Determining the Critical Factors of Tacit Knowledge in Service Industry in Turkey
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Abstract
Tacit knowledge is considered as a strategic factor in knowledge management implementation. Accordingly, it attracts significant attention both from researchers and academicians. Managing tacit knowledge effectively and efficiently is becoming a key success factor for organizations. To gain competitive advantage by using tacit knowledge, tacit knowledge should be understood well. Determining critical factors of tacit knowledge is expected to be helpful. The critical factors of tacit knowledge are one of the challenging issues in knowledge management. This paper aims to analyze critical factors of tacit knowledge based survey data. The survey of this study is conducted on composed of 30 companies from different sectors within service industry in Turkey. The obtained data from the surveys is analyzed through the SPSS statistical packaged software. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) show that tacit knowledge was divided into four factors, namely individual/personal knowledge, managerial knowledge, expertise knowledge, and collective knowledge.

Keywords: Tacit Knowledge, Knowledge Management

1. Introduction
Knowledge and the capacity to create and utilize knowledge are seen as the center of global economic transformation (Kakabadse et al., 2003). They are also the most important source of wealth and the key to gain
sustainable competitive advantage and superior profitability for organizations (Von Krogh et al., 2001). For instance, Eren et al. (2000) emphasized the role of internal and external knowledge sources in strategic planning in large firms. As for the superior organizational performance in dynamic markets collecting data about customers, competitors and suppliers is very critical (Alpkan et al. 2003). The view that knowledge is a valuable resource that has to be managed effectively and efficiently has become widely recognized by academicians and practitioners (Pathirage et al., 2007) and recent studies have expressed considerable interest in knowledge management practices accordingly (Hicks et al., 2007). Together with the increasing interest in knowledge and its management, the concept of tacit knowledge has been dealt with within many disciplines and by many authors. Yet, it is still considered as being relatively unexplored and not fully understood. It has been suggested that the tacit dimension of knowledge is probably the hardest to manage even though it has become more relevant to improving business performance and is perceived as a crucial factor affecting an organization’s ability to remain competitive (Pathirage et al., 2007).

Despite the widely recognized importance of tacit knowledge as a vital source of competitive advantage, there are comparatively less studies that have been able to establish a causal relationship between tacit knowledge and organizational performance (Marques and Simon, 2006). To reveal the dimensions of tacit knowledge remains as a challenging issue in understanding tacit knowledge well and exploring tacit knowledge effect in organizations for future studies. This paper aims to constitute a framework that reflects the main dimensions of tacit knowledge based on data collected from companies operating in service sector in Turkey. The rest of this paper is structured as follows: the second section briefly presents an overview of the tacit knowledge literature. In the third section research methodology is presented. Data analysis and results are discussed in the fourth section. Conclusions are provided at the end.

2. Literature Review

2.1. Knowledge Management

Knowledge is one of the most valuable sources in the processes. In a dynamic world, managing this source becomes more important day by day. Knowledge management creates and disseminates information and knowledge, provides an efficient and effective use of knowledge in order to have strategic advantage for organizations (Nawaz et al., 2014). Knowledge management appears as the main organizational strategy. It helps to create new business processes to achieve superior organizational performance (Wu and Chen, 2014). According to Liebowitz and Beckman “Knowledge management is the systematic, explicit and deliberate building, renewal and application of knowledge to maximize an enterprise’s knowledge-related effectiveness and returns from its knowledge assets.” Beckman also defines knowledge management as “the formalization of and access to experience, knowledge and expertise that create new capabilities, enable superior performance, encourage innovation and enhance customer value.” (Lytras, Pouloudi and Poulymenakou, 2002).

In the knowledge management literature, knowledge is divided into two concepts which are tacit knowledge and explicit knowledge. There is an interaction between them which helps to create new ideas. Although, there are studies that classify knowledge as individual or group, practical or theoretical, hard and soft, internal and external, foreground and background, the classification of tacit and explicit remains as the most common and practical one (Pathirage, 2007; Nonaka, 1994). Tacit knowledge is the less familiar, unconventional form of knowledge. It is the knowledge of which we are not conscious (Alwis and Hartmann, 2008). The concept of "tacit knowledge" is very important for the organizational knowledge and includes knowledge which is unarticulated and tied to the senses, movement skills, physical experiences, intuition, or implicit rules of thumb. Tacit knowledge differs from "explicit knowledge" which is uttered and captured in drawings and writing (Nonaka and von Krogh, 2009). Consequently, explicit knowledge usually comes in the form of books, documents, papers, databases, and policy manuals (O’Dell and Grayson, 1998) and tacit knowledge, contrastively, can be found in the heads of employees involving such intangible factors as personal belief, perspective, instinct and values (Baumard, 2002). From the organizational point of view explicit knowledge is transmittable in formal, systematic language; and can be conceptualized and stored in information systems whereas tacit knowledge is embedded in organizational culture, group behaviors and collective understanding (Borges, 2013).
On the other hand, some scholars assert that knowledge cannot be described purely tacit or purely explicit. They prefer to describe tacitness of knowledge as a matter of degree. According to this point of view knowledge can be seen in a spectrum where at one extreme it is deeply ingrained, unconscious and completely tacit knowledge while at the other end, there exists easily communicated, shared and well-structured explicit knowledge. However, in real life knowledge can be found somewhere in the middle. If it is near to one extreme, it is classified as tacit and if it is near to the other extreme it is then classified as explicit.

