB)*	0.225	0.001
	Knowledge Self Efficacy (KSEF)*	0.303	0.000

	Enjoyment in helping others (EHLP)*	0.295	0.000

Note: The * denotes variables which are significant at the 5% significance level.

By examining the significance levels of the correlation analysis results obtained from this study, we come to the conclusion that except for CEFF, all the other variables: LOKP, CREW, IMAG, RECB, KSEF and EHLP are significant. For this study, a 5% significance level was selected.

4.3 Multiple Linear Regression Analysis Results

Multiple linear regression analysis was used to validate the ten hypotheses in this study. All direct and moderating variables were employed simultaneously such that their effect could be seen in the context of the total model. The results obtained using IBM SPSS 20.0 are given below in Table 3.

Table 3: Multiple Linear Regression Analysis Results

Factor	Hypothesis	Beta	Sig.	Supported
Cost	**LOKPxPSNM**	**-0.169**	**0.010**	**Yes**
	CEFFxGTRU	-0.008	0.901	No
	CEFFxPSNM	0.017	0.814	No
	CEFFxIDEN	-0.025	0.726	No
Benefit	CREWxPSNM	0.162	0.295	No
	CREWxIDEN	**0.248**	**0.001**	**Yes**
	IMAGxPSNM	**0.292**	**0.000**	**Yes**
	RECBxPSNM	0.153	0.097	No
	KSEFF	0.057	0.460	No
	EHLP	0.037	0.648	No

Note: The above model has an Adjusted R-square value of 0.196. A significance level of 5% was chosen for the above model.

The multiple linear regression results reveal that three out of the ten hypotheses are supported, namely LOKPxPSNM, CREWxIDEN and IMAGxPSNM, while the other seven hypotheses are not supported.

An Adjusted R-square value of 0.196 indicate that the above model is satisfactory in terms of explaining variance in the dependent variable [17].

4.4 Discussion & Implications

The results of the knowledge contribution model formulated and empirically tested in this study are shown in Figure 2 below. Out of the ten hypotheses formulated in this study, three were supported and seven were not supported.

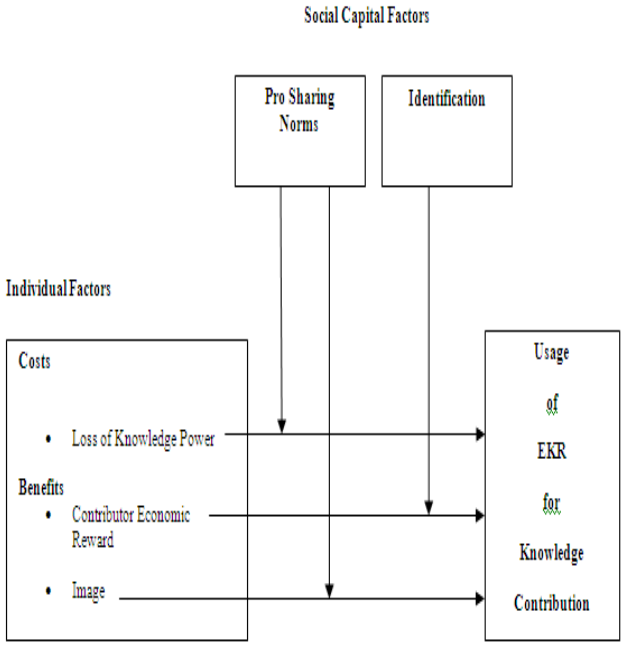

Figure 2: Knowledge Contribution Model

4.4.1 Loss of Knowledge Power

As hypothesized, the negative relationship between loss of knowledge power and usage of EKR for knowledge contribution is moderated by high pro sharing norms. This coincides with previous research, which states that the loss of power due to contribution of unique knowledge is a barrier to knowledge sharing through EKR [18], [15]. However, if other employees are seen to be sharing their knowledge then the deterrent effect of the loss of knowledge power on EKR usage is likely to be less [26].

4.4.2 Contributor Economic Reward

As hypothesized, the positive relationship between contributor economic reward and usage of EKR for knowledge contribution is moderated by high identification. This result coincides with previous research [28]. When identification with the organization is high, the effect of economic rewards on the contributor is stronger. However, contributor economic rewards were not moderated by pro-sharing norms. This result coincides with previous research [28]. This could be due to the fact that the importance of economic incentives to the contributor diminished the effect of pro-sharing norms.

