A Model of the Relationships among Knowledge Management Practices and Task Knowledge

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Abstract

This paper presents a model of knowledge management practices at the individual level and explores its impact on their task related knowledge. Drawing on Nevis, DiBella and Gould’s [28] various organizational learning processes, we explore how knowledge creation, knowledge sharing, and knowledge application at the individual level impact their task related conceptual, contextual and operational knowledge. The model is empirically tested using structural equation modeling with data from a sample of knowledge workers in a wide variety of enterprises. Results suggest that conceptual knowledge is impacted by knowledge sharing and knowledge application. However, contextual knowledge is enhanced mainly by knowledge application. Greater conceptual and contextual knowledge contributes to better operational knowledge.

1. Introduction

Since Grant’s [12] knowledge-based theory of the firm, knowledge is widely viewed as the critical resource for all types of organizations. Recent research has highlighted the importance of knowledge creation, sharing, and application for firms in the twenty first century [8, 28, 41]. Understanding what makes up an organization’s knowledge base, how this knowledge base impacts organization’s competitiveness, and what factors contribute or restrict the utilization of this critical resource is important to the organization’s long term viability.

Equally important is how the knowledge management practices of individuals contribute to building and utilizing the task knowledge necessary for individuals’ task performance and innovation. Knowledge is created and applied primarily by individuals within the organization to meet organizational goals and objectives [12, 38]. An organization cannot be viable in the long run unless its individuals are active in creating, sharing, and applying their task relevant knowledge.

We do not discount the social knowledge or the collective knowledge that emerges as result of the interaction of the organizational entities, and the knowledge embedded and embodied in the processes and systems within the organization [24, 40]. However, Simon [38] and Grant [12] argue that viewing the organization as the entity that creates, stores, and deploys knowledge obscures the knowledge management processes through which individuals share, create, and apply knowledge. An individual level perspective on knowledge management practices may complement the organizational level view, leading to a more comprehensive understanding of knowledge management.

Nevis et al. [28] identify three essential and distinct practices in an organization’s learning process based on Huber’s [14] conceptualization: knowledge acquisition, knowledge sharing (dissemination), and knowledge utilization. At the individual level, these practices are more aptly referred to as knowledge creation, knowledge sharing, and knowledge application. Muhammed, Doll and Deng [26] argue that individual knowledge management practices (IKMP) are stimulated by organizational level critical success factors identified by Jennex and Olfman [16]. In turn, these individual level practices enhance the individual’s task knowledge. However, there is no existing empirical evidence of a relationship between individual knowledge management practices and the components of task knowledge.

This paper presents a model of how individual level knowledge creation, knowledge sharing, and knowledge application practices are related to each other and affect the components of an individual’s task knowledge (i.e., conceptual knowledge, operational knowledge, and contextual knowledge). In the next section we explore individual knowledge management practices in the light of Nevis et al.’s [28] examination of organizations as learning systems. We then present a model of knowledge management practices and its impact on individual level task knowledge. In the
subsequent sections, we describe the research methodology, present the results and discuss the results. We then conclude with some implications and future directions for our research.

2. Knowledge management at organizational and individual levels

An important asset of organizations’ knowledge base is their people. Though there is some emphasis in the literature on collective intelligence that emerges in organizations that cannot be captured at the individual level [45], most organizational knowledge ultimately gets applied or used by the individuals or the systems that these individuals help create. For example, we can see the importance of individuals in Nevis et al.’s [28] description of organizational knowledge. They content that “true knowledge is more than information; it includes the meaning or interpretation of the information, and a lot of intangibles such as the tacit knowledge of experienced people that is not well articulated but often determines collective organizational competence” (pp. 74-75). In describing the knowledge creation process in organizations Nonaka [29] indicates that the “prime mover in the organizational knowledge creation is the individual” (p.21).

At an organizational level KM is often referred as any formal or informal initiative implemented within the organization to codify standard operating procedures (SoP), best practices, or to facilitate sharing of knowledge within the organization’s various constituents. KM is also frequently referred to organizational efforts to implement some form of an IT based system such a knowledge management system or a document management system. From a behavioral standpoint KM is more appropriately viewed as the various organizational and individual activities involved in creating and managing their knowledge.

