

Knowledge Management in Public Research Institutions in Sri Lanka: As Perspective of the Research Officers

Dileepa M. Endagamage¹, Chandrika Dahanayake²
University of Sri Jayewardenepura, Sri Lanka¹,
Hector Kobbekaduwa Agrarian Research & Training Institute, Sri Lanka²
dileepaendagamage@sjp.ac.lk¹, krishanthi22.jayasekara@gmail.com²

Abstract-Knowledge Management is a systematic management of acquisition, retention, sharing and usage processes of explicit and implicit knowledge of individuals or organization. When reaching to the service excellence at any public sector research institution, Knowledge Management process generates competitive advantage. The present study examines whether the 'Social Capital' and 'Information Technology Capability /Facilities' have any significant impact on 'Knowledge Management' within public sector research institutions in Sri Lanka. This study has designed with the positivistic approach and done as a cross-sectional survey with self-administered questionnaire. Data collected from 150 research officers from four selected public research institutions and received 113 successful responses. The findings of the regression analysis show that the 'Structural' and 'Relation' dimensions of 'Social Capital', and the 'Infrastructure' and 'Operations' dimensions of Information Technology Capability/Facilities, have significant impacts on the Knowledge Management with the model accuracy as 69.4%. The perception on Knowledge Management of the males is in higher level than their female counterparts. These results empirically confirmed that, any research institution could manage successfully and efficiently, the accrued knowledge of their researchers by facilitating these four areas. Further, it provides insight to managers to allocate organizational tangible assets and to improve their organizational effectiveness when deciding knowledge management practices.

Keywords: Explicate and Implicit Knowledge, Information Technology Capability, Knowledge Management, Social Capital

1 INTRODUCTION

In the contemporary world, knowledge is considered as the most important intangible asset, which generates a competitive advantage to any organization [1], [2]. Effective utilization of available resources helps to manage the knowledge of any organization and it will lead the organization to achieve better performances [3], [4], [5]. Therefore, effective management of the 'knowledge' resources is one of the most difficult challenges faced by today's organizations [6], [7].

Systematic management of acquisition, storage, distribution and usage process of explicit and implicit knowledge is defined as the 'Knowledge Management' (KM) [8]. KM is becoming as one of the productivity tools, which measures the knowledge creation and innovation [9]. Sharing knowledge between employees and between departments in an organization is necessary to transfer individual and group knowledge into organizational knowledge and it manages the knowledge effectively [6]. KM is regarded as an important feature of an organization that essential for its survival [10], [11], [12].

People have different views on KM. Power of computers and communication technology [13], knowledge content of the human mind, employees training and motivation [12] are some identified significant factors on KM. However, the researchers reveal that technologies and social systems are equally important in KM [14]. The information technologies (IT) are presently identified as the best in the efficient conversion between data and information. However, IT is identified as a poor substitute when converting information into knowledge [15]. The social actors are the best in the conversion of information to knowledge, but they are slow in conversion data to information [16]. That is why the researchers believe that KM is best

carried out through the optimization of technological and social subsystems [13], [15]. Literature identified that within an organization knowledge is intangible factor and KM has to cover various aspects such as the way the people work together (sociology), the way the specific people react to specific situations and changes in the environment (psychology) [13], the way the technical tools assist in creating and mediating the knowledge (IT) [6]. This means all these transitional elements always should be considered together [15]. Therefore, the management has to improve the processes of capturing, developing, sharing, and using organizational knowledge to make the best use of knowledge within their organization [17], [12].

The knowledge is a prime factor within the academic or research institutions and it works as an intellectual capital [18], which leads to academic excellence [19], [20]. A “knowledge reservoir” in any institution is much more than the accumulation of the individual’s knowledge of the institution [4]. These ‘knowledge reservoirs’ can be enhanced and enriched over time with new information products such as documents, databases, software etc. and by transferred knowledge of the individuals and groups of an institution [21]. If these ‘knowledge reservoirs’ is not enriching or enhancing with the change of technology and time, it will be a challenge for any institution to gain competitive advantages. Henceforth, decision-makers or the management should carefully consider on build up a successful “knowledge reservoirs” and make it store the learned knowledge and accumulated experiences, to make a breakthrough in the research and advocacy process [20].