4.4.3 Image

The positive relationship between image and usage of EKR for knowledge contribution is moderated by high pro-sharing norms. This is supported by previous research, which states that an increase in status and recognition by peers is an important factor in motivating employees to share knowledge [21], [29], [38]. However, in environments with high pro-sharing norms, the need for extrinsic benefits like enhanced image is likely to be reduced.

4.4.4 Contribution Effort

Previous research has shown that knowledge sharing can be hindered, if the amount of time required for knowledge contribution is high [28], [38]. However, in this study, contribution effort was not a significant factor. Correlation analysis did not reveal a significant correlation between contribution effort and knowledge contribution. Moderated regression analysis including the moderating variables and the other independent variables also revealed that codification effort was not significant. This can be explained by the fact that technological advancement has resulted in very user friendly EKRs, which are very easy to use and therefore the codification effort is minimal. Also, due to the rapid expansion of computer and internet usage, most employees are now comfortable contributing to social media, online forums, blogs, wikis etc. and therefore no longer consider contribution effort to EKR a significant factor.

4.4.5 Reciprocity Benefit

Correlation analysis revealed a correlation between reciprocity benefit and knowledge contribution as suggested in previous literature [12], [29], [15]. However, reciprocity benefit was not a significant factor. This means that employees who are keen on sharing knowledge are likely to continue to do so even though other employees may not reciprocate by contributing knowledge or by offering help more readily.

4.4.6 Knowledge Self Efficacy

Correlation analysis revealed a correlation between knowledge self-efficacy and knowledge contribution as suggested in previous literature [12], [43], [29]. However, self-efficacy was not a significant factor. This maybe because most IT professionals are well educated and are confident that their knowledge can make a positive contribution to the organisational EKR.

4.4.7 Enjoyment in Helping Others

Correlation analysis revealed a correlation between enjoyment in helping others and knowledge contribution as suggested in previous literature [12], [43], [13]. However, enjoyment in helping others was not a significant factor. This maybe because other benefit factors such as economic reward and image outweigh the importance of the pleasure gained by helping others purely out of one's own altruistic nature.

4.4.8 Implications for Practice

This study reveals that the significant factors that influence knowledge contribution through EKR are: loss of knowledge power, which is moderated by pro-sharing norms; contributor economic reward, which is moderated by identification; and image, which is moderated by pro-sharing norms. The implications of these results can be used by management to promote EKR usage by knowledge contributors by paying extra attention to the significant factors and by also taking into consideration other factors that were correlated to knowledge contribution, such as knowledge reciprocity benefit, knowledge self-efficacy and enjoyment in helping others.

Loss of knowledge power is a significant factor, which is weakened by high pro-sharing norms. The perceived risk of contributing unique knowledge to EKRs would be reduced when employees see that others too are sharing their unique knowledge as well [26]. The management can identify a few knowledge experts and get them to contribute unique knowledge to the EKR on a regular basis. Knowledge contributed by employees must be highlighted to all potential knowledge contributors, so they become aware that others are willingly sharing their unique knowledge, which will in turn encourage them to do the same.

Contributor economic reward is a significant factor, which is strengthened when identification with the organisation is high. A lack of economic rewards has been identified as a major barrier to knowledge contribution [47]. Therefore, the management should reward regular knowledge contributors through bonuses, higher salary, promotions, greater job security and recognition as a reward for knowledge contribution through EKR, since it has been shown that such rewards have motivated employees to contribute knowledge [45], [9], [36]. Research has revealed that group-based incentive schemes seem to be more effective than individual incentive schemes. The advantage of group-based incentive schemes is due to the fact that they pay attention to maximizing the performance of the entire group rather than that of the individual [19], [39].

Image is a significant factor, which is moderated by high pro-sharing norms. Thus, management should highlight the regular knowledge contributors and hold them as good examples for other employees to follow. This will enhance their image in the organization and thereby encourage knowledge contribution. Promotions and more challenging roles can be given to such employees to further enhance their image in the organization.

Loss of knowledge power and image are both moderated by pro-sharing norms, i.e. both these factors become less important when pro-sharing norms are high. Therefore, the management must foster a pro-sharing organisational culture, since this is vital for knowledge contribution to take place effectively [46], [14]. Contributor Economic Reward is moderated by high identification. High identification with the organisation, will diminish the need for economic incentives [27]. Therefore, the management must work towards aligning the employees' values and aspirations with the organisation's mission and vision.