On an individual level, knowledge management can be viewed as the process involving various activates that more or less comprise of knowledge creation, storage, retrieval, transfer, and its application [2]. These processes however should ideally enhance the knowledge base of the entities involved in it and are applicable at individual, group or organizational level depending on the level of analysis undertaken [26]. In an organizational context, Nevis et al. [28] identifies three activities or stages by which organizations learn based on Huber’s [14] organizational learning model. According to them learning takes place when organizations engage in knowledge acquisition, knowledge sharing, and knowledge utilization. In this paper we explore how these KM practices impact individuals’ task related knowledge and test a model involving these constructs. Task knowledge refers to the knowledge relevant to the individuals work rather than their knowledge in other spheres of their life.

Based on Nevis et al.’s [28] model of organizations as learning systems, we explore how the three main activities of knowledge acquisition, knowledge sharing, and knowledge utilization at an individual level impact their task related knowledge. At the individual level we conceptualize these processes as knowledge management practices (KMP) to emphasize the sustained engagement in these processes that is necessary for it to have a lasting impact in the accumulation of individuals’ task knowledge. The three activities however are not viewed as linear stages rather as fluid and often chaotic process where each activity reinforces each other in building individual and subsequently their organizations knowledge base [28].

Knowledge acquisition at the organizational level is the “development or creation of skills, insights, [and] relationships” [28, p.74]. At the individual level this process is often referred to as knowledge creation [29]. This is the process by which individuals synthesize and combine existing knowledge to develop new insights and new ideas. In the context of organizational learning this process may be compared with reflective learning or triple loop learning [4]. Knowledge creation is more of a cognitive process rather than a behavioral process. Though knowledge may be created when individuals engage in various behavioral activities, it is the cognitive reflection while engaged in these activities that enables creation of new knowledge by altering existing mental models or generating new ones [19]. Without such reflection individuals may still perform various activities but may be considered rote with hardly any new knowledge creation.

Knowledge sharing according to Nevis et al. [28] is “the dissemination of what has been learned” (p.74). At an organizational level, knowledge sharing may imply both dissemination and assimilation of shared knowledge because of multiple entities involved in the interaction. However, at the individual level we focus on the dissemination aspect of knowledge sharing to evaluate the extent to which these individuals engage in sharing their knowledge. This may include sharing the knowledge with other individuals directly; or indirectly by documenting their knowledge in systems and other external artifacts for the explicit purpose of sharing it in a synchronous or asynchronous mode.

Knowledge utilization at an organizational level is the “integration of learning so it is broadly available and can be generalized to new situations” [28, p.74]. At an individual level it is the actual use of knowledge for productive purposes. We refer to knowledge utilization at the individual level as knowledge application because of the emphasis on the application
of their knowledge in organizations. This is by far the primary activity by which individual knowledge is made available for the organizational use and value creation. The primary goal of many KM initiatives is to enable the individuals to have access to the right information at the right time and to be able to apply it in the most effective manner. Applying existing knowledge is also an important process by which individuals gain further knowledge that is specific to those particular tasks based on experiential learning theory. Unlike knowledge creation which is fundamentally an internal cognitive process, knowledge sharing and knowledge application are more behavioral manifestations in the knowledge management process.

3. A model of individual level knowledge management practices and task knowledge outcomes

The primary emphasis of this paper is to examine the nature of linkages between knowledge management practices of the individuals and its impact on their task related knowledge. We build on Nevis et al.’s [28] framework of organizational learning to develop our model of KMP and task knowledge at the individual level because of the similarity of their conceptualization of organizational learning and our KM process at the individual level. They define organizational learning as “the capacity or processes within an organization to maintain or improve performance based on experience” (p.73). They further indicate that organizational learning is a system level phenomenon, which means that organizations retain this capability even when individuals within the organizations change. This implies that there are systems and processes in place within the organization that makes it a learning organization and constantly enhances the organizations’ knowledge base. In that sense, organizational learning implies both the process and the outcome - the process of learning that occurs in an organization and the outcome of having learned something. In the next two subsections we examine these processes and the outcomes from an individual KM perspective. First we will examine the interrelationships between the processes involved in managing individual knowledge in the light of Nevis et al.’s [28] learning model as described in the earlier section. Then we will consider the learned outcome as the components of their task knowledge. In the subsequent subsection we will examine the links between these processes and the outcomes. The proposed relationships are shown in our research model in Figure 1.