Nonaka (1998) also underlines the importance of interactions between tacit and explicit knowledge and mentions that tacit and explicit knowledge are not separate but mutually complementary entities. Ryle insists that these are not independent types of knowledge. They are interdependent and cannot be reduced to one another. Due to that, they interact with each other in the creative activities of human beings which is defined as “knowledge conversion process” (Nonaka, 1998; Brown and Duguid, 2001).

2.2. Tacit Knowledge

Polanyi (1998) defines the term “tacit knowledge” with its famous quota “we can know more than we can tell”. Polanyi (1998) also underlines the concepts of “knowing what” and “knowing how,” and he indicates every bit of knowing contains both of these aspects. In this respect, “knowing what” describes something that is knowable, and “knowing how” describes something that is only realizable in action. They are two different things - one can be transferred discursively and the other only through action. Tacit knowing is fundamental to each of these forms of knowing. Accordingly, the concept of “tacit knowing” can be understood through the concepts of distal and proximal. Proximal knowing is the particulars of action, whereas distal is the entire action. For example, when riding a bike, one can concentrate on the steering, pedaling, etc., or proximal aspects of knowing how to ride a bike. The overall knowing how to ride the bike is distal - greater than the sum of its individual components (Berente, 2007).

Tacit knowledge comprises a range of conceptual and sensory information and images that can be brought to bear in an attempt to make sense of something (Hodgkin, 1991). It is suggested that tacit knowledge is hard to articulate, and covers a broad range of meanings which makes it difficult to estimate (Herrgard, 2000). That is why; there are a number of different definitions that define the concept from different perspectives. However conventionally, the concept of tacit knowledge used to oppose explicit knowledge, in order to describe a kind of knowledge which cannot be explicitly represented (Linde, 2001). Hence, tacit knowledge can be defined as a dimension of knowledge which is hard to formalize, difficult to communicate and highly personal (Nonaka, 1998). Tacit knowledge is deeply rooted in action, commitment, and involvement in a specific context. In Polanyi's words, it “indwells” in a comprehensive cognizance of the human mind and body (Cianciolo et al, 2006; Nonaka, 1994). According to Grant, while most explicit knowledge and all tacit knowledge is stored within individuals, much of this knowledge is created within the firm and is firm specific (Grant, 1996). So dissemination of tacit knowledge is not easy. Tacit knowledge is non-transferable without the exchange of key personnel and all the systems that support them (Pham, 2008).

Furthermore, tacit knowledge involves both cognitive and technical elements. That is why, technical tacit knowledge generally refers to personal skills or concrete know-how whereas cognitive tacit knowledge refers to ingrained schema, beliefs, mental models that are taken for granted (Nonaka et al., 2000; Nonaka et al., 1994). In addition to cognitive and technical dimensions, there is also social dimension. These dimensions are related to skills and ability in managing both an individual’s own and other’s behaviors as well as focusing on local and global issues (Insch et al., 2008).

According to Nonaka, the assumption that knowledge is created through conversion between tacit and explicit knowledge allows to postulate four different “modes” of knowledge conversion from: (1) tacit knowledge to tacit knowledge, (2) explicit knowledge to explicit knowledge, (3) tacit knowledge to explicit knowledge, and (4) explicit knowledge to tacit knowledge (Nonaka et al., 1994). Tacit knowledge creation is a continuous activity and objectifies what Bateson has referred to as an “analogue” quality. In this context, communication between individuals may be seen as an analogue process that aims to share tacit knowledge to build mutual understanding (Nonaka et al., 1994).

