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KNOWLEDGE QUALITY ASSESSMENT IN KNOWLEDGE MANAGEMENT SYSTEMS

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Abstract *Enabling organisations to capture, share, and apply collective experience and know-how of people is emerging as fundamental policy to competing in the knowledge economy. There is a growing recognition in the business community about the importance of Knowledge Management (KM). As a result, there is growing enthusiasm and activity centered on knowledge management and Knowledge Management Systems (KMS). Amidst this enthusiasm revolving around KM in organisations, it is important that the knowledge that is captured, shared and applied is of a quality that enhances overall business operation efficiency and boosts customer satisfaction.*

The relation between knowledge quality and knowledge has been suggested in the literature as an integral part of knowledge management success. However, these two constructs have received relatively little theoretical examination. This paper explores some of the knowledge quality agents for the knowledge management process and to ascertain the relative importance of these processes towards a successful KM implementation. In the occurences of Knowledge Management KM. A framework is proposed which uses a hierarchical approach to address the dependence relationships of knowledge quality agent criteria such as completeness, timeliness, accuracy, transparency and relevancy to the knowledge acquired from explicit, embodied and embedded sources. Based on the relationships, managers can judge the need to determine which criteria are needed for the most effective direction towards improvement. Also it should be given the first priority for the development and execution of KMS.

Keywords: *Knowledge, Knowledge Quality, Knowledge Management, Analytical Hierarchical Process*

INTRODUCTION

Knowledge Management (KM) as a concept means organising an organisation's information and knowledge holistically. Davenport & Prusak (1998) offered the widely quoted definition: "knowledge management is the process of capturing, distributing, and effectively using knowledge". Duhon (1998) created another definition of KM, which is perhaps the most frequently cited, "knowledge management is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers". Both these definitions share the view of KMS in an organisational and a corporate orientation. KM is mainly based on managing the knowledge in organisations. The most central drive in KM is to capture the information and make available to the people. Also the knowledge is in people's heads as it were, and that has never been explicitly set down, so it can be used by others (their peers) in the organisation.

If this knowledge has to be treated like any other asset in organisations, the biggest challenge for business managers is to define quality measures for this knowledge in the KMS. There are many definitions of quality, such as "fitness for use", "fitness for purpose", "conformance to requirements". Each of these statements represents a facet of quality (Deming, 1986). In the context of KM all these facets of quality is important because the knowledge that is captured has to be fit for use, has to have a purpose and have to conform to organisational requirements.

Tongchuay & Praneetpolgrang (2004) have identified information quality and quality metrics that can be used to represent knowledge quality. In this paper some of these quality metrics have been taken as knowledge quality agents for the knowledge management process and to ascertain the relative importance of these processes towards a successful KM implementation. A hierarchical framework is proposed to address the dependence relationships of knowledge quality agent criteria such as completeness, timeliness, accuracy, transparency and relevancy to the knowledge acquired from explicit, embodied and embedded sources. Based on

the relationships and weights assessed through the analytic hierarchy process, managers can judge and determine which criteria is required to provide the most effective direction towards a successful of KM implementation.

Theoretical Background

In KM and business, two types of knowledge are generally defined, namely explicit and embodied (tacit) knowledge. The former researchers had codified knowledge in different names. It is found in documents, while the latter refers to non-codified and often used a term personal/experience-based knowledge. KM is in the interaction, interface and create relationship between these two types of knowledge (Nonaka & Takeuchi, 1994). Botha *et al*. (2008) point out that embodied and explicit knowledge should be seen as a variety rather than as definitive points. Therefore, knowledge should be mainly a combination of embodied and explicit elements rather than being one or the other.

Explicit means formalised and codified, and is sometimes referred to as know-what (Brown & Duguid, 1998). It is fairly easy to identify, store, and retrieve (Wellman, 2009). This type of knowledge is easily handled by KMS. It is very important at storage, retrieval, and modification of documents and texts. Many theoreticians observe that explicit knowledge as being less important (Brown & Duguid, 1998; Cook & Brown, 1999; Bukowitz & Williams, 1999). Explicit knowledge is considered simpler in nature. It cannot contain the rich experience based know-how that can generate lasting competitive advantage.