3.1. Knowledge management practices

Knowledge creation from an individual perspective involves developing new or modifying existing mental models to represent reality [17, 19, 33]. At this level, knowledge creation is a highly internal mental process which involves observation, thought and reflection. Individuals need time and right work environments to engage in the process of knowledge creation. However, knowledge sharing and knowledge utilization are behavioral processes that manifests externally. There seem to be a natural human inclination for internal creations to be externalized perhaps, due to of the need for self actualization, work fulfillment and social recognition. Further, there is no utility in engaging in knowledge creation if it cannot be shared or applied, except that it may contribute to one’s intellectual enhancement. Even knowledge creation as a means for intellectual enhancement is limited without the intention to potentially share or apply such insights. Individuals engaging in reflection, thought and learning do so, so that they can apply and share the knowledge they create. Thus we content that individuals who engage in greater knowledge creation also tend to engage in greater knowledge sharing and knowledge utilization.

Knowledge creation is a process of engaging in thought and reflection to create or modify one’s mental models [19]. It requires significant mental prowess to learn or to create new knowledge, one way we deal with such complexity is to routinize certain portion of that knowledge by frequent application. For example, Chilton and Bloodgood [5] indicate that “If an individual continues to use learned explicit knowledge during an activity, and this activity becomes routinized through frequent engagement, then that person will become less aware over time of the specific steps, but will continue to use the knowledge, yet no longer require conscious access to its details” (p.3). This provides a motivation to engage in greater application of knowledge when individuals are engaged in greater knowledge creation.

Knowledge workers often work individually and in groups. For example, they may individually accomplish various tasks on a computer application or work in groups by sharing their ideas with a community to complete the task. The exact mix of time by self applying or creating new ideas versus sharing with others may vary and depend upon whether they have all the resources that is needed or whether collective action is required to “try out” the new idea. In the OADI model [19], knowledge creation would occur in the asses and design stages. Working by oneself, the individual might immediately go to application of his idea and try it out on the computer.
Or, if it requires collective action by a team, he may share it first and then try to convince the team of the merit of trying the idea. Hence individuals engaged in greater knowledge sharing will also be engaged in greater knowledge application.

3.2 Task knowledge

Knowledge can be classified into different types such as declarative and procedural, know-how and know what, tacit and explicit, and so on [2, 29]. It can be described by its various characteristics such as transferability, appropriability, capacity for aggregation etc [12]. It can also be classified based on its use as practical, intellectual, pastime, spiritual and unwanted knowledge [23]. Cho, Lee and Kim [6] try to classify knowledge based on horizontal and vertical dimensions, which may be comparable to Wineburg’s [46] breadth and depth dimensions. However, our focus in this paper is on the knowledge that is relevant from an organizational work perspective and will be referred to here on as task knowledge. In developing a KM success measure at the individual level, earlier research has shown that the task knowledge can be effectively modeled as conceptual, contextual and operational knowledge [26].

Conceptual knowledge provides the core foundation for sense-making in any given situation [47]. It is the mental models that are used as a basic framework to draw upon all other information in a given situation [19]. It is often an answer to the question of why and answers the deeper significance of any task. This type of knowledge provides a deeper understanding about a task such as the reason why the individual is engaged in a particular task and why it has to be performed in a particular manner. For this reason, conceptual knowledge is often referred to as know-why [1, 11, 37]. When classifying task knowledge, Wiig and Jooste [45] highlight the importance of such conceptual knowledge referring to it as metaknowledge. According to Kim [19], know-why implies the ability to articulate a conceptual understanding of an experience. It is often an understanding of the principles and laws of nature, in human mind and in society [18]. Conceptual knowledge provides a lasting basic framework for building other types of knowledge and contributes to building such knowledge.

Importance of context when describing knowledge is a recurring theme in the KM literature. For example, Pearson and Saunders [31] indicate that “Knowledge consists of a mix of contextual information, values, experiences, and rules. It is richer and deeper than information, and more valuable because someone thought deeply about that information and added his or her own unique experience, judgment, and wisdom” (p.13). It is precisely this rich context that often gives the knowledge its hard to transfer [31] or sticky characteristic [42]. Contextual knowledge often includes know-who, know-where and know-when [26]. Know-who is the knowledge regarding the people that may be involved or affected by a task. Know-where is the knowledge regarding the location of the task or the location of the information about a task. And know-when is the knowledge regarding the temporal aspects of a task [18, 36]. Such contextual knowledge may not be absolutely necessary to barely accomplish a task. However, having access to a rich contextual knowledge often improves the quality of the task outcome by embellishing the knowledge required to accomplish those tasks.