2 PUBLIC RESEARCH INSTITUTIONS

Public research institutions (PRIs) are the leaders of innovations due to their role in knowledge creation and diffusion. PRIs are one of the main actors in the public research system and they are responsible to provide information to governments to spur research and innovation into economies [18]. PRIs remain critical for countries’ innovation and economic performance through their activities in creating, discovering, using and diffusing knowledge, and in the end, it creates a knowledge society. To maintain the systematic process of KM, a number of PRIs established and funded by the government of Sri Lanka, and they play a vital role in KM.

Sufficient level of investments on Research and Development helps to collect and record high-quality data that are essential for effective decision-making and to achieve sustainable economic growth, which significantly affects the real gross domestic product (GDP) of a country [23]. Generating new knowledge and transforming it into various products (innovations) and services need involvement of multifarious actors. The resulted innovations and excellence have a considerable level of impact on human life in different ways. It can be through high yielding varieties, value-added product, a scientific formula for a new medicine, technology development, and integrated farming systems. All these innovations come through research institutions where it needs to maximize and manage the knowledge.

3 SIGNIFICANCE OF THE STUDY

Even in the literature, it found lack of studies conduct within the context of research organizations. The most empirical research studies have revealed the relationships between knowledge management and its factors in isolation. There are research models empirically tested inter-connection of knowledge management factors. Similarly, the role of knowledge creation, sharing and management is widely discussed and explored. However, there is little articulated research on how research organizations actually create and manage it. Therefore, to strengthen this view further, this study create a conceptual model consist of Social Capital (SC) and IT Capability (ITC) and impact of these factors with knowledge management in the public research Institution. In addition, most of the studies on KM were conducted in developed countries and a few were carried out in developing countries. An understanding of the current situation and the actual needs of research institutions, authorities can help to utilize key success factors,

sharpen their knowledge management strategies, and improve overall competitiveness and operational performance.

4 LITERATURE REVIEW

4.1 Knowledge Management

According to Newman's (1999) model of general knowledge, knowledge flows into four primary activity areas: knowledge acquisition, retention, transfer and utilization [8]. Development of an organizational context, which supports these flows, is named as soft actions and the use of IT as a support mechanism for knowledge distribution and storage processes is named as hard actions [20]. Organizations acquired knowledge from outside sources as well as created inside. This acquired knowledge facilitates the creation of knowledge starting from individuals and integrating the organizational levels as a learning process [24]. It can be seen as a process of transformation in which knowledge migrates from its explicit form to the tacit one [25]. Once an organization acquired new knowledge, there should be KM mechanism to be accumulated into the organization's "knowledge reservoirs" and re-use it when necessary [26]. Knowledge sharing, also called knowledge transfer or knowledge diffusion, refers to the process by which knowledge is transferred from one person to another, from individuals to groups, or from one group to another group [27]. Dissemination of knowledge happens between individuals through continuous social contacts [28] by using IT as a facilitator of the process. Knowledge utilization refers "...to the process that is oriented toward the actual use of knowledge" [7]. The ownership of knowledge, as the last element of this construct, can be described as "... an individual or group identity and to point at specialist or general sources of knowledge in a given organization" [29]. As to this, there (Smith, 2001) are two main concepts that need to be associated with KM: (1) Social Capital (2) Information Technology Capability/ Infrastructure.

4.2 Social Capital (SC)

SC has emerged as an increasingly popular concept in societies [30]. It facilitates the development of collective intellectual capital such as an organization, intellectual community [31]. SC refers to "networks, norms, trust, and mutual understanding that bind together the members of human networks and communities, and enable participants to act together more effectively to pursue shared objectives" [32]. As to the literature, SC showed a strong impact on knowledge management [30], [33], [34], [35].

In an organization or a cooperative group, SC bridges the gaps between the people [34]. SC is seen through the characteristic of "...high levels of trust, strong personal networks, and vibrant communities, shared understandings, and a sense of equitable participation in a joint enterprise" [35].