Embodied (tacit) knowledge is knowledge that was originally defined by Polanyi in 1966. It is sometimes referred to as know-how (Brown & Duguid, 1998). It refers to intuitive, hard to define knowledge that is largely experience based. Because of this, embodied knowledge is often situation reliant and individual/personal in nature. It is hard to communicate and deeply rooted in action, commitment, and involvement (Nonaka & Takeuchi, 1994). Embodied knowledge is the most valuable source of knowledge, and the most likely to direct to breakthroughs in the organisation (Wellman, 2009). Embodied knowledge is found in the minds of human stakeholders. It includes cultural beliefs, values, mental models and attitudes, etc. It also includes skills, capabilities and expertise (Botha *et al*.,2008).

Some researchers have different views about embedded knowledge. They differentiate in such a way that embodied knowledge is used in terms of people and that embedded in processes such as organisational culture, routines, etc. Embedded knowledge refers to knowledge that is locked in processes, products, culture, routines, artifacts, or structures (Gamble & Blackwell, 2001). Knowledge is embedded either formally, such as through an organisation initiative or plan to formalise a certain valuable routine, or casually as the management uses and applies in the other two knowledge types. Embedded knowledge is found in rules, processes, manuals, organisational culture, codes of conduct, ethics, products, etc. It is important to note, that while embedded knowledge can exist in explicit sources (i.e. a rule can be written in a manual), the knowledge itself is not explicit, i.e. it is not straight away clear why doing something this way is favourable to the organisation.

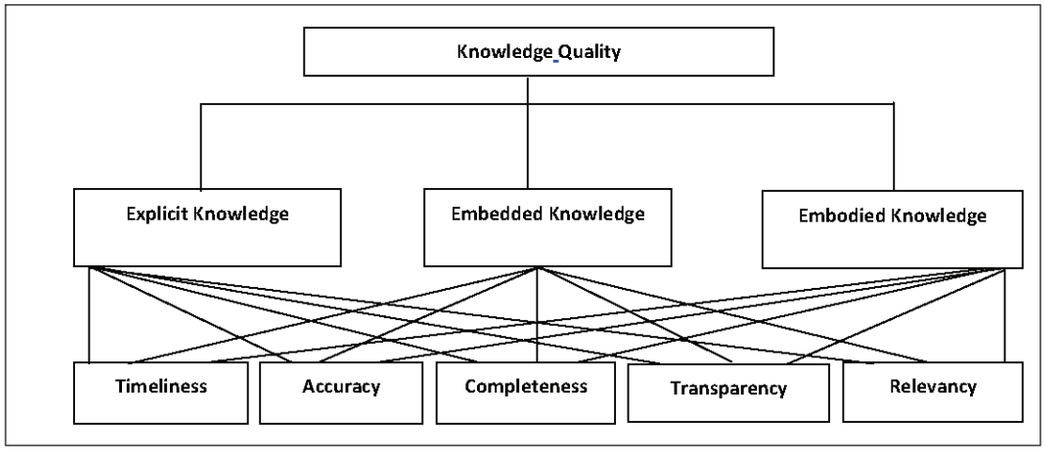
In order to enhance organisational knowledge, KM must therefore be involved across the spectrum of knowledge entirely. It must help knowledge development at all levels and help & encourage its dispersion to individuals, groups, and/or across the entire firm, in accordance with the organisation's requirements. KM must manage organisational knowledge storage and retrieval capabilities, and create an environment conducive to learning and sharing.

The quality movement has laid the foundation for clear organisation thinking by applying scientific methods to production and business process improvement and a process focus to performance measurement. Quality management (QM) has its roots in manufacturing and services to accomplish efficiency and customer satisfaction. QM defined as an approach to management, has a set of mutually reinforcing principles, each of which is supported by a set of general practices and specific techniques (Dean & Bowen, 1994). Quality methods reduce the variations in workflow processes and reduce waste within process flows, ultimately adding value through conformance to specification as well as process speed and cost effectiveness (Adam, 1994). QM has been shown to be particularly useful for the improvement of an organisation's performance (Adam, 1994; Choi & Eboch, 1998; Hackman & Wageman, 1995; Kaynak, 2003; Mills & Smith, 2011; Samson & Terziovski, 1999).