The strategic management literature acknowledges the importance of tacit knowledge which tends to be unique and difficult to imitate since it is context-specific and embedded in complex organizational routines and developed from experience; it is therefore, considered as the most strategically important resource of the firm, and the only renewable and sustainable base for competitiveness (Nonaka and Takeuchi, 2004; Chen and Mohamed, 2010).
3. Methodology

3.1. Sample and Data Collection

Data collected from the companies in service sector in Turkey. Service sector can be defined as “the portion of the economy that produces intangible goods” (investopedia, 2013). According to economic development stages of the countries, as income per capita rises, agriculture loses its primacy, giving way first to a rise in the industrial sector, then to a rise in the service sector. According to World Bank Report, these two consecutive shifts are called “industrialization” and “post-industrialization” and growing economies are likely to go through these stages. Furthermore, for the high-income countries, particularly, in the last few decades, service sector has emerged as the most dynamic and innovative sector that dominates the economic growth and wealth production (Triplett and Bosworth, 2004).

On the other side service sector grows rapidly in the developing countries as well. However, providing the intellectual infrastructure and maintaining the well-educated, competent labor force is considered to be one of the most important challenges of the developing economies like Turkey (Worldbank, 2012).

Turkish economy has been undergoing a substantial transformation since 2001. During this period, the share of agriculture in the economy dropped while that of the service and manufacturing sectors expanded. Hence, increasing the competencies of the labor force according to the rapidly changing demands of the global markets is considered to be one of the major strategic objectives (Turkish Industrial Strategy Document).

Our sample is composed of 30 companies from different sectors within service industry. They are chosen among the leading companies of their sectors. The companies are in banking, cargo, communication, food and catering, finance, publishing, retail, IT, and tourism sectors. The questionnaires have been distributed to 5000 employees in 32 companies and 2778 usable ones were returned.

3.2. Analyses and Results

The data analysis is conducted at two steps:

1. Performing an exploratory factor analysis (EFA) with varimax rotation to determine the underlying dimensions of Tacit Knowledge.
2. Testing of the measurement models for Tacit Knowledge construct using first and second order confirmatory factor analysis (CFA) as well as the Tacit Knowledge context in order to determine if the extracted dimensions in step 1 offered a good fit to the data.

These steps are discussed in the following subsections.

3.3. Exploratory Factor Analysis (EFA)

Due to potential conceptual and statistical overlap, an attempt was made to produce parsimonious set of distinct non-overlapping variables from the full set of items underlying construct. Exploratory factor analysis with varimax rotation was performed on the tacit knowledge criteria in order to extract the dimensions of the construct.

The EFA on the 30 tacit knowledge items yielded 4 factors with eigen values greater than 1. All items were loaded on these 4 factors. Item loadings can be seen in Table 1. Based on the item loadings, these factors were respectively labeled as Individual/personal knowledge (factor 1), Managerial knowledge (factor 2), Expertise knowledge (factor 3), and Collective knowledge (factor 4), The Kaiser-Meyer-Olkin measure of sample adequacy was found as 0.95, which supports the validity of EFA results. The Cronbach’s alpha measures of reliability for the factors were 0.93 for individual knowledge, 0.92 for managerial knowledge and expertise knowledge, 0.90 for collective knowledge, suggesting a satisfactory level of construct reliability.

Individual/personal knowledge is composed of knowledge and competencies such as self-management, learning ability, personal traits and communications skills. Managerial knowledge is about knowledge and competencies related to leadership, planning, organizing, coordinating, decision making and problem solving. Expertise knowledge is task related knowledge that is job specific and professionally oriented. Finally, Collective knowledge includes team working skills, collaboration and cooperation competencies of employees.
### Table 1. Exploratory and Confirmatory Factor Analysis of Tacit Knowledge