In order to ensure that codification effort does not become a hindrance to knowledge contribution, the management must ensure that sufficient training is provided to employees who may not be sufficiently experienced in using EKR for knowledge contribution. Also, the knowledge stored in the EKR must be well organised and structured to ensure codification effort is minimal.

Reciprocity benefit, knowledge self-efficacy and enjoyment in helping others were not significant factors and therefore the management can give less priority to these factors.

4.4.9 Implications for Theory

This study has further advanced the theoretical development in the area of knowledge sharing through EKR by demonstrating that the cost and benefit factors derived from SET and SCT theories can predict EKR usage by knowledge contributors. A new knowledge contribution model was developed based on the research findings, which reflects the current situation with regards to knowledge contribution through EKR by Sri Lankan IT professionals. The new model developed in this study can be used along with other models in order to gain a better insight into knowledge contribution through EKR. The model developed in this study indicates that the significant factors that influence knowledge contribution through EKR are the loss of knowledge power moderated by pro-sharing norms, contributor economic reward moderated by identification and image moderated by pro-sharing norms. Previous research conducted on knowledge contribution through EKR [28], indicate that the significant factors were contribution effort moderated by generalised trust, contributor economic reward moderated by identification, reciprocity benefit moderated by pro sharing norms, knowledge self-efficacy and enjoyment in helping others. Thus, it becomes clear that the significant factors may differ based on place and time of study, target survey group etc.

4.4.10 Limitations

This study was limited to the cost and benefit factors derived from SET and SCT theories and therefore other factors that influence knowledge contribution were not included. This study also limited itself to the study of IT professionals and therefore EKR users from other industries were not included in this study.

4.4.11 Future Studies

Further studies can be conducted to shed more light on knowledge contribution through EKR. The survey used in this study can be replicated periodically in order to be up-to-date and to understand emerging trends on factors influencing knowledge contribution through EKR. Surveys can be conducted to include knowledge workers from other industries (other than IT) where EKRs are used for knowledge contribution in order to better understand the effect of the industry on knowledge contribution. Surveys across cultures/national boundaries can be conducted to better understand the cultural and socio-economic impact on knowledge contribution through EKR. Studies can be conducted using different theoretical models to capture a wide range of factors that may influence knowledge contribution through EKR.

Research can be conducted to explore the interactions and causal links among cost, benefit and social capital variables in order to better understand why certain cost or benefit factors dominate the effect of others and why certain moderators are significant, while others are not. Studies can be conducted to examine whether providing feedback by knowledge seekers to knowledge contributors on the quality, accuracy and usefulness of the knowledge contributed will encourage knowledge contribution through EKR. Research can be conducted to study the effectiveness of providing incentives to knowledge workers to encourage knowledge contribution through EKR.

5. Conclusion

In conclusion, this study reveals many interesting facts about knowledge contribution though EKR among Sri Lankan IT professionals. A knowledge contribution model was developed based on the significant factors that influence knowledge contribution. The significant cost factor that influences knowledge contribution through EKR is the loss of knowledge power moderated by pro-sharing norms and the significant benefit factors are: contributor economic reward moderated by identification and image moderated by pro-sharing norms. There was a correlation between reciprocity benefit, knowledge self-efficacy, enjoyment in helping others and knowledge contribution. However these factors were not significant. There was no correlation between contribution effort and knowledge contribution. The implications of these findings have been discussed and recommendations made on how to improve knowledge contribution through EKR among Sri Lankan IT professionals.

Knowledge contribution through EKR is key to successful knowledge retention and reuse in Sri Lankan IT companies, where there is a high turnover. Therefore, special consideration should be given to the significant factors that influence knowledge contribution, when deciding upon the organisation's KM strategy.