Knowledge management is about supporting individual and organisation performance. The primary measurement of effective knowledge management is time-how long does it take to find, to focus, to elicit, to optimize, to share, to apply, to record, to improve the resident knowledge of the organisation? Focus on process time in knowledge management will lead to quality and cost improvements, just as it has in the quality improvement effort (Ahn & Chang, 2004). That means timeliness, accuracy and completeness are paramount in KMS.

Central to quality management is the development of an aligned, trained, empowered work force, a cross-functional, no-blame culture, and appropriate structures to support a team-based organisation. Successful employee involvement depends on understanding the value of people's knowledge about the work they do as a vital asset of the organisation and the key to cost effective operations (Linderman *et al*., 2004). Knowledge management gives people the opportunity to

Fig. 1: Knowledge Quality Framework



inform others and to share the authorship of processes and decisions that directly affect them and the organisation. Effective knowledge management emerges from as well as enables total employee involvement by tearing down the communication barriers that limit the creativity of a fully informed workforce (Grant, 1996; Yang *et al.*, 2010). Thus, transparency and relevancy becomes important in KMS.

The development of quality measures for knowledge management is the greatest opportunity confronting business managers. Based on the theoretical background provided, we propose and test in an organisational setting a hierarchical relationship that connects the three types of knowledge that exist such as explicit, embedded and embodied with their quality improvements in terms of timeliness, accuracy, completeness, transparency and relevancy. Any successful managerial implementation requires being aware of and having the information about the issues/problem. Similarly, in case of knowledge management systems it is important to have the information about the factors that influence knowledge quality. Not all of the factors are equally important for knowledge quality. For this reason we have used the AHP frame work for finding the importance of the influential factors. AHP has been widely used as an analytical tool for decisions related to knowledge management. The hierarchical model is presented in Fig. 1.

Methodology

Data Source: The research used both secondary and primary data. An extensive literature survey, opinion from experts was undertaken, which helped in framing the questionnaire for the primary data collection. The focus of the study was on primary data.

Research Approach: The survey method was used for the study. Our primary data has been gathered using questionnaire technique. Our target population has been senior business managers in knowledge intensive firms such as IT & consulting organisations.

Contact Method: The questionnaires were filled up through personal interaction.

Sample Size: 57 business managers from 20 companies located in the National Capital Region of Delhi, which included New Delhi, Delhi, Faridabad, Gurgaon, Ghaziabad and NOIDA were made to fill the questionnaire.

Data Analysis: The data so collected were analyzed with the AHP techniques to arrive at weights (priorities).

The AHP is a decision approach followed in the solution of complex multiple criteria problems in a number of application domains. The important advantages of AHP are its simplicity, robustness and the ability to incorporate both 'tangibles' and 'intangibles' into the decision-making process. The decision maker judges the importance of each criterion in pair-wise comparisons. The outcome of AHP is the weight of each decision alternative.

Data Analysis and Discussion

The comparison matrices showing the measure of each attribute relative importance with respect to the overall objective is summarized in Table 1. For the pair-wise comparison of the attributes and sub attributes, we rely on inputs obtained from the survey. It considers three attributes as important for knowledge quality –explicit knowledge, embedded knowledge and embodied knowledge. The picture that emerges from the pair-wise comparison suggests for knowledge quality, embodied knowledge (26%) is more important over explicit knowledge (23%) and embedded knowledge (22%). According to the hierarchical model considered in the present study, timeliness, accuracy,

completeness, transparency and relevancy have been further decomposed of explicit knowledge, embedded knowledge and embodied knowledge. The weights of timeliness (17%), accuracy (02%), completeness (21%), transparency (31%), and relevancy (26%) suggest that transparency in knowledge quality is more important than others.

The pair-wise comparison between with respect to explicit knowledge; the weights are timeliness (28%), accuracy (04%), completeness (10%), transparency (16%), and relevancy (41%). The pair-wise comparison with respect to explicit knowledge suggests that for explicit knowledge of quality it is relevancy that is more important than any other. Timeliness is having the second priority after relevancy.

The pair-wise comparison with respect to embedded knowledge; suggest the weights as timeliness (22%), accuracy (04%), completeness (46%), transparency (16%), and relevancy (10%). The comparison suggests completeness and timeliness have higher priority than others.