<table>
<thead>
<tr>
<th>Factors</th>
<th>Factor Loading</th>
<th>Regression weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal communication</td>
<td>0.72</td>
<td>0.813</td>
</tr>
<tr>
<td>Interpersonal communication</td>
<td>0.72</td>
<td>0.735</td>
</tr>
<tr>
<td>Listening</td>
<td>0.70</td>
<td>0.699</td>
</tr>
<tr>
<td>Problem solving</td>
<td>0.67</td>
<td>0.750</td>
</tr>
<tr>
<td>Time management</td>
<td>0.65</td>
<td>0.757</td>
</tr>
<tr>
<td>Writing (written communication)</td>
<td>0.63</td>
<td>0.785</td>
</tr>
<tr>
<td>Learning capacity (desire and ability)</td>
<td>0.62</td>
<td>0.777</td>
</tr>
<tr>
<td>Personal traits (characteristics)</td>
<td>0.61</td>
<td>0.773</td>
</tr>
<tr>
<td>Coordination</td>
<td>0.56</td>
<td>0.768</td>
</tr>
<tr>
<td><strong>Factor 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk taking</td>
<td>0.74</td>
<td>0.767</td>
</tr>
<tr>
<td>Conceptual skills</td>
<td>0.71</td>
<td>0.792</td>
</tr>
<tr>
<td>Visionary thinking</td>
<td>0.70</td>
<td>0.803</td>
</tr>
<tr>
<td>Innovative thinking</td>
<td>0.66</td>
<td>0.700</td>
</tr>
<tr>
<td>Organization ability</td>
<td>0.58</td>
<td>0.805</td>
</tr>
<tr>
<td>Strategic thinking</td>
<td>0.58</td>
<td>0.799</td>
</tr>
<tr>
<td>Planning ability</td>
<td>0.58</td>
<td>0.720</td>
</tr>
<tr>
<td><strong>Factor 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>0.70</td>
<td>0.768</td>
</tr>
<tr>
<td>Professional development</td>
<td>0.69</td>
<td>0.798</td>
</tr>
<tr>
<td>Training</td>
<td>0.69</td>
<td>0.757</td>
</tr>
<tr>
<td>Task responsibility</td>
<td>0.67</td>
<td>0.803</td>
</tr>
<tr>
<td>Technical (practical) knowledge</td>
<td>0.63</td>
<td>0.743</td>
</tr>
<tr>
<td>Expertise knowledge</td>
<td>0.63</td>
<td>0.832</td>
</tr>
<tr>
<td>Professional discipline</td>
<td>0.52</td>
<td>0.717</td>
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<tr>
<td><strong>Factor 4</strong></td>
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<tr>
<td>Peer relations</td>
<td>0.72</td>
<td>0.824</td>
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<tr>
<td>Knowledge sharing</td>
<td>0.69</td>
<td>0.817</td>
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<tr>
<td>Peer assist</td>
<td>0.68</td>
<td>0.751</td>
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<tr>
<td>Team communication</td>
<td>0.65</td>
<td>0.789</td>
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<tr>
<td>Supervisor-subordinate communication</td>
<td>0.59</td>
<td>0.568</td>
</tr>
<tr>
<td>Teamwork</td>
<td>0.57</td>
<td>0.750</td>
</tr>
<tr>
<td>Collective working</td>
<td>0.50</td>
<td>0.664</td>
</tr>
</tbody>
</table>

*p<0.001

### 3.4. First and Second Order Confirmatory Factor Analysis (CFA)

This step is also known as testing the measurement model where Tacit Knowledge was tested using the first order and second order confirmatory factor model to assess construct validity. The results consistently supported the factor structure for TK that is shown by the EFA. Figure 1 summarizes the measurement model for TK and shows the standardized regression weight for each variable. The factor level analysis is a separate analysis for each factor including only the indicators for that factor (i.e. variables loading on that factor).

The standardized regression weights for all variables that are shown in Figure 1 are significant at the 0.001 level. The CFA showed a good fit. The $\chi^2$ statistic was 1783.407 (degrees of freedom=371, $p<0.05$), with the $X^2/df$ ratio having a value of 4.807 that is less than 5.0 (lower values indicating a better fit). The goodness of fit index (GFI) was 0.958 and adjusted goodness of fit (AGFI) index was 0.947. These scores are very close to 1.0 (a value of 1.0 indicates perfect fit). The Comparative Fit Index (CFI) was 0.978, Tucker-Lewis coefficient (TLI) was 0.974. All indices are close to a value of 1.0 in CFA indicating that the measurement models provide good support for the factor structure determined through the EFA. The model parameters were estimated using the method of maximum likelihood.

### 4. Conclusion

Tacit knowledge is seen as a strategic valuable resource for organizations that has the potential to lead sustainable competitive advantage and superior performance. So the factors which affect tacit knowledge are vital for understanding tacit knowledge better and future studies. There is a scant research attention which considers the critical factors of tacit knowledge in service industry.
The main aim of this study was to investigate the critical factors which affect tacit knowledge in service industry in Turkey. This constitutes the novelty of this research. Based on theoretical considerations, a survey of questions relating to the critical factors of tacit knowledge was developed. Exploratory and confirmatory factor analyses were employed to produce empirically verified and validated factors of tacit knowledge drawing on a sample of service industry in Turkey. The findings of this study confirm that level of tacit knowledge was divided into four factors, namely individual/personal knowledge, managerial knowledge, expertise knowledge, and collective knowledge. Managerial knowledge’s effect on tacit knowledge is the most among four factors. Verbal communication is the most important item in Managerial Knowledge. Task knowledge and collective knowledge have same effect on tacit knowledge. Each item’s relative importance in its factor can be seen in Figure 1.

Tacit knowledge use as a strategic resource is necessary for organizations to remain competitive in today’s industry. The results of this study offer a number of managerial implications for future studies which will investigate tacit knowledge importance in organizations of service industry.

As a result, the findings of this research support a practical model about the dimensions of tacit knowledge. The results should not be generalized due to the reason that they only cover the companies operating in services sector in Turkey.
Figure 1. Second Order Confirmatory Factor Analysis Results
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