Operational knowledge comprises of know-what and know-how signifying an understanding of what needs to be accomplished and how it will be performed. It includes problem-solving knowledge or domain knowledge suggesting its closeness to the task domain [9]. In the KM literature, know-what and know-how is also sometimes referred to as declarative and procedural knowledge [11, 37]. Know-what is the knowledge regarding what needs to be done in performing a task successfully [18]. And know-how is the knowledge regarding how that task needs to be performed [18]. It is unlikely that individuals will be able to complete their task without at least a basic level of operational knowledge regarding a task [20, 30, 34]. Operational knowledge represents those mental models that are available to an individual’s conscious mind to successfully complete a task. It includes those frameworks and routines that are applicable to a specific task [19], and may be an abstraction of the mental models and the contextual information at any given instance relevant for that task.

3.3. Relationship between knowledge management practices and task knowledge

In our research model (Figure 1) knowledge creation is an internal cognitive process that drives the behavioral processes related to KM such as knowledge sharing and knowledge application as discussed in detail in section 3.1.

A wealth of literature on experiential learning indicates that people create more knowledge as they apply their knowledge in the context of their work [21, 22, 29]. For example, Nonaka [29] notes that “individual knowledge is enlarged through this interaction between experience and rationality, and crystallized into a unique perspective original to an individual” (p.22). Similarly, Janz and Prasarnphanich [15] indicate that “application of knowledge may lead
Figure 1: Relationship between individual level knowledge management practices and task knowledge

to additional new knowledge with this learning then becoming embedded into their tacit knowledge space” (p.2). In essence, it means that knowledge application is a significant process by which individuals enlarge their knowledge base. In fact, it is often by application of one’s knowledge that the contextual details necessary for successfully accomplishing many tasks are gained. It is also in the process of applying one’s knowledge that individuals are more likely to realize the deeper significance of their work. Further, as knowledge workers apply their knowledge, both contextual and conceptual knowledge can be created through non-conscious mechanisms [13]. Chilton and Bloodgood [5] show that in this case the “knowledge starts out tacit and remains tacit” (p.3), and that such knowledge is gained mainly through immersion in an activity rather than through formal instruction. Similarly, Pearlson and Saunders [31] indicate that “knowing how to do something is fully learned by actually experiencing a situation” (p.277).

Knowledge sharing is the process of trying to communicate one’s knowledge to an external entity. It requires articulating the thoughts through language, symbols or other physical or symbolic tools. This process of articulation can be viewed as a mechanism by which higher order knowledge such as the conceptual knowledge is created. When we consider the knowledge base such as the task related knowledge of an individual, it comprises of both tacit and explicit knowledge. Sharing knowledge in complex situations such as in knowledge work implies that both tacit and explicit knowledge needs to be shared [5]; the individuals sharing knowledge needs to abstract this knowledge from their mind often using higher order classifications so that it can be efficiently shared. Such higher order classification and abstractions in effect make up conceptual knowledge. Knowledge sharing also implies that individuals are perceptive to the finer aspects of their knowledge that they are trying to share in order to be effective in transferring their knowledge. Being consciously aware of these finer aspects of knowledge within or external to them contributes to enhancing the contextual knowledge related to the particular task for which the knowledge is being shared. Figure 1 shows all the relationships proposed between the KMP and task knowledge.

4. Research method

Measures for all constructs were developed based on generally accepted psychometric principles [7, 32]. The process involved specifying the domain of the constructs, generating items, refining the items based on the pretest, pilot testing, and large scale testing. Following construct definition and item generation pretest was conducted with five experts and five target respondents requesting them to rate the items with respect to the construct definitions in terms of the items’ representativeness, specificity, and clarity on a 3-point scale [27]. Items that had less than 90% agreement were identified for potential elimination or modification.