SC is defined as the sum of actual and potential resources within relationship networks of a person or a social unit and it can be divided into three dimensions such as structural, relational and cognitive [31]. Structural refers to the overall pattern of connections between actors, and Cognitive focuses on the extent to which relational capital is shared among actors in the organization and a marker for a shared organizational mind [31]. Relational dimension explained as nature and quality of the connections among employees [36].

4.3 Information Technology Capability (IT)

According to the literature and the analysis of critical success factors of KM, IT is one of the three components of KM [14]. IT also enhances the ability of organizational memory [37]. Through IT, a lot of valuable information can gather and it provides an ideal mechanism for linking individuals, which is also considered as a part of the organizational memory [38].

Researchers had empirically proved that the KM is heavily relying on technology [14], [15], [38]. As it explained IT, Capability is the extent to which a firm is knowledgeable about and effectively utilizes IT

to manage information within the firm. Three co-specialized resources of IT capability are discussed in the literature as IT Knowledge; IT Operations; IT infrastructure [37], [38].

5 RESEARCH DESIGN AND METHODOLOGY

5.1 Research Design

According to the literature and the researcher's experience at research institutions, relationships of SC and IT capability/ infrastructure with KM can be established as the initial model (figure 01).

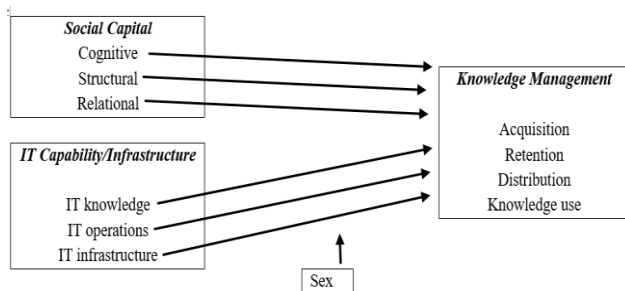


Figure 01: Conceptual Framework of the study

In literature, it was already proved relationship of SC and IT Capability with KM in isolations. Thus, the study proposes the following hypotheses on these relations in the context of public research institutions in Sri Lanka. Further, it examines the impacts of the three dimensions of SC and the three dimensions of IT on the KM.

H1 – H3 : Higher the Social Capital Dimensions, KM will be higher

H4 – H6 : Higher the IT Dimensions, KM will be higher

H7 – H9 : Social Capital Dimensions will significantly influence on KM.

H10 – H12: IT dimensions will significantly influence on KM.

H13 : Sex of the research officer will moderates the relationship from SC to KM and IT to KM

5.2 Method

This study was designed with the positivistic approach and done as a cross-sectional survey with a self-administered questionnaire. Data collected from 150 research officers from four selected public research institutions. The target population of the current study is the research officers who attached to the agriculture-based public research institutions in Sri Lanka. Fifty-four items were in the questionnaire under three main concepts of the study. The first part consisted of the demographic factors and the second and third parts included the independent variables divided into a number of sub-dimensions. The last part included the dependent variable. To cover all possible dimensions of a variable, Likert-scale with seven-points were used in order to specify the respondents' level of agreement ranging from one as the "strongly disagree" to seven as the "strongly agree" of its statements.

Content and construct validity have ensured the validity of a measure [39]. A reasonable level of content validity of the questionnaire was assured by selecting the initial measurements through an extensive review of the literature and obtaining experts opinions. Construct validity was done with the factor analysis and it support further refine and reduce these variable items to form a smaller number of coherent subscales.

Stability of the data was ensured by conducting a pilot study and the necessary modifications were done according to the feedbacks of the respondents. Internal consistency of the data was ensured with the Cronbach's alpha and tested with the threshold value of 0.7 [39].

The collected data were analysed by using appropriate statistical methods using the statistical software package for Social Sciences (SPSS). The data analysis consists of descriptive and inferential statistics. The impact of SC and IT on KM was analysed using the multiple linear regression models.