The pair-wise comparison with respect to embodied knowledge; suggest weights as timeliness (15%), accuracy (04%), completeness (12%), transparency (52%), and relevancy (15%). The comparison emphasizes that transparency most important than others.

What emerges from above is that in knowledge quality embodied knowledge plays a significant role and organisations need to focus on this type of knowledge for competitive advantage. Explicit knowledge also plays a significant role in knowledge quality with embedded knowledge being not so important. Finally the relationship emerges as embodied with highest weights with respect to timeliness, accuracy, completeness, transparency and relevancy. To enhance knowledge quality it is important to concentrate in eliciting embodied knowledge which needs a high level of transparency both from the management and the individuals' side.

Conclusion and Future Research

In this paper we have shown a model for explicit knowledge, embedded knowledge and embodied knowledge in knowledge quality. A number of points emerge from what has been discussed relating to knowledge quality. The Embodied knowledge is most important in organisations and in order to ensure quality knowledge, managers in knowledge intensive organisations need to ensure in their organisational processes a high level of transparency. It is important that further studies be conducted with respect to the relationship between organisational processes and achievement of transparency and a conducive culture of knowledge sharing in organisations.

Table 1: Pair-Wise Comparison

Knowledge Quality

	Timeliness	Accuracy	Completeness	Transparency	Relevancy	Sum	Priority
Timeliness	0.107	0.241	0.439	0.030	0.072	0.889	0.178
Accuracy	0.015	0.034	0.018	0.021	0.024	0.113	0.023
Completeness	0.021	0.172	0.088	0.749	0.043	1.074	0.215
Transparency	0.535	0.241	0.018	0.150	0.646	1.590	0.318
Relevancy	0.321	0.310	0.439	0.050	0.215	1.335	0.267
Sum						5	

Explicit Knowledge

	Timeliness	Accuracy	Completeness	Transparency	Relevancy	Sum	Priority
Timeliness	0.095	0.238	0.432	0.614	0.056	1.436	0.287
Accuracy	0.019	0.048	0.012	0.018	0.101	0.198	0.040
Completeness	0.014	0.238	0.062	0.018	0.169	0.500	0.100
Transparency	0.014	0.238	0.309	0.088	0.169	0.817	0.163
Relevancy	0.858	0.238	0.185	0.263	0.506	2.050	0.410
Sum						5	

Embedded Knowledge

	Timeliness	Accuracy	Completeness	Transparency	Relevancy	Sum	Priority
Timeliness	0.113	0.158	0.076	0.524	0.246	1.117	0.223
Accuracy	0.038	0.053	0.107	0.021	0.016	0.234	0.047
Completeness	0.789	0.263	0.533	0.315	0.410	2.310	0.462
Transparency	0.023	0.263	0.178	0.105	0.246	0.814	0.163
Relevancy	0.038	0.263	0.107	0.035	0.082	0.524	0.105
Sum						5.000	

Embodied Knowledge

	Timeliness	Accuracy	Completeness	Transparency	Relevancy	Sum	Priority
Timeliness	0.087	0.217	0.099	0.065	0.315	0.782	0.156
Accuracy	0.017	0.043	0.014	0.117	0.021	0.213	0.043
Completeness	0.087	0.304	0.099	0.117	0.035	0.641	0.128
Transparency	0.780	0.217	0.493	0.584	0.524	2.600	0.520
Relevancy	0.029	0.217	0.296	0.117	0.105	0.764	0.153
Sum						5	

Knowledge Quality

	Timeliness	Accuracy	Completeness	Transparency	Relevancy	Priority
Explicit Knowledge	0.287	0.040	0.100	0.163	0.410	0.235
Embedded Knowledge	0.223	0.047	0.462	0.163	0.105	0.220
Embodied Knowledge	0.156	0.043	0.128	0.520	0.153	0.262

Although explicit knowledge is important, managers must ensure that they are relevant and provided in time so as to impact knowledge quality. It is important to explore further any other agent that can used in assessing explicit knowledge contribution in knowledge quality.

Embedded knowledge is important but needs to be complete in all respects to be useful in organisations.

With this understanding emerging from the study, managers interested in knowledge management systems need to channelize their effort in harnessing embodied knowledge for organisations to have competitive advantage.

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