Following the pretest of the items measures were further refined by conducting a pilot test. Pilot test involved small scale data collection and assessment of validity, dimensionality and reliability of the scales. Subsequently, large scale data collection targeting managerial and professional knowledge workers were implemented using a web-based questionnaire. The following sections briefly describe the pilot, large scale and measurement development. Structural equation modeling using LISREL is employed for measurement assessment and for testing the research model.

4.1. Measures

Respondents were asked to respond to the survey items based on a particular project or an assignment. If they did not typically work on projects they were asked to respond to the questions based on the last six months of their work. A five point Likert type scale where 1= None or to a very little extent and 5= To a very great extent was used for both knowledge management practices and task knowledge.

Each item in knowledge management practices were preceded by “During the assignment/project work I have…” which was indicated at the beginning of this section. Items for task knowledge was preceded by “Towards the end of the assignment/project/work to what extent did you have FULL knowledge of…” . Separating these leading texts from the main content of the items enabled the respondents to focus on the essential elements of the question. The leading text however created the right frame of reference before answering each of the sections. The final items for each construct after purification and measurement analysis is listed in Table 1.
4.2. Large scale sample

A cross-sectional survey design was used to collect the data to test the model. An email list from Manufacturer’s News Inc targeting managerial knowledge workers were used to reach the target respondents. Email requests were sent out in two rounds requesting the respondents to complete the survey on the web. Website implemented tracking of click-through based on the email invitations. After administering two waves of emailing, 252 usable responses were obtained yielding a 31.6% response rate based on click-throughs. Respondents included individuals from a wide range and size of industries. Majority of the respondents were professionals or in middle management or above positions. Non-response bias was evaluated using a Chi-square test of goodness-of-fit of various demographic variables between the first and the second wave of data collection [39]. The results indicated that no significant difference existed between the various demographic variables such as organization type and size, age of the organization, respondents business function and their current position, and were non-significant at p-values above 0.10. Measures were evaluated in steps similar to that performed in the pilot stage which involved item purification, evaluation of factor structure, unidimensionality, convergent validity, and discriminant validity.

5. Results

5.1. Measurement model results

Evaluation of CITC scores for each construct at this stage indicated good CITC values for their respective items and where all above the recommended 0.60 cutoff. Next, to test for unidimensionality, each scale was factor analyzed separately with their corresponding items. All items for the respective scales loaded on a single factor and had a factor score above 0.60 indicating unidimensionality. To assess the convergent and discriminant validity, first the items were factor analyzed. Following which, the measurement models of each construct were analyzed in a pair-wise fashion using LISREL.

The factor analysis of the items with principle component analysis estimation and promax with kaiser normalization rotation forcing to extract six factors indicated no crossloadings above 0.30 indicating sufficient discrimination between scales. All the items corresponding to each construct loaded on their respective factors. All factor loadings were greater than 0.70 except for one item in contextual knowledge and one in operational knowledge, lowest of which was 0.65, indicating evidence for convergent validity. The six factors together explained 78.9% of the variance in the dataset.

Next an individual measurement model was constructed for each construct with their respective

Table 1: Measurement items for knowledge management practices and task knowledge

<table>
<thead>
<tr>
<th>Construct</th>
<th>Label</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Creation</td>
<td>CREA1</td>
<td>created new thinking</td>
</tr>
<tr>
<td></td>
<td>CREA2</td>
<td>created new ways of interpreting situations</td>
</tr>
<tr>
<td></td>
<td>CREA3</td>
<td>created new ways of working</td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>SHAR1</td>
<td>shared my insights with others</td>
</tr>
<tr>
<td></td>
<td>SHAR2</td>
<td>shared my knowledge with others</td>
</tr>
<tr>
<td></td>
<td>SHAR3</td>
<td>shared my work-related knowledge with others</td>
</tr>
<tr>
<td>Knowledge Application</td>
<td>APPL1</td>
<td>applied my know-how</td>
</tr>
<tr>
<td></td>
<td>APPL2</td>
<td>applied my skills</td>
</tr>
<tr>
<td></td>
<td>APPL3</td>
<td>applied my expertise</td>
</tr>
</tbody>
</table>