6 ANALYSIS AND FINDINGS

The response rate of this is 75.3%, and it is a considerably higher level than 52.7%, which is the response rate for most of the surveys done with individuals [40].

Validity and Reliability tests were performed at the beginning and the Factor Loadings, Kaiser-Meyer-Olkin (KMO) test, and Bartlett's Test were conducted in order to assess the sample adequacy and the inter-item correlations of the scales. The result of 0.6 and above KMO values implied the adequacy of the sample size of the attribute to use as a single dimension. The Average Variance Extracted (AVE), which measures the amount of variance due to measurement error, is above 0.4 for all dimensions. The Cronbach's Alpha value used to confirm the reliability of the data and all dimensions had alpha values above 0.7, which is the acceptable level in exploratory research.

Nearly 55% of the research officers are female. All the research officers are graduates, 25% of them are having PhDs, and 55% of them are having postgraduate qualifications. Around 31% of the officers are having experience as more than 16 years and another 28% are having experience as less than 5 years.

As to the table 01, 'Cognitive' dimension of SC and 'IT knowledge' dimension of IT are not showing significant relationships with KM. Structural, Relational, IT operations, and IT infrastructure have significant positive relationships with KM.

Table 01- Correlation Analysis

Hypothesis	Independent Variables	Correlation Coefficient with KM
H1	Structural	0.519**
H2	Relational	0.505**
H3	Cognitive	0.144
H4	IT Knowledge	0.145
H5	IT operations	0.195*
H6	IT infrastructure	0.521**

N=113

** - Significant at 1% level, *Significant at 5% level

As illustrates in table 02, the multiple regression analysis showed that the dimensions of Relational, IT infrastructure, Structural, and IT operations are having significant impacts on KM. Sex of the respondent as the moderating variable of the model also has a significant impact on KM. The male officers have a higher level of perception on KM than their female counterparts do. Accuracy of the best-fit model generated through the Stepwise method is 69.4%. Tolerance values above 0.10 and VIF values below five (Table 02) are ensured free of multicollinearity among the independent variables. The Durbin Watson value of 2.17 ensued the independence of the residuals and the residuals showed random and normal behaviour.

Table 02- Regression Analysis

Hypothesis	Independent Variables	Unstandardized Coefficients		Stand. Coeff.	Sig.	Collinearity Statistics	
		B	Std. Error	Beta		Tolerance	VIF
	Constant	1.085	.520		.043		
H8	Relational	.378	.060	.539	.000	.907	1.102
H12	IT infrastructure	.264	.058	.380	.000	.938	1.067
H7	Structural	.145	.060	.206	.020	.914	1.094
H13	Sex	.297	.121	.204	.018	.964	1.038
H11	IT operations	-.137	.066	-.171	.045	.976	1.024

Dependent variable: KM

Source: Survey data

7 CONCLUSIONS

According to the findings, the research institutions should pay their attention to develop quality relationships and connections between the employees. It will help to enhance the KM of any organization. Literature has expressed the term “knowledge reservoir” which is the accumulation of the individual’s knowledge of an organization [4]. The roles, rules, precedents, and procedures of an organization create its’ networks [31]. Therefore, these research institutions need to make structural changes and build strong networks to access acquired knowledge of the individuals and other organizations’ when necessary. It facilitates various internal and external parties to access, exchange, and transfer knowledge. This would bridge the gap between intellectual capitals within public research institutions.

With ‘Relational capital’, it shows characteristics and qualities of personal relationships such as trust, obligations, respect and even friendship [36]. These attributes are intangible in nature and highly subjective and vary among individuals and contexts. Therefore, facilitate to develop these attributes will strengthen the contacts and it would enhance and enrich the knowledge.

Findings also expressed the importance of IT operations which refers to the extent which an institution utilizes its IT facilities to manage and disseminate acquired and stored knowledge [38]. Research institutions should have to consider seriously about the ways of supporting IT operations within their institution. Concurrently, they should allocate sufficient annual budgetary provisions to enhance the infrastructure facilities of IT in their institution. These two activities will essentially enhance the quality and systematic ways of managing the knowledge within an organization.

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