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Appendix 1: Questionnaire Items

Variable	Item	Description
Loss of Knowledge Power	LOKP1	Sharing my knowledge through EKR makes me lose my unique value in the organisation
	LOKP2	Sharing my knowledge through EKR makes me lose my power base in the organisation.
	LOKP3	Sharing my knowledge through EKR makes me lose my knowledge that makes me stand out with respect to others.
	LOKP4	Sharing my knowledge through EKR makes me lose my knowledge that no one else has.
Contribution Effort	CEFF1	It takes too much time to enter my knowledge into the EKR.
	CEFF2	It is laborious to codify my knowledge into the EKR.
	CEFF3	The effort is high for me to codify my knowledge into the EKR.
	CEFF4	When I share my knowledge through EKR, I have to spend too much time answering follow up questions
	CEFF5	When I share my knowledge through EKR, follow up requests for clarification and assistance take up a lot of my time.
Contributor Economic Reward	CREW1	I expect to get a better work assignment when I share my knowledge through EKR regularly.
	CREW2	I expect to be promoted when I share my knowledge through EKR regularly.
	CREW3	I expect to get a higher salary when I share my knowledge through EKR regularly.
	CREW4	I expect to get a higher bonus when I share my knowledge through EKR regularly.
	CREW5	I expect to get more job security when I share my knowledge through EKR regularly.
Image	IMAG1	Sharing my knowledge through EKR improves my image within the organisation.
	IMAG2	People in the organisation who share their knowledge through EKR have more prestige than those who do not.
	IMAG3	Sharing my knowledge through EKR improves others recognition of me.
	IMAG4	When I share my knowledge through EKR, the people in my organization respect me more.
	IMAG5	When I share my knowledge through EKR, my superiors praise me.
Reciprocity Benefit	RECB1	When I share my knowledge through EKR, I believe that I will get an answer for giving an answer.
	RECB2	When I share my knowledge through EKR, I expect somebody to respond when I am in need.
Knowledge Self Efficacy	KSEF1	I have confidence in my ability to provide knowledge that others in my organisation consider valuable.
	KSEF2	I have the expertise needed to provide valuable knowledge for my organisation
	KSEF3	I have the competence to provide knowledge that can make a difference to my organization.
	KSEF4	I am confident that I can provide knowledge that is valuable to others in my organization,,
Enjoyment in Helping Others	EHLP1	I enjoy sharing my knowledge with others through EKR.
	EHLP2	I enjoy helping others by sharing my knowledge through EKR.
	EHLP3	It feels good to help someone else by sharing my knowledge through EKR.
	EHLP4	Sharing my knowledge with others through EKR gives me pleasure.
Usage of EKR for Knowledge Contribution	CUSG1	What is your degree of usage of EKR to contribute your knowledge? [] Daily [] Weekly [] Monthly [] Quarterly [] Half yearly [] Less than once in 6 months
	CUSG2	I often use EKR to contribute my knowledge in my work.
	CUSG3	I regularly use EKR to contribute my knowledge in my work.
Generalised Trust	GTRU1	I believe that people in my organization give credit for other's knowledge where it is due.
	GTRU2	I believe that people in my organization do not use unauthorized knowledge.
	GTRU3	I believe that people in my organization use other's knowledge appropriately.
	GTRU4	I believe that people in my organization share the best knowledge that they have.
Pro-sharing Norms	PSNM1	There is a norm of cooperation in my organization
	PSNM2	There is a norm of collaboration in my organization.
	PSNM3	There is a willingness to value and respond to diversity in my organization.
	PSNM4	There is a norm of openness to conflicting views in my organization.
	PSNM5	There is a norm of tolerance of mistakes in my organization.
Identification	IDEN1	I am glad I chose to work for this organization rather than another company.
	IDEN2	I talk of this organization to my friends as a great company to work for.
	IDEN3	I find that my values and my organization's values are very similar.
	IDEN4	I find it easy to identify myself with my organization.
	IDEN5	I feel that my organization cares about me.
	IDEN6	I really care about the fate of this organization.
	IDEN7	I am proud to be an employee of this organization.

Appendix 2: Demographic Details of the Respondents

	Percentage
Gender	
Male	81%
Female	19%
Age	
21-30 years	59%
31-40 years	37%
41 years and above	4%
Education	
Diploma	13%
Bachelors	69%
Masters	17%
Doctorate	1%
Profession	
Software Engineering	54%

Quality Assurance	15%
Project Management	10%
Business Analysis	5%
Other	16%
Total Work Experience	
0-3 years	43%
4-7 years	23%
8-11 years	16%
12-15 years	13%
16-19 years	3%
20 years and above	2%
Work Experience in Current Organisation	
0-3 years	74%
4-7 years	18%
8-11 years	5%
12-15 years	3%

Note: The total number of respondents was 207.

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