Towards the end of the assignment/project/work to what extent did you have FULL knowledge of:

| Conceptual Knowledge           | CONC1                                          | the reasons behind your actions                                       |
|                                | CONC2                                          | the philosophy behind your actions                                    |
|                                | CONC3                                          | the purpose of your actions                                           |
|                                | CONC4                                          | the rationale behind your actions                                     |
| Conceptual Knowledge           | CONT1                                          | whom to go to for the necessary resources                            |
|                                | CONT2                                          | who were the most knowledgeable people at work                        |
|                                | CONT3                                          | where you could get the required resources                            |
|                                | CONT4                                          | when different things had to be done                                  |
|                                | CONT5                                          | when to share information                                            |
| Operational Knowledge          | OPER1                                          | how to implement your work routines                                  |
|                                | OPER2                                          | the relevant know-how                                                |
|                                | OPER3                                          | your job requirements                                                |

Table 2: Reliability, Convergent Validity and Discriminant Validity of Knowledge Management Practices and Task Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Knowledge Creation</th>
<th>Knowledge Sharing</th>
<th>Knowledge Application</th>
<th>Conceptual Knowledge</th>
<th>Contextual Knowledge</th>
<th>Operational Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVE</td>
<td>0.81</td>
<td>0.79</td>
<td>0.80</td>
<td>0.81</td>
<td>0.85</td>
<td>0.69</td>
</tr>
<tr>
<td>χ²</td>
<td>245</td>
<td>242</td>
<td>250</td>
<td>230</td>
<td>408</td>
<td>388</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Conceptual Knowledge</td>
<td>r=0.21**</td>
<td>r=0.38**</td>
<td>r=0.43**</td>
<td>r=0.49**</td>
<td>r=0.53**</td>
<td>r=0.60**</td>
</tr>
<tr>
<td>Knowledge Creation</td>
<td>χ²= 224</td>
<td>χ²= 425</td>
<td>χ²= 425</td>
<td>χ²= 181</td>
<td>χ²= 160</td>
<td>χ²= 196</td>
</tr>
<tr>
<td>Contextual Knowledge</td>
<td>r=0.33**</td>
<td>r=0.47**</td>
<td>r=0.44**</td>
<td>r=0.17**</td>
<td>r=0.43**</td>
<td>r=0.67**</td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>r=0.41**</td>
<td>r=0.56**</td>
<td>r=0.57**</td>
<td>r=0.53**</td>
<td>r=0.60**</td>
<td>r=0.53**</td>
</tr>
<tr>
<td>Knowledge Application</td>
<td>r=0.22**</td>
<td>r=0.47**</td>
<td>r=0.56**</td>
<td>r=0.57**</td>
<td>r=0.60**</td>
<td>r=0.53**</td>
</tr>
<tr>
<td>AVE</td>
<td>0.69</td>
<td>0.78</td>
<td>0.78</td>
<td>0.85</td>
<td>0.91</td>
<td>0.85</td>
</tr>
<tr>
<td>χ²</td>
<td>258</td>
<td>181</td>
<td>196</td>
<td>408</td>
<td>388</td>
<td>407</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Mean</td>
<td>0.86</td>
<td>0.74</td>
<td>0.81</td>
<td>0.85</td>
<td>0.86</td>
<td>0.86</td>
</tr>
<tr>
<td>N</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>
| **Correlation is significant at the 0.05 level (2-tailed).**

χ² = 11.58 for 1 d.f. is significant at p-value (0.01) corrected for number of comparisons (15).
items loading on the construct. The measurement models indicated good model-data fit. To further access the convergent and discriminant validity of the scales using structural equation modeling, all constructs were subjected to pair-wise comparison in LISREL. The results are shown in Table 2, which includes the average variance extracted (AVE), Pearson correlation between the constructs (r) and the reliabilities ( ). The chi-square difference between the models with construct correlations set to free and set to one ranged from 107 to 425 indicating good discriminant validity. Correlation of a scale with another scale below 0.70 is also generally accepted as a good indication of discriminant validity [35].

Correlation of the scales ranges from 0.17 to 0.60 suggesting discriminant validity between the measures. Another good measure of convergent validity in mono-method studies is Fornell and Larker's [10] AVE [35]. AVE can range from 0 to 1, but a value above 0.50 indicates adequate convergent validity for the construct, and indicates that the measures contain less than 50% of error variance [10]. AVE for the measures ranged from 0.53 to 0.80 indicating good convergent validity [3].

Next, all the constructs for KMP and all the constructs for task knowledge were analyzed together as a correlated measurement model. The measurement model for KMP did not have any modifications. The measurement model for task knowledge indicated a cross loading and three minor error correlations. With the largest modification index being 11.28 for an error correlation between two items in conceptual knowledge and were considered to be not serious. Ratio of chi-square to degrees of freedom for fully correlated measurement model of KMP constructs (Figure 2) is 1.5, indicating good fit [25]. Fully correlated measurement model of task knowledge constructs (Figure 3) also had a good fit based on the ratio of chi-square to degrees of freedom at 1.9. Other fit indices evaluated in conjunction for the model-data fit also indicated a good fit for both measurement models. All items had good standardized item loadings on their respective constructs (above 0.70), except for one item in knowledge creation (0.65) and contextual knowledge (0.69). All factor loadings were significant at p-value < 0.01.

5.2. Structural model results

In order to test the research model a full LISREL model was developed with the observed and latent variables. The standardized structural loadings and the t-values of the LISREL model is shown in Figure 4. Dashed lines show the paths that are not significant. The results of this analysis were used to test the model-data fit. All item loadings and proposed structural relationships were significant at p-value<0.01 except the relationship between knowledge sharing and contextual knowledge (β=0.04, t=0.60). Modification indices indicated two crossloadings and a few error correlations. The largest of which was a modification index of 16.9 for a crossloading from CONT5 to knowledge sharing, and was evaluated to be not serious. The model indicated sufficient fit upon examination of the various absolute and comparative fit indices (RMSEA= 0.046, GFI=0.91, AGFI=0.88, NFI=0.93, NNFI=0.97, and CFI=0.97).
6. Discussion

All the proposed relationships between knowledge management practices and task knowledge were significant with the exception of knowledge sharing to contextual knowledge. Individuals’ conceptual knowledge was enhanced by both knowledge sharing and knowledge application as expected. But, only knowledge application had a significant impact on their contextual knowledge. Since we had focused on the knowledge relevant to the task, it is possible that the contextual task knowledge is mainly acquired when individuals engage in the application of their knowledge for that task. Knowledge application also has a closer link to the task rather than knowledge sharing since application implies applying it for a specific task. Knowledge sharing on the other hand may not necessarily be tied to the task as knowledge application may be, since sharing of knowledge may take place irrespective of the task a person is involved in. It is possible that knowledge sharing may help create contextual knowledge as implied by the theory but, may not be as significant in creating contextual knowledge specific to the task as the knowledge application may create.

Within knowledge management practices, the impact of knowledge creation on knowledge sharing, and knowledge sharing on knowledge application were the strongest implying that individuals engaged in greater knowledge creation by engaging in thought and reflection tended to share their knowledge more. Even though the direct impact of knowledge creation on knowledge application was smaller than knowledge sharing, knowledge creation had almost an equal magnitude of indirect effect on knowledge application as its direct effect.

Multiple significant links to the conceptual knowledge compared to the contextual knowledge from knowledge management practices support the primary nature of conceptual knowledge as suggested in the paper earlier. Conceptual knowledge provides the basic framework [19] to build other types of knowledge. Greater levels of conceptual knowledge had a positive impact of the level of contextual and operational knowledge as expected. A broader network of primary mental models related to a task may provide a greater opportunity to connect other contextual information related to the task, and hence provide greater access to the operational information necessary to accomplish the tasks.

7. Conclusion

This paper provides a starting point to investigate the nature of knowledge management and individual task knowledge from a broad perspective suitable for building and testing theory in knowledge management, which is currently inadequate at best. The paper presents a model of knowledge management practices and task knowledge at individual level providing an explicit link between these two important constructs in the KM literature. The model presented provides some empirical evidence for the impact of knowledge management on the level of knowledge, at an individual level these are conceptualized as knowledge management practices and task specific knowledge.

The results should however be cautiously interpreted since it is based on a convenience sample. However, such sampling techniques are not uncommon in similar research. The measures of knowledge management practices and task knowledge if validated with further research can have broad application to test various factors that may impact individual knowledge management behaviors. Measures of task knowledge can also be used as dependent variables to assess the impact of various individual factors from a KM
perspective. This research presents a model of knowledge management practices at an individual level that can also be easily adapted to team and organizational levels to assess KM initiatives.

8. References


